Project: Wells Ranch
Site: A Section 21
Well: Harper A21-681
Wellbore: Original Drilling
Design: APD - Rev 1

Northern Region - DJ Basin

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
System Datum: Mean Sea Level

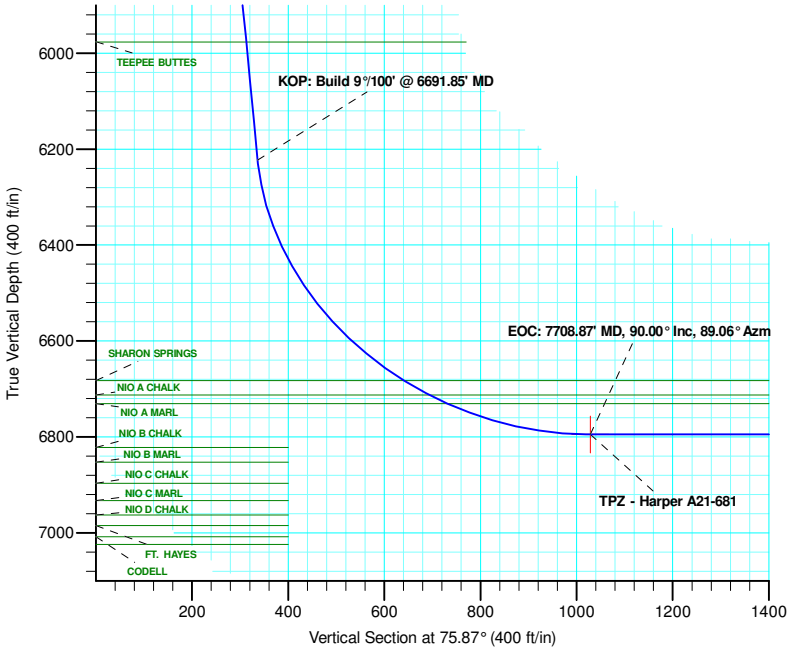
SECTION DETAILS

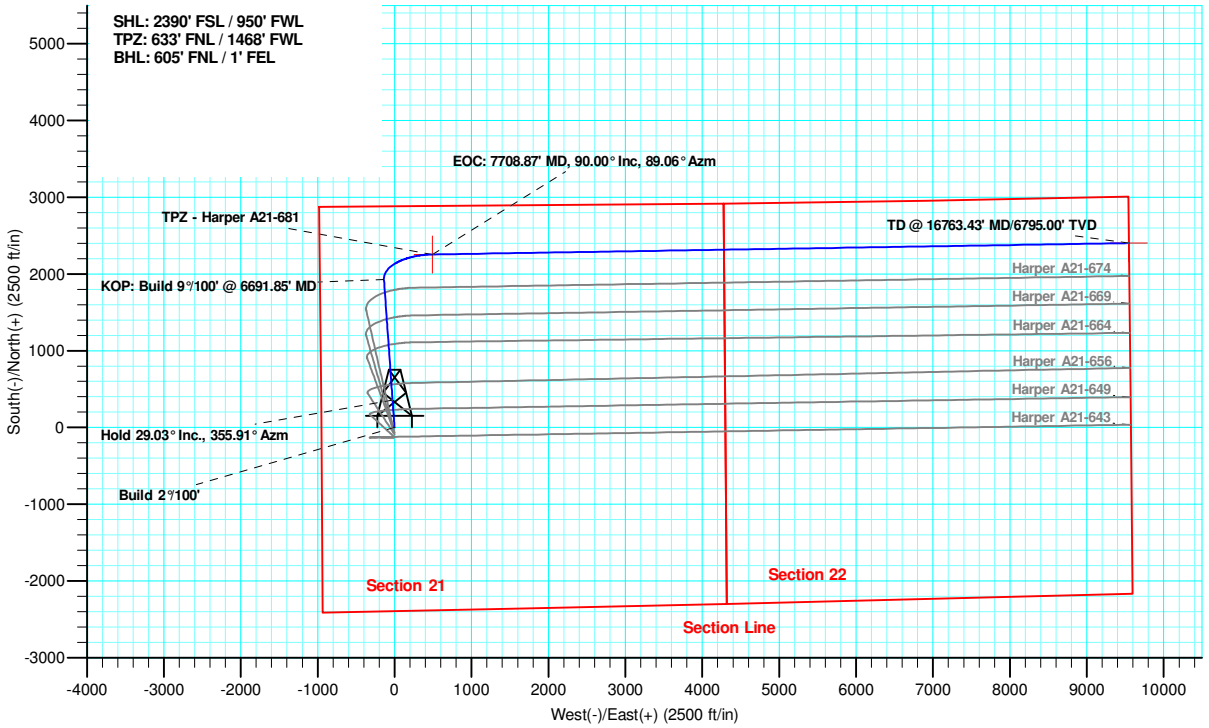
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	
3	3451.75	29.03	355.91	3390.41	359.12	-25.71	2.00	355.91	62.73	
4	6691.85	29.03	355.91	6223.30	1927.66	-137.99	0.00	0.00	336.70	
5	7708.87	90.00	89.06	6795.00	2254.89	493.14	9.00	92.76	1028.61	TPZ - Harper A21-681
6	16763.43	90.00	89.06	6795.00	2402.82	9546.49	0.00	0.00	9844.24	BHL - Harper A21-681

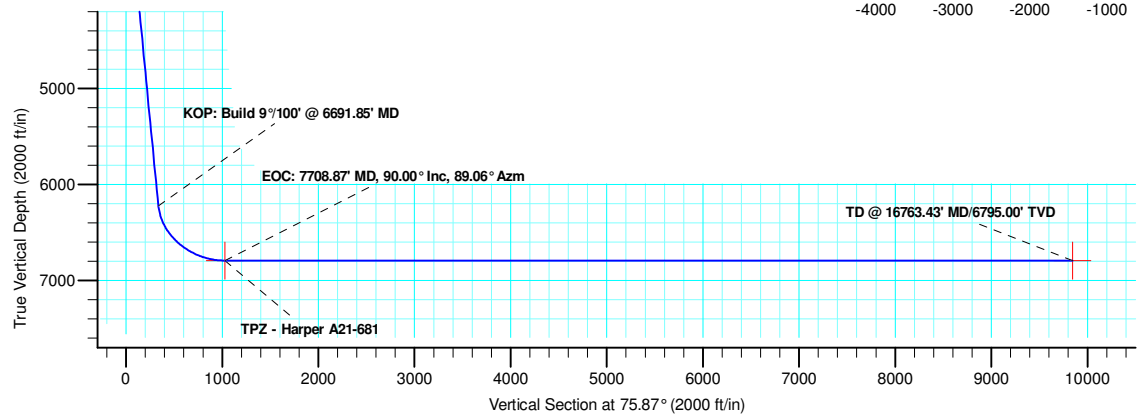
WELL DETAILS: Harper A21-681

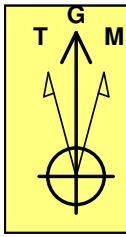
Ground Level: 4744.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1415741.52	3261196.12	40.4708165	-104.5611691	









Azimuths to Grid North
True North: -0.61°
Magnetic North: 7.55°

Magnetic Field
Strength: 52504.0snT
Dip Angle: 66.95°
Date: 12/29/2016
Model: IGRF2015

Plan: APD - Rev 1 (Harper A21-681/Original Drilling)

Created By: Shelly C. Peterkin Date: 20:36, January 30 2018

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-681

Original Drilling

Plan: APD - Rev 1

Standard Planning Report

30 January, 2018

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-681
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 1		

Project Wells Ranch, Weld County Colorado

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site A Section 21

Site Position:		**Northing:**	1,414,202.83 usft	**Latitude:**	40.4665920
From:	Lat/Long	**Easting:**	3,261,231.91 usft	**Longitude:**	-104.5610990
Position Uncertainty:	0.00 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.61 °

Well Harper A21-681, aka Harper A21-681

Well Position	**+N/-S**	1,538.70 ft	**Northing:**	1,415,741.52 usft	**Latitude:**	40.4708165
	+E/-W	-35.79 ft	**Easting:**	3,261,196.13 usft	**Longitude:**	-104.5611690
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	4,744.00 ft

Wellbore Original Drilling

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/29/2016	8.16	66.95	52,504.03249623

Design APD - Rev 1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	75.87

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,451.75	29.03	355.91	3,390.41	359.12	-25.71	2.00	2.00	0.00	355.91	
6,691.85	29.03	355.91	6,223.30	1,927.66	-137.99	0.00	0.00	0.00	0.00	
7,708.87	90.00	89.06	6,795.00	2,254.89	493.14	9.00	5.99	9.16	92.76	TPZ - Harper A21-681
16,763.43	90.00	89.06	6,795.00	2,402.82	9,546.49	0.00	0.00	0.00	0.00	BHL - Harper A21-681

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-681
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
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Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 1		

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
506.00	0.00	0.00	506.00	0.00	0.00	0.00	0.00	0.00	0.00
PIERRE									
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
708.00	0.00	0.00	708.00	0.00	0.00	0.00	0.00	0.00	0.00
UPPER PIERRE AQUIFER TOP									
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,533.00	0.00	0.00	1,533.00	0.00	0.00	0.00	0.00	0.00	0.00
UPPER PIERRE AQUIFER BASE									
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Build 2°/100'									
2,100.00	2.00	355.91	2,099.98	1.74	-0.12	0.30	2.00	2.00	0.00
2,200.00	4.00	355.91	2,199.84	6.96	-0.50	1.22	2.00	2.00	0.00
2,300.00	6.00	355.91	2,299.45	15.65	-1.12	2.73	2.00	2.00	0.00
2,400.00	8.00	355.91	2,398.70	27.81	-1.99	4.86	2.00	2.00	0.00
2,500.00	10.00	355.91	2,497.47	43.41	-3.11	7.58	2.00	2.00	0.00
2,600.00	12.00	355.91	2,595.62	62.44	-4.47	10.91	2.00	2.00	0.00
2,700.00	14.00	355.91	2,693.06	84.88	-6.08	14.83	2.00	2.00	0.00
2,800.00	16.00	355.91	2,789.64	110.69	-7.92	19.33	2.00	2.00	0.00
2,900.00	18.00	355.91	2,885.27	139.85	-10.01	24.43	2.00	2.00	0.00
3,000.00	20.00	355.91	2,979.82	172.33	-12.34	30.10	2.00	2.00	0.00
3,100.00	22.00	355.91	3,073.17	208.07	-14.89	36.34	2.00	2.00	0.00
3,200.00	24.00	355.91	3,165.21	247.04	-17.68	43.15	2.00	2.00	0.00
3,300.00	26.00	355.91	3,255.84	289.19	-20.70	50.51	2.00	2.00	0.00
3,400.00	28.00	355.91	3,344.94	334.47	-23.94	58.42	2.00	2.00	0.00
3,451.75	29.03	355.91	3,390.41	359.12	-25.71	62.73	2.00	2.00	0.00
Hold 29.03° Inc., 355.91° Azm									
3,500.00	29.03	355.91	3,432.59	382.48	-27.38	66.81	0.00	0.00	0.00
3,600.00	29.03	355.91	3,520.03	430.89	-30.84	75.26	0.00	0.00	0.00
3,700.00	29.03	355.91	3,607.46	479.30	-34.31	83.72	0.00	0.00	0.00
3,800.00	29.03	355.91	3,694.89	527.71	-37.78	92.17	0.00	0.00	0.00
3,811.56	29.03	355.91	3,705.00	533.30	-38.18	93.15	0.00	0.00	0.00
PARKMAN									
3,900.00	29.03	355.91	3,782.32	576.12	-41.24	100.63	0.00	0.00	0.00
4,000.00	29.03	355.91	3,869.76	624.53	-44.71	109.08	0.00	0.00	0.00
4,100.00	29.03	355.91	3,957.19	672.94	-48.17	117.54	0.00	0.00	0.00

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Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 1		

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)
4,200.00	29.03	355.91	4,044.62	721.35	-51.64	125.99	0.00	0.00	0.00
4,300.00	29.03	355.91	4,132.05	769.76	-55.10	134.45	0.00	0.00	0.00
4,400.00	29.03	355.91	4,219.49	818.17	-58.57	142.91	0.00	0.00	0.00
4,442.91	29.03	355.91	4,257.00	838.94	-60.05	146.53	0.00	0.00	0.00
SUSSEX									
4,500.00	29.03	355.91	4,306.92	866.58	-62.03	151.36	0.00	0.00	0.00
4,600.00	29.03	355.91	4,394.35	914.99	-65.50	159.82	0.00	0.00	0.00
4,700.00	29.03	355.91	4,481.78	963.40	-68.96	168.27	0.00	0.00	0.00
4,800.00	29.03	355.91	4,569.21	1,011.81	-72.43	176.73	0.00	0.00	0.00
4,900.00	29.03	355.91	4,656.65	1,060.22	-75.89	185.18	0.00	0.00	0.00
5,000.00	29.03	355.91	4,744.08	1,108.63	-79.36	193.64	0.00	0.00	0.00
5,100.00	29.03	355.91	4,831.51	1,157.04	-82.83	202.10	0.00	0.00	0.00
5,200.00	29.03	355.91	4,918.94	1,205.45	-86.29	210.55	0.00	0.00	0.00
5,288.13	29.03	355.91	4,996.00	1,248.12	-89.35	218.00	0.00	0.00	0.00
SHANNON									
5,300.00	29.03	355.91	5,006.38	1,253.86	-89.76	219.01	0.00	0.00	0.00
5,400.00	29.03	355.91	5,093.81	1,302.27	-93.22	227.46	0.00	0.00	0.00
5,500.00	29.03	355.91	5,181.24	1,350.69	-96.69	235.92	0.00	0.00	0.00
5,600.00	29.03	355.91	5,268.67	1,399.10	-100.15	244.37	0.00	0.00	0.00
5,700.00	29.03	355.91	5,356.11	1,447.51	-103.62	252.83	0.00	0.00	0.00
5,800.00	29.03	355.91	5,443.54	1,495.92	-107.08	261.28	0.00	0.00	0.00
5,900.00	29.03	355.91	5,530.97	1,544.33	-110.55	269.74	0.00	0.00	0.00
6,000.00	29.03	355.91	5,618.40	1,592.74	-114.01	278.20	0.00	0.00	0.00
6,100.00	29.03	355.91	5,705.84	1,641.15	-117.48	286.65	0.00	0.00	0.00
6,200.00	29.03	355.91	5,793.27	1,689.56	-120.94	295.11	0.00	0.00	0.00
6,300.00	29.03	355.91	5,880.70	1,737.97	-124.41	303.56	0.00	0.00	0.00
6,400.00	29.03	355.91	5,968.13	1,786.38	-127.88	312.02	0.00	0.00	0.00
6,410.14	29.03	355.91	5,977.00	1,791.29	-128.23	312.88	0.00	0.00	0.00
TEEPEE BUTTES									
6,500.00	29.03	355.91	6,055.56	1,834.79	-131.34	320.47	0.00	0.00	0.00
6,600.00	29.03	355.91	6,143.00	1,883.20	-134.81	328.93	0.00	0.00	0.00
6,691.85	29.03	355.91	6,223.30	1,927.66	-137.99	336.70	0.00	0.00	0.00
KOP: Build 9°/100' @ 6691.85' MD									
6,700.00	29.01	357.42	6,230.43	1,931.61	-138.22	337.44	9.00	-0.33	18.54
6,750.00	29.21	6.67	6,274.14	1,955.85	-137.35	344.20	9.00	0.41	18.50
6,800.00	30.04	15.62	6,317.62	1,980.04	-132.56	354.74	9.00	1.65	17.91
6,850.00	31.43	24.00	6,360.62	2,004.01	-123.88	369.01	9.00	2.79	16.75
6,900.00	33.33	31.63	6,402.86	2,027.63	-111.37	386.91	9.00	3.79	15.25
6,950.00	35.64	38.45	6,444.08	2,050.75	-95.10	408.33	9.00	4.63	13.64
7,000.00	38.30	44.49	6,484.04	2,073.23	-75.17	433.14	9.00	5.31	12.09
7,050.00	41.23	49.84	6,522.48	2,094.92	-51.71	461.19	9.00	5.86	10.68
7,100.00	44.38	54.57	6,559.17	2,115.69	-24.85	492.30	9.00	6.30	9.47
7,150.00	47.71	58.78	6,593.87	2,135.43	5.22	526.29	9.00	6.65	8.43
7,200.00	51.17	62.57	6,626.39	2,153.99	38.34	562.94	9.00	6.93	7.57
7,250.00	54.74	66.00	6,656.51	2,171.28	74.29	602.02	9.00	7.15	6.86
7,297.99	58.26	69.01	6,683.00	2,186.56	111.26	641.60	9.00	7.32	6.28
SHARON SPRINGS									
7,300.00	58.41	69.13	6,684.05	2,187.18	112.86	643.30	9.00	7.40	6.02
7,350.00	62.14	72.03	6,708.85	2,201.59	153.80	686.52	9.00	7.47	5.79
7,358.98	62.82	72.52	6,713.00	2,204.01	161.39	694.47	9.00	7.54	5.55
NIO A CHALK									
7,400.00	65.93	74.73	6,730.74	2,214.43	196.87	731.42	9.00	7.59	5.37
7,400.64	65.98	74.76	6,731.00	2,214.58	197.43	732.00	9.00	7.63	5.23

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Wellbore:	Original Drilling		
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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)
NIO A MARL									
7,450.00	69.76	77.27	6,749.60	2,225.61	241.79	777.71	9.00	7.67	5.09
7,500.00	73.63	79.69	6,765.30	2,235.08	288.29	825.12	9.00	7.74	4.84
7,550.00	77.53	82.02	6,777.75	2,242.76	336.09	873.35	9.00	7.79	4.65
7,600.00	81.44	84.28	6,786.88	2,248.62	384.89	922.10	9.00	7.83	4.52
7,650.00	85.37	86.49	6,792.62	2,252.61	434.38	971.07	9.00	7.86	4.42
7,700.00	89.30	88.68	6,794.95	2,254.72	484.27	1,019.96	9.00	7.87	4.37
7,708.87	90.00	89.06	6,795.00	2,254.89	493.14	1,028.61	9.00	7.87	4.36
EOC: 7708.87' MD, 90.00° Inc, 89.06° Azm									
7,800.00	90.00	89.06	6,795.00	2,256.38	584.26	1,117.33	0.00	0.00	0.00
7,900.00	90.00	89.06	6,795.00	2,258.01	684.24	1,214.69	0.00	0.00	0.00
8,000.00	90.00	89.06	6,795.00	2,259.65	784.23	1,312.05	0.00	0.00	0.00
8,100.00	90.00	89.06	6,795.00	2,261.28	884.22	1,409.42	0.00	0.00	0.00
8,200.00	90.00	89.06	6,795.00	2,262.91	984.20	1,506.78	0.00	0.00	0.00
8,300.00	90.00	89.06	6,795.00	2,264.55	1,084.19	1,604.14	0.00	0.00	0.00
8,400.00	90.00	89.06	6,795.00	2,266.18	1,184.18	1,701.50	0.00	0.00	0.00
8,500.00	90.00	89.06	6,795.00	2,267.82	1,284.16	1,798.86	0.00	0.00	0.00
8,600.00	90.00	89.06	6,795.00	2,269.45	1,384.15	1,896.22	0.00	0.00	0.00
8,700.00	90.00	89.06	6,795.00	2,271.08	1,484.14	1,993.58	0.00	0.00	0.00
8,800.00	90.00	89.06	6,795.00	2,272.72	1,584.12	2,090.94	0.00	0.00	0.00
8,900.00	90.00	89.06	6,795.00	2,274.35	1,684.11	2,188.31	0.00	0.00	0.00
9,000.00	90.00	89.06	6,795.00	2,275.98	1,784.10	2,285.67	0.00	0.00	0.00
9,100.00	90.00	89.06	6,795.00	2,277.62	1,884.08	2,383.03	0.00	0.00	0.00
9,200.00	90.00	89.06	6,795.00	2,279.25	1,984.07	2,480.39	0.00	0.00	0.00
9,300.00	90.00	89.06	6,795.00	2,280.89	2,084.06	2,577.75	0.00	0.00	0.00
9,400.00	90.00	89.06	6,795.00	2,282.52	2,184.04	2,675.11	0.00	0.00	0.00
9,500.00	90.00	89.06	6,795.00	2,284.15	2,284.03	2,772.47	0.00	0.00	0.00
9,600.00	90.00	89.06	6,795.00	2,285.79	2,384.02	2,869.83	0.00	0.00	0.00
9,700.00	90.00	89.06	6,795.00	2,287.42	2,484.00	2,967.20	0.00	0.00	0.00
9,800.00	90.00	89.06	6,795.00	2,289.05	2,583.99	3,064.56	0.00	0.00	0.00
9,900.00	90.00	89.06	6,795.00	2,290.69	2,683.98	3,161.92	0.00	0.00	0.00
10,000.00	90.00	89.06	6,795.00	2,292.32	2,783.96	3,259.28	0.00	0.00	0.00
10,100.00	90.00	89.06	6,795.00	2,293.96	2,883.95	3,356.64	0.00	0.00	0.00
10,200.00	90.00	89.06	6,795.00	2,295.59	2,983.94	3,454.00	0.00	0.00	0.00
10,300.00	90.00	89.06	6,795.00	2,297.22	3,083.92	3,551.36	0.00	0.00	0.00
10,400.00	90.00	89.06	6,795.00	2,298.86	3,183.91	3,648.72	0.00	0.00	0.00
10,500.00	90.00	89.06	6,795.00	2,300.49	3,283.90	3,746.09	0.00	0.00	0.00
10,600.00	90.00	89.06	6,795.00	2,302.12	3,383.88	3,843.45	0.00	0.00	0.00
10,700.00	90.00	89.06	6,795.00	2,303.76	3,483.87	3,940.81	0.00	0.00	0.00
10,800.00	90.00	89.06	6,795.00	2,305.39	3,583.86	4,038.17	0.00	0.00	0.00
10,900.00	90.00	89.06	6,795.00	2,307.03	3,683.84	4,135.53	0.00	0.00	0.00
11,000.00	90.00	89.06	6,795.00	2,308.66	3,783.83	4,232.89	0.00	0.00	0.00
11,100.00	90.00	89.06	6,795.00	2,310.29	3,883.82	4,330.25	0.00	0.00	0.00
11,200.00	90.00	89.06	6,795.00	2,311.93	3,983.80	4,427.61	0.00	0.00	0.00
11,300.00	90.00	89.06	6,795.00	2,313.56	4,083.79	4,524.98	0.00	0.00	0.00
11,400.00	90.00	89.06	6,795.00	2,315.19	4,183.78	4,622.34	0.00	0.00	0.00
11,500.00	90.00	89.06	6,795.00	2,316.83	4,283.76	4,719.70	0.00	0.00	0.00
11,600.00	90.00	89.06	6,795.00	2,318.46	4,383.75	4,817.06	0.00	0.00	0.00
11,700.00	90.00	89.06	6,795.00	2,320.10	4,483.74	4,914.42	0.00	0.00	0.00
11,800.00	90.00	89.06	6,795.00	2,321.73	4,583.72	5,011.78	0.00	0.00	0.00
11,900.00	90.00	89.06	6,795.00	2,323.36	4,683.71	5,109.14	0.00	0.00	0.00
12,000.00	90.00	89.06	6,795.00	2,325.00	4,783.70	5,206.50	0.00	0.00	0.00
12,100.00	90.00	89.06	6,795.00	2,326.63	4,883.68	5,303.87	0.00	0.00	0.00

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-681
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 1		

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)
12,200.00	90.00	89.06	6,795.00	2,328.26	4,983.67	5,401.23	0.00	0.00	0.00
12,300.00	90.00	89.06	6,795.00	2,329.90	5,083.66	5,498.59	0.00	0.00	0.00
12,400.00	90.00	89.06	6,795.00	2,331.53	5,183.64	5,595.95	0.00	0.00	0.00
12,500.00	90.00	89.06	6,795.00	2,333.17	5,283.63	5,693.31	0.00	0.00	0.00
12,600.00	90.00	89.06	6,795.00	2,334.80	5,383.62	5,790.67	0.00	0.00	0.00
12,700.00	90.00	89.06	6,795.00	2,336.43	5,483.60	5,888.03	0.00	0.00	0.00
12,800.00	90.00	89.06	6,795.00	2,338.07	5,583.59	5,985.39	0.00	0.00	0.00
12,900.00	90.00	89.06	6,795.00	2,339.70	5,683.58	6,082.76	0.00	0.00	0.00
13,000.00	90.00	89.06	6,795.00	2,341.33	5,783.56	6,180.12	0.00	0.00	0.00
13,100.00	90.00	89.06	6,795.00	2,342.97	5,883.55	6,277.48	0.00	0.00	0.00
13,200.00	90.00	89.06	6,795.00	2,344.60	5,983.54	6,374.84	0.00	0.00	0.00
13,300.00	90.00	89.06	6,795.00	2,346.24	6,083.52	6,472.20	0.00	0.00	0.00
13,400.00	90.00	89.06	6,795.00	2,347.87	6,183.51	6,569.56	0.00	0.00	0.00
13,500.00	90.00	89.06	6,795.00	2,349.50	6,283.50	6,666.92	0.00	0.00	0.00
13,600.00	90.00	89.06	6,795.00	2,351.14	6,383.48	6,764.28	0.00	0.00	0.00
13,700.00	90.00	89.06	6,795.00	2,352.77	6,483.47	6,861.65	0.00	0.00	0.00
13,800.00	90.00	89.06	6,795.00	2,354.40	6,583.46	6,959.01	0.00	0.00	0.00
13,900.00	90.00	89.06	6,795.00	2,356.04	6,683.44	7,056.37	0.00	0.00	0.00
14,000.00	90.00	89.06	6,795.00	2,357.67	6,783.43	7,153.73	0.00	0.00	0.00
14,100.00	90.00	89.06	6,795.00	2,359.31	6,883.42	7,251.09	0.00	0.00	0.00
14,200.00	90.00	89.06	6,795.00	2,360.94	6,983.40	7,348.45	0.00	0.00	0.00
14,300.00	90.00	89.06	6,795.00	2,362.57	7,083.39	7,445.81	0.00	0.00	0.00
14,400.00	90.00	89.06	6,795.00	2,364.21	7,183.38	7,543.17	0.00	0.00	0.00
14,500.00	90.00	89.06	6,795.00	2,365.84	7,283.36	7,640.54	0.00	0.00	0.00
14,600.00	90.00	89.06	6,795.00	2,367.47	7,383.35	7,737.90	0.00	0.00	0.00
14,700.00	90.00	89.06	6,795.00	2,369.11	7,483.34	7,835.26	0.00	0.00	0.00
14,800.00	90.00	89.06	6,795.00	2,370.74	7,583.32	7,932.62	0.00	0.00	0.00
14,900.00	90.00	89.06	6,795.00	2,372.38	7,683.31	8,029.98	0.00	0.00	0.00
15,000.00	90.00	89.06	6,795.00	2,374.01	7,783.30	8,127.34	0.00	0.00	0.00
15,100.00	90.00	89.06	6,795.00	2,375.64	7,883.28	8,224.70	0.00	0.00	0.00
15,200.00	90.00	89.06	6,795.00	2,377.28	7,983.27	8,322.06	0.00	0.00	0.00
15,300.00	90.00	89.06	6,795.00	2,378.91	8,083.26	8,419.43	0.00	0.00	0.00
15,400.00	90.00	89.06	6,795.00	2,380.54	8,183.24	8,516.79	0.00	0.00	0.00
15,500.00	90.00	89.06	6,795.00	2,382.18	8,283.23	8,614.15	0.00	0.00	0.00
15,600.00	90.00	89.06	6,795.00	2,383.81	8,383.22	8,711.51	0.00	0.00	0.00
15,700.00	90.00	89.06	6,795.00	2,385.45	8,483.20	8,808.87	0.00	0.00	0.00
15,800.00	90.00	89.06	6,795.00	2,387.08	8,583.19	8,906.23	0.00	0.00	0.00
15,900.00	90.00	89.06	6,795.00	2,388.71	8,683.18	9,003.59	0.00	0.00	0.00
16,000.00	90.00	89.06	6,795.00	2,390.35	8,783.16	9,100.95	0.00	0.00	0.00
16,100.00	90.00	89.06	6,795.00	2,391.98	8,883.15	9,198.32	0.00	0.00	0.00
16,200.00	90.00	89.06	6,795.00	2,393.61	8,983.14	9,295.68	0.00	0.00	0.00
16,300.00	90.00	89.06	6,795.00	2,395.25	9,083.12	9,393.04	0.00	0.00	0.00
16,400.00	90.00	89.06	6,795.00	2,396.88	9,183.11	9,490.40	0.00	0.00	0.00
16,500.00	90.00	89.06	6,795.00	2,398.52	9,283.10	9,587.76	0.00	0.00	0.00
16,600.00	90.00	89.06	6,795.00	2,400.15	9,383.08	9,685.12	0.00	0.00	0.00
16,700.00	90.00	89.06	6,795.00	2,401.78	9,483.07	9,782.48	0.00	0.00	0.00
16,763.43	90.00	89.06	6,795.00	2,402.82	9,546.49	9,844.24	0.00	0.00	0.00

TD @ 16763.43' MD/6795.00' TVD

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-681
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
TPZ - Harper A21-681 - plan hits target center - Point	0.00	0.01	6,795.00	2,254.89	493.14	1,417,996.40	3,261,689.27	40.4769914	-104.5593107
BHL - Harper A21-681 - plan hits target center - Point	0.00	0.00	6,795.00	2,402.82	9,546.49	1,418,144.33	3,270,742.60	40.4771292	-104.5267636

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
506.00	506.00	PIERRE		0.00	
708.00	708.00	UPPER PIERRE AQUIFER TOP		0.00	
1,533.00	1,533.00	UPPER PIERRE AQUIFER BASE		0.00	
3,811.56	3,705.00	PARKMAN		0.00	
4,442.91	4,257.00	SUSSEX		0.00	
5,288.13	4,996.00	SHANNON		0.00	
6,410.14	5,977.00	TEEPEE BUTTES		0.00	
7,297.99	6,683.00	SHARON SPRINGS		0.00	
7,358.98	6,713.00	NIO A CHALK		0.00	
7,400.64	6,731.00	NIO A MARL		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,000.00	2,000.00	0.00	0.00	Build 2°/100'
3,451.75	3,390.41	359.12	-25.71	Hold 29.03° Inc., 355.91° Azm
6,691.85	6,223.30	1,927.66	-137.99	KOP: Build 9°/100' @ 6691.85' MD
7,708.87	6,795.00	2,254.89	493.14	EOC: 7708.87' MD, 90.00° Inc, 89.06° Azm
16,763.43	6,795.00	2,402.82	9,546.49	TD @ 16763.43' MD/6795.00' TVD

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-681

Original Drilling
APD - Rev 1

Anticollision Summary Report

30 January, 2018

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Reference	APD - Rev 1		
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 10,000.00 ft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 1/29/2018

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	16,763.43	APD - Rev 1 (Original Drilling)	2_MWD+IFR1+MS	A008Mb: IFR dec & multi-station analysis

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 13						
Lapp A15-613 - Original Drilling - Original Drilling - As Dr	12,039.69	17,560.00	809.63	613.97	4.138	CC, ES
Lapp A15-613 - Original Drilling - Original Drilling - As Dr	12,100.00	17,555.22	811.86	615.26	4.130	SF
Lapp A22-689 - Original Drilling - Original Drilling - As Dr	13,929.77	15,719.70	542.01	341.16	2.699	CC, ES
Lapp A22-689 - Original Drilling - Original Drilling - As Dr	14,000.00	15,657.97	542.52	341.45	2.698	SF
A Section 15						
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	11,945.69	6,926.44	3,754.85	3,665.80	42.166	CC
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	12,000.00	6,926.69	3,755.24	3,665.49	41.841	ES
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	13,100.00	6,931.81	3,928.27	3,826.91	38.757	SF
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	11,971.47	6,781.65	1,117.72	1,028.59	12.541	CC
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	12,000.00	6,781.57	1,118.08	1,028.48	12.478	ES
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	12,100.00	6,781.26	1,125.09	1,034.09	12.364	SF
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,698.78	6,892.69	3,759.66	3,650.41	34.413	CC
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,700.00	6,892.69	3,759.66	3,650.39	34.407	ES
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	14,700.00	6,896.29	3,890.69	3,770.68	32.421	SF
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,686.88	6,823.29	2,426.10	2,317.04	22.246	CC
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,700.00	6,823.20	2,426.13	2,316.88	22.208	ES
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	14,100.00	6,820.30	2,461.02	2,347.03	21.590	SF
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,697.05	6,787.70	1,071.83	962.75	9.826	CC
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,700.00	6,787.73	1,071.83	962.70	9.821	ES
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,800.00	6,788.83	1,076.76	966.15	9.735	SF
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	14,816.20	6,845.57	2,571.36	2,449.07	21.027	CC, ES
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	15,300.00	6,864.31	2,616.39	2,488.65	20.483	SF
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,777.73	6,783.64	1,187.39	1,061.79	9.453	CC
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,800.00	6,783.68	1,187.60	1,061.61	9.426	ES
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,900.00	6,783.86	1,193.67	1,066.35	9.375	SF
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,031.18	6,805.18	2,392.04	2,255.26	17.489	CC
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,100.00	6,807.30	2,393.02	2,255.26	17.371	ES
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,400.00	6,817.17	2,420.28	2,279.24	17.160	SF
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	15,921.85	6,754.09	1,054.58	919.04	7.780	CC, ES
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	16,000.00	6,754.13	1,057.47	920.74	7.734	SF
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,230.07	7,653.17	2,637.99	2,528.13	24.013	CC
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,300.00	7,653.07	2,638.92	2,527.50	23.686	ES
Kerbs USX A15-12D - Original Drilling - Original Drilling	13,000.00	7,651.95	2,748.05	2,624.12	22.174	SF
McDaniel 32-15 - Original Drilling - Original Drilling - As D	14,795.78	6,826.75	3,879.52	3,757.31	31.746	CC
McDaniel 32-15 - Original Drilling - Original Drilling - As D	14,900.00	6,872.27	3,880.92	3,757.15	31.357	ES
McDaniel 32-15 - Original Drilling - Original Drilling - As D	15,700.00	6,859.32	3,983.48	3,851.34	30.147	SF

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

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 15						
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,175.66	6,791.82	3,992.49	3,853.85	28.797	CC
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,200.00	6,792.13	3,992.57	3,853.59	28.728	ES
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,763.43	6,799.15	4,035.52	3,889.92	27.717	SF
Speicher 31-15 - Original Drilling - Original Drilling	15,041.88	6,650.01	5,242.85	5,117.75	41.911	CC
Speicher 31-15 - Original Drilling - Original Drilling	15,100.00	6,650.01	5,243.17	5,117.31	41.657	ES
Speicher 31-15 - Original Drilling - Original Drilling	16,600.00	6,650.01	5,469.48	5,328.23	38.723	SF
Speicher 41-15 - Original Drilling - Original Drilling	16,075.21	6,900.01	5,198.34	5,060.81	37.798	CC
Speicher 41-15 - Original Drilling - Original Drilling	16,100.00	6,900.01	5,198.40	5,060.54	37.708	ES
Speicher 41-15 - Original Drilling - Original Drilling	16,763.43	6,900.01	5,243.70	5,097.88	35.960	SF
Tye USX A15-03D - Original Drilling - Original MWD	13,456.92	6,920.82	5,392.87	5,283.82	49.453	CC
Tye USX A15-03D - Original Drilling - Original MWD	13,500.00	6,921.44	5,393.04	5,283.47	49.218	ES
Tye USX A15-03D - Original Drilling - Original MWD	15,300.00	6,944.22	5,699.08	5,572.13	44.895	SF
Tye USX A15-04D - Original Drilling - Original Drilling	12,176.74	7,271.89	5,337.04	5,225.69	47.931	CC
Tye USX A15-04D - Original Drilling - Original Drilling	12,200.00	7,271.96	5,337.09	5,225.50	47.828	ES
Tye USX A15-04D - Original Drilling - Original Drilling	13,700.00	7,276.39	5,550.16	5,426.18	44.766	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 20						
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,039.24	1,998.03	2,401.76	2,387.87	172.876	CC, ES
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	6,900.00	6,334.89	4,072.18	4,024.11	84.714	SF
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	531.94	477.95	2,921.07	2,917.90	921.369	CC
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	600.00	532.63	2,921.18	2,917.58	810.350	ES
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	6,850.00	6,268.88	3,819.20	3,771.06	79.340	SF
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,000.00	1,926.00	3,517.94	3,472.48	77.391	CC
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,100.00	2,025.98	3,518.80	3,470.99	73.593	ES
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	7,000.00	6,410.04	4,934.97	4,779.98	31.840	SF
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	356.77	311.77	1,494.59	1,492.63	761.761	CC
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	1,300.00	1,244.69	1,499.66	1,491.06	174.372	ES
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	6,600.00	6,106.63	2,560.40	2,514.16	55.377	SF
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	356.42	283.42	7,332.34	7,330.48	3,941.425	CC
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	2,100.00	2,014.19	7,335.14	7,320.99	518.185	ES
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	7,350.00	6,696.88	8,226.83	8,169.42	143.316	SF
Simmons 42-20D - Original Drilling - Original Drilling - As	4,154.87	3,758.25	1,397.09	1,369.51	50.660	CC
Simmons 42-20D - Original Drilling - Original Drilling - As	4,200.00	3,792.60	1,397.35	1,369.48	50.127	ES
Simmons 42-20D - Original Drilling - Original Drilling - As	6,700.00	6,252.21	1,758.17	1,710.51	36.889	SF
Snider 1-20EG - Original Drilling - Original Drilling - As D	1,321.82	1,249.84	4,624.53	4,615.83	531.370	CC
Snider 1-20EG - Original Drilling - Original Drilling - As D	2,100.00	2,048.50	4,625.34	4,611.07	324.027	ES
Snider 1-20EG - Original Drilling - Original Drilling - As D	6,950.00	6,131.09	5,664.66	5,616.77	118.290	SF
Stump A20-11 - Original Drilling - Original Drilling - As Dr	100.00	34.82	4,490.62	4,490.43	10,000.000	CC
Stump A20-11 - Original Drilling - Original Drilling - As Dr	2,400.00	2,353.81	4,496.19	4,479.79	274.008	ES
Stump A20-11 - Original Drilling - Original Drilling - As Dr	7,600.00	7,600.00	5,580.18	5,525.53	102.116	SF
Stump A20-12 - Original Drilling - Original Drilling - As Dr	3,114.91	3,071.66	5,444.05	5,422.61	253.902	CC
Stump A20-12 - Original Drilling - Original Drilling - As Dr	3,200.00	3,117.10	5,444.42	5,422.51	248.506	ES
Stump A20-12 - Original Drilling - Original Drilling - As Dr	7,200.00	6,719.19	5,969.77	5,918.38	116.172	SF
Stump A20-13 - Original Drilling - Original Drilling - As Dr	2,225.66	2,275.46	5,868.37	5,852.86	378.263	CC
Stump A20-13 - Original Drilling - Original Drilling - As Dr	2,300.00	2,349.36	5,868.66	5,852.63	365.953	ES
Stump A20-13 - Original Drilling - Original Drilling - As Dr	7,100.00	6,464.56	6,796.39	6,746.44	136.073	SF
Winter 20-19 - Original Drilling - Original Drilling - As Dril	888.78	822.48	7,392.64	7,386.30	1,167.188	CC
Winter 20-19 - Original Drilling - Original Drilling - As Dril	1,200.00	1,059.23	7,393.86	7,385.03	837.132	ES
Winter 20-19 - Original Drilling - Original Drilling - As Dril	7,150.00	6,717.04	8,059.07	8,005.09	149.298	SF
Winter 24-19 - Original Drilling - Original Drilling - As Dril	4,238.77	4,563.53	7,248.91	7,203.76	160.551	CC
Winter 24-19 - Original Drilling - Original Drilling - As Dril	4,700.00	4,978.83	7,249.68	7,199.57	144.669	ES
Winter 24-19 - Original Drilling - Original Drilling - As Dril	7,000.00	6,758.69	7,431.88	7,366.88	114.325	SF
Winter 39-19 - Original Drilling - Original Drilling - As Dril	3,456.87	4,155.38	6,503.82	6,475.47	229.411	CC, ES
Winter 39-19 - Original Drilling - Original Drilling - As Dril	7,100.00	6,603.11	7,121.71	7,070.69	139.604	SF
Winter 40-19 - Original Drilling - Original Drilling - As Dril	5,114.38	5,645.05	6,244.96	6,185.52	105.073	CC, ES
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,950.00	6,799.58	6,432.94	6,366.92	97.429	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 21						
Culbreath 23-21 - Original Drilling - Original Drilling - As D	2,034.49	1,998.38	1,326.99	1,313.11	95.598	CC
Culbreath 23-21 - Original Drilling - Original Drilling - As D	2,100.00	2,064.61	1,327.25	1,312.90	92.513	ES
Culbreath 23-21 - Original Drilling - Original Drilling - As D	9,000.00	6,736.30	2,646.97	2,589.21	45.834	SF
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	2,000.00	1,944.00	2,347.06	2,301.24	51.227	CC
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	2,300.00	2,243.45	2,351.05	2,298.17	44.466	ES
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	9,800.00	6,739.00	2,728.98	2,552.29	15.445	SF
Harper A21-618 - Original Drilling - APD - Rev 1	2,000.00	1,983.00	1,541.11	1,527.30	111.579	CC, ES
Harper A21-618 - Original Drilling - APD - Rev 1	16,763.43	16,198.56	4,060.82	3,817.36	16.680	SF
Harper A21-626 - Original Drilling - APD - Rev 1	2,000.00	1,983.00	1,518.13	1,504.32	109.915	CC, ES
Harper A21-626 - Original Drilling - APD - Rev 1	16,763.43	16,268.46	3,536.76	3,292.84	14.500	SF
Harper A21-631 - Original Drilling - APD - Rev 1	2,000.00	1,983.00	1,496.15	1,482.33	108.323	CC, ES
Harper A21-631 - Original Drilling - APD - Rev 1	16,763.43	16,211.86	3,160.70	2,917.11	12.976	SF
Harper A21-637 - Original Drilling - APD - Rev 1	2,577.30	2,853.88	1,446.99	1,428.26	77.226	CC
Harper A21-637 - Original Drilling - APD - Rev 1	2,600.00	2,876.58	1,447.08	1,428.18	76.560	ES
Harper A21-637 - Original Drilling - APD - Rev 1	16,763.43	16,342.35	2,786.72	2,542.53	11.412	SF
Harper A21-643 - Original Drilling - APD - Rev 1	2,000.00	1,997.00	137.72	123.86	9.935	CC, ES
Harper A21-643 - Original Drilling - APD - Rev 1	2,200.00	2,196.05	145.10	129.83	9.502	SF
Harper A21-649 - Original Drilling - APD - Rev 1	2,000.00	2,002.00	115.83	101.95	8.345	CC, ES
Harper A21-649 - Original Drilling - APD - Rev 1	2,200.00	2,202.16	122.71	107.40	8.013	SF
Harper A21-656 - Original Drilling - APD - Rev 1	2,000.00	2,002.00	90.01	76.13	6.485	CC, ES
Harper A21-656 - Original Drilling - APD - Rev 1	2,100.00	2,102.02	91.75	77.16	6.286	SF
Harper A21-664 - Original Drilling - APD - Rev 1	2,000.00	2,002.00	68.01	54.13	4.900	CC, ES
Harper A21-664 - Original Drilling - APD - Rev 1	16,763.43	16,789.96	1,180.49	932.75	4.765	SF
Harper A21-669 - Original Drilling - APD - Rev 1	2,000.00	2,001.00	48.84	34.97	3.520	CC, ES
Harper A21-669 - Original Drilling - APD - Rev 1	16,753.27	16,724.78	787.77	541.76	3.202	SF
Harper A21-674 - Original Drilling - APD - Rev 1	2,000.00	2,001.00	28.22	14.34	2.033	CC, ES
Harper A21-674 - Original Drilling - APD - Rev 1	16,754.13	16,912.02	434.42	186.02	1.749	SF
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	789.96	768.98	1,537.16	1,532.79	351.775	CC
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	1,000.00	970.13	1,537.69	1,532.02	271.286	ES
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	9,100.00	9,100.00	4,486.22	4,428.25	77.385	SF
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	2,018.89	2,007.92	1,509.84	1,497.04	117.949	CC, ES
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	8,200.00	8,200.00	3,735.05	3,683.79	72.875	SF
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	2,007.68	1,990.66	1,457.34	1,445.52	123.280	CC, ES
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	6,600.00	7,461.00	2,704.95	2,655.75	54.988	SF
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,401.30	1,399.32	187.61	178.13	19.771	CC
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,700.00	1,696.21	188.93	177.33	16.291	ES
Kona A19-646 - Original Drilling - Original Drilling - As Dr	2,200.00	2,198.22	199.99	185.65	13.945	SF
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,388.49	1,388.55	142.55	133.14	15.143	CC
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,700.00	1,699.06	143.57	131.96	12.366	ES
Kona A19-662 - Original Drilling - Original Drilling - As Dr	2,100.00	2,096.36	150.01	136.04	10.739	SF
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	1,542.86	1,542.87	149.18	138.68	14.212	CC
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	1,800.00	1,798.86	149.93	137.62	12.179	ES
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	3,200.00	3,191.54	182.82	163.52	9.472	SF
Kona A19-685 - Original Drilling - Original Drilling - As Dr	7,965.77	7,595.92	93.88	36.32	1.631	CC, ES, SF
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	4,101.18	3,938.22	314.76	221.30	3.368	CC, ES
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	4,200.00	4,024.62	318.40	222.79	3.330	SF
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	8,411.47	6,791.00	252.26	84.86	1.507	CC, ES, SF
McKee 22-21 - Original Drilling - Original Drilling - As Dril	4,092.17	3,915.10	1,093.22	1,065.05	38.799	CC
McKee 22-21 - Original Drilling - Original Drilling - As Dril	4,100.00	3,922.35	1,093.23	1,064.99	38.720	ES
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,300.00	6,775.62	1,454.17	1,399.85	26.767	SF
McKee 31-21 - Original Drilling - Original Drilling - As Dril	9,461.87	6,790.98	118.70	56.12	1.897	CC, ES, SF
McKee 32-21 - Original Drilling - Original Drilling - As Dril	9,462.03	6,747.12	1,426.76	1,363.84	22.677	CC, ES
McKee 32-21 - Original Drilling - Original Drilling - As Dril	9,600.00	6,747.61	1,433.41	1,369.84	22.548	SF

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

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 21						
McKee 41-21 - Original Drilling - Original Drilling - As Dril	10,757.07	6,761.07	53.39	-22.76	0.701	Level 1, CC, ES, SF
McKee 42-21 - Original Drilling - Original Drilling - As Dril	10,819.67	6,719.92	1,605.88	1,529.75	21.093	CC, ES
McKee 42-21 - Original Drilling - Original Drilling - As Dril	11,000.00	6,719.85	1,615.97	1,538.87	20.958	SF
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	10,770.62	6,731.00	2,486.06	2,298.95	13.286	CC
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	10,800.00	6,731.00	2,486.24	2,298.89	13.271	ES
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	11,000.00	6,731.00	2,496.62	2,307.81	13.223	SF
Wells Trust 13-21 - Original Drilling - Original Drilling - As	100.00	54.83	689.63	689.40	3,104.412	CC
Wells Trust 13-21 - Original Drilling - Original Drilling - As	1,400.00	1,354.19	690.70	681.36	73.946	ES
Wells Trust 13-21 - Original Drilling - Original Drilling - As	2,900.00	2,846.41	817.35	797.44	41.043	SF
Wells Trust 14-21 - Original Drilling - Original Drilling - As	2,030.47	1,989.27	1,865.67	1,851.84	134.918	CC, ES
Wells Trust 14-21 - Original Drilling - Original Drilling - As	7,150.00	6,547.12	3,951.90	3,902.40	79.839	SF
Wells Trust 24-21 - Original Drilling - Original Drilling - As	2,011.75	1,948.95	1,768.63	1,755.01	129.913	CC, ES
Wells Trust 24-21 - Original Drilling - Original Drilling - As	9,000.00	6,759.83	4,200.63	4,143.64	73.705	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 22						
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,070.64	6,675.57	3,857.50	3,720.61	28.178	CC
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,100.00	6,675.86	3,857.61	3,720.42	28.118	ES
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,700.00	6,681.91	3,908.50	3,766.62	27.549	SF
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,586.32	6,848.56	3,282.74	3,160.51	26.857	CC
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,600.00	6,848.52	3,282.77	3,160.41	26.829	ES
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	15,100.00	6,847.23	3,322.68	3,196.57	26.348	SF
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,232.13	6,707.20	2,833.71	2,676.94	18.076	CC, ES
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,500.00	6,706.14	2,846.34	2,687.54	17.924	SF
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	14,750.72	6,771.27	3,883.15	3,761.58	31.941	CC
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	14,800.00	6,771.91	3,883.46	3,761.40	31.815	ES
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,500.00	6,781.64	3,954.76	3,827.31	31.031	SF
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	15,722.14	6,801.84	3,439.31	3,305.83	25.765	CC, ES
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,200.00	6,807.36	3,472.35	3,335.10	25.300	SF
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,107.84	6,745.00	145.51	-103.70	0.584	Level 1, CC, ES, SF
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,641.72	6,758.07	1,749.97	1,629.78	14.560	CC, ES
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,800.00	6,757.41	1,757.11	1,636.05	14.515	SF
Eisenstat 22-15 - Original Drilling - Original Drilling - As D	15,452.64	6,766.38	521.18	391.15	4.008	CC, ES, SF
Eisenstat 22-21 - Original Drilling - Original Drilling - As D	13,649.58	6,770.04	250.06	141.77	2.309	CC, ES, SF
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,238.74	6,758.50	1,228.28	1,136.17	13.336	CC, ES
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,300.00	6,758.83	1,229.80	1,137.41	13.310	SF
Gill Land Assoc. 1 (PA) - Original Drilling - Original Drillin	16,098.26	6,746.00	1,373.24	1,124.12	5.512	CC
Gill Land Assoc. 1 (PA) - Original Drilling - Original Drillin	16,100.00	6,746.00	1,373.24	1,124.11	5.512	ES, SF
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,422.50	6,756.00	1,404.21	1,186.75	6.457	CC, ES
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,500.00	6,756.00	1,406.35	1,188.47	6.455	SF
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,136.49	6,765.79	113.89	22.89	1.251	Level 3, CC, ES, SF
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	14,717.82	6,754.00	85.22	-147.52	0.366	Level 1, CC, ES, SF
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,074.24	6,724.08	2,678.46	2,588.43	29.753	CC
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,100.00	6,724.05	2,678.58	2,588.33	29.681	ES
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,500.00	6,723.51	2,712.08	2,619.03	29.144	SF
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,378.47	6,728.27	3,963.51	3,858.43	37.718	CC
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,400.00	6,727.80	3,963.57	3,858.28	37.644	ES
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	14,200.00	6,717.65	4,047.68	3,936.15	36.292	SF
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,399.04	6,740.64	2,665.31	2,559.98	25.304	CC
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,400.00	6,740.63	2,665.31	2,559.97	25.302	ES
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,800.00	6,740.47	2,695.30	2,587.17	24.926	SF
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,109.37	6,679.56	3,934.80	3,844.65	43.644	CC, ES
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	13,100.00	6,700.00	4,057.57	3,959.63	41.426	SF
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	12,723.64	6,740.91	3,407.72	3,309.90	34.839	CC, ES
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,400.00	6,743.56	3,474.19	3,371.23	33.744	SF
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	14,752.06	6,735.67	2,558.25	2,436.92	21.085	CC, ES
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	15,000.00	6,736.02	2,570.23	2,447.07	20.868	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 23						
Cecil 23-13 - Original Drilling - Original Drilling - As Drille	16,763.43	6,618.89	3,211.18	3,130.44	39.773	CC, ES, SF
Champlin 23-02 (PA) - Original Drilling - Original Drilling -	16,763.43	6,705.00	2,630.47	2,375.43	10.314	CC, ES, SF
Champlin 23-03 - Original Drilling - Original Drilling - As D	16,763.43	6,648.86	4,209.11	4,070.88	30.451	CC, ES, SF
Champlin Amoco A 1 #308 - Original Drilling - Original Dr	16,763.43	6,680.00	4,196.41	3,945.98	16.757	CC, ES, SF
Cooper 23-1-17 - Orignal Drilling - Orignal Drilling - As Dr	16,763.43	6,664.63	3,947.44	3,892.73	72.152	CC, ES, SF
Cooper 23-1-19 - Original Drilling - Original Drilling - As D	16,763.43	6,646.90	2,846.81	2,781.06	43.297	CC, ES, SF
Cooper 23-12 - Original Drilling - Original Drilling - As Dri	16,763.43	6,665.13	3,333.44	3,277.53	59.628	CC, ES, SF
Cooper 23-1-20 - Original Drilling - Original Drilling - As D	16,763.43	6,615.33	3,368.97	3,267.86	33.321	CC, ES, SF
Cooper 23-15 - Original Drilling - Original Drilling - As Dri	16,763.43	6,677.25	4,028.10	3,964.79	63.624	CC, ES, SF
Foss 41-23D - Original Drilling - Original Drilling - As Drill	16,763.43	6,896.31	4,632.12	4,564.84	68.845	CC, ES, SF
Foss 42-23 - Original Drilling - Original Drilling - As Drille	16,763.43	6,671.79	4,655.09	4,577.44	59.949	CC, ES, SF
J&L Farms 23-11 - Original Drilling - Original Drilling - As	16,763.43	6,708.17	527.73	472.41	9.539	CC, ES, SF
J&L Farms 23-12 - Original Drilling - Original Drilling - As	16,763.43	6,809.88	1,534.79	1,390.68	10.650	CC, ES, SF
J&L Farms 23-21 - Original Drilling - Original Drilling - As	16,763.43	6,664.35	2,156.84	2,101.85	39.225	CC, ES, SF
J&L Farms 23-22 - Original Drilling - Original Drilling - As	16,763.43	6,768.99	2,279.07	2,176.97	22.321	CC, ES, SF
McIntosh 33-23 - Original Drilling - Original Drilling - As D	16,763.43	6,658.55	4,324.18	4,213.06	38.916	CC, ES, SF
McIntosh 34-23 - Original Drilling - Original Drilling - As D	16,763.43	6,644.72	5,199.69	5,077.59	42.584	CC, ES, SF
McIntosh 43-23 - Original Drilling - Original Drilling - As D	16,763.43	6,626.50	5,408.39	5,316.13	58.617	CC, ES, SF
McIntosh 44-23 - Original Drilling - Original Drilling - As D	16,763.43	6,643.77	6,345.04	6,234.06	57.176	CC, ES, SF
Schroeder 23-31 - Original Drilling - Original Drilling - As	16,763.43	6,611.12	3,567.18	3,440.60	28.183	CC, ES, SF
Schroeder 23-33 - Original Drilling - Original Drilling - As	16,763.43	6,678.01	4,180.30	4,034.87	28.744	CC, ES, SF
A Section 24						
Larson A23-622 - Original Drilling - APD - Rev 0	16,741.51	17,335.78	3,755.65	3,633.73	30.804	CC
Larson A23-622 - Original Drilling - APD - Rev 0	16,763.43	17,335.78	3,755.72	3,633.58	30.749	ES, SF
Larson A23-627 - Original Drilling - APD - Rev 0	16,743.30	17,349.62	3,420.60	3,298.51	28.016	CC
Larson A23-627 - Original Drilling - APD - Rev 0	16,763.43	17,349.62	3,420.66	3,298.37	27.971	ES, SF
Larson A23-633 - Original Drilling - APD - Rev 0	16,763.43	17,283.90	3,070.78	2,948.61	25.136	CC, ES, SF
Larson A23-639 - Original Drilling - APD - Rev 0	16,747.33	17,357.51	2,670.08	2,547.96	21.864	CC
Larson A23-639 - Original Drilling - APD - Rev 0	16,763.43	17,356.91	2,670.13	2,547.86	21.837	ES, SF
Larson A23-645 - Original Drilling - APD - Rev 0	16,752.26	18,106.34	2,269.37	2,147.18	18.572	CC
Larson A23-645 - Original Drilling - APD - Rev 0	16,763.43	18,114.24	2,269.39	2,147.13	18.562	ES, SF
Larson A23-651 - Original Drilling - APD - Rev 0	16,753.92	18,048.86	1,959.65	1,837.55	16.050	CC
Larson A23-651 - Original Drilling - APD - Rev 0	16,763.43	18,050.31	1,959.67	1,837.51	16.041	ES, SF
Larson A23-656 - Original Drilling - APD - Rev 0	16,763.43	18,053.95	1,650.10	1,527.68	13.479	CC, ES, SF
Larson A23-662 - Original Drilling - APD - Rev 0	16,763.43	18,043.93	1,227.38	1,105.25	10.050	CC, ES, SF
Larson A23-668 - Original Drilling - APD - Rev 0	16,763.43	17,459.98	855.89	733.47	6.991	CC, ES, SF
Larson A23-672 - Original Drilling - APD - Rev 0	16,763.43	17,441.73	641.69	521.20	5.326	CC, ES, SF
Larson A23-678 - Original Drilling - APD - Rev 0	16,763.43	17,178.97	193.11	70.25	1.572	CC, ES, SF
Larson A23-683 - Original Drilling - APD - Rev 0	16,755.84	17,329.81	130.43	9.70	1.080	Level 2, CC
Larson A23-683 - Original Drilling - APD - Rev 0	16,763.43	17,322.22	130.45	9.63	1.080	Level 2, ES, SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 27						
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	14,774.60	6,761.00	5,242.32	5,008.77	22.446	CC
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	14,800.00	6,761.00	5,242.38	5,008.56	22.421	ES
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	15,600.00	6,761.00	5,306.90	5,065.81	22.012	SF
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,366.37	6,726.23	5,320.46	5,215.49	50.687	CC
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,400.00	6,725.82	5,320.57	5,215.25	50.522	ES
Howard 03-27 - Original Drilling - Original Drilling - As Dr	14,900.00	6,709.73	5,537.06	5,419.58	47.134	SF
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,124.41	6,721.00	5,204.07	5,002.27	25.788	CC
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,200.00	6,721.00	5,204.62	5,002.07	25.695	ES
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	13,100.00	6,721.00	5,294.73	5,084.16	25.145	SF
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,061.89	6,712.05	6,644.46	6,507.44	48.494	CC
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,100.00	6,712.15	6,644.57	6,507.13	48.348	ES
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,763.43	6,713.98	6,681.39	6,537.30	46.369	SF
Howard 10-27 - Original Drilling - Original Drilling - As Dr	14,827.12	6,642.15	7,948.45	7,826.57	65.217	CC
Howard 10-27 - Original Drilling - Original Drilling - As Dr	14,900.00	6,642.19	7,948.79	7,826.11	64.795	ES
Howard 10-27 - Original Drilling - Original Drilling - As Dr	16,763.43	6,643.15	8,180.90	8,040.71	58.356	SF
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,660.33	6,872.37	9,113.14	8,994.60	76.883	CC
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,800.00	6,870.51	9,114.21	8,994.13	75.906	ES
Howard 15-27 - Original Drilling - Original Drilling - As Dr	16,763.43	6,844.26	9,352.62	9,213.46	67.206	SF
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	2,000.00	1,925.00	5,775.66	5,730.22	127.115	CC
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	2,100.00	2,024.98	5,776.65	5,728.85	120.866	ES
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	14,200.00	3,765.00	6,369.95	6,229.57	45.374	SF
Howard A27-01 - Original Drilling - Original Drilling - As D	16,102.81	6,703.36	5,251.81	5,114.36	38.209	CC
Howard A27-01 - Original Drilling - Original Drilling - As D	16,200.00	6,703.37	5,252.71	5,114.24	37.934	ES
Howard A27-01 - Original Drilling - Original Drilling - As D	16,763.43	6,703.43	5,293.19	5,149.57	36.856	SF
Howard A27-05 - Original Drilling - Original Drilling - As D	12,127.95	6,662.27	6,603.67	6,513.25	73.032	CC
Howard A27-05 - Original Drilling - Original Drilling - As D	12,200.00	6,662.42	6,604.06	6,512.90	72.443	ES
Howard A27-05 - Original Drilling - Original Drilling - As D	14,800.00	6,667.39	7,123.78	7,011.29	63.326	SF
Howard A27-06 - Original Drilling - Original Drilling - As D	13,506.65	6,826.48	6,569.11	6,456.74	58.460	CC
Howard A27-06 - Original Drilling - Original Drilling - As D	13,600.00	6,826.26	6,569.77	6,456.34	57.917	ES
Howard A27-06 - Original Drilling - Original Drilling - As D	15,800.00	6,821.50	6,957.92	6,824.96	52.331	SF
Howard A27-07 - Original Drilling - Original Drilling - As D	14,855.36	6,722.92	6,647.84	6,525.32	54.256	CC
Howard A27-07 - Original Drilling - Original Drilling - As D	14,900.00	6,723.08	6,647.99	6,524.98	54.045	ES
Howard A27-07 - Original Drilling - Original Drilling - As D	16,763.43	6,730.32	6,916.25	6,777.19	49.735	SF
Howard A27-09 - Original Drilling - Original Drilling - As D	15,955.10	6,648.83	8,016.57	7,881.12	59.181	CC
Howard A27-09 - Original Drilling - Original Drilling - As D	16,000.00	6,648.78	8,016.70	7,880.74	58.965	ES
Howard A27-09 - Original Drilling - Original Drilling - As D	16,763.43	6,647.89	8,057.22	7,913.32	55.992	SF
Howard A27-16 - Original Drilling - Original Drilling - As D	16,225.21	6,783.12	9,289.56	9,150.17	66.646	CC
Howard A27-16 - Original Drilling - Original Drilling - As D	16,300.00	6,782.97	9,289.86	9,149.63	66.249	ES
Howard A27-16 - Original Drilling - Original Drilling - As D	16,763.43	6,782.00	9,305.14	9,159.87	64.056	SF
Howard A27-17D - Original Drilling - Original Drilling - As	15,514.46	6,810.98	5,839.75	5,704.83	43.285	CC
Howard A27-17D - Original Drilling - Original Drilling - As	15,600.00	6,811.08	5,840.37	5,704.65	43.031	ES
Howard A27-17D - Original Drilling - Original Drilling - As	16,763.43	6,812.37	5,971.82	5,827.34	41.333	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Summary

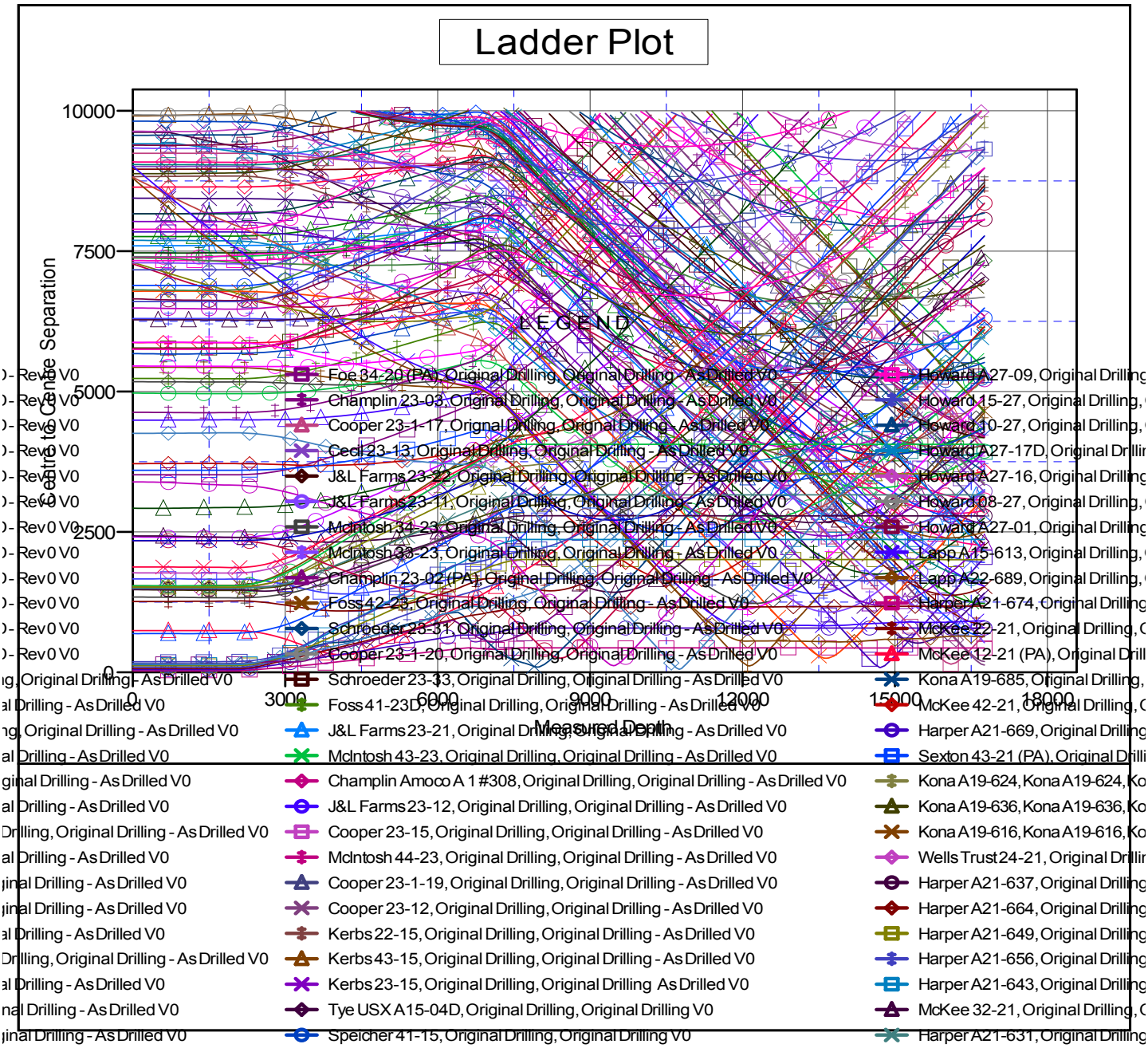
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
A Section 28						
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	2,000.00	1,903.00	5,751.44	5,706.44	127.820	CC
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	2,100.00	2,002.98	5,752.85	5,705.50	121.485	ES
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	12,700.00	6,698.00	6,977.37	6,773.66	34.252	SF
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,000.00	1,891.00	7,890.93	7,846.17	176.308	CC
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,100.00	1,990.98	7,892.54	7,845.42	167.518	ES
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	14,100.00	6,686.00	9,997.23	9,780.77	46.185	SF
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,000.00	1,886.00	7,168.09	7,123.44	160.516	CC
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,100.00	1,985.98	7,169.71	7,122.69	152.500	ES
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	13,500.00	6,681.00	9,282.08	9,072.11	44.206	SF
Webster 09-28 - Original Drilling - Original Drilling - As D	2,000.00	1,901.00	6,604.62	6,559.66	146.911	CC
Webster 09-28 - Original Drilling - Original Drilling - As D	2,100.00	2,000.98	6,606.16	6,558.85	139.623	ES
Webster 09-28 - Original Drilling - Original Drilling - As D	13,200.00	6,696.00	8,332.90	8,124.89	40.062	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4774.00ft (Original Well Elev	Coordinates are relative to: Harper A21-681
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.5000000	Grid Convergence at Surface is: 0.61°



Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-681
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4774.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-681	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Original Drilling	**Database:**	EDMP
Reference Design:	APD - Rev 1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4774.00ft (Original Well Elev	Coordinates are relative to: Harper A21-681
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.5000000	Grid Convergence at Surface is: 0.61°