Project: Wells Ranch
Site: A Section 21
Well: Harper A21-669
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

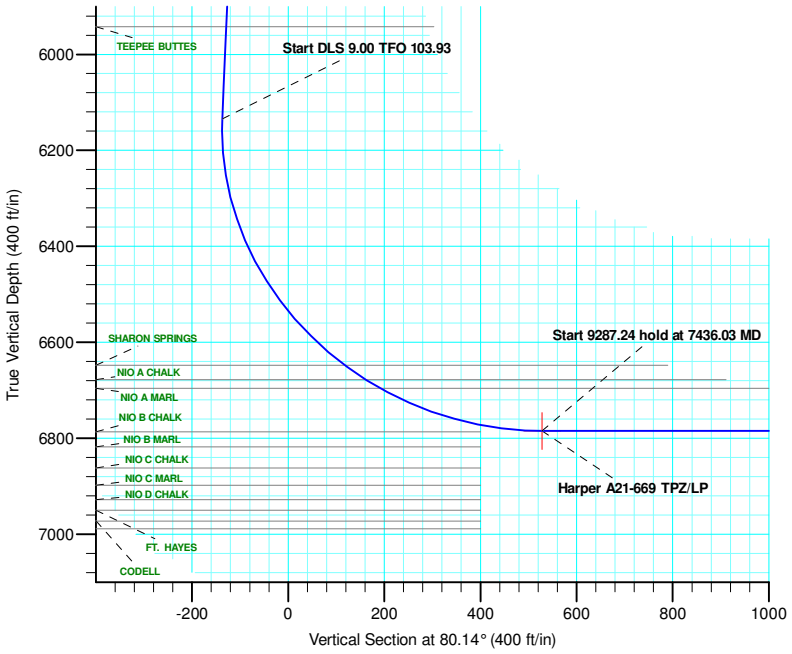
SECTION DETAILS

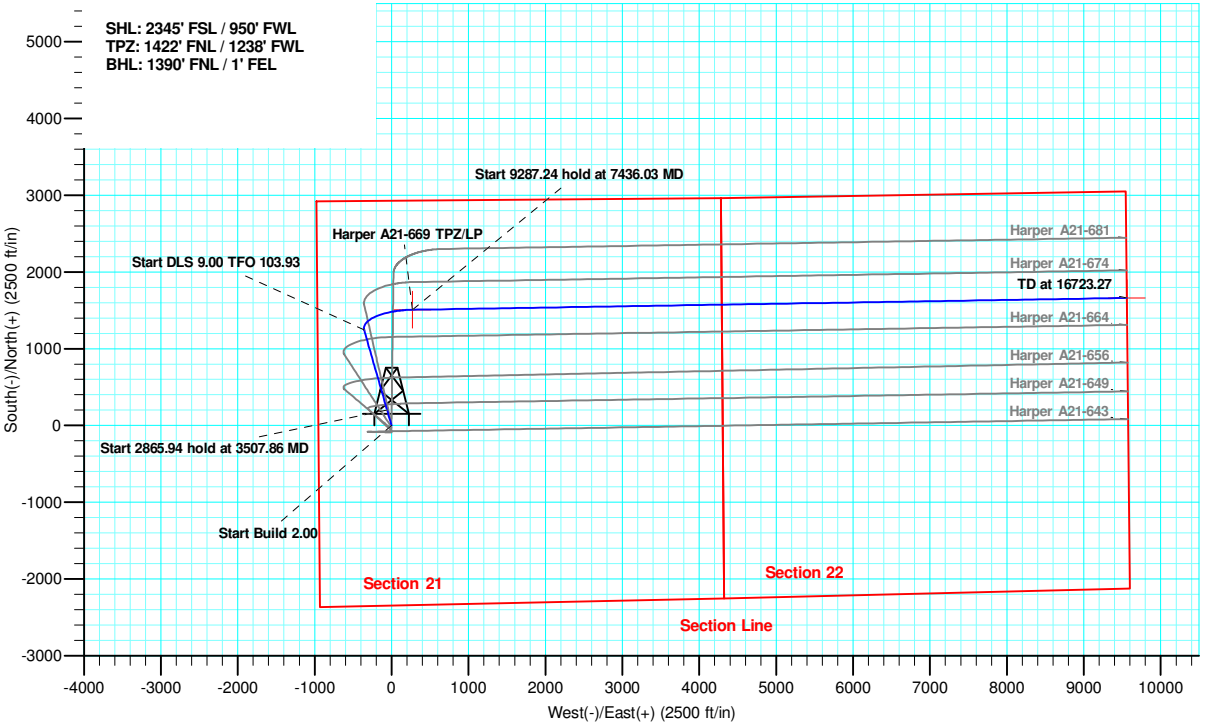
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2400.00	0.00	0.00	2400.00	0.00	0.00	0.00	0.00	0.00	
3	3507.86	22.16	344.06	3480.45	203.42	-58.11	2.00	344.06	-22.40	
4	6373.80	22.16	344.06	6134.75	1242.74	-354.98	0.00	0.00	-136.85	
5	7436.03	90.00	89.05	6785.00	1508.95	274.30	9.00	103.93	528.72	Harper A21-669 TPZ/LP
6	16723.27	90.00	89.05	6785.00	1662.25	9560.27	0.00	0.00	9703.70	Harper A21-669 BHL 1390'FNL, 1'FEL

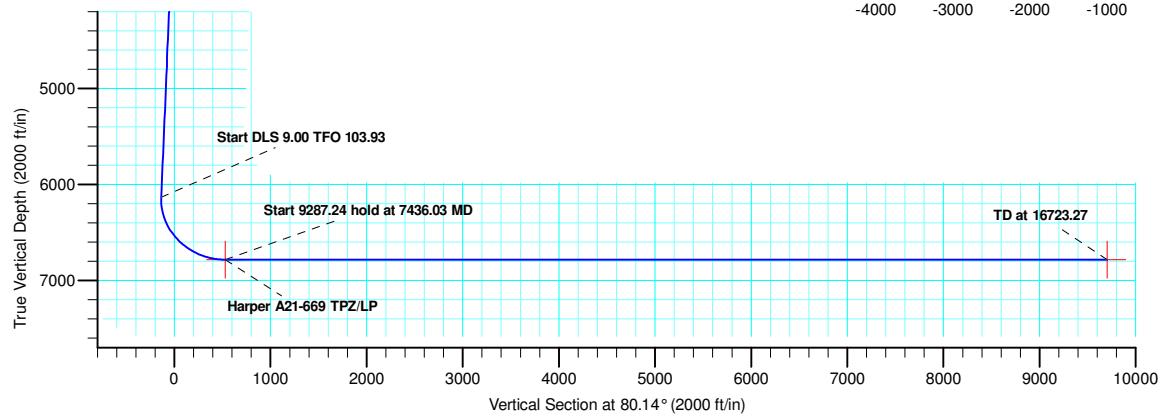
WELL DETAILS: Harper A21-669

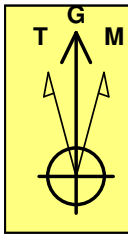
Ground Level: 4743.00

		Northing	Easting	Latitude	Longitude
0.00	0.00	1415694.29	3261183.68	40.4706872	-104.5612156









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 A21-669/Original Drilling)

Created By: Shelly C. Peterkin Date: 10:00, January 17 2018

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-669

Original Drilling

Plan: APD - Rev 1

Standard Planning Report

17 January, 2018

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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 A21-669

Well Position	**+N/-S**	1,491.46 ft	**Northing:**	1,415,694.29 usft	**Latitude:**	40.4706872
	+E/-W	-48.23 ft	**Easting:**	3,261,183.68 usft	**Longitude:**	-104.5612156
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	4,743.00 ft

Wellbore Original Drilling

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/29/2016	8.16	66.95	52,503.96879968

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	80.14

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	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,507.86	22.16	344.06	3,480.46	203.42	-58.11	2.00	2.00	0.00	344.06	
6,373.80	22.16	344.06	6,134.75	1,242.74	-354.98	0.00	0.00	0.00	0.00	
7,436.03	90.00	89.05	6,785.00	1,508.95	274.30	9.00	6.39	9.88	103.93	Harper A21-669 TPZ/
16,723.27	90.00	89.05	6,785.00	1,662.25	9,560.27	0.00	0.00	0.00	0.00	Harper A21-669 BHL

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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
505.00	0.00	0.00	505.00	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
707.00	0.00	0.00	707.00	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
1,532.00	0.00	0.00	1,532.00	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
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
2,500.00	2.00	344.06	2,499.98	1.68	-0.48	-0.18	2.00	2.00	0.00
2,600.00	4.00	344.06	2,599.84	6.71	-1.92	-0.74	2.00	2.00	0.00
2,700.00	6.00	344.06	2,699.45	15.09	-4.31	-1.66	2.00	2.00	0.00
2,800.00	8.00	344.06	2,798.70	26.81	-7.66	-2.95	2.00	2.00	0.00
2,900.00	10.00	344.06	2,897.47	41.85	-11.95	-4.61	2.00	2.00	0.00
3,000.00	12.00	344.06	2,995.62	60.19	-17.19	-6.63	2.00	2.00	0.00
3,100.00	14.00	344.06	3,093.06	81.82	-23.37	-9.01	2.00	2.00	0.00
3,200.00	16.00	344.06	3,189.64	106.71	-30.48	-11.75	2.00	2.00	0.00
3,300.00	18.00	344.06	3,285.27	134.82	-38.51	-14.85	2.00	2.00	0.00
3,400.00	20.00	344.06	3,379.82	166.12	-47.45	-18.29	2.00	2.00	0.00
3,507.86	22.16	344.06	3,480.46	203.42	-58.11	-22.40	2.00	2.00	0.00
Start 2865.94 hold at 3507.86 MD									
3,600.00	22.16	344.06	3,565.79	236.84	-67.65	-26.08	0.00	0.00	0.00
3,700.00	22.16	344.06	3,658.40	273.10	-78.01	-30.07	0.00	0.00	0.00
3,712.52	22.16	344.06	3,670.00	277.64	-79.31	-30.57	0.00	0.00	0.00
PARKMAN									
3,800.00	22.16	344.06	3,751.02	309.36	-88.37	-34.07	0.00	0.00	0.00
3,900.00	22.16	344.06	3,843.63	345.63	-98.73	-38.06	0.00	0.00	0.00
4,000.00	22.16	344.06	3,936.25	381.89	-109.08	-42.05	0.00	0.00	0.00
4,100.00	22.16	344.06	4,028.86	418.16	-119.44	-46.05	0.00	0.00	0.00
4,200.00	22.16	344.06	4,121.48	454.42	-129.80	-50.04	0.00	0.00	0.00

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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)
4,300.00	22.16	344.06	4,214.09	490.69	-140.16	-54.03	0.00	0.00	0.00
4,308.54	22.16	344.06	4,222.00	493.78	-141.04	-54.37	0.00	0.00	0.00
SUSSEX									
4,400.00	22.16	344.06	4,306.71	526.95	-150.52	-58.03	0.00	0.00	0.00
4,500.00	22.16	344.06	4,399.33	563.22	-160.88	-62.02	0.00	0.00	0.00
4,600.00	22.16	344.06	4,491.94	599.48	-171.24	-66.01	0.00	0.00	0.00
4,700.00	22.16	344.06	4,584.56	635.75	-181.59	-70.01	0.00	0.00	0.00
4,800.00	22.16	344.06	4,677.17	672.01	-191.95	-74.00	0.00	0.00	0.00
4,900.00	22.16	344.06	4,769.79	708.28	-202.31	-77.99	0.00	0.00	0.00
5,000.00	22.16	344.06	4,862.40	744.54	-212.67	-81.99	0.00	0.00	0.00
5,100.00	22.16	344.06	4,955.02	780.80	-223.03	-85.98	0.00	0.00	0.00
5,106.46	22.16	344.06	4,961.00	783.15	-223.70	-86.24	0.00	0.00	0.00
SHANNON									
5,200.00	22.16	344.06	5,047.63	817.07	-233.39	-89.97	0.00	0.00	0.00
5,300.00	22.16	344.06	5,140.25	853.33	-243.75	-93.97	0.00	0.00	0.00
5,400.00	22.16	344.06	5,232.86	889.60	-254.10	-97.96	0.00	0.00	0.00
5,500.00	22.16	344.06	5,325.48	925.86	-264.46	-101.95	0.00	0.00	0.00
5,600.00	22.16	344.06	5,418.09	962.13	-274.82	-105.95	0.00	0.00	0.00
5,700.00	22.16	344.06	5,510.71	998.39	-285.18	-109.94	0.00	0.00	0.00
5,800.00	22.16	344.06	5,603.32	1,034.66	-295.54	-113.93	0.00	0.00	0.00
5,900.00	22.16	344.06	5,695.94	1,070.92	-305.90	-117.93	0.00	0.00	0.00
6,000.00	22.16	344.06	5,788.55	1,107.19	-316.26	-121.92	0.00	0.00	0.00
6,100.00	22.16	344.06	5,881.17	1,143.45	-326.62	-125.91	0.00	0.00	0.00
6,165.68	22.16	344.06	5,942.00	1,167.27	-333.42	-128.54	0.00	0.00	0.00
TEEPEE BUTTES									
6,200.00	22.16	344.06	5,973.78	1,179.71	-336.97	-129.91	0.00	0.00	0.00
6,300.00	22.16	344.06	6,066.40	1,215.98	-347.33	-133.90	0.00	0.00	0.00
6,373.80	22.16	344.06	6,134.75	1,242.74	-354.98	-136.85	0.00	0.00	0.00
Start DLS 9.00 TFO 103.93									
6,400.00	21.70	350.26	6,159.06	1,252.27	-357.15	-137.36	9.00	-1.73	23.66
6,450.00	21.51	2.49	6,205.57	1,270.55	-358.32	-135.38	9.00	-0.39	24.46
6,500.00	22.20	14.45	6,252.00	1,288.86	-355.57	-129.53	9.00	1.38	23.94
6,550.00	23.69	25.36	6,298.06	1,307.09	-348.90	-119.84	9.00	2.99	21.81
6,600.00	25.86	34.79	6,343.48	1,325.13	-338.37	-106.38	9.00	4.33	18.87
6,650.00	28.54	42.72	6,387.96	1,342.87	-324.04	-89.22	9.00	5.36	15.85
6,700.00	31.60	49.31	6,431.24	1,360.19	-306.00	-68.48	9.00	6.13	13.18
6,750.00	34.95	54.80	6,473.05	1,377.00	-284.36	-44.27	9.00	6.69	10.98
6,800.00	38.50	59.42	6,513.12	1,393.18	-259.24	-16.76	9.00	7.11	9.24
6,850.00	42.21	63.35	6,551.22	1,408.64	-230.82	13.89	9.00	7.42	7.87
6,900.00	46.04	66.76	6,587.11	1,423.28	-199.25	47.50	9.00	7.65	6.81
6,950.00	49.95	69.75	6,620.57	1,437.01	-164.75	83.85	9.00	7.83	5.98
6,994.27	53.48	72.12	6,648.00	1,448.34	-131.91	118.14	9.00	7.96	5.35
SHARON SPRINGS									
7,000.00	53.94	72.41	6,651.39	1,449.75	-127.51	122.72	9.00	8.02	5.07
7,047.40	57.76	74.69	6,678.00	1,460.84	-89.89	161.68	9.00	8.07	4.82
NIO A CHALK									
7,050.00	57.97	74.81	6,679.38	1,461.42	-87.77	163.87	9.00	8.12	4.59
7,082.55	60.62	76.26	6,696.00	1,468.40	-60.67	191.76	9.00	8.14	4.46
NIO A MARL									
7,100.00	62.05	77.01	6,704.37	1,471.94	-45.78	207.04	9.00	8.18	4.28
7,150.00	66.16	79.04	6,726.20	1,481.26	-1.79	251.98	9.00	8.22	4.07
7,200.00	70.30	80.96	6,744.75	1,489.31	43.93	298.40	9.00	8.27	3.82
7,250.00	74.45	82.77	6,759.89	1,496.04	91.09	346.02	9.00	8.31	3.63

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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)
7,300.00	78.62	84.51	6,771.53	1,501.42	139.41	394.54	9.00	8.34	3.49
7,350.00	82.80	86.21	6,779.60	1,505.41	188.58	443.66	9.00	8.36	3.38
7,400.00	86.98	87.87	6,784.05	1,507.98	238.30	493.09	9.00	8.37	3.32
7,436.03	90.00	89.05	6,785.00	1,508.95	274.30	528.72	9.00	8.37	3.30
Start 9287.24 hold at 7436.03 MD									
7,500.00	90.00	89.05	6,785.00	1,510.00	338.26	591.92	0.00	0.00	0.00
7,600.00	90.00	89.05	6,785.00	1,511.65	438.25	690.71	0.00	0.00	0.00
7,700.00	90.00	89.05	6,785.00	1,513.30	538.23	789.51	0.00	0.00	0.00
7,800.00	90.00	89.05	6,785.00	1,514.95	638.22	888.30	0.00	0.00	0.00
7,900.00	90.00	89.05	6,785.00	1,516.60	738.20	987.09	0.00	0.00	0.00
8,000.00	90.00	89.05	6,785.00	1,518.25	838.19	1,085.88	0.00	0.00	0.00
8,100.00	90.00	89.05	6,785.00	1,519.91	938.18	1,184.67	0.00	0.00	0.00
8,200.00	90.00	89.05	6,785.00	1,521.56	1,038.16	1,283.46	0.00	0.00	0.00
8,300.00	90.00	89.05	6,785.00	1,523.21	1,138.15	1,382.25	0.00	0.00	0.00
8,400.00	90.00	89.05	6,785.00	1,524.86	1,238.14	1,481.04	0.00	0.00	0.00
8,500.00	90.00	89.05	6,785.00	1,526.51	1,338.12	1,579.83	0.00	0.00	0.00
8,600.00	90.00	89.05	6,785.00	1,528.16	1,438.11	1,678.63	0.00	0.00	0.00
8,700.00	90.00	89.05	6,785.00	1,529.81	1,538.10	1,777.42	0.00	0.00	0.00
8,800.00	90.00	89.05	6,785.00	1,531.46	1,638.08	1,876.21	0.00	0.00	0.00
8,900.00	90.00	89.05	6,785.00	1,533.11	1,738.07	1,975.00	0.00	0.00	0.00
9,000.00	90.00	89.05	6,785.00	1,534.76	1,838.05	2,073.79	0.00	0.00	0.00
9,100.00	90.00	89.05	6,785.00	1,536.41	1,938.04	2,172.58	0.00	0.00	0.00
9,200.00	90.00	89.05	6,785.00	1,538.06	2,038.03	2,271.37	0.00	0.00	0.00
9,300.00	90.00	89.05	6,785.00	1,539.71	2,138.01	2,370.16	0.00	0.00	0.00
9,400.00	90.00	89.05	6,785.00	1,541.36	2,238.00	2,468.96	0.00	0.00	0.00
9,500.00	90.00	89.05	6,785.00	1,543.01	2,337.99	2,567.75	0.00	0.00	0.00
9,600.00	90.00	89.05	6,785.00	1,544.66	2,437.97	2,666.54	0.00	0.00	0.00
9,700.00	90.00	89.05	6,785.00	1,546.32	2,537.96	2,765.33	0.00	0.00	0.00
9,800.00	90.00	89.05	6,785.00	1,547.97	2,637.95	2,864.12	0.00	0.00	0.00
9,900.00	90.00	89.05	6,785.00	1,549.62	2,737.93	2,962.91	0.00	0.00	0.00
10,000.00	90.00	89.05	6,785.00	1,551.27	2,837.92	3,061.70	0.00	0.00	0.00
10,100.00	90.00	89.05	6,785.00	1,552.92	2,937.91	3,160.49	0.00	0.00	0.00
10,200.00	90.00	89.05	6,785.00	1,554.57	3,037.89	3,259.29	0.00	0.00	0.00
10,300.00	90.00	89.05	6,785.00	1,556.22	3,137.88	3,358.08	0.00	0.00	0.00
10,400.00	90.00	89.05	6,785.00	1,557.87	3,237.86	3,456.87	0.00	0.00	0.00
10,500.00	90.00	89.05	6,785.00	1,559.52	3,337.85	3,555.66	0.00	0.00	0.00
10,600.00	90.00	89.05	6,785.00	1,561.17	3,437.84	3,654.45	0.00	0.00	0.00
10,700.00	90.00	89.05	6,785.00	1,562.82	3,537.82	3,753.24	0.00	0.00	0.00
10,800.00	90.00	89.05	6,785.00	1,564.47	3,637.81	3,852.03	0.00	0.00	0.00
10,900.00	90.00	89.05	6,785.00	1,566.12	3,737.80	3,950.82	0.00	0.00	0.00
11,000.00	90.00	89.05	6,785.00	1,567.77	3,837.78	4,049.62	0.00	0.00	0.00
11,100.00	90.00	89.05	6,785.00	1,569.42	3,937.77	4,148.41	0.00	0.00	0.00
11,200.00	90.00	89.05	6,785.00	1,571.08	4,037.76	4,247.20	0.00	0.00	0.00
11,300.00	90.00	89.05	6,785.00	1,572.73	4,137.74	4,345.99	0.00	0.00	0.00
11,400.00	90.00	89.05	6,785.00	1,574.38	4,237.73	4,444.78	0.00	0.00	0.00
11,500.00	90.00	89.05	6,785.00	1,576.03	4,337.71	4,543.57	0.00	0.00	0.00
11,600.00	90.00	89.05	6,785.00	1,577.68	4,437.70	4,642.36	0.00	0.00	0.00
11,700.00	90.00	89.05	6,785.00	1,579.33	4,537.69	4,741.15	0.00	0.00	0.00
11,800.00	90.00	89.05	6,785.00	1,580.98	4,637.67	4,839.95	0.00	0.00	0.00
11,900.00	90.00	89.05	6,785.00	1,582.63	4,737.66	4,938.74	0.00	0.00	0.00
12,000.00	90.00	89.05	6,785.00	1,584.28	4,837.65	5,037.53	0.00	0.00	0.00
12,100.00	90.00	89.05	6,785.00	1,585.93	4,937.63	5,136.32	0.00	0.00	0.00
12,200.00	90.00	89.05	6,785.00	1,587.58	5,037.62	5,235.11	0.00	0.00	0.00

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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)
12,300.00	90.00	89.05	6,785.00	1,589.23	5,137.61	5,333.90	0.00	0.00	0.00
12,400.00	90.00	89.05	6,785.00	1,590.88	5,237.59	5,432.69	0.00	0.00	0.00
12,500.00	90.00	89.05	6,785.00	1,592.53	5,337.58	5,531.48	0.00	0.00	0.00
12,600.00	90.00	89.05	6,785.00	1,594.18	5,437.56	5,630.28	0.00	0.00	0.00
12,700.00	90.00	89.05	6,785.00	1,595.84	5,537.55	5,729.07	0.00	0.00	0.00
12,800.00	90.00	89.05	6,785.00	1,597.49	5,637.54	5,827.86	0.00	0.00	0.00
12,900.00	90.00	89.05	6,785.00	1,599.14	5,737.52	5,926.65	0.00	0.00	0.00
13,000.00	90.00	89.05	6,785.00	1,600.79	5,837.51	6,025.44	0.00	0.00	0.00
13,100.00	90.00	89.05	6,785.00	1,602.44	5,937.50	6,124.23	0.00	0.00	0.00
13,200.00	90.00	89.05	6,785.00	1,604.09	6,037.48	6,223.02	0.00	0.00	0.00
13,300.00	90.00	89.05	6,785.00	1,605.74	6,137.47	6,321.81	0.00	0.00	0.00
13,400.00	90.00	89.05	6,785.00	1,607.39	6,237.46	6,420.61	0.00	0.00	0.00
13,500.00	90.00	89.05	6,785.00	1,609.04	6,337.44	6,519.40	0.00	0.00	0.00
13,600.00	90.00	89.05	6,785.00	1,610.69	6,437.43	6,618.19	0.00	0.00	0.00
13,700.00	90.00	89.05	6,785.00	1,612.34	6,537.41	6,716.98	0.00	0.00	0.00
13,800.00	90.00	89.05	6,785.00	1,613.99	6,637.40	6,815.77	0.00	0.00	0.00
13,900.00	90.00	89.05	6,785.00	1,615.64	6,737.39	6,914.56	0.00	0.00	0.00
14,000.00	90.00	89.05	6,785.00	1,617.29	6,837.37	7,013.35	0.00	0.00	0.00
14,100.00	90.00	89.05	6,785.00	1,618.94	6,937.36	7,112.14	0.00	0.00	0.00
14,200.00	90.00	89.05	6,785.00	1,620.59	7,037.35	7,210.93	0.00	0.00	0.00
14,300.00	90.00	89.05	6,785.00	1,622.25	7,137.33	7,309.73	0.00	0.00	0.00
14,400.00	90.00	89.05	6,785.00	1,623.90	7,237.32	7,408.52	0.00	0.00	0.00
14,500.00	90.00	89.05	6,785.00	1,625.55	7,337.31	7,507.31	0.00	0.00	0.00
14,600.00	90.00	89.05	6,785.00	1,627.20	7,437.29	7,606.10	0.00	0.00	0.00
14,700.00	90.00	89.05	6,785.00	1,628.85	7,537.28	7,704.89	0.00	0.00	0.00
14,800.00	90.00	89.05	6,785.00	1,630.50	7,637.26	7,803.68	0.00	0.00	0.00
14,900.00	90.00	89.05	6,785.00	1,632.15	7,737.25	7,902.47	0.00	0.00	0.00
15,000.00	90.00	89.05	6,785.00	1,633.80	7,837.24	8,001.26	0.00	0.00	0.00
15,100.00	90.00	89.05	6,785.00	1,635.45	7,937.22	8,100.06	0.00	0.00	0.00
15,200.00	90.00	89.05	6,785.00	1,637.10	8,037.21	8,198.85	0.00	0.00	0.00
15,300.00	90.00	89.05	6,785.00	1,638.75	8,137.20	8,297.64	0.00	0.00	0.00
15,400.00	90.00	89.05	6,785.00	1,640.40	8,237.18	8,396.43	0.00	0.00	0.00
15,500.00	90.00	89.05	6,785.00	1,642.05	8,337.17	8,495.22	0.00	0.00	0.00
15,600.00	90.00	89.05	6,785.00	1,643.70	8,437.16	8,594.01	0.00	0.00	0.00
15,700.00	90.00	89.05	6,785.00	1,645.35	8,537.14	8,692.80	0.00	0.00	0.00
15,800.00	90.00	89.05	6,785.00	1,647.01	8,637.13	8,791.59	0.00	0.00	0.00
15,900.00	90.00	89.05	6,785.00	1,648.66	8,737.11	8,890.39	0.00	0.00	0.00
16,000.00	90.00	89.05	6,785.00	1,650.31	8,837.10	8,989.18	0.00	0.00	0.00
16,100.00	90.00	89.05	6,785.00	1,651.96	8,937.09	9,087.97	0.00	0.00	0.00
16,200.00	90.00	89.05	6,785.00	1,653.61	9,037.07	9,186.76	0.00	0.00	0.00
16,300.00	90.00	89.05	6,785.00	1,655.26	9,137.06	9,285.55	0.00	0.00	0.00
16,400.00	90.00	89.05	6,785.00	1,656.91	9,237.05	9,384.34	0.00	0.00	0.00
16,500.00	90.00	89.05	6,785.00	1,658.56	9,337.03	9,483.13	0.00	0.00	0.00
16,600.00	90.00	89.05	6,785.00	1,660.21	9,437.02	9,581.92	0.00	0.00	0.00
16,700.00	90.00	89.05	6,785.00	1,661.86	9,537.01	9,680.72	0.00	0.00	0.00
16,723.27	90.00	89.05	6,785.00	1,662.25	9,560.27	9,703.70	0.00	0.00	0.00
TD at 16723.27									

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-669
Company:	Northern Region - DJ Basin	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Project:	Wells Ranch	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-669	**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
Harper A21-669 TPZ/LP - plan hits target center - Point	0.00	0.00	6,785.00	1,508.95	274.30	1,417,203.23	3,261,457.97	40.4748210	-104.5601723
Harper A21-669 BHL 13 - plan hits target center - Point	0.00	0.00	6,785.00	1,662.25	9,560.27	1,417,356.53	3,270,743.93	40.4749668	-104.5267899

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
505.00	505.00	PIERRE		0.00	
707.00	707.00	UPPER PIERRE AQUIFER TOP		0.00	
1,532.00	1,532.00	UPPER PIERRE AQUIFER BASE		0.00	
3,712.52	3,670.00	PARKMAN		0.00	
4,308.54	4,222.00	SUSSEX		0.00	
5,106.46	4,961.00	SHANNON		0.00	
6,165.68	5,942.00	TEEPEE BUTTES		0.00	
6,994.27	6,648.00	SHARON SPRINGS		0.00	
7,047.40	6,678.00	NIO A CHALK		0.00	
7,082.55	6,696.00	NIO A MARL		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,400.00	2,400.00	0.00	0.00	Start Build 2.00
3,507.86	3,480.46	203.42	-58.11	Start 2865.94 hold at 3507.86 MD
6,373.80	6,134.75	1,242.74	-354.98	Start DLS 9.00 TFO 103.93
7,436.03	6,785.00	1,508.95	274.30	Start 9287.24 hold at 7436.03 MD
16,723.27	6,785.00	1,662.25	9,560.27	TD at 16723.27

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-669

Original Drilling
APD - Rev 1

Anticollision Summary Report

17 January, 2018

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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** 1/17/2018

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	16,723.27	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 15						
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	11,917.88	6,934.37	4,543.37	4,452.58	50.047	CC
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	12,000.00	6,934.74	4,544.11	4,452.32	49.507	ES
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	13,500.00	6,941.51	4,810.95	4,704.57	45.227	SF
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	11,943.19	6,775.15	1,906.27	1,815.56	21.013	CC, ES
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	12,300.00	6,774.31	1,939.38	1,844.84	20.515	SF
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,670.96	6,900.01	4,547.94	4,436.75	40.904	CC
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,700.00	6,900.01	4,548.03	4,436.48	40.770	ES
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	15,000.00	6,901.05	4,738.15	4,613.70	38.072	SF
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,658.85	6,816.15	3,214.36	3,103.47	28.988	CC
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,700.00	6,815.83	3,214.62	3,103.20	28.851	ES
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	14,300.00	6,810.68	3,277.67	3,159.99	27.852	SF
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,668.65	6,779.93	1,860.08	1,749.18	16.773	CC
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,700.00	6,780.27	1,860.34	1,749.01	16.710	ES
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,900.00	6,782.48	1,874.41	1,760.86	16.508	SF
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	14,788.43	6,851.12	3,359.42	3,235.09	27.020	CC
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	14,800.00	6,851.56	3,359.44	3,234.96	26.987	ES
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	15,500.00	6,876.42	3,433.83	3,302.23	26.093	SF
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,749.42	6,773.79	1,975.44	1,847.99	15.500	CC
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,800.00	6,773.88	1,976.08	1,847.95	15.422	ES
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	15,000.00	6,774.24	1,991.26	1,861.02	15.289	SF
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,003.27	6,813.44	3,179.91	3,041.04	22.898	CC, ES
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,500.00	6,834.38	3,218.44	3,074.23	22.318	SF
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	15,893.53	6,742.17	1,842.40	1,704.91	13.400	CC
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	15,900.00	6,742.18	1,842.41	1,704.83	13.391	ES
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	16,100.00	6,742.31	1,853.94	1,714.13	13.261	SF
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,202.09	7,702.75	3,424.35	3,312.36	30.579	CC
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,300.00	7,703.03	3,425.75	3,311.90	30.090	ES
Kerbs USX A15-12D - Original Drilling - Original Drilling	13,300.00	7,706.20	3,596.05	3,467.17	27.903	SF
McDaniel 32-15 - Original Drilling - Original Drilling - As D	14,767.87	6,821.93	4,667.61	4,543.46	37.597	CC
McDaniel 32-15 - Original Drilling - Original Drilling - As D	14,800.00	6,822.43	4,667.72	4,543.15	37.473	ES
McDaniel 32-15 - Original Drilling - Original Drilling - As D	16,000.00	6,859.14	4,827.45	4,690.81	35.329	SF
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,147.77	6,786.54	4,780.34	4,639.67	33.983	CC
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,200.00	6,787.20	4,780.63	4,639.28	33.823	ES
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,723.27	6,793.71	4,814.85	4,667.51	32.677	SF
Speicher 31-15 - Original Drilling - Original Drilling	15,014.28	6,650.01	6,030.34	5,903.43	47.516	CC
Speicher 31-15 - Original Drilling - Original Drilling	15,100.00	6,650.01	6,030.95	5,902.95	47.119	ES
Speicher 31-15 - Original Drilling - Original Drilling	16,723.27	6,650.01	6,267.82	6,123.49	43.427	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 A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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						
Speicher 41-15 - Original Drilling - Original Drilling	16,047.59	6,900.01	5,986.19	5,846.54	42.866	CC
Speicher 41-15 - Original Drilling - Original Drilling	16,100.00	6,900.01	5,986.42	5,846.10	42.663	ES
Speicher 41-15 - Original Drilling - Original Drilling	16,723.27	6,900.01	6,024.20	5,876.60	40.815	SF
Tye USX A15-03D - Original Drilling - Original MWD	13,429.18	6,906.93	6,181.12	6,070.29	55.774	CC
Tye USX A15-03D - Original Drilling - Original MWD	13,500.00	6,907.96	6,181.52	6,069.86	55.362	ES
Tye USX A15-03D - Original Drilling - Original MWD	15,600.00	6,936.57	6,551.17	6,419.91	49.910	SF
Tye USX A15-04D - Original Drilling - Original Drilling	12,149.12	7,262.79	6,125.51	6,012.55	54.227	CC
Tye USX A15-04D - Original Drilling - Original Drilling	12,200.00	7,262.92	6,125.72	6,012.24	53.980	ES
Tye USX A15-04D - Original Drilling - Original Drilling	14,000.00	7,267.83	6,399.03	6,270.95	49.963	SF
A Section 20						
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,439.35	2,393.20	2,354.96	2,338.25	140.943	CC
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,500.00	2,456.36	2,355.26	2,338.12	137.363	ES
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	6,650.00	6,323.01	3,309.25	3,262.77	71.199	SF
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	531.44	478.45	2,898.91	2,895.74	914.398	CC
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	3,507.86	3,417.24	2,913.53	2,889.48	121.110	ES
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	6,600.00	6,263.31	3,171.03	3,124.76	68.537	SF
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,400.00	2,327.00	3,481.47	3,426.56	63.403	CC
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,600.00	2,526.84	3,483.55	3,423.93	58.428	ES
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	6,750.00	6,400.05	4,207.25	4,054.23	27.495	SF
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	350.05	308.23	1,474.16	1,472.24	765.485	CC
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	1,300.00	1,246.09	1,479.16	1,470.55	171.892	ES
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	6,450.00	6,166.88	1,878.99	1,833.69	41.475	SF
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	5,250.40	5,210.02	7,301.37	7,264.30	196.965	CC
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	5,400.00	5,316.84	7,301.88	7,263.83	191.875	ES
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	7,100.00	6,693.32	7,697.67	7,642.78	140.222	SF
Simmons 42-20D - Original Drilling - Original Drilling - As	6,394.38	6,174.90	1,251.48	1,206.35	27.729	CC
Simmons 42-20D - Original Drilling - Original Drilling - As	6,400.00	6,180.19	1,251.51	1,206.33	27.704	ES
Simmons 42-20D - Original Drilling - Original Drilling - As	6,500.00	6,274.23	1,260.60	1,214.71	27.472	SF
Snider 1-20EG - Original Drilling - Original Drilling - As D	2,393.13	2,322.17	4,594.49	4,578.21	282.178	CC
Snider 1-20EG - Original Drilling - Original Drilling - As D	2,600.00	2,534.98	4,595.28	4,577.52	258.700	ES
Snider 1-20EG - Original Drilling - Original Drilling - As D	7,150.00	7,150.00	5,341.05	5,290.50	105.656	SF
Stump A20-11 - Original Drilling - Original Drilling - As Dr	4,851.39	4,680.89	4,396.70	4,363.10	130.856	CC
Stump A20-11 - Original Drilling - Original Drilling - As Dr	5,100.00	4,921.56	4,397.44	4,361.99	124.065	ES
Stump A20-11 - Original Drilling - Original Drilling - As Dr	6,700.00	6,400.00	4,516.64	4,469.52	95.862	SF
Stump A20-12 - Original Drilling - Original Drilling - As Dr	6,377.81	6,116.45	5,259.96	5,215.08	117.201	CC, ES
Stump A20-12 - Original Drilling - Original Drilling - As Dr	6,950.00	6,676.24	5,498.11	5,449.43	112.932	SF
Stump A20-13 - Original Drilling - Original Drilling - As Dr	2,889.51	2,873.10	5,828.47	5,808.50	291.818	CC
Stump A20-13 - Original Drilling - Original Drilling - As Dr	3,000.00	2,963.18	5,828.81	5,808.13	281.902	ES
Stump A20-13 - Original Drilling - Original Drilling - As Dr	6,800.00	6,429.64	6,163.97	6,116.45	129.710	SF
Winter 20-19 - Original Drilling - Original Drilling - As Dril	5,520.32	5,326.70	7,358.06	7,316.02	175.024	CC
Winter 20-19 - Original Drilling - Original Drilling - As Dril	5,600.00	5,359.12	7,358.33	7,315.87	173.296	ES
Winter 20-19 - Original Drilling - Original Drilling - As Dril	6,900.00	6,685.18	7,582.92	7,531.51	147.493	SF
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,403.06	6,442.96	6,959.84	6,898.83	114.068	CC, ES
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,700.00	6,709.85	7,028.21	6,965.58	112.232	SF
Winter 39-19 - Original Drilling - Original Drilling - As Dril	4,565.81	4,579.41	6,353.02	6,319.59	190.068	CC
Winter 39-19 - Original Drilling - Original Drilling - As Dril	4,700.00	4,687.79	6,353.49	6,319.25	185.561	ES
Winter 39-19 - Original Drilling - Original Drilling - As Dril	6,800.00	6,570.20	6,553.94	6,505.60	135.568	SF
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,387.60	6,455.92	5,926.18	5,860.91	90.800	CC, ES
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,600.00	6,658.57	5,960.84	5,894.71	90.133	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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	2,383.52	2,342.66	1,324.61	1,308.27	81.092	CC
Culbreath 23-21 - Original Drilling - Original Drilling - As D	2,400.00	2,358.72	1,324.61	1,308.16	80.524	ES
Culbreath 23-21 - Original Drilling - Original Drilling - As D	8,700.00	6,732.75	1,820.14	1,763.56	32.172	SF
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	9,450.82	6,730.00	1,921.18	1,746.07	10.972	CC, ES
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	9,600.00	6,730.00	1,926.96	1,750.75	10.935	SF
Harper A21-618 - Original Drilling - APD - Rev 1	2,000.00	1,984.00	1,493.55	1,479.73	108.107	CC
Harper A21-618 - Original Drilling - APD - Rev 1	2,100.00	2,063.54	1,494.13	1,479.68	103.407	ES
Harper A21-618 - Original Drilling - APD - Rev 1	16,723.27	16,495.03	3,273.09	3,024.93	13.190	SF
Harper A21-626 - Original Drilling - APD - Rev 1	2,400.00	2,384.00	1,470.56	1,453.88	88.146	CC, ES
Harper A21-626 - Original Drilling - APD - Rev 1	16,723.27	16,563.49	2,749.57	2,501.04	11.063	SF
Harper A21-631 - Original Drilling - APD - Rev 1	2,791.97	2,962.96	1,411.29	1,391.26	70.442	CC
Harper A21-631 - Original Drilling - APD - Rev 1	2,800.00	2,970.99	1,411.30	1,391.21	70.241	ES
Harper A21-631 - Original Drilling - APD - Rev 1	16,723.27	16,211.86	2,372.92	2,127.34	9.662	SF
Harper A21-637 - Original Drilling - APD - Rev 1	3,001.18	3,261.08	1,318.01	1,296.29	60.678	CC, ES
Harper A21-637 - Original Drilling - APD - Rev 1	16,714.99	16,346.20	1,999.69	1,753.49	8.122	SF
Harper A21-643 - Original Drilling - APD - Rev 1	2,141.18	2,139.23	89.94	75.08	6.051	CC
Harper A21-643 - Original Drilling - APD - Rev 1	2,300.00	2,302.41	90.62	74.62	5.665	ES
Harper A21-643 - Original Drilling - APD - Rev 1	2,500.00	2,502.99	95.23	77.83	5.471	SF
Harper A21-649 - Original Drilling - APD - Rev 1	2,400.00	2,401.00	68.00	51.26	4.061	CC, ES
Harper A21-649 - Original Drilling - APD - Rev 1	2,500.00	2,501.02	69.68	52.22	3.991	SF
Harper A21-656 - Original Drilling - APD - Rev 1	2,400.00	2,401.00	45.00	28.25	2.687	CC, ES
Harper A21-656 - Original Drilling - APD - Rev 1	2,500.00	2,501.02	46.68	29.22	2.674	SF
Harper A21-664 - Original Drilling - APD - Rev 1	2,400.00	2,401.00	23.00	6.25	1.373	Level 3, CC, ES, SF
Harper A21-674 - Original Drilling - APD - Rev 1	2,200.00	2,200.00	22.01	6.70	1.438	Level 3, CC, ES, SF
Harper A21-681 - Original Drilling - APD - Rev 1	2,000.00	2,001.00	45.01	31.13	3.243	CC, ES
Harper A21-681 - Original Drilling - APD - Rev 1	2,100.00	2,099.40	46.76	32.18	3.207	SF
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	790.08	770.11	1,491.01	1,486.63	340.965	CC
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	1,000.00	971.34	1,491.54	1,485.87	262.983	ES
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	8,800.00	6,362.30	3,656.32	3,607.42	74.771	SF
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	2,245.34	2,225.47	1,462.03	1,448.34	106.787	CC
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	2,400.00	2,379.39	1,462.12	1,447.76	101.840	ES
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	8,100.00	8,100.00	2,945.22	2,894.81	58.431	SF
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	2,875.44	3,102.38	1,391.43	1,373.39	77.119	CC
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	2,900.00	3,122.58	1,391.57	1,373.36	76.438	ES
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	6,600.00	7,927.33	2,095.32	2,044.62	41.326	SF
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,414.23	1,413.25	174.11	164.52	18.166	CC
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,700.00	1,697.64	175.30	163.70	15.111	ES
Kona A19-646 - Original Drilling - Original Drilling - As Dr	2,600.00	2,598.58	184.66	168.57	11.476	SF
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,519.43	1,520.50	156.07	145.72	15.090	CC
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,800.00	1,800.35	156.91	144.59	12.734	ES
Kona A19-662 - Original Drilling - Original Drilling - As Dr	7,150.00	7,207.42	505.95	458.58	10.682	SF
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	7,500.00	7,128.95	128.05	79.07	2.614	SF
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	7,530.26	7,107.33	126.21	78.74	2.659	CC, ES
Kona A19-685 - Original Drilling - Original Drilling - As Dr	1,580.22	1,580.26	158.48	147.72	14.731	CC
Kona A19-685 - Original Drilling - Original Drilling - As Dr	2,361.20	2,361.38	161.05	145.98	10.690	ES
Kona A19-685 - Original Drilling - Original Drilling - As Dr	2,500.00	2,494.95	163.82	148.16	10.457	SF
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	4,981.83	4,826.58	144.49	30.01	1.262	Level 3, CC
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	5,000.00	4,843.40	144.66	29.76	1.259	Level 3, ES, SF
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	8,382.94	6,782.00	536.88	369.74	3.212	CC, ES
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	8,400.00	6,782.00	537.15	369.83	3.210	SF
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,188.73	6,764.58	662.68	608.97	12.338	CC, ES
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,200.00	6,764.66	662.78	609.03	12.330	SF
McKee 31-21 - Original Drilling - Original Drilling - As Dril	9,432.83	6,815.88	907.32	843.72	14.268	CC, ES

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 A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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 31-21 - Original Drilling - Original Drilling - As Dril	9,600.00	6,812.04	922.58	857.19	14.109	SF
McKee 32-21 - Original Drilling - Original Drilling - As Dril	9,433.29	6,745.31	637.76	574.07	10.014	CC, ES, SF
McKee 41-21 - Original Drilling - Original Drilling - As Dril	10,728.31	6,730.13	841.56	764.34	10.898	CC, ES
McKee 41-21 - Original Drilling - Original Drilling - As Dril	10,800.00	6,730.71	844.60	766.44	10.805	SF
McKee 42-21 - Original Drilling - Original Drilling - As Dril	10,790.91	6,723.15	817.11	739.58	10.539	CC
McKee 42-21 - Original Drilling - Original Drilling - As Dril	10,800.00	6,723.15	817.16	739.57	10.532	ES, SF
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	10,741.71	6,722.00	1,697.33	1,509.09	9.017	CC, ES
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	10,900.00	6,722.00	1,704.70	1,515.27	8.999	SF
Wells Trust 13-21 - Original Drilling - Original Drilling - As	100.00	55.99	643.11	642.89	2,868.689	CC
Wells Trust 13-21 - Original Drilling - Original Drilling - As	1,400.00	1,355.55	644.16	634.82	68.928	ES
Wells Trust 13-21 - Original Drilling - Original Drilling - As	3,300.00	3,242.80	752.51	729.79	33.109	SF
Wells Trust 14-21 - Original Drilling - Original Drilling - As	2,414.28	2,363.09	1,814.12	1,797.60	109.854	CC, ES
Wells Trust 14-21 - Original Drilling - Original Drilling - As	7,000.00	6,605.44	3,206.88	3,158.46	66.231	SF
Wells Trust 24-21 - Original Drilling - Original Drilling - As	2,435.46	2,387.79	1,722.40	1,705.73	103.335	CC, ES
Wells Trust 24-21 - Original Drilling - Original Drilling - As	8,500.00	6,743.90	3,300.28	3,245.69	60.450	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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	16,041.50	6,675.40	3,069.61	2,930.67	22.093	CC
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,100.00	6,676.02	3,070.17	2,930.62	22.000	ES
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,400.00	6,679.23	3,090.48	2,948.44	21.759	SF
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,557.36	6,818.74	2,495.16	2,371.35	20.153	CC
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,600.00	6,818.63	2,495.53	2,371.29	20.087	ES
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,900.00	6,817.86	2,518.58	2,392.13	19.919	SF
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,203.18	6,701.52	2,045.87	1,887.15	12.890	CC, ES
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,400.00	6,700.75	2,055.31	1,895.17	12.834	SF
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	14,721.42	6,761.48	3,095.14	2,971.69	25.072	CC, ES
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,200.00	6,767.75	3,131.91	3,004.49	24.580	SF
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	15,692.78	6,776.96	2,651.76	2,516.45	19.598	CC
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	15,700.00	6,777.04	2,651.77	2,516.38	19.587	ES
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,000.00	6,780.51	2,669.50	2,531.68	19.370	SF
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,079.37	6,736.00	933.34	682.29	3.718	CC
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,100.00	6,736.00	933.57	682.19	3.714	ES, SF
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,612.97	6,747.76	961.89	839.83	7.880	CC, ES, SF
Eisenstat 22-15 - Original Drilling - Original Drilling - As D	15,423.97	6,748.65	266.61	134.72	2.021	CC, ES, SF
Eisenstat 22-21 - Original Drilling - Original Drilling - As D	13,621.03	6,771.99	538.23	428.05	4.885	CC, ES, SF
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,209.99	6,749.48	439.80	346.08	4.693	CC, ES, SF
Gill Land Assoc. 1 (PA) - Original Drilling - Original Drillin	16,069.53	6,737.00	585.41	334.46	2.333	CC, ES, SF
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,393.78	6,747.00	615.93	396.84	2.811	CC, ES
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,400.00	6,747.00	615.96	396.84	2.811	SF
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,108.00	6,755.66	674.59	582.00	7.285	CC, ES
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,200.00	6,755.50	680.84	587.18	7.270	SF
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	14,689.32	6,745.00	702.85	468.37	2.997	CC
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	14,700.00	6,745.00	702.93	468.26	2.995	ES, SF
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,045.31	6,721.52	1,889.90	1,798.24	20.619	CC, ES
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,300.00	6,721.10	1,906.99	1,813.49	20.395	SF
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,349.39	6,725.81	3,175.17	3,068.27	29.702	CC
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,400.00	6,724.63	3,175.58	3,068.16	29.564	ES
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,900.00	6,720.33	3,222.50	3,111.05	28.913	SF
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,370.10	6,738.38	1,876.97	1,769.81	17.516	CC
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,400.00	6,738.37	1,877.21	1,769.78	17.473	ES
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,600.00	6,738.34	1,891.00	1,782.22	17.383	SF
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,080.25	6,681.43	3,146.25	3,054.41	34.259	CC
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,100.00	6,681.68	3,146.31	3,054.27	34.185	ES
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,700.00	6,689.64	3,206.69	3,109.67	33.050	SF
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	12,694.48	6,718.19	2,619.62	2,520.24	26.360	CC
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	12,700.00	6,718.22	2,619.63	2,520.19	26.346	ES
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,100.00	6,719.75	2,650.82	2,548.17	25.824	SF
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	14,723.14	6,731.71	1,770.15	1,646.88	14.361	CC, ES
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	14,900.00	6,731.94	1,778.96	1,654.47	14.290	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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	16,723.27	6,623.44	3,036.89	2,979.48	52.906	CC, ES, SF
Champlin 23-02 (PA) - Original Drilling - Original Drilling -	16,723.27	6,696.00	1,875.41	1,622.21	7.407	CC, ES, SF
Champlin 23-03 - Original Drilling - Original Drilling - As D	16,723.27	6,645.56	3,510.62	3,376.53	26.182	CC, ES, SF
Champlin Amoco A 1 #308 - Original Drilling - Original Dr	16,723.27	6,671.00	3,482.36	3,235.32	14.096	CC, ES, SF
Cooper 23-1-17 - Orignal Drilling - Orignal Drilling - As Dr	16,723.27	6,656.26	4,097.12	4,033.39	64.291	CC, ES, SF
Cooper 23-1-19 - Original Drilling - Original Drilling - As D	16,723.27	6,628.26	2,823.85	2,770.67	53.096	CC, ES, SF
Cooper 23-12 - Original Drilling - Original Drilling - As Dri	16,723.27	6,655.20	3,426.36	3,366.71	57.442	CC, ES, SF
Cooper 23-1-20 - Original Drilling - Original Drilling - As D	16,723.27	6,619.59	3,016.19	2,937.61	38.382	CC, ES, SF
Cooper 23-15 - Original Drilling - Original Drilling - As Dri	16,723.27	6,643.67	4,000.51	3,948.05	76.250	CC, ES, SF
Foss 41-23D - Original Drilling - Original Drilling - As Drill	16,723.27	6,881.73	4,705.41	4,638.34	70.156	CC, ES, SF
Foss 42-23 - Original Drilling - Original Drilling - As Drille	16,723.27	6,663.97	4,480.65	4,420.28	74.226	CC, ES, SF
J&L Farms 23-11 - Original Drilling - Original Drilling - As	16,723.27	6,696.56	960.43	835.65	7.697	CC, ES, SF
J&L Farms 23-12 - Original Drilling - Original Drilling - As	16,723.27	6,749.49	811.69	678.71	6.104	CC, ES, SF
J&L Farms 23-21 - Original Drilling - Original Drilling - As	16,723.27	6,646.63	2,380.80	2,302.31	30.333	CC, ES, SF
J&L Farms 23-22 - Original Drilling - Original Drilling - As	16,723.27	6,737.69	1,968.60	1,900.43	28.876	CC, ES, SF
McIntosh 33-23 - Original Drilling - Original Drilling - As D	16,723.27	6,698.52	3,871.09	3,774.92	40.250	CC, ES, SF
McIntosh 34-23 - Original Drilling - Original Drilling - As D	16,723.27	6,642.10	4,644.24	4,531.63	41.241	CC, ES, SF
McIntosh 43-23 - Original Drilling - Original Drilling - As D	16,723.27	6,626.63	5,099.81	5,022.86	66.276	CC, ES, SF
McIntosh 44-23 - Original Drilling - Original Drilling - As D	16,723.27	6,648.40	5,876.56	5,775.94	58.405	CC, ES, SF
Schroeder 23-31 - Original Drilling - Original Drilling - As	16,723.27	6,622.33	2,982.89	2,868.44	26.063	CC, ES, SF
Schroeder 23-33 - Original Drilling - Original Drilling - As	16,723.27	6,673.04	3,400.42	3,253.74	23.183	CC, ES, SF
A Section 24						
Larson A23-622 - Original Drilling - APD - Rev 0	16,712.38	17,335.78	2,967.91	2,843.91	23.936	CC
Larson A23-622 - Original Drilling - APD - Rev 0	16,723.27	17,335.78	2,967.93	2,843.82	23.914	ES, SF
Larson A23-627 - Original Drilling - APD - Rev 0	16,714.24	17,349.62	2,633.04	2,508.88	21.208	CC
Larson A23-627 - Original Drilling - APD - Rev 0	16,723.27	17,349.62	2,633.05	2,508.80	21.192	ES, SF
Larson A23-633 - Original Drilling - APD - Rev 0	16,723.27	17,295.75	2,283.03	2,158.92	18.395	CC, ES, SF
Larson A23-639 - Original Drilling - APD - Rev 0	16,718.39	17,357.51	1,882.50	1,758.30	15.156	CC
Larson A23-639 - Original Drilling - APD - Rev 0	16,723.27	17,357.51	1,882.51	1,758.26	15.151	ES, SF
Larson A23-645 - Original Drilling - APD - Rev 0	16,723.27	18,106.34	1,481.83	1,357.54	11.922	CC, ES, SF
Larson A23-651 - Original Drilling - APD - Rev 0	16,723.27	18,048.86	1,171.95	1,047.75	9.437	CC, ES, SF
Larson A23-656 - Original Drilling - APD - Rev 0	16,723.27	18,068.53	862.84	738.41	6.934	CC, ES, SF
Larson A23-662 - Original Drilling - APD - Rev 0	16,723.27	18,065.31	439.82	315.83	3.547	CC, ES, SF
Larson A23-668 - Original Drilling - APD - Rev 0	16,723.27	17,466.37	71.71	-51.69	0.581	Level 1, CC, ES, SF
Larson A23-672 - Original Drilling - APD - Rev 0	16,723.27	17,460.94	378.44	285.84	4.087	CC, ES, SF
Larson A23-678 - Original Drilling - APD - Rev 0	16,723.27	17,179.62	595.37	471.67	4.813	CC, ES, SF
Larson A23-683 - Original Drilling - APD - Rev 0	16,723.27	17,320.24	906.00	781.56	7.281	CC, ES, SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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	14,745.23	6,752.00	4,454.26	4,218.97	18.931	CC
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	14,800.00	6,752.00	4,454.60	4,218.71	18.884	ES
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	15,400.00	6,752.00	4,502.13	4,260.67	18.645	SF
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,337.06	6,719.00	4,532.14	4,425.40	42.457	CC
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,400.00	6,719.80	4,532.58	4,425.15	42.192	ES
Howard 03-27 - Original Drilling - Original Drilling - As Dr	14,500.00	6,706.37	4,678.95	4,562.32	40.116	SF
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,095.04	6,712.00	4,415.57	4,212.33	21.726	CC
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,100.00	6,712.00	4,415.57	4,212.28	21.721	ES
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,900.00	6,712.00	4,488.34	4,277.62	21.300	SF
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,032.26	6,701.37	5,856.61	5,717.64	42.140	CC
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,100.00	6,701.52	5,857.01	5,717.27	41.913	ES
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,723.27	6,702.97	5,897.24	5,751.20	40.382	SF
Howard 10-27 - Original Drilling - Original Drilling - As Dr	14,797.29	6,640.36	7,160.36	7,036.54	57.828	CC
Howard 10-27 - Original Drilling - Original Drilling - As Dr	14,900.00	6,640.42	7,161.10	7,036.11	57.297	ES
Howard 10-27 - Original Drilling - Original Drilling - As Dr	16,723.27	6,641.40	7,414.86	7,272.93	52.243	SF
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,630.62	6,849.12	8,325.35	8,205.02	69.188	CC
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,700.00	6,848.19	8,325.64	8,204.52	68.739	ES
Howard 15-27 - Original Drilling - Original Drilling - As Dr	16,723.27	6,821.15	8,584.28	8,443.36	60.914	SF
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	12,086.47	3,765.00	5,341.46	5,220.38	44.116	CC
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	12,100.00	3,765.00	5,341.48	5,220.27	44.067	ES
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	13,800.00	3,765.00	5,609.58	5,473.14	41.113	SF
Howard A27-01 - Original Drilling - Original Drilling - As D	16,073.43	6,696.79	4,463.95	4,324.51	32.012	CC
Howard A27-01 - Original Drilling - Original Drilling - As D	16,100.00	6,696.80	4,464.03	4,324.29	31.946	ES
Howard A27-01 - Original Drilling - Original Drilling - As D	16,723.27	6,696.99	4,511.01	4,365.54	31.011	SF
Howard A27-05 - Original Drilling - Original Drilling - As D	12,098.34	6,658.22	5,815.12	5,723.07	63.173	CC
Howard A27-05 - Original Drilling - Original Drilling - As D	12,200.00	6,658.44	5,816.01	5,722.87	62.442	ES
Howard A27-05 - Original Drilling - Original Drilling - As D	14,200.00	6,662.45	6,183.25	6,073.01	56.088	SF
Howard A27-06 - Original Drilling - Original Drilling - As D	13,477.08	6,816.81	5,780.85	5,666.71	50.646	CC
Howard A27-06 - Original Drilling - Original Drilling - As D	13,500.00	6,816.76	5,780.90	5,666.48	50.525	ES
Howard A27-06 - Original Drilling - Original Drilling - As D	15,300.00	6,813.19	6,061.46	5,930.12	46.151	SF
Howard A27-07 - Original Drilling - Original Drilling - As D	14,825.74	6,717.41	5,859.76	5,735.31	47.085	CC
Howard A27-07 - Original Drilling - Original Drilling - As D	14,900.00	6,717.64	5,860.23	5,734.95	46.776	ES
Howard A27-07 - Original Drilling - Original Drilling - As D	16,500.00	6,723.17	6,094.26	5,955.17	43.817	SF
Howard A27-09 - Original Drilling - Original Drilling - As D	15,925.26	6,645.81	7,228.68	7,091.21	52.585	CC
Howard A27-09 - Original Drilling - Original Drilling - As D	16,000.00	6,645.72	7,229.06	7,090.74	52.264	ES
Howard A27-09 - Original Drilling - Original Drilling - As D	16,723.27	6,644.80	7,272.59	7,126.65	49.832	SF
Howard A27-16 - Original Drilling - Original Drilling - As D	16,195.18	6,766.59	8,501.87	8,360.57	60.169	CC
Howard A27-16 - Original Drilling - Original Drilling - As D	16,300.00	6,766.37	8,502.52	8,360.01	59.665	ES
Howard A27-16 - Original Drilling - Original Drilling - As D	16,723.27	6,765.49	8,518.26	8,371.06	57.870	SF
Howard A27-17D - Original Drilling - Original Drilling - As	15,484.98	6,806.75	5,051.81	4,914.92	36.906	CC
Howard A27-17D - Original Drilling - Original Drilling - As	15,500.00	6,806.78	5,051.83	4,914.80	36.866	ES
Howard A27-17D - Original Drilling - Original Drilling - As	16,500.00	6,808.95	5,152.77	5,008.06	35.608	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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	2,400.00	2,304.00	5,723.38	5,668.93	105.112	CC
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	2,500.00	2,403.98	5,724.97	5,668.16	100.778	ES
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	12,300.00	6,689.00	6,119.26	5,917.08	30.266	SF
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,400.00	2,292.00	7,854.31	7,800.10	144.886	CC
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,500.00	2,391.98	7,856.03	7,799.46	138.878	ES
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	13,600.00	6,677.00	9,095.18	8,880.93	42.450	SF
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,400.00	2,287.00	7,131.51	7,077.40	131.795	CC
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,500.00	2,386.98	7,133.23	7,076.76	126.323	ES
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	13,000.00	6,672.00	8,380.95	8,173.22	40.346	SF
Webster 09-28 - Original Drilling - Original Drilling - As D	2,400.00	2,302.00	6,571.20	6,516.79	120.771	CC
Webster 09-28 - Original Drilling - Original Drilling - As D	2,500.00	2,401.98	6,572.88	6,516.11	115.785	ES
Webster 09-28 - Original Drilling - Original Drilling - As D	12,700.00	6,687.00	7,438.88	7,233.17	36.161	SF

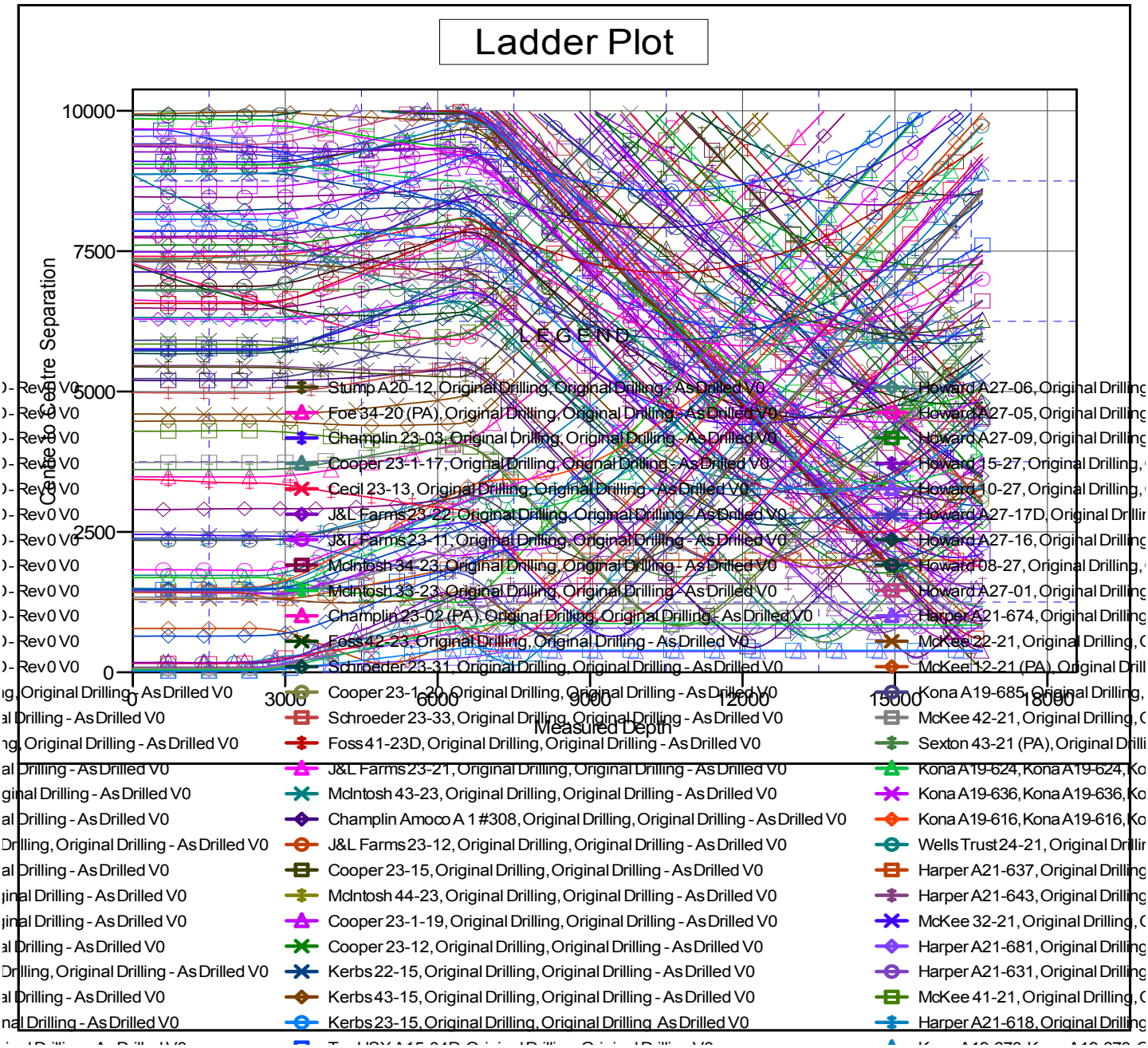
CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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 @ 4773.00ft (Original Well Elev	Coordinates are relative to: Harper A21-669
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°



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 A21-669
Project:	Wells Ranch	**TVD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Reference Site:	A Section 21	**MD Reference:**	WELL @ 4773.00ft (Original Well Elev.)
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Harper A21-669	**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 @ 4773.00ft (Original Well Elev
Offset Depths are relative to Offset Datum
Central Meridian is -105.5000000

Coordinates are relative to: Harper A21-669
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.61°