Project: Wells Ranch
Site: A Section 21
Well: Harper A21-674
Wellbore: Original Drilling
Design: APD - Rev 1

Northern Region - DJ Basin

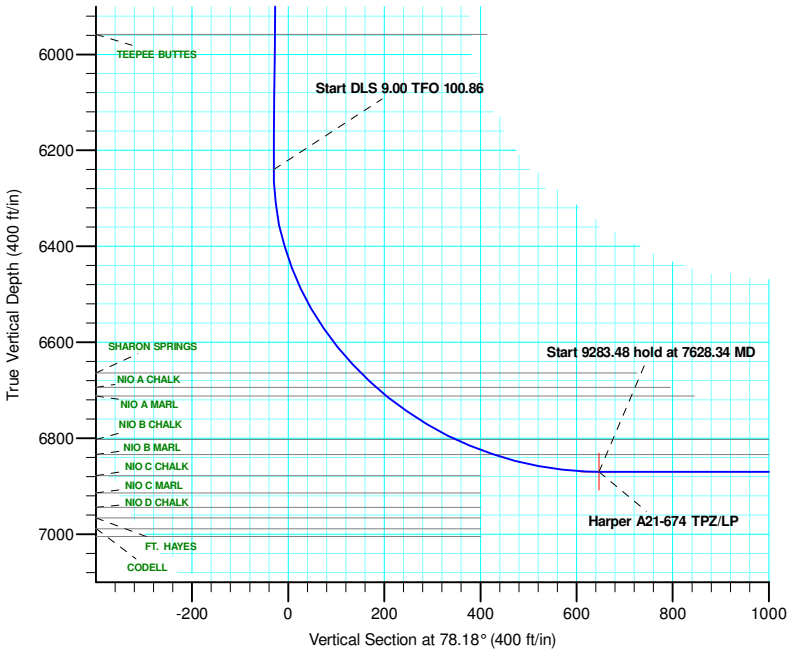
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
System Datum: Mean Sea Level

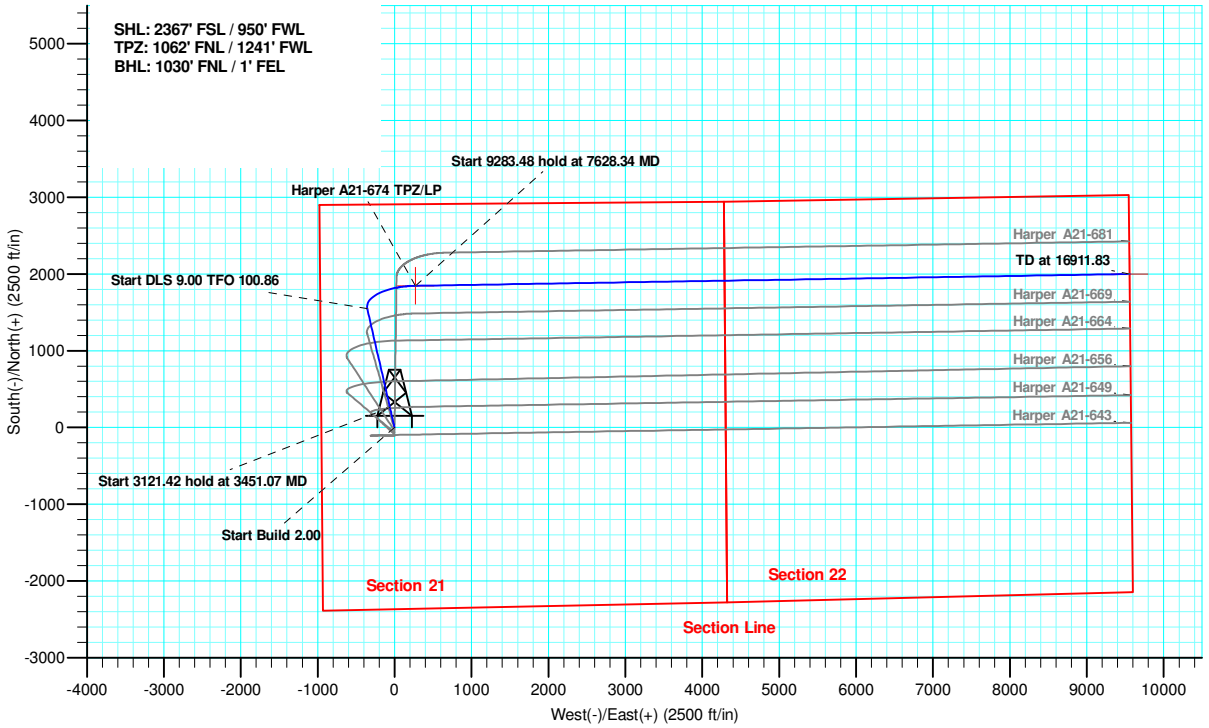
SECTION DETAILS

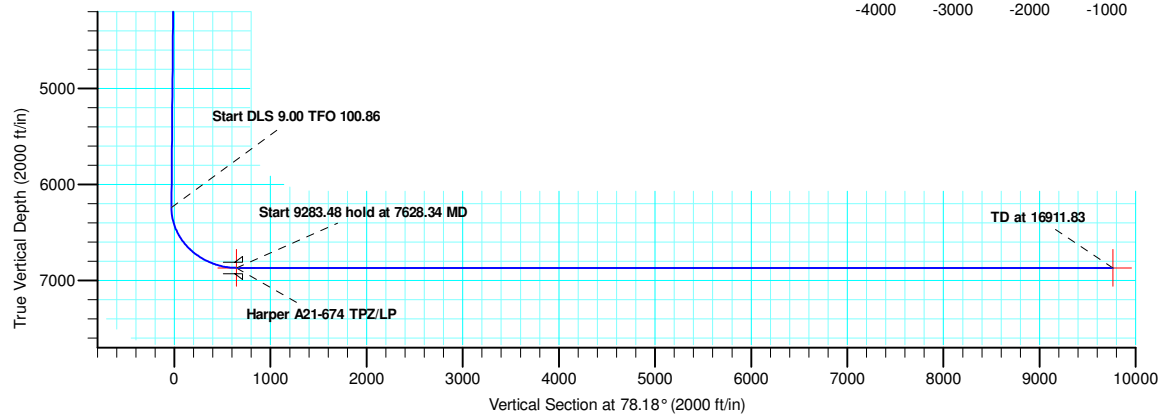
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	0.00	0.00	
3	3451.07	25.02	347.10	3411.68	262.07	-60.04	2.00	347.10	-5.08	
4	6572.49	25.02	347.10	6240.15	1548.96	-354.84	0.00	0.00	-30.00	
5	7628.34	90.00	89.05	6870.00	1846.99	274.49	9.00	100.86	647.05	Harper A21-674 TPZ/LP
6	16911.83	90.00	89.05	6870.00	2000.23	9556.71	0.00	0.00	9763.79	Harper A21-674 BHL 1030'FNL, 1'FEL

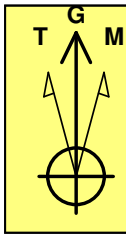
WELL DETAILS: Harper A21-674

	Northing	Easting	Ground Level:	4743.00	
			Latitude		Longitude
0.00	0.00	1415716.29	3261183.48	40.4707476	-104.5612155









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 A21-674/Original Drilling)

Created By: Shelly C. Peterkin Date: 10:24, January 17 2018

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-674

Original Drilling

Plan: APD - Rev 1

Standard Planning Report

17 January, 2018

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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 A21-674

Well Position	**+N/-S**	1,513.47 ft	**Northing:**	1,415,716.29 usft	**Latitude:**	40.4707476
	+E/-W	-48.43 ft	**Easting:**	3,261,183.48 usft	**Longitude:**	-104.5612154
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	52,504.00010120

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	78.18

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	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,451.07	25.02	347.10	3,411.68	262.07	-60.04	2.00	2.00	0.00	347.10	
6,572.49	25.02	347.10	6,240.15	1,548.96	-354.84	0.00	0.00	0.00	0.00	
7,628.34	90.00	89.05	6,870.00	1,846.99	274.49	9.00	6.15	9.66	100.86	Harper A21-674 TPZ/
16,911.83	90.00	89.05	6,870.00	2,000.23	9,556.71	0.00	0.00	0.00	0.00	Harper A21-674 BHL

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-674
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Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-674	**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
Start Build 2.00									
2,300.00	2.00	347.10	2,299.98	1.70	-0.39	-0.03	2.00	2.00	0.00
2,400.00	4.00	347.10	2,399.84	6.80	-1.56	-0.13	2.00	2.00	0.00
2,500.00	6.00	347.10	2,499.45	15.30	-3.50	-0.30	2.00	2.00	0.00
2,600.00	8.00	347.10	2,598.70	27.18	-6.23	-0.53	2.00	2.00	0.00
2,700.00	10.00	347.10	2,697.47	42.42	-9.72	-0.82	2.00	2.00	0.00
2,800.00	12.00	347.10	2,795.62	61.02	-13.98	-1.18	2.00	2.00	0.00
2,900.00	14.00	347.10	2,893.06	82.95	-19.00	-1.61	2.00	2.00	0.00
3,000.00	16.00	347.10	2,989.64	108.17	-24.78	-2.09	2.00	2.00	0.00
3,100.00	18.00	347.10	3,085.27	136.67	-31.31	-2.65	2.00	2.00	0.00
3,200.00	20.00	347.10	3,179.82	168.41	-38.58	-3.26	2.00	2.00	0.00
3,300.00	22.00	347.10	3,273.17	203.34	-46.58	-3.94	2.00	2.00	0.00
3,400.00	24.00	347.10	3,365.21	241.42	-55.31	-4.68	2.00	2.00	0.00
3,451.07	25.02	347.10	3,411.68	262.07	-60.04	-5.08	2.00	2.00	0.00
Start 3121.42 hold at 3451.07 MD									
3,500.00	25.02	347.10	3,456.02	282.24	-64.66	-5.47	0.00	0.00	0.00
3,600.00	25.02	347.10	3,546.63	323.47	-74.10	-6.26	0.00	0.00	0.00
3,700.00	25.02	347.10	3,637.25	364.70	-83.55	-7.06	0.00	0.00	0.00
3,753.80	25.02	347.10	3,686.00	386.88	-88.63	-7.49	0.00	0.00	0.00
PARKMAN									
3,800.00	25.02	347.10	3,727.86	405.93	-92.99	-7.86	0.00	0.00	0.00
3,900.00	25.02	347.10	3,818.48	447.15	-102.44	-8.66	0.00	0.00	0.00
4,000.00	25.02	347.10	3,909.09	488.38	-111.88	-9.46	0.00	0.00	0.00
4,100.00	25.02	347.10	3,999.71	529.61	-121.33	-10.26	0.00	0.00	0.00

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Site:	A Section 21	**North Reference:**	Grid
Well:	Harper A21-674	**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	25.02	347.10	4,090.33	570.84	-130.77	-11.05	0.00	0.00	0.00
4,300.00	25.02	347.10	4,180.94	612.07	-140.22	-11.85	0.00	0.00	0.00
4,362.97	25.02	347.10	4,238.00	638.03	-146.16	-12.36	0.00	0.00	0.00
SUSSEX									
4,400.00	25.02	347.10	4,271.56	653.29	-149.66	-12.65	0.00	0.00	0.00
4,500.00	25.02	347.10	4,362.17	694.52	-159.11	-13.45	0.00	0.00	0.00
4,600.00	25.02	347.10	4,452.79	735.75	-168.55	-14.25	0.00	0.00	0.00
4,700.00	25.02	347.10	4,543.40	776.98	-177.99	-15.05	0.00	0.00	0.00
4,800.00	25.02	347.10	4,634.02	818.20	-187.44	-15.84	0.00	0.00	0.00
4,900.00	25.02	347.10	4,724.63	859.43	-196.88	-16.64	0.00	0.00	0.00
5,000.00	25.02	347.10	4,815.25	900.66	-206.33	-17.44	0.00	0.00	0.00
5,100.00	25.02	347.10	4,905.86	941.89	-215.77	-18.24	0.00	0.00	0.00
5,178.51	25.02	347.10	4,977.00	974.25	-223.19	-18.87	0.00	0.00	0.00
SHANNON									
5,200.00	25.02	347.10	4,996.48	983.11	-225.22	-19.04	0.00	0.00	0.00
5,300.00	25.02	347.10	5,087.09	1,024.34	-234.66	-19.84	0.00	0.00	0.00
5,400.00	25.02	347.10	5,177.71	1,065.57	-244.11	-20.64	0.00	0.00	0.00
5,500.00	25.02	347.10	5,268.32	1,106.80	-253.55	-21.43	0.00	0.00	0.00
5,600.00	25.02	347.10	5,358.94	1,148.02	-263.00	-22.23	0.00	0.00	0.00
5,700.00	25.02	347.10	5,449.55	1,189.25	-272.44	-23.03	0.00	0.00	0.00
5,800.00	25.02	347.10	5,540.17	1,230.48	-281.89	-23.83	0.00	0.00	0.00
5,900.00	25.02	347.10	5,630.78	1,271.71	-291.33	-24.63	0.00	0.00	0.00
6,000.00	25.02	347.10	5,721.40	1,312.93	-300.78	-25.43	0.00	0.00	0.00
6,100.00	25.02	347.10	5,812.01	1,354.16	-310.22	-26.22	0.00	0.00	0.00
6,200.00	25.02	347.10	5,902.63	1,395.39	-319.66	-27.02	0.00	0.00	0.00
6,261.11	25.02	347.10	5,958.00	1,420.58	-325.44	-27.51	0.00	0.00	0.00
TEEPEE BUTTES									
6,300.00	25.02	347.10	5,993.24	1,436.62	-329.11	-27.82	0.00	0.00	0.00
6,400.00	25.02	347.10	6,083.86	1,477.85	-338.55	-28.62	0.00	0.00	0.00
6,500.00	25.02	347.10	6,174.47	1,519.07	-348.00	-29.42	0.00	0.00	0.00
6,572.49	25.02	347.10	6,240.15	1,548.96	-354.84	-30.00	0.00	0.00	0.00
Start DLS 9.00 TFO 100.86									
6,600.00	24.67	352.93	6,265.13	1,560.33	-356.85	-29.63	9.00	-1.29	21.21
6,650.00	24.62	3.74	6,310.60	1,581.08	-357.46	-25.97	9.00	-0.10	21.61
6,700.00	25.33	14.28	6,355.94	1,601.85	-354.14	-18.47	9.00	1.42	21.08
6,750.00	26.74	24.03	6,400.89	1,622.50	-346.92	-7.17	9.00	2.82	19.50
6,800.00	28.74	32.69	6,445.16	1,642.90	-335.84	7.85	9.00	4.02	17.33
6,850.00	31.23	40.20	6,488.48	1,662.93	-320.97	26.51	9.00	4.98	15.02
6,900.00	34.10	46.64	6,530.58	1,682.46	-302.40	48.68	9.00	5.73	12.87
6,950.00	37.25	52.15	6,571.20	1,701.38	-280.25	74.24	9.00	6.31	11.02
7,000.00	40.62	56.89	6,610.10	1,719.56	-254.66	103.02	9.00	6.75	9.49
7,050.00	44.17	61.01	6,647.02	1,736.90	-225.77	134.84	9.00	7.08	8.24
7,074.03	45.92	62.81	6,664.00	1,744.90	-210.77	151.16	9.00	7.29	7.47
SHARON SPRINGS									
7,100.00	47.84	64.63	6,681.75	1,753.29	-193.77	169.52	9.00	7.40	7.02
7,118.49	49.22	65.86	6,694.00	1,759.09	-181.19	183.03	9.00	7.49	6.66
NIO A CHALK									
7,146.67	51.36	67.64	6,712.00	1,767.64	-161.27	204.27	9.00	7.57	6.32
NIO A MARL									
7,150.00	51.61	67.85	6,714.08	1,768.63	-158.86	206.83	9.00	7.63	6.11
7,200.00	55.47	70.74	6,743.79	1,782.82	-121.25	246.55	9.00	7.71	5.79
7,250.00	59.38	73.37	6,770.71	1,795.78	-81.17	288.44	9.00	7.83	5.27
7,300.00	63.34	75.80	6,794.67	1,807.42	-38.88	332.22	9.00	7.93	4.86

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Well:	Harper A21-674	**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)
7,319.08	64.87	76.68	6,803.00	1,811.50	-22.21	349.37	9.00	7.98	4.62
NIO B CHALK									
7,350.00	67.35	78.07	6,815.53	1,817.67	5.38	377.64	9.00	8.02	4.47
7,400.00	71.38	80.20	6,833.15	1,826.48	51.32	424.41	9.00	8.06	4.27
7,402.69	71.60	80.31	6,834.00	1,826.91	53.83	426.96	9.00	8.09	4.16
NIO B MARL									
7,450.00	75.43	82.24	6,847.42	1,833.78	98.67	472.25	9.00	8.11	4.07
7,500.00	79.51	84.20	6,858.27	1,839.54	147.12	520.85	9.00	8.14	3.92
7,550.00	83.59	86.11	6,865.62	1,843.71	196.39	569.93	9.00	8.17	3.82
7,600.00	87.68	87.99	6,869.43	1,846.26	246.17	619.18	9.00	8.18	3.76
7,628.34	90.00	89.05	6,870.00	1,846.99	274.49	647.05	9.00	8.19	3.74
Start 9283.48 hold at 7628.34 MD									
7,691.50	90.00	89.05	6,870.00	1,848.04	337.64	709.07	0.00	0.00	0.00
TPZ									
7,700.00	90.00	89.05	6,870.00	1,848.18	346.14	717.42	0.00	0.00	0.00
7,800.00	90.00	89.05	6,870.00	1,849.83	446.13	815.62	0.00	0.00	0.00
7,900.00	90.00	89.05	6,870.00	1,851.48	546.11	913.83	0.00	0.00	0.00
8,000.00	90.00	89.05	6,870.00	1,853.13	646.10	1,012.03	0.00	0.00	0.00
8,100.00	90.00	89.05	6,870.00	1,854.78	746.08	1,110.23	0.00	0.00	0.00
8,200.00	90.00	89.05	6,870.00	1,856.43	846.07	1,208.44	0.00	0.00	0.00
8,300.00	90.00	89.05	6,870.00	1,858.08	946.06	1,306.64	0.00	0.00	0.00
8,400.00	90.00	89.05	6,870.00	1,859.73	1,046.04	1,404.85	0.00	0.00	0.00
8,500.00	90.00	89.05	6,870.00	1,861.38	1,146.03	1,503.05	0.00	0.00	0.00
8,600.00	90.00	89.05	6,870.00	1,863.03	1,246.02	1,601.25	0.00	0.00	0.00
8,700.00	90.00	89.05	6,870.00	1,864.68	1,346.00	1,699.46	0.00	0.00	0.00
8,800.00	90.00	89.05	6,870.00	1,866.33	1,445.99	1,797.66	0.00	0.00	0.00
8,900.00	90.00	89.05	6,870.00	1,867.98	1,545.98	1,895.87	0.00	0.00	0.00
9,000.00	90.00	89.05	6,870.00	1,869.64	1,645.96	1,994.07	0.00	0.00	0.00
9,100.00	90.00	89.05	6,870.00	1,871.29	1,745.95	2,092.27	0.00	0.00	0.00
9,200.00	90.00	89.05	6,870.00	1,872.94	1,845.94	2,190.48	0.00	0.00	0.00
9,300.00	90.00	89.05	6,870.00	1,874.59	1,945.92	2,288.68	0.00	0.00	0.00
9,400.00	90.00	89.05	6,870.00	1,876.24	2,045.91	2,386.89	0.00	0.00	0.00
9,500.00	90.00	89.05	6,870.00	1,877.89	2,145.89	2,485.09	0.00	0.00	0.00
9,600.00	90.00	89.05	6,870.00	1,879.54	2,245.88	2,583.29	0.00	0.00	0.00
9,700.00	90.00	89.05	6,870.00	1,881.19	2,345.87	2,681.50	0.00	0.00	0.00
9,800.00	90.00	89.05	6,870.00	1,882.84	2,445.85	2,779.70	0.00	0.00	0.00
9,900.00	90.00	89.05	6,870.00	1,884.49	2,545.84	2,877.91	0.00	0.00	0.00
10,000.00	90.00	89.05	6,870.00	1,886.14	2,645.83	2,976.11	0.00	0.00	0.00
10,100.00	90.00	89.05	6,870.00	1,887.79	2,745.81	3,074.31	0.00	0.00	0.00
10,200.00	90.00	89.05	6,870.00	1,889.44	2,845.80	3,172.52	0.00	0.00	0.00
10,300.00	90.00	89.05	6,870.00	1,891.09	2,945.79	3,270.72	0.00	0.00	0.00
10,400.00	90.00	89.05	6,870.00	1,892.74	3,045.77	3,368.92	0.00	0.00	0.00
10,500.00	90.00	89.05	6,870.00	1,894.39	3,145.76	3,467.13	0.00	0.00	0.00
10,600.00	90.00	89.05	6,870.00	1,896.05	3,245.74	3,565.33	0.00	0.00	0.00
10,700.00	90.00	89.05	6,870.00	1,897.70	3,345.73	3,663.54	0.00	0.00	0.00
10,800.00	90.00	89.05	6,870.00	1,899.35	3,445.72	3,761.74	0.00	0.00	0.00
10,900.00	90.00	89.05	6,870.00	1,901.00	3,545.70	3,859.94	0.00	0.00	0.00
11,000.00	90.00	89.05	6,870.00	1,902.65	3,645.69	3,958.15	0.00	0.00	0.00
11,100.00	90.00	89.05	6,870.00	1,904.30	3,745.68	4,056.35	0.00	0.00	0.00
11,200.00	90.00	89.05	6,870.00	1,905.95	3,845.66	4,154.56	0.00	0.00	0.00
11,300.00	90.00	89.05	6,870.00	1,907.60	3,945.65	4,252.76	0.00	0.00	0.00
11,400.00	90.00	89.05	6,870.00	1,909.25	4,045.64	4,350.96	0.00	0.00	0.00
11,500.00	90.00	89.05	6,870.00	1,910.90	4,145.62	4,449.17	0.00	0.00	0.00

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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)
11,600.00	90.00	89.05	6,870.00	1,912.55	4,245.61	4,547.37	0.00	0.00	0.00
11,700.00	90.00	89.05	6,870.00	1,914.20	4,345.59	4,645.58	0.00	0.00	0.00
11,800.00	90.00	89.05	6,870.00	1,915.85	4,445.58	4,743.78	0.00	0.00	0.00
11,900.00	90.00	89.05	6,870.00	1,917.50	4,545.57	4,841.98	0.00	0.00	0.00
12,000.00	90.00	89.05	6,870.00	1,919.15	4,645.55	4,940.19	0.00	0.00	0.00
12,100.00	90.00	89.05	6,870.00	1,920.80	4,745.54	5,038.39	0.00	0.00	0.00
12,200.00	90.00	89.05	6,870.00	1,922.45	4,845.53	5,136.59	0.00	0.00	0.00
12,300.00	90.00	89.05	6,870.00	1,924.11	4,945.51	5,234.80	0.00	0.00	0.00
12,400.00	90.00	89.05	6,870.00	1,925.76	5,045.50	5,333.00	0.00	0.00	0.00
12,500.00	90.00	89.05	6,870.00	1,927.41	5,145.49	5,431.21	0.00	0.00	0.00
12,600.00	90.00	89.05	6,870.00	1,929.06	5,245.47	5,529.41	0.00	0.00	0.00
12,700.00	90.00	89.05	6,870.00	1,930.71	5,345.46	5,627.61	0.00	0.00	0.00
12,800.00	90.00	89.05	6,870.00	1,932.36	5,445.44	5,725.82	0.00	0.00	0.00
12,900.00	90.00	89.05	6,870.00	1,934.01	5,545.43	5,824.02	0.00	0.00	0.00
13,000.00	90.00	89.05	6,870.00	1,935.66	5,645.42	5,922.23	0.00	0.00	0.00
13,100.00	90.00	89.05	6,870.00	1,937.31	5,745.40	6,020.43	0.00	0.00	0.00
13,200.00	90.00	89.05	6,870.00	1,938.96	5,845.39	6,118.63	0.00	0.00	0.00
13,300.00	90.00	89.05	6,870.00	1,940.61	5,945.38	6,216.84	0.00	0.00	0.00
13,400.00	90.00	89.05	6,870.00	1,942.26	6,045.36	6,315.04	0.00	0.00	0.00
13,500.00	90.00	89.05	6,870.00	1,943.91	6,145.35	6,413.25	0.00	0.00	0.00
13,600.00	90.00	89.05	6,870.00	1,945.56	6,245.34	6,511.45	0.00	0.00	0.00
13,700.00	90.00	89.05	6,870.00	1,947.21	6,345.32	6,609.65	0.00	0.00	0.00
13,800.00	90.00	89.05	6,870.00	1,948.86	6,445.31	6,707.86	0.00	0.00	0.00
13,900.00	90.00	89.05	6,870.00	1,950.52	6,545.29	6,806.06	0.00	0.00	0.00
14,000.00	90.00	89.05	6,870.00	1,952.17	6,645.28	6,904.27	0.00	0.00	0.00
14,100.00	90.00	89.05	6,870.00	1,953.82	6,745.27	7,002.47	0.00	0.00	0.00
14,200.00	90.00	89.05	6,870.00	1,955.47	6,845.25	7,100.67	0.00	0.00	0.00
14,300.00	90.00	89.05	6,870.00	1,957.12	6,945.24	7,198.88	0.00	0.00	0.00
14,400.00	90.00	89.05	6,870.00	1,958.77	7,045.23	7,297.08	0.00	0.00	0.00
14,500.00	90.00	89.05	6,870.00	1,960.42	7,145.21	7,395.28	0.00	0.00	0.00
14,600.00	90.00	89.05	6,870.00	1,962.07	7,245.20	7,493.49	0.00	0.00	0.00
14,700.00	90.00	89.05	6,870.00	1,963.72	7,345.19	7,591.69	0.00	0.00	0.00
14,800.00	90.00	89.05	6,870.00	1,965.37	7,445.17	7,689.90	0.00	0.00	0.00
14,900.00	90.00	89.05	6,870.00	1,967.02	7,545.16	7,788.10	0.00	0.00	0.00
15,000.00	90.00	89.05	6,870.00	1,968.67	7,645.15	7,886.30	0.00	0.00	0.00
15,100.00	90.00	89.05	6,870.00	1,970.32	7,745.13	7,984.51	0.00	0.00	0.00
15,200.00	90.00	89.05	6,870.00	1,971.97	7,845.12	8,082.71	0.00	0.00	0.00
15,300.00	90.00	89.05	6,870.00	1,973.62	7,945.10	8,180.92	0.00	0.00	0.00
15,400.00	90.00	89.05	6,870.00	1,975.27	8,045.09	8,279.12	0.00	0.00	0.00
15,500.00	90.00	89.05	6,870.00	1,976.93	8,145.08	8,377.32	0.00	0.00	0.00
15,600.00	90.00	89.05	6,870.00	1,978.58	8,245.06	8,475.53	0.00	0.00	0.00
15,700.00	90.00	89.05	6,870.00	1,980.23	8,345.05	8,573.73	0.00	0.00	0.00
15,800.00	90.00	89.05	6,870.00	1,981.88	8,445.04	8,671.94	0.00	0.00	0.00
15,900.00	90.00	89.05	6,870.00	1,983.53	8,545.02	8,770.14	0.00	0.00	0.00
16,000.00	90.00	89.05	6,870.00	1,985.18	8,645.01	8,868.34	0.00	0.00	0.00
16,100.00	90.00	89.05	6,870.00	1,986.83	8,745.00	8,966.55	0.00	0.00	0.00
16,200.00	90.00	89.05	6,870.00	1,988.48	8,844.98	9,064.75	0.00	0.00	0.00
16,300.00	90.00	89.05	6,870.00	1,990.13	8,944.97	9,162.95	0.00	0.00	0.00
16,400.00	90.00	89.05	6,870.00	1,991.78	9,044.95	9,261.16	0.00	0.00	0.00
16,500.00	90.00	89.05	6,870.00	1,993.43	9,144.94	9,359.36	0.00	0.00	0.00
16,600.00	90.00	89.05	6,870.00	1,995.08	9,244.93	9,457.57	0.00	0.00	0.00
16,700.00	90.00	89.05	6,870.00	1,996.73	9,344.91	9,555.77	0.00	0.00	0.00
16,800.00	90.00	89.05	6,870.00	1,998.38	9,444.90	9,653.97	0.00	0.00	0.00
16,900.00	90.00	89.05	6,870.00	2,000.03	9,544.89	9,752.18	0.00	0.00	0.00

Database:	EDMP	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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)
16,911.83	90.00	89.05	6,870.00	2,000.23	9,556.71	9,763.79	0.00	0.00	0.00
TD at 16911.83									

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 A21-674 BHL 10 - plan hits target center - Point	0.00	0.00	6,870.00	2,000.23	9,556.71	1,417,716.52	3,270,740.17	40.4759550	-104.5267892
Harper A21-674 TPZ/LP - plan hits target center - Point	0.00	0.00	6,870.00	1,846.99	274.49	1,417,563.28	3,261,457.97	40.4758093	-104.5601585

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
7,691.50	6,870.00	TPZ	5.500	6.000

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	
3,753.80	3,686.00	PARKMAN		0.00	
4,362.97	4,238.00	SUSSEX		0.00	
5,178.51	4,977.00	SHANNON		0.00	
6,261.11	5,958.00	TEEPEE BUTTES		0.00	
7,074.03	6,664.00	SHARON SPRINGS		0.00	
7,118.49	6,694.00	NIO A CHALK		0.00	
7,146.67	6,712.00	NIO A MARL		0.00	
7,319.08	6,803.00	NIO B CHALK		0.00	
7,402.69	6,834.00	NIO B MARL		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,200.00	2,200.00	0.00	0.00	Start Build 2.00
3,451.07	3,411.68	262.07	-60.04	Start 3121.42 hold at 3451.07 MD
6,572.49	6,240.15	1,548.96	-354.84	Start DLS 9.00 TFO 100.86
7,628.34	6,870.00	1,846.99	274.49	Start 9283.48 hold at 7628.34 MD
16,911.83	6,870.00	2,000.23	9,556.71	TD at 16911.83

Northern Region - DJ Basin

Wells Ranch
A Section 21
Harper A21-674

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 A21-674
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 A21-674	**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	16,911.83	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	12,104.61	7,007.70	4,181.58	4,090.17	45.748	CC
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	12,200.00	7,007.10	4,182.67	4,090.08	45.178	ES
Kerbs 12-15 - Original Drilling - Original Drilling - As Drille	13,500.00	7,001.16	4,408.25	4,302.90	41.845	SF
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	12,129.20	6,859.03	1,546.03	1,454.68	16.924	CC, ES
Kerbs 14-15 - Original Drilling - Original Drilling - As Drille	12,400.00	6,857.96	1,569.57	1,475.16	16.625	SF
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,857.68	6,973.68	4,186.56	4,074.88	37.485	CC
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	13,900.00	6,973.88	4,186.78	4,074.54	37.304	ES
Kerbs 22-15 - Original Drilling - Original Drilling - As Drille	15,000.00	6,979.03	4,339.60	4,216.20	35.167	SF
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,845.00	6,907.37	2,854.00	2,742.57	25.613	CC
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	13,900.00	6,907.52	2,854.53	2,742.36	25.450	ES
Kerbs 23-15 - Original Drilling - Original Drilling As Drille	14,400.00	6,908.94	2,907.46	2,790.02	24.758	SF
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	13,855.90	6,864.25	1,499.94	1,388.48	13.457	CC, ES
Kerbs 24-15 - Original Drilling - Original Drilling - As Drille	14,000.00	6,865.60	1,506.84	1,393.56	13.301	SF
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	14,977.40	6,908.98	2,998.01	2,873.19	24.018	CC
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	15,000.00	6,909.55	2,998.10	2,872.96	23.959	ES
Kerbs 33-15 - Original Drilling - Original Drilling - As Drille	15,500.00	6,921.53	3,043.16	2,912.64	23.315	SF
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	14,935.95	6,859.18	1,615.52	1,487.07	12.577	CC, ES
Kerbs 34-15 - Original Drilling - Original Drilling - As Drille	15,100.00	6,859.47	1,623.83	1,493.37	12.446	SF
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,191.95	6,905.74	2,818.07	2,678.75	20.228	CC
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,200.00	6,905.95	2,818.08	2,678.65	20.212	ES
Kerbs 43-15 - Original Drilling - Original Drilling - As Drille	16,600.00	6,916.29	2,847.44	2,703.59	19.795	SF
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	16,079.91	6,872.57	1,482.70	1,344.54	10.732	CC
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	16,100.00	6,872.60	1,482.83	1,344.38	10.710	ES
Kerbs 44-15 - Original Drilling - Original Drilling - As Drille	16,200.00	6,872.74	1,487.55	1,347.87	10.650	SF
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,388.73	7,749.50	3,058.55	2,946.26	27.236	CC
Kerbs USX A15-12D - Original Drilling - Original Drilling	12,500.00	7,750.38	3,060.58	2,946.04	26.722	ES
Kerbs USX A15-12D - Original Drilling - Original Drilling	13,300.00	7,757.21	3,191.41	3,064.09	25.065	SF
McDaniel 32-15 - Original Drilling - Original Drilling - As D	14,955.57	6,904.19	4,307.19	4,182.52	34.551	CC
McDaniel 32-15 - Original Drilling - Original Drilling - As D	15,000.00	6,904.91	4,307.42	4,182.17	34.392	ES
McDaniel 32-15 - Original Drilling - Original Drilling - As D	16,000.00	6,921.09	4,431.98	4,296.45	32.702	SF
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,335.21	6,872.74	4,419.96	4,278.82	31.315	CC
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,400.00	6,873.50	4,420.44	4,278.44	31.131	ES
McDaniel 42-15 - Original Drilling - Original Drilling - As D	16,911.83	6,879.47	4,457.41	4,309.57	30.149	SF
Speicher 31-15 - Original Drilling - Original Drilling	15,200.65	6,650.01	5,673.26	5,545.96	44.567	CC
Speicher 31-15 - Original Drilling - Original Drilling	15,300.00	6,650.01	5,674.13	5,545.56	44.134	ES
Speicher 31-15 - Original Drilling - Original Drilling	16,900.00	6,650.01	5,922.30	5,777.89	41.011	SF
Speicher 41-15 - Original Drilling - Original Drilling	16,233.97	6,900.01	5,625.03	5,485.07	40.192	CC

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 A21-674
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 A21-674	**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	16,300.00	6,900.01	5,625.42	5,484.61	39.951	ES
Speicher 41-15 - Original Drilling - Original Drilling	16,911.83	6,900.01	5,665.73	5,517.76	38.292	SF
Tye USX A15-03D - Original Drilling - Original MWD	13,616.55	7,012.73	5,821.24	5,709.85	52.262	CC
Tye USX A15-03D - Original Drilling - Original MWD	13,700.00	7,013.38	5,821.84	5,709.46	51.807	ES
Tye USX A15-03D - Original Drilling - Original MWD	15,600.00	7,017.91	6,149.87	6,019.66	47.229	SF
Tye USX A15-04D - Original Drilling - Original Drilling	12,335.79	7,335.33	5,765.83	5,652.36	50.814	CC
Tye USX A15-04D - Original Drilling - Original Drilling	12,400.00	7,335.77	5,766.19	5,652.06	50.524	ES
Tye USX A15-04D - Original Drilling - Original Drilling	14,000.00	7,347.49	6,001.19	5,874.09	47.217	SF
A Section 20						
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,247.51	2,206.94	2,372.66	2,357.29	154.373	CC
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	2,300.00	2,258.82	2,372.94	2,357.20	150.768	ES
Foe 16-20 - Original Drilling - Original Drilling - As Drilled	6,950.00	6,514.68	3,678.95	3,630.34	75.684	SF
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	531.19	478.20	2,903.29	2,900.12	916.284	CC
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	600.00	533.47	2,903.41	2,899.80	804.762	ES
Foe 33-20 - Original Drilling - Original Drilling - As Drilled	6,800.00	6,358.99	3,391.94	3,344.08	70.865	SF
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,200.00	2,127.00	3,493.42	3,443.23	69.599	CC
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	2,400.00	2,326.84	3,495.89	3,440.99	63.672	ES
Foe 34-20 (PA) - Original Drilling - Original Drilling - As D	6,900.00	6,457.58	4,457.03	4,301.81	28.714	SF
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	355.67	311.67	1,477.61	1,475.65	754.742	CC
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	1,300.00	1,245.90	1,482.64	1,474.04	172.309	ES
Foe 43-20 - Original Drilling - Original Drilling - As Drilled	6,650.00	6,273.83	2,158.47	2,111.66	46.113	SF
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	355.64	283.64	7,314.23	7,312.37	3,935.958	CC
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	2,900.00	2,800.50	7,320.63	7,300.89	370.883	ES
Linda Rae 1 - Original Drilling - Original Drilling - As Drille	7,300.00	6,782.80	7,852.94	7,795.70	137.191	SF
Simmons 42-20D - Original Drilling - Original Drilling - As	5,745.64	5,474.10	1,323.01	1,282.57	32.719	CC
Simmons 42-20D - Original Drilling - Original Drilling - As	5,900.00	5,628.98	1,323.87	1,282.24	31.801	ES
Simmons 42-20D - Original Drilling - Original Drilling - As	6,650.00	6,333.72	1,366.87	1,319.62	28.930	SF
Snider 1-20EG - Original Drilling - Original Drilling - As D	2,238.84	2,178.31	4,602.90	4,587.68	302.297	CC
Snider 1-20EG - Original Drilling - Original Drilling - As D	2,300.00	2,234.51	4,603.05	4,587.41	294.286	ES
Snider 1-20EG - Original Drilling - Original Drilling - As D	7,150.00	6,500.26	5,414.96	5,365.66	109.833	SF
Stump A20-11 - Original Drilling - Original Drilling - As Dr	4,088.95	3,982.81	4,439.38	4,411.12	157.085	CC
Stump A20-11 - Original Drilling - Original Drilling - As Dr	4,200.00	4,081.52	4,439.62	4,410.57	152.832	ES
Stump A20-11 - Original Drilling - Original Drilling - As Dr	6,900.00	6,470.92	4,676.53	4,627.80	95.965	SF
Stump A20-12 - Original Drilling - Original Drilling - As Dr	5,748.38	5,559.06	5,346.51	5,305.83	131.420	CC
Stump A20-12 - Original Drilling - Original Drilling - As Dr	6,100.00	5,915.92	5,347.96	5,304.50	123.062	ES
Stump A20-12 - Original Drilling - Original Drilling - As Dr	7,050.00	6,733.75	5,545.12	5,495.01	110.651	SF
Stump A20-13 - Original Drilling - Original Drilling - As Dr	2,665.25	2,700.00	5,840.38	5,821.81	314.606	CC
Stump A20-13 - Original Drilling - Original Drilling - As Dr	2,700.00	2,726.62	5,840.42	5,821.64	310.990	ES
Stump A20-13 - Original Drilling - Original Drilling - As Dr	7,150.00	6,665.19	6,463.42	6,413.36	129.116	SF
Winter 20-19 - Original Drilling - Original Drilling - As Dril	449.64	380.69	7,374.45	7,371.89	2,877.739	CC
Winter 20-19 - Original Drilling - Original Drilling - As Dril	1,200.00	1,057.51	7,375.98	7,367.16	836.127	ES
Winter 20-19 - Original Drilling - Original Drilling - As Dril	7,050.00	6,748.77	7,672.03	7,619.12	144.992	SF
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,578.22	6,520.16	7,019.19	6,956.88	112.652	CC, ES
Winter 24-19 - Original Drilling - Original Drilling - As Dril	6,950.00	6,839.04	7,124.53	7,060.22	110.781	SF
Winter 39-19 - Original Drilling - Original Drilling - As Dril	4,152.63	4,320.03	6,396.57	6,365.37	205.017	CC
Winter 39-19 - Original Drilling - Original Drilling - As Dril	4,200.00	4,341.94	6,396.68	6,365.25	203.518	ES
Winter 39-19 - Original Drilling - Original Drilling - As Dril	7,000.00	6,656.46	6,709.34	6,659.29	134.058	SF
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,101.89	6,172.86	6,004.29	5,940.81	94.596	CC, ES
Winter 40-19 - Original Drilling - Original Drilling - As Dril	6,800.00	6,792.41	6,053.93	5,987.70	91.403	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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	2,228.26	2,193.70	1,331.02	1,315.77	87.234	CC, ES
Culbreath 23-21 - Original Drilling - Original Drilling - As D	9,000.00	6,816.33	2,195.25	2,136.97	37.668	SF
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	9,637.20	6,815.00	2,281.18	2,103.76	12.857	CC, ES
Culbreath 33-21 (PA) - Original Drilling - Original Drilling	9,800.00	6,815.00	2,286.99	2,108.35	12.803	SF
Harper A21-618 - Original Drilling - APD - Rev 1	2,000.00	1,984.00	1,515.54	1,501.73	109.699	CC
Harper A21-618 - Original Drilling - APD - Rev 1	2,100.00	2,063.32	1,516.12	1,501.67	104.934	ES
Harper A21-618 - Original Drilling - APD - Rev 1	16,911.83	16,495.03	3,633.59	3,385.50	14.646	SF
Harper A21-626 - Original Drilling - APD - Rev 1	2,200.00	2,184.00	1,492.55	1,477.30	97.876	CC, ES
Harper A21-626 - Original Drilling - APD - Rev 1	16,911.83	16,563.49	3,107.98	2,859.53	12.509	SF
Harper A21-631 - Original Drilling - APD - Rev 1	2,586.07	2,761.69	1,459.52	1,440.95	78.563	CC
Harper A21-631 - Original Drilling - APD - Rev 1	2,600.00	2,775.62	1,459.56	1,440.88	78.143	ES
Harper A21-631 - Original Drilling - APD - Rev 1	16,911.83	16,211.86	2,734.07	2,488.82	11.148	SF
Harper A21-637 - Original Drilling - APD - Rev 1	2,792.45	3,060.91	1,380.29	1,360.04	68.162	CC
Harper A21-637 - Original Drilling - APD - Rev 1	2,800.00	3,068.46	1,380.30	1,359.99	67.978	ES
Harper A21-637 - Original Drilling - APD - Rev 1	16,911.83	16,342.35	2,357.88	2,112.00	9.589	SF
Harper A21-643 - Original Drilling - APD - Rev 1	2,157.30	2,155.38	111.93	96.95	7.473	CC
Harper A21-643 - Original Drilling - APD - Rev 1	2,200.00	2,197.98	111.96	96.68	7.329	ES
Harper A21-643 - Original Drilling - APD - Rev 1	2,300.00	2,302.33	114.04	98.05	7.129	SF
Harper A21-649 - Original Drilling - APD - Rev 1	2,200.00	2,201.00	90.01	74.70	5.879	CC, ES
Harper A21-649 - Original Drilling - APD - Rev 1	2,300.00	2,301.02	91.71	75.68	5.722	SF
Harper A21-656 - Original Drilling - APD - Rev 1	2,200.00	2,201.00	67.00	51.69	4.376	CC, ES
Harper A21-656 - Original Drilling - APD - Rev 1	2,300.00	2,301.02	68.71	52.68	4.287	SF
Harper A21-664 - Original Drilling - APD - Rev 1	2,200.00	2,201.00	45.00	29.69	2.939	CC, ES
Harper A21-664 - Original Drilling - APD - Rev 1	16,911.83	17,101.42	715.44	462.78	2.832	SF
Harper A21-669 - 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	23.00	9.13	1.658	CC, ES, SF
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	789.97	770.00	1,512.95	1,508.58	346.038	CC
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	1,000.00	971.21	1,513.49	1,507.82	266.870	ES
Kona A19-616 - Kona A19-616 - Kona A19-616 - As Drille	9,300.00	6,361.77	4,112.54	4,061.47	80.518	SF
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	2,201.13	2,181.84	1,483.99	1,470.48	109.860	CC, ES
Kona A19-624 - Kona A19-624 - Kona A19-624 - As Drille	6,900.00	7,272.00	3,132.56	3,086.95	68.683	SF
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	2,302.42	2,333.87	1,427.98	1,414.21	103.714	CC, ES
Kona A19-636 - Kona A19-636 - Kona A19-636 - As Drille	6,650.00	7,957.97	2,372.78	2,321.17	45.967	SF
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,408.76	1,407.78	184.07	174.52	19.283	CC
Kona A19-646 - Original Drilling - Original Drilling - As Dr	1,700.00	1,697.41	185.32	173.72	15.976	ES
Kona A19-646 - Original Drilling - Original Drilling - As Dr	2,400.00	2,399.01	195.46	180.28	12.874	SF
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,507.88	1,509.04	153.96	143.70	15.004	CC
Kona A19-662 - Original Drilling - Original Drilling - As Dr	1,800.00	1,800.03	155.20	142.88	12.597	ES
Kona A19-662 - Original Drilling - Original Drilling - As Dr	2,200.00	2,194.91	162.93	148.57	11.347	SF
Kona A19-670 - Kona A19-670 - Original Drilling - As Dril	7,268.71	7,579.83	141.68	89.48	2.714	CC, ES, SF
Kona A19-685 - Original Drilling - Original Drilling - As Dr	1,069.05	1,069.07	159.80	152.65	22.369	CC
Kona A19-685 - Original Drilling - Original Drilling - As Dr	1,800.00	1,798.52	160.80	148.49	13.066	ES
Kona A19-685 - Original Drilling - Original Drilling - As Dr	8,262.98	7,333.69	472.93	416.64	8.401	SF
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	4,558.45	4,396.14	189.69	85.35	1.818	CC
McKee 12-21 (PA) - Original Drilling - Original Drilling - A	4,600.00	4,433.79	190.50	85.23	1.810	ES, SF
McKee 21-21 (PA) - Original Drilling - Original Drilling - A	8,569.31	6,867.00	176.87	7.22	1.043	Level 2, CC, ES, SF
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,375.63	6,844.66	1,022.67	967.87	18.662	CC, ES
McKee 22-21 - Original Drilling - Original Drilling - As Dril	8,400.00	6,844.78	1,022.96	968.06	18.634	SF
McKee 31-21 - Original Drilling - Original Drilling - As Dril	9,617.61	6,885.36	543.99	479.63	8.452	CC, ES
McKee 31-21 - Original Drilling - Original Drilling - As Dril	9,700.00	6,883.47	550.19	484.72	8.403	SF
McKee 32-21 - Original Drilling - Original Drilling - As Dril	9,619.92	6,825.10	998.62	934.07	15.470	CC, ES
McKee 32-21 - Original Drilling - Original Drilling - As Dril	9,700.00	6,825.33	1,001.82	936.89	15.429	SF
McKee 41-21 - Original Drilling - Original Drilling - As Dril	10,915.61	6,824.31	484.19	406.11	6.201	CC, ES, 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 A21-674
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 A21-674	**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 42-21 - Original Drilling - Original Drilling - As Dril	10,977.17	6,806.98	1,178.22	1,099.93	15.050	CC, ES
McKee 42-21 - Original Drilling - Original Drilling - As Dril	11,100.00	6,806.69	1,184.61	1,105.69	15.011	SF
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	10,928.08	6,807.00	2,057.34	1,866.94	10.806	CC, ES
Sexton 43-21 (PA) - Original Drilling - Original Drilling - A	11,100.00	6,807.00	2,064.51	1,872.78	10.768	SF
Wells Trust 13-21 - Original Drilling - Original Drilling - As	100.00	55.90	661.54	661.31	2,952.821	CC
Wells Trust 13-21 - Original Drilling - Original Drilling - As	1,400.00	1,355.33	662.61	653.27	70.908	ES
Wells Trust 13-21 - Original Drilling - Original Drilling - As	3,100.00	3,044.40	776.82	755.50	36.434	SF
Wells Trust 14-21 - Original Drilling - Original Drilling - As	2,218.09	2,169.41	1,836.34	1,821.21	121.354	CC, ES
Wells Trust 14-21 - Original Drilling - Original Drilling - As	7,200.00	6,701.52	3,560.29	3,510.47	71.452	SF
Wells Trust 24-21 - Original Drilling - Original Drilling - As	2,220.15	2,163.46	1,745.54	1,730.42	115.508	CC, ES
Wells Trust 24-21 - Original Drilling - Original Drilling - As	8,900.00	6,826.82	3,708.86	3,652.02	65.254	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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	16,228.97	6,746.06	3,430.73	3,291.40	24.623	CC, ES
Carpio 22-01 - Original Drilling - Original Drilling - As Dril	16,700.00	6,753.48	3,462.91	3,319.62	24.168	SF
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	14,743.49	6,913.22	2,852.79	2,727.99	22.858	CC, ES
Carpio 22-04-19 - Original Drilling - Original Drilling - As D	15,100.00	6,912.30	2,874.98	2,747.30	22.517	SF
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,389.23	6,785.01	2,406.23	2,246.18	15.034	CC
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,400.00	6,784.96	2,406.25	2,246.10	15.025	ES
Carpio 22-41 - Original Drilling - Original Drilling - As Dril	16,600.00	6,784.17	2,415.44	2,253.76	14.939	SF
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	14,909.26	6,837.40	3,454.91	3,330.98	27.879	CC, ES
Carpio 22-43 - Original Drilling - Original Drilling - As Dril	15,500.00	6,849.59	3,505.03	3,376.25	27.217	SF
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	15,880.22	6,869.20	3,009.98	2,874.10	22.153	CC
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	15,900.00	6,869.43	3,010.04	2,873.97	22.120	ES
Carpio 22-45 - Original Drilling - Original Drilling - As Dril	16,300.00	6,874.06	3,039.10	2,899.93	21.836	SF
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,265.74	6,821.00	573.34	320.40	2.267	CC, ES
Eisenstat 22-11 (PA) - Original Drilling - Original Drilling -	16,300.00	6,821.00	574.36	320.89	2.266	SF
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,798.88	6,862.13	1,321.66	1,198.93	10.769	CC
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,800.00	6,862.14	1,321.66	1,198.93	10.769	ES
Eisenstat 22-13 - Original Drilling - Original Drilling - As D	14,900.00	6,862.96	1,325.52	1,202.26	10.754	SF
Eisenstat 22-15 - Original Drilling - Original Drilling - As D	15,610.72	6,837.54	92.30	-40.14	0.697	Level 1, CC, ES, SF
Eisenstat 22-21 - Original Drilling - Original Drilling - As D	13,806.90	6,852.00	177.08	66.38	1.600	CC, ES, SF
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,396.92	6,833.18	799.86	705.53	8.479	CC
Eisenstat 22-23 - Original Drilling - Original Drilling - As D	12,400.00	6,833.20	799.87	705.52	8.478	ES, SF
Gill Land Assoc. 1 (PA) - Original Drilling - Original Drillin	16,255.91	6,822.00	945.41	692.58	3.739	CC, ES, SF
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,580.15	6,832.00	975.93	754.87	4.415	CC, ES
Gill Land Assoc. 22-02 (PA) - Original Drilling - Original D	13,600.00	6,832.00	976.14	754.96	4.413	SF
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,294.31	6,841.51	314.65	221.42	3.375	CC
Gill Land Assoc. 22-03 - Original Drilling - Original Drilling	12,300.00	6,841.51	314.70	221.33	3.370	ES, SF
Gill Land Assoc. 22-04 (PA) - Original Drilling - Original D	14,875.69	6,830.00	342.85	106.44	1.450	Level 3, CC, ES, SF
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,231.70	6,820.91	2,250.83	2,158.61	24.409	CC, ES
Gruen 22-01 - Original Drilling - Original Drilling - As Drill	12,500.00	6,819.42	2,266.76	2,172.48	24.042	SF
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,534.00	6,783.73	3,536.03	3,428.77	32.965	CC
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	13,600.00	6,782.40	3,536.65	3,428.73	32.770	ES
Gruen 22-02 - Original Drilling - Original Drilling - As Drill	14,200.00	6,769.92	3,598.17	3,485.51	31.940	SF
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,556.15	6,830.14	2,237.50	2,129.72	20.760	CC, ES
Gruen 22-31 - Original Drilling - Original Drilling - As Drill	13,800.00	6,829.13	2,250.75	2,141.12	20.530	SF
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,267.72	6,733.77	3,507.83	3,415.57	38.023	CC
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	12,300.00	6,734.25	3,507.98	3,415.40	37.891	ES
Gruen 22-33 - Original Drilling - Original Drilling - As Drill	13,100.00	6,746.37	3,605.18	3,506.22	36.431	SF
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	12,881.23	6,805.95	2,978.02	2,878.00	29.775	CC
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	12,900.00	6,806.03	2,978.07	2,877.87	29.721	ES
Gruen 22-35 - Original Drilling - Original Drilling - As Drill	13,400.00	6,805.87	3,022.87	2,918.75	29.033	SF
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	14,909.68	6,810.42	2,130.75	2,007.02	17.221	CC, ES
Ottinger 22-01 - Original Drilling - Original Drilling - As Dr	15,100.00	6,810.92	2,139.23	2,014.06	17.091	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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	16,911.83	6,707.02	3,097.31	3,029.38	45.596	CC, ES, SF
Champlin 23-02 (PA) - Original Drilling - Original Drilling -	16,911.83	6,781.00	2,218.52	1,961.52	8.632	CC, ES, SF
Champlin 23-03 - Original Drilling - Original Drilling - As D	16,911.83	6,716.03	3,827.76	3,690.43	27.873	CC, ES, SF
Champlin Amoco A 1 #308 - Original Drilling - Original Dr	16,911.83	6,756.00	3,806.38	3,555.03	15.144	CC, ES, SF
Cooper 23-1-17 - Orignal Drilling - Orignal Drilling - As Dr	16,911.83	6,731.27	4,013.72	3,955.44	68.866	CC, ES, SF
Cooper 23-1-19 - Original Drilling - Original Drilling - As D	16,911.83	6,717.61	2,811.23	2,756.03	50.925	CC, ES, SF
Cooper 23-12 - Original Drilling - Original Drilling - As Dri	16,911.83	6,742.31	3,365.06	3,310.01	61.127	CC, ES, SF
Cooper 23-1-20 - Original Drilling - Original Drilling - As D	16,911.83	6,694.25	3,161.83	3,071.63	35.052	CC, ES, SF
Cooper 23-15 - Original Drilling - Original Drilling - As Dri	16,911.83	6,737.26	3,997.35	3,941.68	71.797	CC, ES, SF
Foss 41-23D - Original Drilling - Original Drilling - As Drill	16,911.83	6,962.67	4,659.67	4,594.12	71.093	CC, ES, SF
Foss 42-23 - Original Drilling - Original Drilling - As Drille	16,911.83	6,745.84	4,547.55	4,479.16	66.496	CC, ES, SF
J&L Farms 23-11 - Original Drilling - Original Drilling - As	16,911.83	6,783.72	690.89	589.59	6.820	CC, ES, SF
J&L Farms 23-12 - Original Drilling - Original Drilling - As	16,911.83	6,846.54	1,129.14	987.08	7.948	CC, ES, SF
J&L Farms 23-21 - Original Drilling - Original Drilling - As	16,911.83	6,738.07	2,251.58	2,185.72	34.185	CC, ES, SF
J&L Farms 23-22 - Original Drilling - Original Drilling - As	16,911.83	6,826.62	2,080.16	1,994.81	24.372	CC, ES, SF
McIntosh 33-23 - Original Drilling - Original Drilling - As D	16,911.83	6,748.59	4,067.87	3,963.50	38.976	CC, ES, SF
McIntosh 34-23 - Original Drilling - Original Drilling - As D	16,911.83	6,735.30	4,892.36	4,774.10	41.367	CC, ES, SF
McIntosh 43-23 - Original Drilling - Original Drilling - As D	16,911.83	6,673.98	5,232.01	5,147.51	61.919	CC, ES, SF
McIntosh 44-23 - Original Drilling - Original Drilling - As D	16,911.83	6,700.00	6,085.43	5,979.23	57.300	CC, ES, SF
Schroeder 23-31 - Original Drilling - Original Drilling - As	16,911.83	6,700.66	3,243.09	3,121.33	26.634	CC, ES, SF
Schroeder 23-33 - Original Drilling - Original Drilling - As	16,911.83	6,750.05	3,757.35	3,609.95	25.491	CC, ES, SF
A Section 24						
Larson A23-622 - Original Drilling - APD - Rev 0	16,898.76	17,335.78	3,329.12	3,205.26	26.878	CC
Larson A23-622 - Original Drilling - APD - Rev 0	16,911.83	17,335.78	3,329.15	3,205.15	26.848	ES, SF
Larson A23-627 - Original Drilling - APD - Rev 0	16,900.61	17,349.62	2,993.10	2,869.08	24.133	CC
Larson A23-627 - Original Drilling - APD - Rev 0	16,911.83	17,349.62	2,993.12	2,868.98	24.111	ES, SF
Larson A23-633 - Original Drilling - APD - Rev 0	16,911.83	17,293.48	2,644.62	2,520.70	21.341	CC, ES, SF
Larson A23-639 - Original Drilling - APD - Rev 0	16,904.76	17,357.51	2,243.02	2,119.07	18.096	CC
Larson A23-639 - Original Drilling - APD - Rev 0	16,911.83	17,357.51	2,243.03	2,119.01	18.086	ES, SF
Larson A23-645 - Original Drilling - APD - Rev 0	16,909.76	18,106.34	1,842.50	1,718.56	14.866	CC
Larson A23-645 - Original Drilling - APD - Rev 0	16,911.83	18,106.34	1,842.50	1,718.54	14.864	ES, SF
Larson A23-651 - Original Drilling - APD - Rev 0	16,911.47	18,048.86	1,533.97	1,410.28	12.402	CC
Larson A23-651 - Original Drilling - APD - Rev 0	16,911.83	18,048.86	1,533.97	1,410.27	12.401	ES, SF
Larson A23-656 - Original Drilling - APD - Rev 0	16,911.83	18,065.01	1,223.47	1,099.65	9.881	CC, ES, SF
Larson A23-662 - Original Drilling - APD - Rev 0	16,911.83	18,058.69	805.18	682.50	6.563	CC, ES, SF
Larson A23-668 - Original Drilling - APD - Rev 0	16,911.83	17,470.80	432.88	310.86	3.548	CC, ES, SF
Larson A23-672 - Original Drilling - APD - Rev 0	16,911.83	17,457.90	263.57	160.72	2.563	CC, ES, SF
Larson A23-678 - Original Drilling - APD - Rev 0	16,911.83	17,179.62	243.92	119.59	1.962	CC, ES, SF
Larson A23-683 - Original Drilling - APD - Rev 0	16,911.83	17,320.24	560.92	436.21	4.498	CC, ES, SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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	14,931.60	6,837.00	4,814.27	4,577.05	20.295	CC
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	15,000.00	6,837.00	4,814.75	4,576.81	20.235	ES
Howard 02-27 (PA) - Original Drilling - Original Drilling - A	15,700.00	6,837.00	4,875.20	4,630.88	19.954	SF
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,522.31	6,809.84	4,892.34	4,785.01	45.581	CC
Howard 03-27 - Original Drilling - Original Drilling - As Dr	13,600.00	6,808.69	4,892.96	4,784.81	45.243	ES
Howard 03-27 - Original Drilling - Original Drilling - As Dr	14,800.00	6,791.61	5,056.40	4,938.26	42.801	SF
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,281.42	6,797.00	4,775.57	4,570.29	23.264	CC
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	12,300.00	6,797.00	4,775.61	4,570.14	23.242	ES
Howard 04-27 (PA) - Original Drilling - Original Drilling - A	13,200.00	6,797.00	4,863.11	4,649.42	22.757	SF
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,218.74	6,762.05	6,216.84	6,077.51	44.620	CC
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,300.00	6,762.14	6,217.37	6,077.14	44.336	ES
Howard 08-27 - Original Drilling - Original Drilling - As Dr	16,911.83	6,762.78	6,255.36	6,108.95	42.726	SF
Howard 10-27 - Original Drilling - Original Drilling - As Dr	14,983.72	6,700.00	7,521.19	7,396.99	60.557	CC
Howard 10-27 - Original Drilling - Original Drilling - As Dr	15,100.00	6,700.00	7,522.09	7,396.59	59.937	ES
Howard 10-27 - Original Drilling - Original Drilling - As Dr	16,911.83	6,700.00	7,764.40	7,621.94	54.501	SF
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,815.77	6,940.60	8,683.76	8,563.01	71.919	CC
Howard 15-27 - Original Drilling - Original Drilling - As Dr	14,900.00	6,939.48	8,684.16	8,562.47	71.361	ES
Howard 15-27 - Original Drilling - Original Drilling - As Dr	16,911.83	6,912.59	8,933.10	8,791.69	63.169	SF
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	12,272.84	3,765.00	5,690.07	5,567.91	46.578	CC
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	12,300.00	3,765.00	5,690.14	5,567.71	46.477	ES
Howard 4B-27 (DA) - Original Drilling - Original Drilling - A	14,200.00	3,765.00	6,007.57	5,868.39	43.165	SF
Howard A27-01 - Original Drilling - Original Drilling - As D	16,259.90	6,775.03	4,824.27	4,684.38	34.488	CC
Howard A27-01 - Original Drilling - Original Drilling - As D	16,300.00	6,775.10	4,824.43	4,684.11	34.382	ES
Howard A27-01 - Original Drilling - Original Drilling - As D	16,911.83	6,776.25	4,868.12	4,722.11	33.341	SF
Howard A27-05 - Original Drilling - Original Drilling - As D	12,284.84	6,737.52	6,175.70	6,083.05	66.655	CC
Howard A27-05 - Original Drilling - Original Drilling - As D	12,400.00	6,737.83	6,176.78	6,082.91	65.801	ES
Howard A27-05 - Original Drilling - Original Drilling - As D	14,600.00	6,744.84	6,595.39	6,482.95	58.655	SF
Howard A27-06 - Original Drilling - Original Drilling - As D	13,663.19	6,897.78	6,140.75	6,026.12	53.571	CC
Howard A27-06 - Original Drilling - Original Drilling - As D	13,700.00	6,897.63	6,140.86	6,025.80	53.370	ES
Howard A27-06 - Original Drilling - Original Drilling - As D	15,700.00	6,889.93	6,469.73	6,336.30	48.489	SF
Howard A27-07 - Original Drilling - Original Drilling - As D	15,012.57	6,817.00	6,220.13	6,095.09	49.745	CC
Howard A27-07 - Original Drilling - Original Drilling - As D	15,100.00	6,817.70	6,220.75	6,094.74	49.368	ES
Howard A27-07 - Original Drilling - Original Drilling - As D	16,800.00	6,824.79	6,471.86	6,331.20	46.012	SF
Howard A27-09 - Original Drilling - Original Drilling - As D	16,111.61	6,717.67	7,589.32	7,451.44	55.045	CC
Howard A27-09 - Original Drilling - Original Drilling - As D	16,200.00	6,717.77	7,589.83	7,450.96	54.653	ES
Howard A27-09 - Original Drilling - Original Drilling - As D	16,911.83	6,718.63	7,631.39	7,485.03	52.143	SF
Howard A27-16 - Original Drilling - Original Drilling - As D	16,381.37	6,854.85	8,861.04	8,719.24	62.490	CC
Howard A27-16 - Original Drilling - Original Drilling - As D	16,500.00	6,854.60	8,861.84	8,718.68	61.905	ES
Howard A27-16 - Original Drilling - Original Drilling - As D	16,911.83	6,853.75	8,876.91	8,729.22	60.107	SF
Howard A27-17D - Original Drilling - Original Drilling - As	15,671.37	6,874.68	5,412.05	5,274.80	39.432	CC
Howard A27-17D - Original Drilling - Original Drilling - As	15,700.00	6,874.67	5,412.13	5,274.60	39.352	ES
Howard A27-17D - Original Drilling - Original Drilling - As	16,800.00	6,874.23	5,528.48	5,382.52	37.876	SF

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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	2,200.00	2,104.00	5,740.29	5,690.56	115.421	CC
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	2,300.00	2,203.98	5,741.84	5,689.75	110.227	ES
Ankenney 28-01 (PA) - Original Drilling - Original Drilling	12,600.00	6,774.00	6,496.26	6,291.05	31.656	SF
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,200.00	2,092.00	7,874.05	7,824.56	159.093	CC
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	2,300.00	2,191.98	7,875.74	7,823.89	151.891	ES
Wardlaw 16-28 - Original Drilling - Original Drilling - As D	14,000.00	6,762.00	9,506.22	9,288.17	43.597	SF
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,200.00	2,087.00	7,151.24	7,101.85	144.781	CC
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	2,300.00	2,186.98	7,152.93	7,101.18	138.218	ES
Wardlaw 20-28 - Original Drilling - Original Drilling - As D	13,300.00	6,757.00	8,758.31	8,547.57	41.560	SF
Webster 09-28 - Original Drilling - Original Drilling - As D	2,200.00	2,102.00	6,589.93	6,540.24	132.612	CC
Webster 09-28 - Original Drilling - Original Drilling - As D	2,300.00	2,201.98	6,591.58	6,539.53	126.637	ES
Webster 09-28 - Original Drilling - Original Drilling - As D	13,100.00	6,772.00	7,845.94	7,636.40	37.443	SF

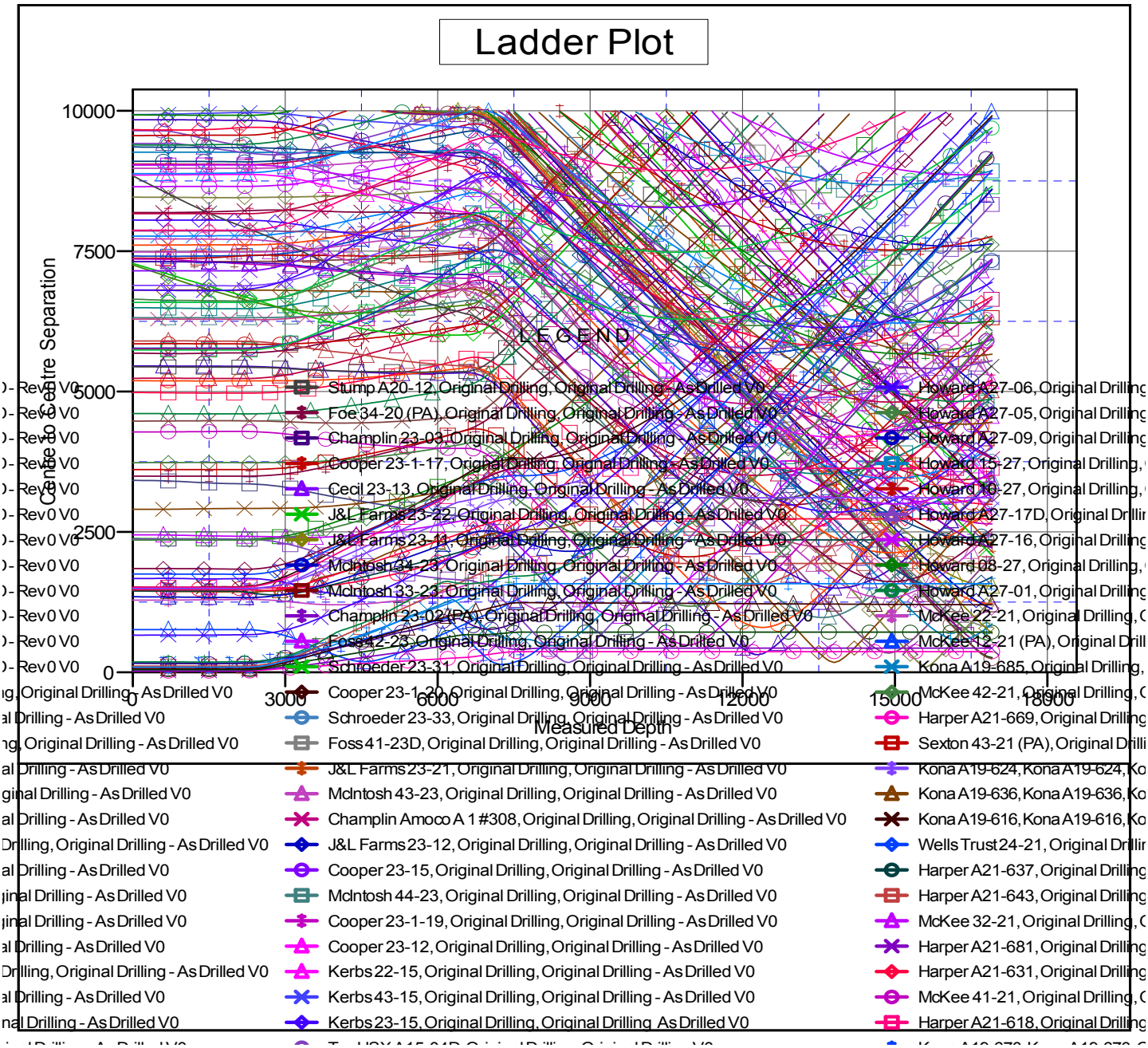
Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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 A21-674
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.61°



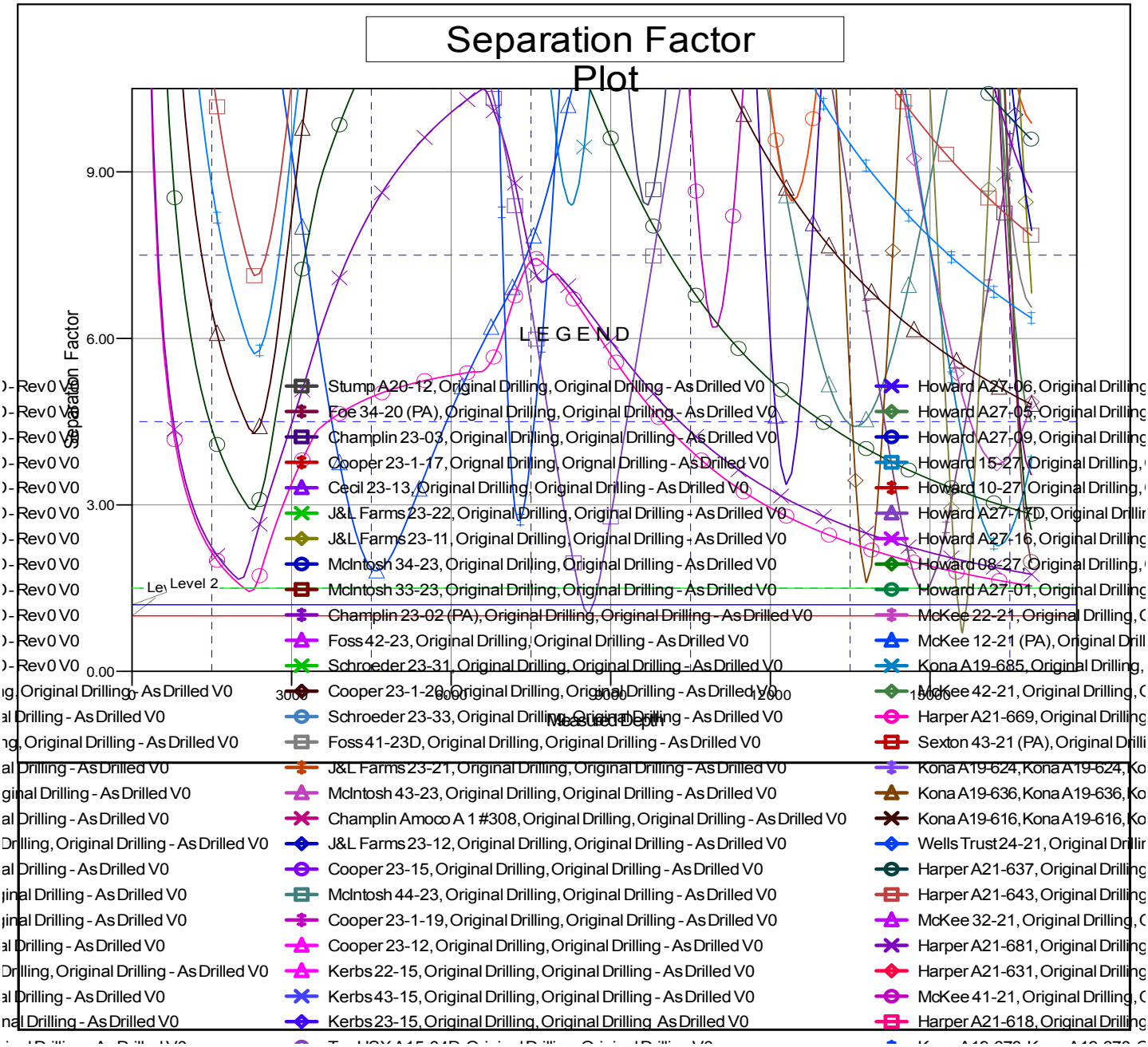
CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Noble Energy, Inc.

Anticollision Summary Report

Company:	Northern Region - DJ Basin	**Local Co-ordinate Reference:**	Well Harper A21-674
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 A21-674	**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 A21-674
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