

Approved: _____ Date: _____

Northern Region Drilling - Working

Wattenberg Field

LC (09N-59W)

Cutthraot LC28-72HNB

Original Drilling

Plan: APD - Rev 0

Standard Planning Report

29 August, 2013

Noble Energy Inc

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Company:	Northern Region Drilling - Working	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site:	LC (09N-59W)	North Reference:	Grid
Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Project	Wattenberg Field, Weld County CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	LC (09N-59W)		
Site Position:		Northing:	1,527,709.69 usft
From:	Lat/Long	Easting:	3,433,728.00 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	40.771436
		Longitude:	-103.934025
		Grid Convergence:	1.01 °

Well	Cutthroat LC28-72HNB		
Well Position	+N/-S	-20,753.3 usft	Northing: 1,506,956.38 usft
	+E/-W	-11,465.5 usft	Easting: 3,422,262.50 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Latitude: 40.715030
			Longitude: -103.976700
			Ground Level: 4,837.0 usft

Wellbore	Original Drilling				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/28/2013	8.11	67.36	53,167

Design	APD - Rev 0			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	2.08

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,100.6	12.01	107.82	2,096.3	-19.2	59.7	2.00	2.00	0.00	107.82	
2,910.9	12.01	107.82	2,888.7	-70.8	220.3	0.00	0.00	0.00	0.00	
3,511.5	0.00	0.00	3,485.0	-90.0	280.0	2.00	-2.00	0.00	180.00	
5,367.8	0.00	0.00	5,341.3	-90.0	280.0	0.00	0.00	0.00	0.00	
6,430.3	85.00	358.43	6,054.7	563.5	262.1	8.00	8.00	0.00	358.43	
6,505.3	85.00	358.43	6,061.3	638.2	260.0	0.00	0.00	0.00	0.00	
6,567.8	90.00	358.43	6,064.0	700.6	258.3	8.00	8.00	0.00	0.00	
10,225.7	90.00	358.43	6,064.0	4,357.1	158.0	0.00	0.00	0.00	0.00	Cutthroat LC28-72HN

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Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
50.0	0.00	0.00	50.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
150.0	0.00	0.00	150.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
350.0	0.00	0.00	350.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
450.0	0.00	0.00	450.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
550.0	0.00	0.00	550.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
750.0	0.00	0.00	750.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
950.0	0.00	0.00	950.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,050.0	0.00	0.00	1,050.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,150.0	0.00	0.00	1,150.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,250.0	0.00	0.00	1,250.0	0.0	0.0	0.0	0.00	0.00	0.00
1,277.0	0.00	0.00	1,277.0	0.0	0.0	0.0	0.00	0.00	0.00
PIERRE									
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,350.0	0.00	0.00	1,350.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,450.0	0.00	0.00	1,450.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start Build 2.00									
1,550.0	1.00	107.82	1,550.0	-0.1	0.4	-0.1	2.00	2.00	0.00
1,600.0	2.00	107.82	1,600.0	-0.5	1.7	-0.5	2.00	2.00	0.00
1,650.0	3.00	107.82	1,649.9	-1.2	3.7	-1.1	2.00	2.00	0.00
1,700.0	4.00	107.82	1,699.8	-2.1	6.6	-1.9	2.00	2.00	0.00
1,750.0	5.00	107.82	1,749.7	-3.3	10.4	-3.0	2.00	2.00	0.00
1,800.0	6.00	107.82	1,799.5	-4.8	14.9	-4.3	2.00	2.00	0.00
1,850.0	7.00	107.82	1,849.1	-6.5	20.3	-5.8	2.00	2.00	0.00
1,900.0	8.00	107.82	1,898.7	-8.5	26.5	-7.6	2.00	2.00	0.00
1,950.0	9.00	107.82	1,948.2	-10.8	33.6	-9.6	2.00	2.00	0.00
2,000.0	10.00	107.82	1,997.5	-13.3	41.4	-11.8	2.00	2.00	0.00
2,050.0	11.00	107.82	2,046.6	-16.1	50.1	-14.3	2.00	2.00	0.00
2,100.0	12.00	107.82	2,095.6	-19.2	59.6	-17.0	2.00	2.00	0.00
2,100.6	12.01	107.82	2,096.3	-19.2	59.7	-17.0	2.00	2.00	0.00
2,150.0	12.01	107.82	2,144.5	-22.3	69.5	-19.8	0.00	0.00	0.00
2,200.0	12.01	107.82	2,193.4	-25.5	79.4	-22.6	0.00	0.00	0.00
2,250.0	12.01	107.82	2,242.3	-28.7	89.3	-25.5	0.00	0.00	0.00
2,300.0	12.01	107.82	2,291.2	-31.9	99.2	-28.3	0.00	0.00	0.00
2,350.0	12.01	107.82	2,340.1	-35.1	109.1	-31.1	0.00	0.00	0.00
2,400.0	12.01	107.82	2,389.1	-38.3	119.0	-33.9	0.00	0.00	0.00
2,450.0	12.01	107.82	2,438.0	-41.4	129.0	-36.7	0.00	0.00	0.00

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Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,500.0	12.01	107.82	2,486.9	-44.6	138.9	-39.6	0.00	0.00	0.00
2,550.0	12.01	107.82	2,535.8	-47.8	148.8	-42.4	0.00	0.00	0.00
2,600.0	12.01	107.82	2,584.7	-51.0	158.7	-45.2	0.00	0.00	0.00
2,650.0	12.01	107.82	2,633.6	-54.2	168.6	-48.0	0.00	0.00	0.00
2,700.0	12.01	107.82	2,682.5	-57.4	178.5	-50.9	0.00	0.00	0.00
2,750.0	12.01	107.82	2,731.4	-60.6	188.4	-53.7	0.00	0.00	0.00
2,800.0	12.01	107.82	2,780.3	-63.7	198.3	-56.5	0.00	0.00	0.00
2,850.0	12.01	107.82	2,829.2	-66.9	208.2	-59.3	0.00	0.00	0.00
2,900.0	12.01	107.82	2,878.1	-70.1	218.1	-62.2	0.00	0.00	0.00
2,910.9	12.01	107.82	2,888.8	-70.8	220.3	-62.8	0.00	0.00	0.00
Start Drop -2.00									
2,950.0	11.23	107.82	2,927.1	-73.2	227.8	-64.9	2.00	-2.00	0.00
3,000.0	10.23	107.82	2,976.2	-76.1	236.6	-67.4	2.00	-2.00	0.00
3,050.0	9.23	107.82	3,025.5	-78.6	244.7	-69.7	2.00	-2.00	0.00
3,100.0	8.23	107.82	3,074.9	-81.0	251.9	-71.8	2.00	-2.00	0.00
3,150.0	7.23	107.82	3,124.4	-83.0	258.3	-73.6	2.00	-2.00	0.00
3,200.0	6.23	107.82	3,174.1	-84.8	263.9	-75.2	2.00	-2.00	0.00
3,250.0	5.23	107.82	3,223.8	-86.3	268.6	-76.6	2.00	-2.00	0.00
3,300.0	4.23	107.82	3,273.7	-87.6	272.6	-77.7	2.00	-2.00	0.00
3,350.0	3.23	107.82	3,323.6	-88.6	275.7	-78.6	2.00	-2.00	0.00
3,400.0	2.23	107.82	3,373.5	-89.3	277.9	-79.2	2.00	-2.00	0.00
3,401.5	2.20	107.82	3,375.0	-89.4	278.0	-79.2	2.00	-2.00	0.00
PARKMAN									
3,450.0	1.23	107.82	3,423.5	-89.8	279.4	-79.6	2.00	-2.00	0.00
3,500.0	0.23	107.82	3,473.5	-90.0	280.0	-79.8	2.00	-2.00	0.00
3,511.5	0.00	0.00	3,485.0	-90.0	280.0	-79.8	2.00	-2.00	0.00
3,550.0	0.00	0.00	3,523.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,600.0	0.00	0.00	3,573.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,650.0	0.00	0.00	3,623.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,700.0	0.00	0.00	3,673.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,750.0	0.00	0.00	3,723.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,800.0	0.00	0.00	3,773.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,850.0	0.00	0.00	3,823.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,900.0	0.00	0.00	3,873.5	-90.0	280.0	-79.8	0.00	0.00	0.00
3,950.0	0.00	0.00	3,923.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,000.0	0.00	0.00	3,973.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,050.0	0.00	0.00	4,023.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,100.0	0.00	0.00	4,073.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,114.5	0.00	0.00	4,088.0	-90.0	280.0	-79.8	0.00	0.00	0.00
SUSSEX									
4,150.0	0.00	0.00	4,123.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,200.0	0.00	0.00	4,173.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,250.0	0.00	0.00	4,223.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,300.0	0.00	0.00	4,273.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,350.0	0.00	0.00	4,323.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,400.0	0.00	0.00	4,373.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,450.0	0.00	0.00	4,423.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,500.0	0.00	0.00	4,473.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,519.5	0.00	0.00	4,493.0	-90.0	280.0	-79.8	0.00	0.00	0.00
SHANNON									
4,550.0	0.00	0.00	4,523.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,600.0	0.00	0.00	4,573.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,650.0	0.00	0.00	4,623.5	-90.0	280.0	-79.8	0.00	0.00	0.00

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Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.0	0.00	0.00	4,673.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,750.0	0.00	0.00	4,723.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,800.0	0.00	0.00	4,773.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,850.0	0.00	0.00	4,823.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,900.0	0.00	0.00	4,873.5	-90.0	280.0	-79.8	0.00	0.00	0.00
4,950.0	0.00	0.00	4,923.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,000.0	0.00	0.00	4,973.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,050.0	0.00	0.00	5,023.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,100.0	0.00	0.00	5,073.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,150.0	0.00	0.00	5,123.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,200.0	0.00	0.00	5,173.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,250.0	0.00	0.00	5,223.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,299.5	0.00	0.00	5,273.0	-90.0	280.0	-79.8	0.00	0.00	0.00
TEEPEE BUTTES									
5,300.0	0.00	0.00	5,273.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,350.0	0.00	0.00	5,323.5	-90.0	280.0	-79.8	0.00	0.00	0.00
5,367.8	0.00	0.00	5,341.3	-90.0	280.0	-79.8	0.00	0.00	0.00
KOP #2 - Start Build 8.00									
5,400.0	2.58	358.43	5,373.5	-89.3	280.0	-79.1	8.00	8.00	0.00
5,450.0	6.58	358.43	5,423.3	-85.3	279.9	-75.1	8.00	8.00	0.00
5,500.0	10.58	358.43	5,472.7	-77.8	279.7	-67.7	8.00	8.00	0.00
5,550.0	14.58	358.43	5,521.5	-67.0	279.4	-56.8	8.00	8.00	0.00
5,600.0	18.58	358.43	5,569.4	-52.7	279.0	-42.6	8.00	8.00	0.00
5,650.0	22.58	358.43	5,616.2	-35.1	278.5	-25.0	8.00	8.00	0.00
5,700.0	26.58	358.43	5,661.7	-14.4	277.9	-4.3	8.00	8.00	0.00
5,750.0	30.58	358.43	5,705.6	9.6	277.3	19.6	8.00	8.00	0.00
5,800.0	34.58	358.43	5,747.7	36.5	276.5	46.5	8.00	8.00	0.00
5,850.0	38.58	358.43	5,787.9	66.2	275.7	76.2	8.00	8.00	0.00
5,900.0	42.58	358.43	5,825.8	98.7	274.8	108.6	8.00	8.00	0.00
5,950.0	46.58	358.43	5,861.4	133.8	273.9	143.6	8.00	8.00	0.00
6,000.0	50.58	358.43	5,894.5	171.3	272.8	181.1	8.00	8.00	0.00
6,023.3	52.44	358.43	5,909.0	189.5	272.3	199.2	8.00	8.00	0.00
SHARON SPRINGS									
6,050.0	54.58	358.43	5,924.9	211.0	271.7	220.7	8.00	8.00	0.00
6,064.2	55.71	358.43	5,933.0	222.6	271.4	232.3	8.00	8.00	0.00
NIOBRARA - NIO A CHALK									
6,100.0	58.58	358.43	5,952.4	252.7	270.6	262.3	8.00	8.00	0.00
6,120.8	60.24	358.43	5,963.0	270.6	270.1	280.2	8.00	8.00	0.00
NIO A MARL									
6,150.0	62.58	358.43	5,977.0	296.2	269.4	305.8	8.00	8.00	0.00
6,200.0	66.58	358.43	5,998.4	341.3	268.2	350.8	8.00	8.00	0.00
6,250.0	70.58	358.43	6,016.7	387.8	266.9	397.3	8.00	8.00	0.00
6,300.0	74.58	358.43	6,031.7	435.5	265.6	444.9	8.00	8.00	0.00
6,312.9	75.61	358.43	6,035.0	448.0	265.2	457.3	8.00	8.00	0.00
NIO B CHALK									
6,350.0	78.58	358.43	6,043.3	484.1	264.2	493.4	8.00	8.00	0.00
6,400.0	82.58	358.43	6,051.5	533.4	262.9	542.6	8.00	8.00	0.00
6,430.3	85.00	358.43	6,054.7	563.5	262.1	572.7	8.00	8.00	0.00
Start 75.0 hold at 6430.3 MD - 7" Casing @ 6430.3' MD									
6,450.0	85.00	358.43	6,056.5	583.2	261.5	592.3	0.00	0.00	0.00
6,500.0	85.00	358.43	6,060.8	632.9	260.2	642.0	0.00	0.00	0.00
6,505.3	85.00	358.43	6,061.3	638.2	260.0	647.2	0.00	0.00	0.00
Start Build 8.00									

Noble Energy Inc

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Company:	Northern Region Drilling - Working	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site:	LC (09N-59W)	North Reference:	Grid
Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,550.0	88.58	358.43	6,063.8	682.8	258.8	691.8	8.00	8.00	0.00
6,567.8	90.00	358.43	6,064.0	700.6	258.3	709.5	8.00	8.00	0.00
NIO B MARL									
6,600.0	90.00	358.43	6,064.0	732.8	257.4	741.7	0.00	0.00	0.00
6,650.0	90.00	358.43	6,064.0	782.8	256.1	791.6	0.00	0.00	0.00
6,700.0	90.00	358.43	6,064.0	832.8	254.7	841.5	0.00	0.00	0.00
6,750.0	90.00	358.43	6,064.0	882.8	253.3	891.4	0.00	0.00	0.00
6,800.0	90.00	358.43	6,064.0	932.7	251.9	941.3	0.00	0.00	0.00
6,850.0	90.00	358.43	6,064.0	982.7	250.6	991.2	0.00	0.00	0.00
6,900.0	90.00	358.43	6,064.0	1,032.7	249.2	1,041.1	0.00	0.00	0.00
6,950.0	90.00	358.43	6,064.0	1,082.7	247.8	1,090.9	0.00	0.00	0.00
7,000.0	90.00	358.43	6,064.0	1,132.7	246.5	1,140.8	0.00	0.00	0.00
7,050.0	90.00	358.43	6,064.0	1,182.6	245.1	1,190.7	0.00	0.00	0.00
7,100.0	90.00	358.43	6,064.0	1,232.6	243.7	1,240.6	0.00	0.00	0.00
7,150.0	90.00	358.43	6,064.0	1,282.6	242.3	1,290.5	0.00	0.00	0.00
7,200.0	90.00	358.43	6,064.0	1,332.6	241.0	1,340.4	0.00	0.00	0.00
7,250.0	90.00	358.43	6,064.0	1,382.6	239.6	1,390.3	0.00	0.00	0.00
7,300.0	90.00	358.43	6,064.0	1,432.5	238.2	1,440.2	0.00	0.00	0.00
7,350.0	90.00	358.43	6,064.0	1,482.5	236.9	1,490.1	0.00	0.00	0.00
7,400.0	90.00	358.43	6,064.0	1,532.5	235.5	1,540.0	0.00	0.00	0.00
7,450.0	90.00	358.43	6,064.0	1,582.5	234.1	1,589.9	0.00	0.00	0.00
7,500.0	90.00	358.43	6,064.0	1,632.5	232.7	1,639.8	0.00	0.00	0.00
7,550.0	90.00	358.43	6,064.0	1,682.5	231.4	1,689.7	0.00	0.00	0.00
7,600.0	90.00	358.43	6,064.0	1,732.4	230.0	1,739.6	0.00	0.00	0.00
7,650.0	90.00	358.43	6,064.0	1,782.4	228.6	1,789.5	0.00	0.00	0.00
7,700.0	90.00	358.43	6,064.0	1,832.4	227.3	1,839.4	0.00	0.00	0.00
7,750.0	90.00	358.43	6,064.0	1,882.4	225.9	1,889.3	0.00	0.00	0.00
7,800.0	90.00	358.43	6,064.0	1,932.4	224.5	1,939.2	0.00	0.00	0.00
7,850.0	90.00	358.43	6,064.0	1,982.3	223.1	1,989.1	0.00	0.00	0.00
7,900.0	90.00	358.43	6,064.0	2,032.3	221.8	2,039.0	0.00	0.00	0.00
7,950.0	90.00	358.43	6,064.0	2,082.3	220.4	2,088.9	0.00	0.00	0.00
8,000.0	90.00	358.43	6,064.0	2,132.3	219.0	2,138.8	0.00	0.00	0.00
8,050.0	90.00	358.43	6,064.0	2,182.3	217.7	2,188.7	0.00	0.00	0.00
8,100.0	90.00	358.43	6,064.0	2,232.2	216.3	2,238.6	0.00	0.00	0.00
8,150.0	90.00	358.43	6,064.0	2,282.2	214.9	2,288.5	0.00	0.00	0.00
8,200.0	90.00	358.43	6,064.0	2,332.2	213.6	2,338.4	0.00	0.00	0.00
8,250.0	90.00	358.43	6,064.0	2,382.2	212.2	2,388.3	0.00	0.00	0.00
8,300.0	90.00	358.43	6,064.0	2,432.2	210.8	2,438.2	0.00	0.00	0.00
8,350.0	90.00	358.43	6,064.0	2,482.2	209.4	2,488.1	0.00	0.00	0.00
8,400.0	90.00	358.43	6,064.0	2,532.1	208.1	2,538.0	0.00	0.00	0.00
8,450.0	90.00	358.43	6,064.0	2,582.1	206.7	2,587.9	0.00	0.00	0.00
8,500.0	90.00	358.43	6,064.0	2,632.1	205.3	2,637.8	0.00	0.00	0.00
8,550.0	90.00	358.43	6,064.0	2,682.1	204.0	2,687.7	0.00	0.00	0.00
8,600.0	90.00	358.43	6,064.0	2,732.1	202.6	2,737.6	0.00	0.00	0.00
8,650.0	90.00	358.43	6,064.0	2,782.0	201.2	2,787.5	0.00	0.00	0.00
8,700.0	90.00	358.43	6,064.0	2,832.0	199.8	2,837.4	0.00	0.00	0.00
8,750.0	90.00	358.43	6,064.0	2,882.0	198.5	2,887.3	0.00	0.00	0.00
8,800.0	90.00	358.43	6,064.0	2,932.0	197.1	2,937.2	0.00	0.00	0.00
8,850.0	90.00	358.43	6,064.0	2,982.0	195.7	2,987.1	0.00	0.00	0.00
8,900.0	90.00	358.43	6,064.0	3,031.9	194.4	3,037.0	0.00	0.00	0.00
8,950.0	90.00	358.43	6,064.0	3,081.9	193.0	3,086.9	0.00	0.00	0.00
9,000.0	90.00	358.43	6,064.0	3,131.9	191.6	3,136.8	0.00	0.00	0.00
9,050.0	90.00	358.43	6,064.0	3,181.9	190.2	3,186.7	0.00	0.00	0.00
9,100.0	90.00	358.43	6,064.0	3,231.9	188.9	3,236.6	0.00	0.00	0.00

Noble Energy Inc

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Company:	Northern Region Drilling - Working	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site:	LC (09N-59W)	North Reference:	Grid
Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,150.0	90.00	358.43	6,064.0	3,281.9	187.5	3,286.5	0.00	0.00	0.00	
9,200.0	90.00	358.43	6,064.0	3,331.8	186.1	3,336.4	0.00	0.00	0.00	
9,250.0	90.00	358.43	6,064.0	3,381.8	184.8	3,386.3	0.00	0.00	0.00	
9,300.0	90.00	358.43	6,064.0	3,431.8	183.4	3,436.2	0.00	0.00	0.00	
9,350.0	90.00	358.43	6,064.0	3,481.8	182.0	3,486.1	0.00	0.00	0.00	
9,400.0	90.00	358.43	6,064.0	3,531.8	180.6	3,536.0	0.00	0.00	0.00	
9,450.0	90.00	358.43	6,064.0	3,581.7	179.3	3,585.9	0.00	0.00	0.00	
9,500.0	90.00	358.43	6,064.0	3,631.7	177.9	3,635.8	0.00	0.00	0.00	
9,550.0	90.00	358.43	6,064.0	3,681.7	176.5	3,685.7	0.00	0.00	0.00	
9,600.0	90.00	358.43	6,064.0	3,731.7	175.2	3,735.6	0.00	0.00	0.00	
9,650.0	90.00	358.43	6,064.0	3,781.7	173.8	3,785.5	0.00	0.00	0.00	
9,700.0	90.00	358.43	6,064.0	3,831.6	172.4	3,835.4	0.00	0.00	0.00	
9,750.0	90.00	358.43	6,064.0	3,881.6	171.0	3,885.3	0.00	0.00	0.00	
9,800.0	90.00	358.43	6,064.0	3,931.6	169.7	3,935.2	0.00	0.00	0.00	
9,850.0	90.00	358.43	6,064.0	3,981.6	168.3	3,985.1	0.00	0.00	0.00	
9,900.0	90.00	358.43	6,064.0	4,031.6	166.9	4,035.0	0.00	0.00	0.00	
9,950.0	90.00	358.43	6,064.0	4,081.6	165.6	4,084.9	0.00	0.00	0.00	
10,000.0	90.00	358.43	6,064.0	4,131.5	164.2	4,134.8	0.00	0.00	0.00	
10,050.0	90.00	358.43	6,064.0	4,181.5	162.8	4,184.7	0.00	0.00	0.00	
10,100.0	90.00	358.43	6,064.0	4,231.5	161.4	4,234.6	0.00	0.00	0.00	
10,150.0	90.00	358.43	6,064.0	4,281.5	160.1	4,284.5	0.00	0.00	0.00	
10,200.0	90.00	358.43	6,064.0	4,331.5	158.7	4,334.4	0.00	0.00	0.00	
10,225.7	90.00	358.43	6,064.0	4,357.1	158.0	4,360.0	0.00	0.00	0.00	
TD at 10225.7 - Cutthroat LC28-72HNB BHL 675'FNL, 675'FEL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
Cutthroat LC28-72HNB I	0.00	0.00	6,064.0	4,357.1	158.0	1,511,313.47	3,422,420.49	40.726980	-103.975860	
- plan hits target center										
- Point										

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,430.3	6,054.7	7" Casing @ 6430.3' MD	7	8-3/4	

Noble Energy Inc

Planning Report

Database:	EDM Production	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Company:	Northern Region Drilling - Working	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site:	LC (09N-59W)	North Reference:	Grid
Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,277.0	1,277.0	PIERRE		0.00		
3,401.5	3,375.0	PARKMAN		0.00		
4,114.5	4,088.0	SUSSEX		0.00		
4,519.5	4,493.0	SHANNON		0.00		
5,299.5	5,273.0	TEEPEE BUTTES		0.00		
6,023.3	5,909.0	SHARON SPRINGS		0.00		
6,064.2	5,933.0	NIOBRARA		0.00		
6,064.2	5,933.0	NIO A CHALK		0.00		
6,120.8	5,963.0	NIO A MARL		0.00		
6,312.9	6,035.0	NIO B CHALK		0.00		
6,567.8	6,064.0	NIO B MARL		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,500.0	1,500.0	0.0	0.0	KOP - Start Build 2.00	
2,910.9	2,888.8	-70.8	220.3	Start Drop -2.00	
5,367.8	5,341.3	-90.0	280.0	KOP #2 - Start Build 8.00	
6,430.3	6,054.7	563.5	262.1	Start 75.0 hold at 6430.3 MD	
6,505.3	6,061.3	638.2	260.0	Start Build 8.00	
10,225.7	6,064.0	4,357.1	158.0	TD at 10225.7	

Northern Region Drilling - Working

**Wattenberg Field
LC (09N-59W)
Cutthraot LC28-72HNB**

**Original Drilling
APD - Rev 0**

Anticollision Summary Report

29 August, 2013

Noble Energy Inc
Anticollision Summary Report

Company:	Northern Region Drilling - Working	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Project:	Wattenberg Field	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Reference Site:	LC (09N-59W)	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference	APD - Rev 0		
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 10,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	8/29/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	10,225.7	APD - Rev 0 (Original Drilling)	MWD+IFR1+MS_WY	Fixed:v2:Rockies, crustal dec + 3-axis correction

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
LC (09N-59W)						
Cutthroat LC28-73HNB - Original Drilling - APD - Rev 0	1,500.0	1,499.0	74.8	68.4	11.607	CC, ES
Cutthroat LC28-73HNB - Original Drilling - APD - Rev 0	10,225.7	10,218.8	643.1	554.4	7.249	SF
Rainbow LC28-73-1HNA - Original Drilling - APD- Rev 0	1,500.0	1,499.0	36.0	29.6	5.589	CC, ES
Rainbow LC28-73-1HNA - Original Drilling - APD- Rev 0	10,225.7	10,154.1	331.0	245.0	3.850	SF

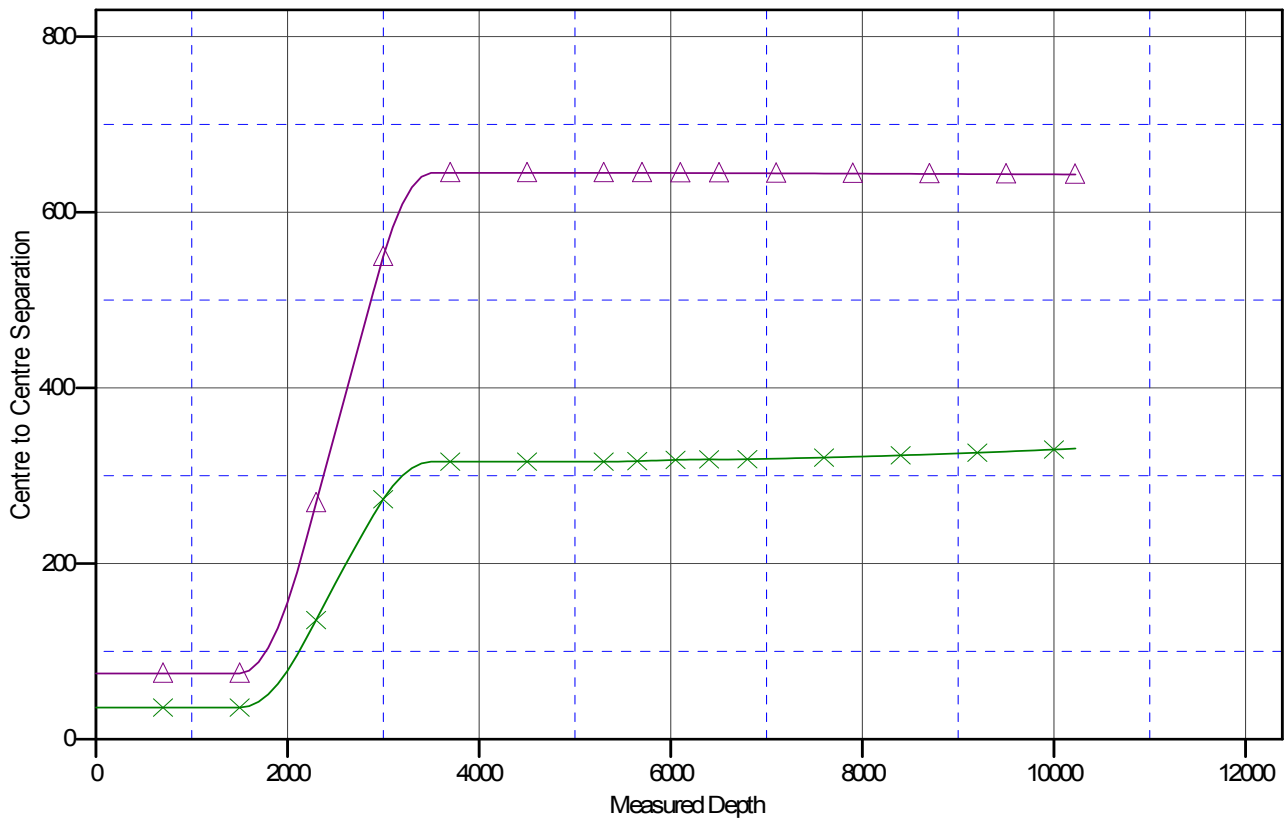
Noble Energy Inc
Anticollision Summary Report

Company:	Northern Region Drilling - Working	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Project:	Wattenberg Field	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Reference Site:	LC (09N-59W)	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4867.0usft (Original Well Ele)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Cutthroat LC28-72HNB
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.98°

Ladder Plot



LEGEND

vLC28-73-1HNA, Original Drilling, APD- Rev0 V0 ▲ Cutthroat LC28-73HNB, Original Drilling, APD- Rev0 V0

Noble Energy Inc
Anticollision Summary Report

Company:	Northern Region Drilling - Working	Local Co-ordinate Reference:	Well Cutthroat LC28-72HNB
Project:	Wattenberg Field	TVD Reference:	WELL @ 4867.0usft (Original Well Elev)
Reference Site:	LC (09N-59W)	MD Reference:	WELL @ 4867.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Cutthroat LC28-72HNB	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4867.0usft (Original Well Ele
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Cutthroat LC28-72HNB
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.98°

