



Well Name: Kummer PC LE23-65-1HN

Surface Location: Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W
North American Datum 1983 US State Plane 1983 Colorado Northern Zone
Ground Elevation: 4982.0

+N/-S
0.0

+E/-W
0.0

Northing
1480989.52

Easting
3365897.96

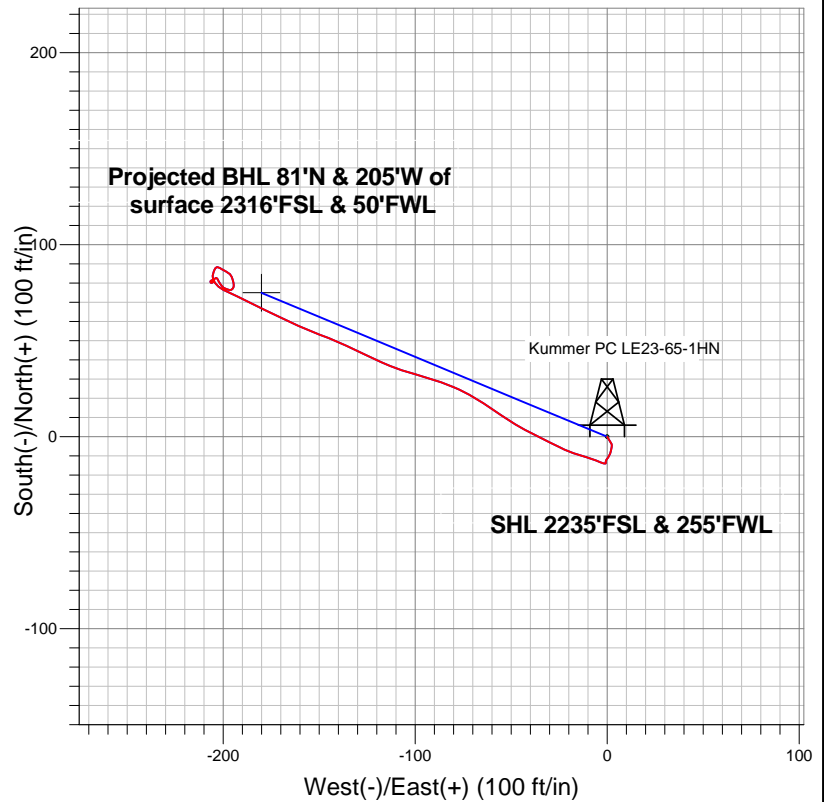
Latitude
40.646244

Longitude
-104.181394

Slot

H&P 273 RKB - 24' WELL @ 5006.0ft (H&P 273 RKB - 24')

Noble Energy Inc.- Weld County, CO (Grid North)



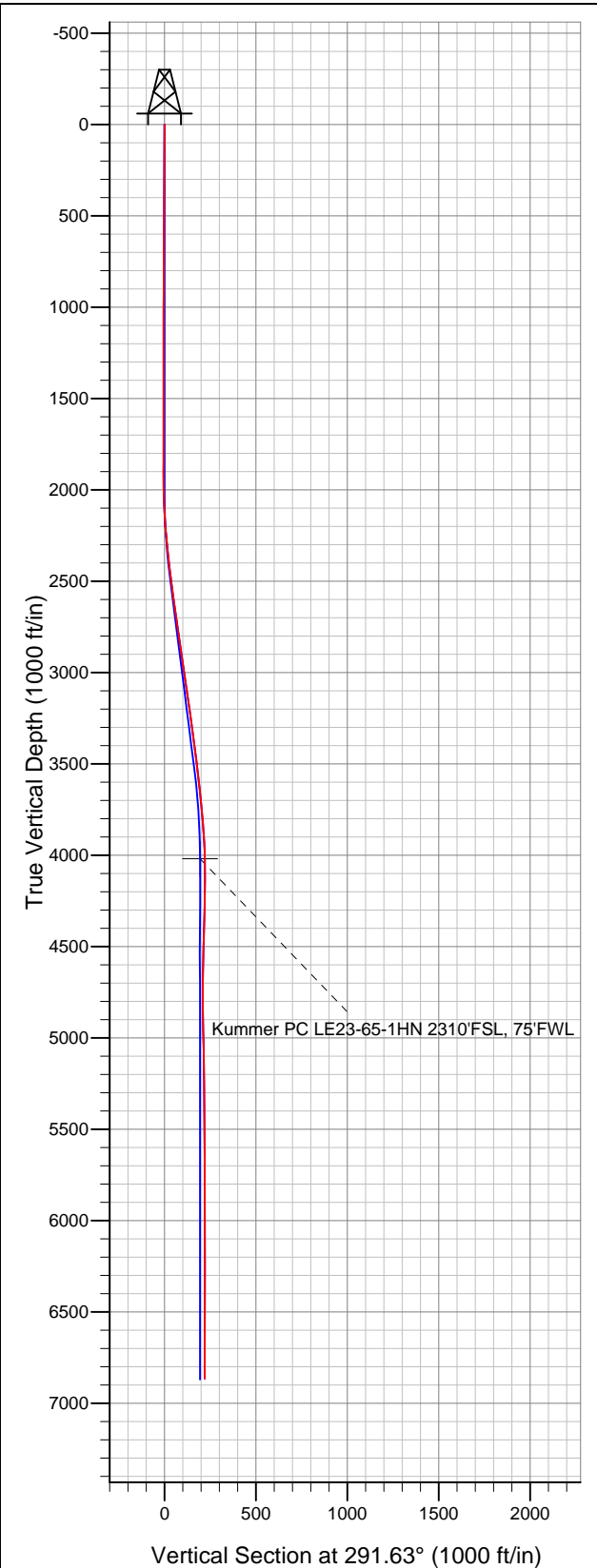
LEGEND

- Kummer PC LE23-65-1HN, Wellbore #1, Pilot Hole Plan A - Rev 1 Updated 4-07-13 V0
- Wellbore #1
- Survey #1

Final Survey Plot

**Projected Final Survey -
6880'MD & 6865'TVD @ 220°VS
0.4 deg Inc 54.8 deg AZ**

Project: SEC.23-T8N-R61W
Site: Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W
Well: Kummer PC LE23-65-1HN
Plan: Wellbore #1





Noble Energy Inc.- Weld County, CO (Grid North)

SEC.23-T8N-R61W

Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W

Kummer PC LE23-65-1HN

Wellbore #1

Survey: Survey #1

Standard Survey Report

19 April, 2013

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Kummer PC LE23-65-1HN
Project:	SEC.23-T8N-R61W	TVD Reference:	WELL @ 5006.0ft (H&P 273 RKB - 24')
Site:	Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W	MD Reference:	WELL @ 5006.0ft (H&P 273 RKB - 24')
Well:	Kummer PC LE23-65-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.23-T8N-R61W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W			
Site Position:		Northing:	1,481,064.59 ft	Latitude:	40.646450
From:	Lat/Long	Easting:	3,365,898.23 ft	Longitude:	-104.181389
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.85 °

Well	Kummer PC LE23-65-1HN					
Well Position	+N-S	0.0 ft	Northing:	1,480,989.52 ft	Latitude:	40.646244
	+E-W	0.0 ft	Easting:	3,365,897.96 ft	Longitude:	-104.181394
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,982.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/27/2013	8.33	67.28	53,131

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	291.63	

Survey Program		Date	4/9/2013	
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
817.0	6,880.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

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)
Main Survey	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	817.0	0.60	148.10	817.0	-3.6	2.3	-3.4	0.07	0.07	0.00
	910.0	0.40	183.30	910.0	-4.4	2.5	-3.9	0.38	-0.22	37.85
	1,003.0	0.80	187.30	1,003.0	-5.3	2.4	-4.2	0.43	0.43	4.30
	1,096.0	0.70	200.50	1,096.0	-6.5	2.1	-4.4	0.21	-0.11	14.19
	1,189.0	0.70	188.50	1,189.0	-7.6	1.8	-4.5	0.16	0.00	-12.90
	1,282.0	0.50	189.10	1,282.0	-8.6	1.7	-4.7	0.22	-0.22	0.65
	1,375.0	0.40	227.70	1,375.0	-9.2	1.4	-4.7	0.34	-0.11	41.51
	1,468.0	0.50	197.50	1,468.0	-9.8	1.0	-4.6	0.27	0.11	-32.47
	1,563.0	0.80	216.10	1,562.9	-10.7	0.5	-4.4	0.38	0.32	19.58
	1,657.0	0.50	213.00	1,656.9	-11.6	-0.1	-4.2	0.32	-0.32	-3.30

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Kummer PC LE23-65-1HN
Project:	SEC.23-T8N-R61W	TVD Reference:	WELL @ 5006.0ft (H&P 273 RKB - 24')
Site:	Kummer PC LE23-66-1HN Pad Sec.23-T8N-R61W	MD Reference:	WELL @ 5006.0ft (H&P 273 RKB - 24')
Well:	Kummer PC LE23-65-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
1,752.0	0.50	213.70	1,751.9	-12.3	-0.6	-4.0	0.01	0.00	0.74
1,847.0	0.40	179.90	1,846.9	-13.0	-0.8	-4.0	0.29	-0.11	-35.58
1,942.0	0.50	166.40	1,941.9	-13.7	-0.7	-4.4	0.15	0.11	-14.21
2,037.0	1.60	282.90	2,036.9	-13.8	-1.9	-3.3	1.98	1.16	122.63
2,131.0	3.50	294.20	2,130.8	-12.3	-5.8	0.8	2.08	2.02	12.02
2,226.0	4.70	284.30	2,225.6	-10.2	-12.2	7.6	1.46	1.26	-10.42
2,321.0	5.60	292.40	2,320.2	-7.5	-20.3	16.1	1.22	0.95	8.53
2,416.0	7.20	298.00	2,414.6	-2.9	-29.8	26.6	1.81	1.68	5.89
2,511.0	6.90	295.10	2,508.9	2.3	-40.2	38.2	0.49	-0.32	-3.05
2,606.0	7.70	303.70	2,603.1	8.3	-50.7	50.2	1.42	0.84	9.05
2,701.0	8.30	303.80	2,697.2	15.6	-61.7	63.1	0.63	0.63	0.11
2,795.0	8.60	298.60	2,790.2	22.8	-73.5	76.7	0.87	0.32	-5.53
2,890.0	8.60	288.70	2,884.1	28.4	-86.5	90.8	1.56	0.00	-10.42
2,985.0	8.80	285.20	2,978.0	32.6	-100.2	105.2	0.60	0.21	-3.68
3,080.0	7.60	292.40	3,072.0	36.9	-113.0	118.7	1.66	-1.26	7.58
3,175.0	8.50	296.60	3,166.1	42.4	-125.1	131.9	1.13	0.95	4.42
3,270.0	8.40	293.30	3,260.1	48.3	-137.8	145.9	0.52	-0.11	-3.47
3,365.0	7.40	290.70	3,354.2	53.2	-149.9	158.9	1.12	-1.05	-2.74
3,460.0	6.90	294.40	3,448.4	57.8	-160.8	170.7	0.72	-0.53	3.89
3,554.0	6.40	296.10	3,541.8	62.4	-170.6	181.6	0.57	-0.53	1.81
3,649.0	6.80	295.10	3,636.2	67.1	-180.5	192.5	0.44	0.42	-1.05
3,744.0	5.50	297.50	3,730.6	71.6	-189.6	202.6	1.39	-1.37	2.53
3,839.0	4.30	292.20	3,825.3	75.1	-196.9	210.7	1.35	-1.26	-5.58
3,934.0	3.50	310.70	3,920.1	78.3	-202.4	217.0	1.56	-0.84	19.47
4,029.0	2.30	342.00	4,014.9	82.0	-205.2	221.0	2.05	-1.26	32.95
4,032.8	2.29	343.78	4,018.8	82.1	-205.3	221.1	1.87	-0.23	46.27
Kummer PC LE23-65-1HN 2310'FSL, 75'FWL									
4,124.0	2.70	22.60	4,109.9	85.9	-204.9	222.2	1.87	0.45	42.59
4,219.0	0.80	62.10	4,204.8	88.2	-203.5	221.7	2.26	-2.00	41.58
4,314.0	1.60	118.20	4,299.8	87.9	-201.7	220.0	1.40	0.84	59.05
4,409.0	2.60	120.70	4,394.7	86.2	-198.7	216.5	1.06	1.05	2.63
4,504.0	0.70	129.10	4,489.7	84.7	-196.4	213.8	2.01	-2.00	8.84
4,599.0	1.30	158.70	4,584.7	83.4	-195.6	212.5	0.81	0.63	31.16
4,693.0	2.60	165.90	4,678.6	80.3	-194.7	210.6	1.40	1.38	7.66
4,788.0	1.50	218.40	4,773.6	77.2	-194.9	209.7	2.17	-1.16	55.26
4,883.0	1.00	282.80	4,868.5	76.5	-196.5	210.8	1.47	-0.53	67.79
4,978.0	1.10	290.30	4,963.5	77.0	-198.2	212.6	0.18	0.11	7.89
5,073.0	0.90	293.80	5,058.5	77.6	-199.7	214.2	0.22	-0.21	3.68
5,168.0	0.90	330.00	5,153.5	78.5	-200.8	215.6	0.59	0.00	38.11
5,263.0	1.00	320.70	5,248.5	79.8	-201.7	216.9	0.19	0.11	-9.79
5,357.0	1.00	339.70	5,342.5	81.2	-202.5	218.1	0.35	0.00	20.21
5,452.0	0.40	318.60	5,437.5	82.2	-203.0	219.0	0.68	-0.63	-22.21
5,547.0	0.30	311.90	5,532.5	82.7	-203.4	219.5	0.11	-0.11	-7.05
5,642.0	0.20	258.80	5,627.5	82.8	-203.7	219.9	0.25	-0.11	-55.89
5,737.0	0.30	210.30	5,722.5	82.5	-204.0	220.1	0.24	0.11	-51.05
5,831.0	0.40	261.70	5,816.5	82.3	-204.5	220.4	0.34	0.11	54.68
5,926.0	0.40	222.10	5,911.5	82.0	-205.0	220.8	0.29	0.00	-41.68
6,021.0	0.20	281.90	6,006.5	81.8	-205.4	221.1	0.36	-0.21	62.95
6,116.0	0.40	227.40	6,101.5	81.6	-205.8	221.4	0.34	0.21	-57.37
6,210.0	0.50	253.60	6,195.5	81.2	-206.4	221.8	0.24	0.11	27.87
6,305.0	0.40	150.70	6,290.5	80.8	-206.7	221.9	0.74	-0.11	-108.32
6,400.0	0.20	177.80	6,385.4	80.4	-206.5	221.6	0.25	-0.21	28.53

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Survey										
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6,487.7	0.37	106.25	6,473.2	80.1	-206.2	221.2	0.41	0.20	-81.55	
Kummer PC LE23-65-1HN BHL 2310'FSL & 660'FEL										
6,495.0	0.40	104.00	6,480.4	80.1	-206.2	221.2	0.41	0.36	-30.98	
6,589.0	0.30	43.90	6,574.4	80.2	-205.7	220.8	0.38	-0.11	-63.94	
6,684.0	0.10	1.50	6,669.4	80.5	-205.5	220.7	0.25	-0.21	-44.63	
6,779.0	0.40	56.50	6,764.4	80.8	-205.2	220.5	0.37	0.32	57.89	
6,830.0	0.40	54.80	6,815.4	81.0	-204.9	220.3	0.02	0.00	-3.33	
6,880.0	0.40	54.80	6,865.4	81.2	-204.6	220.2	0.00	0.00	0.00	

Checked By: _____	Approved By: _____	Date: _____
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