

# Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Long 20-22C

Plan #1

Plan: Plan #1 Proposal

## Sperry Drilling Services

# Proposal Report

22 January, 2009

Well Coordinates: 589,022.77 N, 1,317,931.53 E (39° 25' 32.80" N, 107° 54' 53.20" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin:

Centered on Well Long 20-22C

Viewing Datum:

RKB 25' @ 7931.00ft (Original Well Elev)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 42

**HALLIBURTON**

## Plan Report for Long 20-22C - Plan #1 Proposal

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)	Toolface Azimuth (°)
0.00	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	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.00	0.00	0.00	225.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Kickoff at 225.00ft</b>										
300.00	1.50	83.61	299.99	0.11	0.98	0.98	2.00	2.00	0.00	83.61
400.00	3.50	83.61	399.89	0.59	5.31	5.34	2.00	2.00	0.00	0.00
<b>Build Rate = 2.00°/100ft</b>										
500.00	5.50	83.61	499.58	1.47	13.11	13.18	2.00	2.00	0.00	0.00
580.75	7.11	83.61	579.84	2.46	21.92	22.05	2.00	2.00	0.00	0.00
<b>End Build at 580.75ft</b>										
600.00	7.11	83.61	598.94	2.72	24.29	24.43	0.00	0.00	0.00	0.00
700.00	7.11	83.61	698.17	4.10	36.60	36.81	0.00	0.00	0.00	0.00
800.00	7.11	83.61	797.40	5.48	48.91	49.20	0.00	0.00	0.00	0.00
900.00	7.11	83.61	896.63	6.86	61.22	61.58	0.00	0.00	0.00	0.00
1,000.00	7.11	83.61	995.86	8.24	73.53	73.96	0.00	0.00	0.00	0.00
1,100.00	7.11	83.61	1,095.09	9.61	85.84	86.34	0.00	0.00	0.00	0.00
1,200.00	7.11	83.61	1,194.32	10.99	98.15	98.72	0.00	0.00	0.00	0.00
1,300.00	7.11	83.61	1,293.55	12.37	110.46	111.10	0.00	0.00	0.00	0.00
1,400.00	7.11	83.61	1,392.78	13.75	122.77	123.48	0.00	0.00	0.00	0.00
1,500.00	7.11	83.61	1,492.01	15.13	135.07	135.86	0.00	0.00	0.00	0.00
1,600.00	7.11	83.61	1,591.24	16.51	147.38	148.24	0.00	0.00	0.00	0.00
1,700.00	7.11	83.61	1,690.47	17.89	159.69	160.62	0.00	0.00	0.00	0.00
1,800.00	7.11	83.61	1,789.70	19.27	172.00	173.00	0.00	0.00	0.00	0.00
1,900.00	7.11	83.61	1,888.93	20.64	184.31	185.38	0.00	0.00	0.00	0.00
2,000.00	7.11	83.61	1,988.16	22.02	196.62	197.76	0.00	0.00	0.00	0.00
2,100.00	7.11	83.61	2,087.39	23.40	208.93	210.14	0.00	0.00	0.00	0.00
2,200.00	7.11	83.61	2,186.62	24.78	221.24	222.52	0.00	0.00	0.00	0.00
2,300.00	7.11	83.61	2,285.85	26.16	233.55	234.91	0.00	0.00	0.00	0.00
2,400.00	7.11	83.61	2,385.08	27.54	245.86	247.29	0.00	0.00	0.00	0.00
2,500.00	7.11	83.61	2,484.31	28.92	258.17	259.67	0.00	0.00	0.00	0.00
<b>8 5/8" Casing Pt.</b>										
2,600.00	7.11	83.61	2,583.54	30.30	270.48	272.05	0.00	0.00	0.00	0.00
2,700.00	7.11	83.61	2,682.77	31.67	282.78	284.43	0.00	0.00	0.00	0.00
2,800.00	7.11	83.61	2,782.00	33.05	295.09	296.81	0.00	0.00	0.00	0.00
2,900.00	7.11	83.61	2,881.23	34.43	307.40	309.19	0.00	0.00	0.00	0.00
3,000.00	7.11	83.61	2,980.46	35.81	319.71	321.57	0.00	0.00	0.00	0.00
3,100.00	7.11	83.61	3,079.69	37.19	332.02	333.95	0.00	0.00	0.00	0.00
3,200.00	7.11	83.61	3,178.92	38.57	344.33	346.33	0.00	0.00	0.00	0.00
3,300.00	7.11	83.61	3,278.15	39.95	356.64	358.71	0.00	0.00	0.00	0.00
<b>7.11 Inclination</b>										
3,400.00	7.11	83.61	3,377.38	41.33	368.95	371.09	0.00	0.00	0.00	0.00
3,500.00	7.11	83.61	3,476.61	42.70	381.26	383.47	0.00	0.00	0.00	0.00
3,600.00	7.11	83.61	3,575.84	44.08	393.57	395.85	0.00	0.00	0.00	0.00
3,700.00	7.11	83.61	3,675.07	45.46	405.88	408.23	0.00	0.00	0.00	0.00
3,800.00	7.11	83.61	3,774.30	46.84	418.19	420.62	0.00	0.00	0.00	0.00
3,900.00	7.11	83.61	3,873.53	48.22	430.49	433.00	0.00	0.00	0.00	0.00
4,000.00	7.11	83.61	3,972.76	49.60	442.80	445.38	0.00	0.00	0.00	0.00
4,100.00	7.11	83.61	4,071.99	50.98	455.11	457.76	0.00	0.00	0.00	0.00
4,200.00	7.11	83.61	4,171.22	52.36	467.42	470.14	0.00	0.00	0.00	0.00
4,300.00	7.11	83.61	4,270.45	53.73	479.73	482.52	0.00	0.00	0.00	0.00
4,400.00	7.11	83.61	4,369.68	55.11	492.04	494.90	0.00	0.00	0.00	0.00
4,500.00	7.11	83.61	4,468.91	56.49	504.35	507.28	0.00	0.00	0.00	0.00
4,600.00	7.11	83.61	4,568.14	57.87	516.66	519.66	0.00	0.00	0.00	0.00
4,700.00	7.11	83.61	4,667.37	59.25	528.97	532.04	0.00	0.00	0.00	0.00
4,800.00	7.11	83.61	4,766.60	60.63	541.28	544.42	0.00	0.00	0.00	0.00
4,900.00	7.11	83.61	4,865.83	62.01	553.59	556.80	0.00	0.00	0.00	0.00
5,000.00	7.11	83.61	4,965.06	63.39	565.89	569.18	0.00	0.00	0.00	0.00

## Plan Report for Long 20-22C - Plan #1 Proposal

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)	Toolface Azimuth (°)
5,100.00	7.11	83.61	5,064.29	64.76	578.20	581.56	0.00	0.00	0.00	0.00
5,200.00	7.11	83.61	5,163.52	66.14	590.51	593.95	0.00	0.00	0.00	0.00
5,300.00	7.11	83.61	5,262.75	67.52	602.82	606.33	0.00	0.00	0.00	0.00
5,400.00	7.11	83.61	5,361.98	68.90	615.13	618.71	0.00	0.00	0.00	0.00
5,500.00	7.11	83.61	5,461.21	70.28	627.44	631.09	0.00	0.00	0.00	0.00
5,600.00	7.11	83.61	5,560.44	71.66	639.75	643.47	0.00	0.00	0.00	0.00
5,700.00	7.11	83.61	5,659.67	73.04	652.06	655.85	0.00	0.00	0.00	0.00
5,800.00	7.11	83.61	5,758.90	74.42	664.37	668.23	0.00	0.00	0.00	0.00
5,900.00	7.11	83.61	5,858.13	75.79	676.68	680.61	0.00	0.00	0.00	0.00
6,000.00	7.11	83.61	5,957.36	77.17	688.99	692.99	0.00	0.00	0.00	0.00
6,077.12	7.11	83.61	6,033.88	78.24	698.48	702.54	0.00	0.00	0.00	0.00
<b>Begin Drop at 6077.12ft</b>										
6,100.00	6.77	83.61	6,056.59	78.54	701.23	705.30	1.50	-1.50	0.00	180.00
6,200.00	5.27	83.61	6,156.04	79.71	711.65	715.79	1.50	-1.50	0.00	180.00
6,300.00	3.77	83.61	6,255.73	80.59	719.49	723.67	1.50	-1.50	0.00	180.00
6,310.00	3.62	83.61	6,265.70	80.66	720.13	724.31	1.50	-1.50	0.00	-180.00
<b>Drop Rate = 1.50°/100ft</b>										
6,400.00	2.27	83.61	6,355.58	81.18	724.73	728.94	1.50	-1.50	0.00	180.00
6,500.00	0.77	83.61	6,455.55	81.47	727.37	731.59	1.50	-1.50	0.00	180.00
6,551.46	0.00	0.00	6,507.00	81.51	727.71	731.94	1.50	-1.50	0.00	-180.00
<b>End Drop at 6551.46ft - Williams Fork - Long 20-22C Plan #1 Driller's Tgt</b>										
6,600.00	0.04	237.67	6,555.54	81.50	727.70	731.93	0.08	0.08	0.00	237.67
6,700.00	0.12	237.67	6,655.54	81.43	727.58	731.80	0.08	0.08	0.00	0.00
6,800.00	0.20	237.67	6,755.54	81.28	727.35	731.56	0.08	0.08	0.00	0.00
6,900.00	0.28	237.67	6,855.54	81.06	726.99	731.19	0.08	0.08	0.00	0.00
7,000.00	0.36	237.67	6,955.54	80.76	726.52	730.70	0.08	0.08	0.00	0.00
7,100.00	0.44	237.67	7,055.54	80.39	725.93	730.08	0.08	0.08	0.00	0.00
7,200.00	0.52	237.67	7,155.53	79.94	725.23	729.34	0.08	0.08	0.00	0.00
7,300.00	0.60	237.67	7,255.53	79.42	724.40	728.47	0.08	0.08	0.00	0.00
7,369.47	0.65	237.67	7,325.00	79.01	723.76	727.80	0.08	0.08	0.00	0.00
<b>Top of Gas</b>										
7,400.00	0.68	237.67	7,355.52	78.82	723.46	727.49	0.08	0.08	0.00	0.00
7,500.00	0.76	237.67	7,455.52	78.15	722.40	726.37	0.08	0.08	0.00	0.00
7,600.00	0.84	237.67	7,555.51	77.41	721.22	725.14	0.08	0.08	0.00	0.00
7,700.00	0.92	237.67	7,655.49	76.59	719.93	723.78	0.08	0.08	0.00	0.00
7,800.00	1.00	237.67	7,755.48	75.69	718.51	722.30	0.08	0.08	0.00	0.00
7,900.00	1.08	237.67	7,855.46	74.72	716.98	720.69	0.08	0.08	0.00	0.00
8,000.00	1.16	237.67	7,955.44	73.68	715.33	718.96	0.08	0.08	0.00	0.00
8,100.00	1.24	237.67	8,055.42	72.56	713.56	717.11	0.08	0.08	0.00	0.00
8,200.00	1.32	237.67	8,155.40	71.36	711.68	715.13	0.08	0.08	0.00	0.00
8,246.82	1.36	237.67	8,202.20	70.78	710.75	714.16	0.08	0.08	0.00	0.00
8,300.00	1.32	237.67	8,255.37	70.11	709.70	713.06	0.06	-0.06	0.00	180.00
8,400.00	1.26	237.67	8,355.35	68.91	707.80	711.06	0.06	-0.06	0.00	180.00
8,500.00	1.20	237.67	8,455.32	67.76	705.98	709.15	0.06	-0.06	0.00	180.00
8,600.00	1.14	237.67	8,555.30	66.66	704.24	707.34	0.06	-0.06	0.00	180.00
8,700.00	1.08	237.67	8,655.28	65.62	702.60	705.62	0.06	-0.06	0.00	180.00
8,800.00	1.02	237.67	8,755.27	64.64	701.05	703.99	0.06	-0.06	0.00	180.00
8,900.00	0.96	237.67	8,855.25	63.71	699.58	702.45	0.06	-0.06	0.00	180.00
9,000.00	0.90	237.67	8,955.24	62.84	698.21	701.01	0.06	-0.06	0.00	180.00
9,100.00	0.84	237.67	9,055.23	62.02	696.92	699.66	0.06	-0.06	0.00	180.00
9,142.78	0.82	237.67	9,098.00	61.69	696.40	699.11	0.06	-0.06	0.00	-180.00
<b>Cameo</b>										
9,200.00	0.78	237.67	9,155.22	61.27	695.72	698.40	0.06	-0.06	0.00	180.00
9,300.00	0.72	237.67	9,255.21	60.56	694.61	697.24	0.06	-0.06	0.00	180.00
9,400.00	0.66	237.67	9,355.20	59.92	693.59	696.17	0.06	-0.06	0.00	180.00
9,500.00	0.60	237.67	9,455.19	59.33	692.66	695.19	0.06	-0.06	0.00	180.00
9,600.00	0.54	237.67	9,555.19	58.79	691.81	694.30	0.06	-0.06	0.00	180.00
9,602.81	0.54	237.67	9,558.00	58.78	691.79	694.28	0.00	0.00	0.00	0.00
<b>Rollins</b>										

## Plan Report for Long 20-22C - Plan #1 Proposal

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)	Toolface Azimuth (°)
9,700.00	0.48	237.67	9,655.18	58.32	691.06	693.51	0.06	-0.06	0.00	180.00
9,800.00	0.42	237.67	9,755.18	57.89	690.39	692.81	0.06	-0.06	0.00	180.00
9,900.00	0.36	237.67	9,855.18	57.53	689.81	692.21	0.06	-0.06	0.00	180.00
9,941.82	0.34	237.67	9,897.00	57.39	689.60	691.98	0.06	-0.06	0.00	180.00
<b>Cozzette</b>										
10,000.00	0.30	237.67	9,955.18	57.22	689.33	691.70	0.06	-0.06	0.00	-180.00
10,100.00	0.24	237.67	10,055.18	56.97	688.93	691.28	0.06	-0.06	0.00	180.00
10,200.00	0.18	237.67	10,155.18	56.77	688.61	690.95	0.06	-0.06	0.00	180.00
10,220.82	0.17	237.67	10,176.00	56.73	688.56	690.89	0.06	-0.06	0.00	-180.00
<b>Corcoran</b>										
10,300.00	0.12	237.67	10,255.18	56.63	688.39	690.72	0.06	-0.06	0.00	180.00
10,350.83	0.09	237.67	10,306.00	56.58	688.31	690.63	0.06	-0.06	0.00	-180.00
<b>Mancos</b>										
10,400.00	0.06	237.67	10,355.17	56.54	688.26	690.58	0.06	-0.06	0.00	180.00
10,500.00	0.00	237.67	10,455.17	56.51	688.21	690.53	0.06	-0.06	0.00	180.00
10,500.83	0.00	0.00	10,456.00	56.51	688.21	690.53	0.06	-0.06	0.00	180.00
<b>Long 20-22C Plan #1 BH Tgt</b>										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
225.00	225.00	0.00	0.00	Total Depth = 10502.29ft Kickoff at 225.00ft
400.00	399.89	0.59	5.31	Build Rate = 2.00°/100ft
580.75	579.84	2.46	21.92	End Build at 580.75ft
3,300.00	3,278.15	39.95	356.64	7.11 Inclination
6,077.12	6,033.88	78.24	698.48	Begin Drop at 6077.12ft
6,310.00	6,265.70	80.66	720.13	Drop Rate = 1.50°/100ft
6,551.46	6,507.00	81.51	727.71	End Drop at 6551.46ft
10,500.83	10,456.00	56.51	688.21	Total Depth = 10500.83ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	+E/-W (ft)	Start TVD (ft)
Target	Long 20-22C Plan #1 BH Tgt	85.31	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,500.83	Plan #1 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,484.31	8 5/8" Casing Pt.	8-5/8	11

**Plan Report for Long 20-22C - Plan #1 Proposal**

**Formation Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,551.46	6,507.00	Williams Fork		0.00	
7,369.47	7,325.00	Top of Gas		0.00	
9,142.78	9,098.00	Cameo		0.00	
9,602.81	9,558.00	Rollins		0.00	
9,941.82	9,897.00	Cozzette		0.00	
10,220.82	10,176.00	Corcoran		0.00	
10,350.83	10,306.00	Mancos		0.00	

***Targets associated with this wellbore***

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Long 20-22C Plan #1 BH Tgt	10,456.00	56.51	688.21	Point
Long 20-22C Plan #1 Driller's Tgt	6,507.00	81.51	727.71	Rectangle
Long 20-22C Plan #1 Zone Tgt	7,325.00	56.51	688.21	Rectangle
Long 20-22C Hardline	0.00	0.00	0.00	Polygon

**North Reference Sheet for Sec. 20-T7S-R94W - Long 20-22C - Plan #1**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB 25' @ 7931.00ft (Original Well Elev). Northing and Easting are relative to Long 20-22C

Coordinate System is US State Plane 1927 (Exact solution), Colorado Central 502 using datum NAD 1927 (NADCON CONUS), ellipsoid Clarke 1866

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.50°, Longitude Origin: 0° 0' 0.000 E°, Latitude Origin: 39° 45' 0.000 N°

False Easting: 2,000,000.00ft, False Northing: 0.00ft, Scale Reduction: 0.99995194

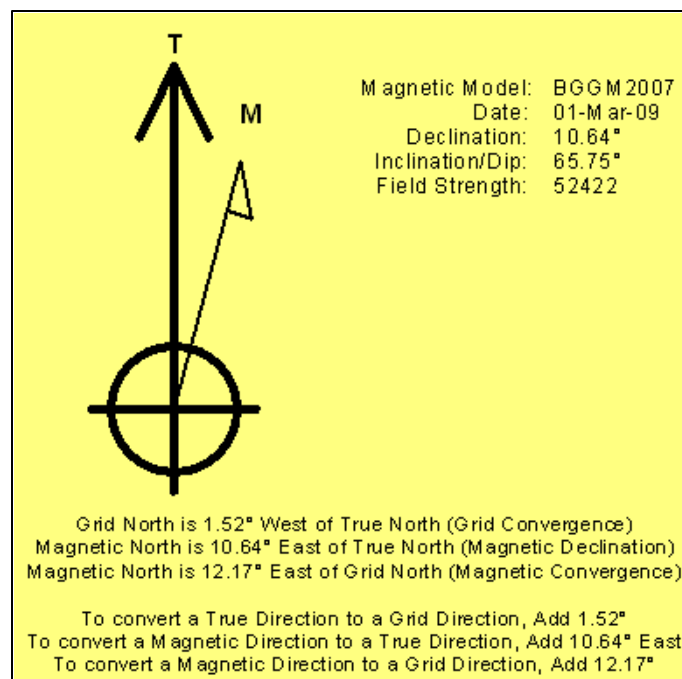
Grid Coordinates of Well: 589,022.77 ft N, 1,317,931.53 ft E

Geographical Coordinates of Well: 39° 25' 32.80" N, 107° 54' 53.20" W

Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,500.83ft  
the Bottom Hole Displacement is 690.53ft in the Direction of 85.31° (True).

Magnetic Convergence at surface is: -12.17° ( 1 March 2009, , BGGM2007)



Project: Garfield County, CO  
Site: Sec. 20-T7S-R94W  
Well: Long 20-22C  
Wellbore: Plan #1  
Plan: Plan #1 Proposal

Noble Energy

HALLIBURTON

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	225.00	0.00	0.00	225.00	0.00	0.00	0.00	0.00	0.00
3	580.75	7.11	83.61	579.84	2.46	21.92	2.00	83.61	22.05
4	6077.12	7.11	83.61	6033.89	78.24	698.48	0.00	0.00	702.54
5	6551.46	0.00	0.00	6507.00	81.51	727.71	1.50	180.00	731.94
6	8246.82	1.36	237.67	8202.20	70.78	710.75	0.08	237.67	714.16
7	10500.83	0.00	0.00	10456.00	56.51	688.21	0.06	180.00	690.53

Long 20-22C Plan #1 Driller's Tgt

Long 20-22C Plan #1 BH Tgt

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Long 20-22C Hardline	0.00	0.00	0.00	Polygon
Long 20-22C Plan #1 Driller's Tgt	6507.00	81.51	727.71	Rectangle (Sides: L25.00 W25.00)
Long 20-22C Plan #1 Zone Tgt	7325.00	56.51	688.21	Rectangle (Sides: L100.00 W200.00)
Long 20-22C Plan #1 BH Tgt	10456.00	56.51	688.21	Point

WELL DETAILS: Long 20-22C

Northing	Easting	Ground Level:	Latitude	Longitude
589022.77	1317931.53	7906.00	39°25'32.797 N	107°54'53.198 W



Azimuths to True North  
Magnetic North: 10.64°  
Magnetic Field  
Strength: 52422.0snT  
Dip Angle: 65.75°  
Date: 3/1/2009  
Model: BGGM2007

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6507.00	6551.46	Williams Fork
7325.00	7369.47	Top of Gas
9098.00	9142.78	Cameo
9558.00	9602.81	Rollins
9897.00	9941.82	Cozzette
10176.00	10220.82	Corcoran
10306.00	10350.83	Mancos

