

# Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Long 20-12B

Plan #1

Plan: Plan #1 Proposal

## Sperry Drilling Services

## Proposal Report

21 January, 2009

Well Coordinates: 589,022.77 N, 1,317,864.03 E (39° 25' 32.78" N, 107° 54' 54.06" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin:

Centered on Well Long 20-12B

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 20-12B - 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	320.52	299.99	0.76	-0.62	0.98	2.00	2.00	0.00	320.52
355.00	2.60	320.52	354.96	2.28	-1.88	2.93	2.00	2.00	0.00	0.00
<b>Build Rate = 2.00 °/100ft</b>										
400.00	3.50	320.52	399.89	4.12	-3.40	5.32	2.00	2.00	0.00	0.00
486.05	5.22	320.52	485.69	9.17	-7.56	11.83	2.00	2.00	0.00	0.00
<b>End Build at 486.05ft</b>										
500.00	5.22	320.52	499.58	10.15	-8.36	13.09	0.00	0.00	0.00	0.00
600.00	5.22	320.52	599.17	17.18	-14.15	22.15	0.00	0.00	0.00	0.00
700.00	5.22	320.52	698.75	24.20	-19.94	31.20	0.00	0.00	0.00	0.00
800.00	5.22	320.52	798.34	31.22	-25.72	40.26	0.00	0.00	0.00	0.00
900.00	5.22	320.52	897.92	38.25	-31.51	49.31	0.00	0.00	0.00	0.00
1,000.00	5.22	320.52	997.51	45.27	-37.30	58.37	0.00	0.00	0.00	0.00
1,100.00	5.22	320.52	1,097.09	52.29	-43.08	67.43	0.00	0.00	0.00	0.00
1,200.00	5.22	320.52	1,196.68	59.31	-48.87	76.48	0.00	0.00	0.00	0.00
1,300.00	5.22	320.52	1,296.26	66.34	-54.65	85.54	0.00	0.00	0.00	0.00
1,400.00	5.22	320.52	1,395.85	73.36	-60.44	94.59	0.00	0.00	0.00	0.00
1,500.00	5.22	320.52	1,495.43	80.38	-66.23	103.65	0.00	0.00	0.00	0.00
1,600.00	5.22	320.52	1,595.02	87.41	-72.01	112.71	0.00	0.00	0.00	0.00
1,700.00	5.22	320.52	1,694.60	94.43	-77.80	121.76	0.00	0.00	0.00	0.00
1,800.00	5.22	320.52	1,794.19	101.45	-83.59	130.82	0.00	0.00	0.00	0.00
1,900.00	5.22	320.52	1,893.77	108.48	-89.37	139.87	0.00	0.00	0.00	0.00
2,000.00	5.22	320.52	1,993.36	115.50	-95.16	148.93	0.00	0.00	0.00	0.00
2,100.00	5.22	320.52	2,092.94	122.52	-100.94	157.98	0.00	0.00	0.00	0.00
2,200.00	5.22	320.52	2,192.53	129.55	-106.73	167.04	0.00	0.00	0.00	0.00
2,300.00	5.22	320.52	2,292.11	136.57	-112.52	176.10	0.00	0.00	0.00	0.00
2,400.00	5.22	320.52	2,391.70	143.59	-118.30	185.15	0.00	0.00	0.00	0.00
2,500.00	5.22	320.52	2,491.28	150.61	-124.09	194.21	0.00	0.00	0.00	0.00
<b>8 5/8" Casing Pt.</b>										
2,600.00	5.22	320.52	2,590.87	157.64	-129.88	203.26	0.00	0.00	0.00	0.00
2,700.00	5.22	320.52	2,690.45	164.66	-135.66	212.32	0.00	0.00	0.00	0.00
2,800.00	5.22	320.52	2,790.04	171.68	-141.45	221.37	0.00	0.00	0.00	0.00
2,900.00	5.22	320.52	2,889.62	178.71	-147.23	230.43	0.00	0.00	0.00	0.00
3,000.00	5.22	320.52	2,989.21	185.73	-153.02	239.49	0.00	0.00	0.00	0.00
3,100.00	5.22	320.52	3,088.79	192.75	-158.81	248.54	0.00	0.00	0.00	0.00
3,200.00	5.22	320.52	3,188.38	199.78	-164.59	257.60	0.00	0.00	0.00	0.00
3,300.00	5.22	320.52	3,287.96	206.80	-170.38	266.65	0.00	0.00	0.00	0.00
<b>5.22 Inclination</b>										
3,400.00	5.22	320.52	3,387.55	213.82	-176.17	275.71	0.00	0.00	0.00	0.00
3,500.00	5.22	320.52	3,487.13	220.85	-181.95	284.76	0.00	0.00	0.00	0.00
3,600.00	5.22	320.52	3,586.72	227.87	-187.74	293.82	0.00	0.00	0.00	0.00
3,700.00	5.22	320.52	3,686.30	234.89	-193.52	302.88	0.00	0.00	0.00	0.00
3,800.00	5.22	320.52	3,785.89	241.91	-199.31	311.93	0.00	0.00	0.00	0.00
3,900.00	5.22	320.52	3,885.48	248.94	-205.10	320.99	0.00	0.00	0.00	0.00
4,000.00	5.22	320.52	3,985.06	255.96	-210.88	330.04	0.00	0.00	0.00	0.00
4,100.00	5.22	320.52	4,084.65	262.98	-216.67	339.10	0.00	0.00	0.00	0.00
4,200.00	5.22	320.52	4,184.23	270.01	-222.46	348.15	0.00	0.00	0.00	0.00
4,300.00	5.22	320.52	4,283.82	277.03	-228.24	357.21	0.00	0.00	0.00	0.00
4,400.00	5.22	320.52	4,383.40	284.05	-234.03	366.27	0.00	0.00	0.00	0.00
4,500.00	5.22	320.52	4,482.99	291.08	-239.81	375.32	0.00	0.00	0.00	0.00
4,600.00	5.22	320.52	4,582.57	298.10	-245.60	384.38	0.00	0.00	0.00	0.00
4,700.00	5.22	320.52	4,682.16	305.12	-251.39	393.43	0.00	0.00	0.00	0.00
4,800.00	5.22	320.52	4,781.74	312.14	-257.17	402.49	0.00	0.00	0.00	0.00
4,900.00	5.22	320.52	4,881.33	319.17	-262.96	411.55	0.00	0.00	0.00	0.00

## Plan Report for Long 20-12B - 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 (°)
5,000.00	5.22	320.52	4,980.91	326.19	-268.74	420.60	0.00	0.00	0.00	0.00
5,100.00	5.22	320.52	5,080.50	333.21	-274.53	429.66	0.00	0.00	0.00	0.00
5,200.00	5.22	320.52	5,180.08	340.24	-280.32	438.71	0.00	0.00	0.00	0.00
5,300.00	5.22	320.52	5,279.67	347.26	-286.10	447.77	0.00	0.00	0.00	0.00
5,400.00	5.22	320.52	5,379.25	354.28	-291.89	456.82	0.00	0.00	0.00	0.00
5,500.00	5.22	320.52	5,478.84	361.31	-297.68	465.88	0.00	0.00	0.00	0.00
5,600.00	5.22	320.52	5,578.42	368.33	-303.46	474.94	0.00	0.00	0.00	0.00
5,700.00	5.22	320.52	5,678.01	375.35	-309.25	483.99	0.00	0.00	0.00	0.00
5,800.00	5.22	320.52	5,777.59	382.38	-315.03	493.05	0.00	0.00	0.00	0.00
5,900.00	5.22	320.52	5,877.18	389.40	-320.82	502.10	0.00	0.00	0.00	0.00
6,000.00	5.22	320.52	5,976.76	396.42	-326.61	511.16	0.00	0.00	0.00	0.00
6,100.00	5.22	320.52	6,076.35	403.44	-332.39	520.21	0.00	0.00	0.00	0.00
6,118.15	5.22	320.52	6,094.42	404.72	-333.44	521.86	0.00	0.00	0.00	0.00
<b>Begin Drop at 6118.15ft</b>										
6,200.00	3.99	320.52	6,176.01	409.79	-337.62	528.40	1.50	-1.50	0.00	180.00
6,300.00	2.49	320.52	6,275.84	414.16	-341.22	534.03	1.50	-1.50	0.00	-180.00
<b>Drop Rate = 1.50°/100ft</b>										
6,400.00	0.99	320.52	6,375.79	416.51	-343.16	537.06	1.50	-1.50	0.00	180.00
6,466.21	0.00	0.00	6,442.00	416.95	-343.52	537.63	1.50	-1.50	59.64	180.00
<b>End Drop at 6466.21ft - Long 20-12B Plan #1 Driller's Tgt</b>										
6,481.21	0.01	243.43	6,457.00	416.95	-343.52	537.63	0.08	0.08	-777.10	-116.63
<b>Williams Fork</b>										
6,500.00	0.03	243.43	6,475.79	416.95	-343.53	537.63	0.08	0.08	0.00	0.00
6,600.00	0.11	243.43	6,575.79	416.89	-343.63	537.67	0.08	0.08	0.00	0.00
6,700.00	0.19	243.43	6,675.79	416.78	-343.86	537.75	0.08	0.08	0.00	0.00
6,800.00	0.27	243.43	6,775.79	416.60	-344.22	537.88	0.08	0.08	0.00	0.00
6,900.00	0.35	243.43	6,875.79	416.36	-344.70	538.05	0.08	0.08	0.00	0.00
7,000.00	0.43	243.43	6,975.79	416.06	-345.30	538.26	0.08	0.08	0.00	0.00
7,100.00	0.51	243.43	7,075.78	415.70	-346.03	538.52	0.08	0.08	0.00	0.00
7,200.00	0.59	243.43	7,175.78	415.27	-346.88	538.82	0.08	0.08	0.00	0.00
7,299.23	0.67	243.43	7,275.00	414.78	-347.85	539.17	0.08	0.08	0.00	0.00
<b>Top of Gas</b>										
7,300.00	0.67	243.43	7,275.77	414.78	-347.86	539.17	0.08	0.08	0.00	0.00
7,400.00	0.75	243.43	7,375.76	414.23	-348.96	539.56	0.08	0.08	0.00	0.00
7,500.00	0.83	243.43	7,475.76	413.61	-350.19	540.00	0.08	0.08	0.00	0.00
7,600.00	0.91	243.43	7,575.74	412.94	-351.55	540.48	0.08	0.08	0.00	0.00
7,700.00	0.99	243.43	7,675.73	412.20	-353.03	541.01	0.08	0.08	0.00	0.00
7,800.00	1.07	243.43	7,775.71	411.40	-354.63	541.58	0.08	0.08	0.00	0.00
7,900.00	1.15	243.43	7,875.70	410.53	-356.36	542.19	0.08	0.08	0.00	0.00
8,000.00	1.23	243.43	7,975.67	409.61	-358.21	542.85	0.08	0.08	0.00	0.00
8,100.00	1.31	243.43	8,075.65	408.62	-360.19	543.56	0.08	0.08	0.00	0.00
8,200.00	1.39	243.43	8,175.62	407.57	-362.29	544.30	0.08	0.08	0.00	0.00
8,300.00	1.47	243.43	8,275.59	406.45	-364.52	545.10	0.08	0.08	0.00	0.00
8,400.00	1.55	243.43	8,375.56	405.28	-366.87	545.93	0.08	0.08	0.00	0.00
8,486.17	1.62	243.43	8,461.69	404.21	-369.00	546.69	0.08	0.08	0.00	0.00
8,500.00	1.60	243.43	8,475.52	404.04	-369.34	546.81	0.08	-0.08	0.00	180.00
8,600.00	1.52	243.43	8,575.48	402.82	-371.78	547.68	0.08	-0.08	0.00	180.00
8,700.00	1.44	243.43	8,675.45	401.66	-374.09	548.50	0.08	-0.08	0.00	180.00
8,800.00	1.36	243.43	8,775.42	400.57	-376.27	549.28	0.08	-0.08	0.00	180.00
8,900.00	1.27	243.43	8,875.39	399.55	-378.32	550.01	0.08	-0.08	0.00	180.00
9,000.00	1.19	243.43	8,975.37	398.59	-380.24	550.69	0.08	-0.08	0.00	180.00
9,072.65	1.13	243.43	9,048.00	397.93	-381.56	551.16	0.08	-0.08	0.00	180.00
<b>Cameo</b>										
9,100.00	1.11	243.43	9,075.35	397.69	-382.04	551.33	0.08	-0.08	0.00	-180.00
9,200.00	1.02	243.43	9,175.33	396.86	-383.70	551.92	0.08	-0.08	0.00	180.00
9,300.00	0.94	243.43	9,275.32	396.10	-385.23	552.46	0.08	-0.08	0.00	180.00
9,400.00	0.86	243.43	9,375.30	395.39	-386.63	552.96	0.08	-0.08	0.00	180.00
9,500.00	0.77	243.43	9,475.29	394.76	-387.90	553.41	0.08	-0.08	0.00	180.00
9,532.71	0.75	243.43	9,508.00	394.56	-388.29	553.55	0.08	-0.08	0.00	180.00

## Plan Report for Long 20-12B - 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 (°)
<b>Rollins</b>										
9,600.00	0.69	243.43	9,575.29	394.19	-389.05	553.82	0.08	-0.08	0.00	-180.00
9,700.00	0.61	243.43	9,675.28	393.68	-390.06	554.18	0.08	-0.08	0.00	180.00
9,800.00	0.52	243.43	9,775.27	393.24	-390.94	554.50	0.08	-0.08	0.00	180.00
9,871.73	0.46	243.43	9,847.00	392.96	-391.50	554.69	0.08	-0.08	0.00	180.00
<b>Cozzette</b>										
9,900.00	0.44	243.43	9,875.27	392.86	-391.69	554.76	0.08	-0.08	0.00	-180.00
10,000.00	0.36	243.43	9,975.27	392.55	-392.32	554.98	0.08	-0.08	0.00	180.00
10,100.00	0.27	243.43	10,075.27	392.30	-392.81	555.16	0.08	-0.08	0.00	180.00
10,150.73	0.23	243.43	10,126.00	392.20	-393.01	555.23	0.08	-0.08	0.00	180.00
<b>Corcoran</b>										
10,200.00	0.19	243.43	10,175.27	392.12	-393.18	555.29	0.08	-0.08	0.00	-180.00
10,280.73	0.12	243.43	10,256.00	392.02	-393.38	555.36	0.08	-0.08	0.00	-180.00
<b>Mancos</b>										
10,300.00	0.11	243.43	10,275.27	392.00	-393.41	555.37	0.08	-0.08	0.00	180.00
10,400.00	0.03	243.43	10,375.27	391.95	-393.52	555.41	0.08	-0.08	0.00	180.00
10,430.73	0.00	0.00	10,406.00	391.95	-393.52	555.41	0.08	-0.08	379.32	179.99
<b>Total Depth = 10430.73ft - Long 20-12B Plan #1 BH Tgt</b>										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
225.00	225.00	0.00	0.00	Kickoff at 225.00ft
355.00	354.96	2.28	-1.88	Build Rate = 2.00°/100ft
486.05	485.69	9.17	-7.56	End Build at 486.05ft
3,300.00	3,287.96	206.80	-170.38	5.22 Inclination
6,118.15	6,094.42	404.72	-333.44	Begin Drop at 6118.15ft
6,300.00	6,275.84	414.16	-341.22	Drop Rate = 1.50°/100ft
6,466.21	6,442.00	416.95	-343.52	End Drop at 6466.21ft
10,430.73	10,406.00	391.95	-393.52	Total Depth = 10430.73ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Long 20-12B Plan #1 BH Tgt	314.89	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,430.43	Plan #1 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,491.28	8 5/8" Casing Pt.	8-5/8	11

## Plan Report for Long 20-12B - Plan #1 Proposal

**Formation Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,481.21	6,457.00	Williams Fork		0.00	
7,299.23	7,275.00	Top of Gas		0.00	
9,072.65	9,048.00	Cameo		0.00	
9,532.71	9,508.00	Rollins		0.00	
9,871.73	9,847.00	Cozzette		0.00	
10,150.73	10,126.00	Corcoran		0.00	
10,280.73	10,256.00	Mancos		0.00	

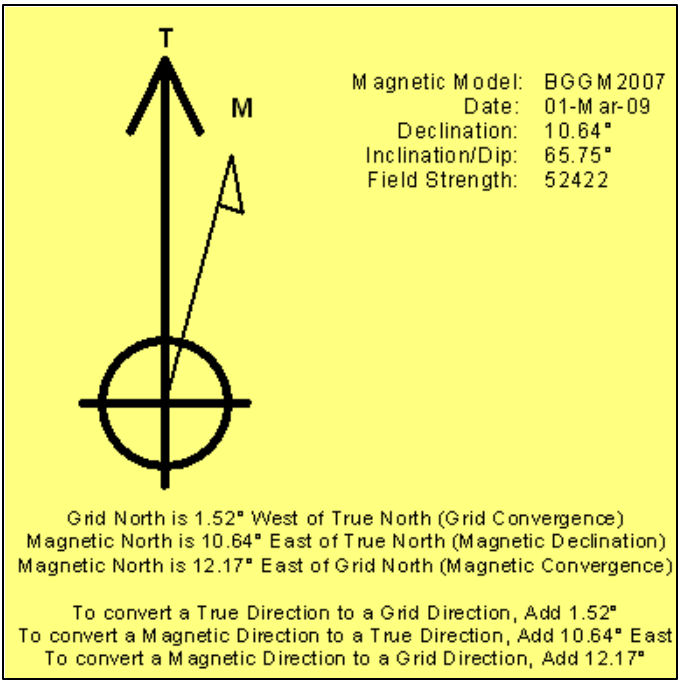
***Targets associated with this wellbore***

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Long 20-12B Plan #1 Driller's Tgt	6,442.00	416.95	-343.52	Rectangle
Long 20-12B Plan #1 BH Tgt	10,406.00	391.95	-393.52	Point
Long 20-12B Plan #1 Zone Tgt	7,275.00	391.95	-393.52	Rectangle

# North Reference Sheet for Sec. 20-T7S-R94W - Long 20-12B - 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 20-12B  
 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: 0.99995193  
 Grid Coordinates of Well: 589,022.77 ft N, 1,317,864.03 ft E  
 Geographical Coordinates of Well: 39° 25' 32.78" N, 107° 54' 54.06" W  
 Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,430.73ft  
 the Bottom Hole Displacement is 555.41ft in the Direction of 314.89° (True).  
 Magnetic Convergence at surface is: -12.17° ( 1 March 2009, , BGGM2007)



Project: Garfield County, CO  
Site: Sec. 20-T7S-R94W  
Well: Long 20-12B  
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	486.05	5.22	320.52	485.69	9.17	-7.56	2.00	320.52	11.83	
4	6118.15	5.22	320.52	6094.42	404.72	-333.44	0.00	0.00	521.86	Long 20-12B Plan #1 Driller's Tgt
5	6466.21	0.00	0.00	6442.00	416.95	-343.52	1.50	180.00	537.63	
6	8486.17	1.62	243.43	8461.69	404.21	-369.00	0.08	243.43	546.69	
7	10430.73	0.00	0.00	10406.00	391.95	-393.52	0.08	180.00	555.41	Long 20-12B Plan #1 BH Tgt

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Long 20-12B Plan #1 Driller's Tgt	6442.00	416.95	-343.52	Rectangle (Sides: L25.00 W25.00)
Long 20-12B Plan #1 Zone Tgt	7275.00	391.95	-393.52	Rectangle (Sides: L100.00 W200.00)
Long 20-12B Plan #1 BH Tgt	10406.00	391.95	-393.52	Point

WELL DETAILS: Long 20-12B

Northing	Easting	Ground Level:	Latitude	Longitude
589022.77	1317864.03	7906.00	39° 25' 32.779 N	107° 54' 54.058 W

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6457.00	6481.21	Williams Fork
7275.00	7299.23	Top of Gas
9048.00	9072.65	Cameo
9508.00	9532.71	Rollins
9847.00	9871.73	Cozzette
10126.00	10150.73	Corcoran
10256.00	10280.73	Mancos



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

