

Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Long 20-22B

Plan #1

Plan: Plan #1 Proposal

Sperry Drilling Services

Proposal Report

22 January, 2009

Well Coordinates: 589,022.77 N, 1,317,909.03 E (39° 25' 32.79" N, 107° 54' 53.48" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin:

Centered on Well Long 20-22B

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 20-22B - 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
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kickoff at 250.00ft										
300.00	1.00	55.00	300.00	0.25	0.36	0.43	2.00	2.00	0.00	55.00
400.00	3.00	55.00	399.93	2.25	3.22	3.89	2.00	2.00	0.00	0.00
465.00	4.30	55.00	464.80	4.63	6.61	7.98	2.00	2.00	0.00	0.00
Build Rate = 2.00°/100ft										
500.00	5.00	55.00	499.68	6.25	8.93	10.79	2.00	2.00	0.00	0.00
600.00	7.00	55.00	599.13	12.25	17.49	21.13	2.00	2.00	0.00	0.00
667.50	8.35	55.00	666.02	17.42	24.88	30.05	2.00	2.00	0.00	0.00
End Build at 667.50ft										
700.00	8.35	55.00	698.18	20.13	28.74	34.72	0.00	0.00	0.00	0.00
800.00	8.35	55.00	797.12	28.46	40.64	49.09	0.00	0.00	0.00	0.00
900.00	8.35	55.00	896.06	36.78	52.53	63.46	0.00	0.00	0.00	0.00
1,000.00	8.35	55.00	995.00	45.11	64.43	77.83	0.00	0.00	0.00	0.00
1,100.00	8.35	55.00	1,093.94	53.44	76.33	92.20	0.00	0.00	0.00	0.00
1,200.00	8.35	55.00	1,192.88	61.77	88.22	106.57	0.00	0.00	0.00	0.00
1,300.00	8.35	55.00	1,291.82	70.10	100.12	120.94	0.00	0.00	0.00	0.00
8.35 Inclination										
1,400.00	8.35	55.00	1,390.76	78.43	112.01	135.31	0.00	0.00	0.00	0.00
1,500.00	8.35	55.00	1,489.70	86.76	123.91	149.68	0.00	0.00	0.00	0.00
1,600.00	8.35	55.00	1,588.64	95.09	135.80	164.06	0.00	0.00	0.00	0.00
1,700.00	8.35	55.00	1,687.58	103.42	147.70	178.43	0.00	0.00	0.00	0.00
1,800.00	8.35	55.00	1,786.52	111.75	159.60	192.80	0.00	0.00	0.00	0.00
1,900.00	8.35	55.00	1,885.46	120.08	171.49	207.17	0.00	0.00	0.00	0.00
1,917.50	8.35	55.00	1,902.77	121.54	173.57	209.68	0.00	0.00	0.00	0.00
Begin Turn at 1917.50ft										
1,960.00	8.32	59.39	1,944.82	124.87	178.75	215.80	1.50	-0.07	10.34	94.95
Turn Rate = 1.50°/100ft										
2,000.00	8.33	63.54	1,984.40	127.64	183.83	221.59	1.50	0.04	10.36	90.60
2,015.42	8.35	65.13	1,999.66	128.61	185.85	223.83	1.50	0.11	10.31	86.50
End Turn at 2015.42ft										
2,100.00	8.35	65.13	2,083.34	133.77	196.99	236.10	0.00	0.00	0.00	84.93
2,200.00	8.35	65.13	2,182.28	139.88	210.17	250.62	0.00	0.00	0.00	0.00
2,300.00	8.35	65.13	2,281.22	145.99	223.35	265.14	0.00	0.00	0.00	0.00
2,400.00	8.35	65.13	2,380.16	152.10	236.53	279.66	0.00	0.00	0.00	0.00
2,500.00	8.35	65.13	2,479.10	158.21	249.70	294.17	0.00	0.00	0.00	0.00
8 5/8" Casing Pt.										
2,600.00	8.35	65.13	2,578.04	164.32	262.88	308.69	0.00	0.00	0.00	0.00
2,700.00	8.35	65.13	2,676.98	170.43	276.06	323.21	0.00	0.00	0.00	0.00
2,800.00	8.35	65.13	2,775.92	176.54	289.24	337.72	0.00	0.00	0.00	0.00
2,900.00	8.35	65.13	2,874.86	182.65	302.41	352.24	0.00	0.00	0.00	0.00
3,000.00	8.35	65.13	2,973.80	188.76	315.59	366.76	0.00	0.00	0.00	0.00
3,100.00	8.35	65.13	3,072.74	194.87	328.77	381.28	0.00	0.00	0.00	0.00
3,200.00	8.35	65.13	3,171.68	200.98	341.95	395.79	0.00	0.00	0.00	0.00
3,300.00	8.35	65.13	3,270.62	207.09	355.12	410.31	0.00	0.00	0.00	0.00
3,400.00	8.35	65.13	3,369.56	213.19	368.30	424.83	0.00	0.00	0.00	0.00
3,500.00	8.35	65.13	3,468.50	219.30	381.48	439.34	0.00	0.00	0.00	0.00
3,600.00	8.35	65.13	3,567.44	225.41	394.66	453.86	0.00	0.00	0.00	0.00
3,700.00	8.35	65.13	3,666.38	231.52	407.83	468.38	0.00	0.00	0.00	0.00
3,800.00	8.35	65.13	3,765.32	237.63	421.01	482.90	0.00	0.00	0.00	0.00
3,900.00	8.35	65.13	3,864.25	243.74	434.19	497.41	0.00	0.00	0.00	0.00
4,000.00	8.35	65.13	3,963.19	249.85	447.37	511.93	0.00	0.00	0.00	0.00
8.35 Inclination										
4,100.00	8.35	65.13	4,062.13	255.96	460.54	526.45	0.00	0.00	0.00	0.00
4,200.00	8.35	65.13	4,161.07	262.07	473.72	540.97	0.00	0.00	0.00	0.00

Plan Report for Long 20-22B - 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 (°)
4,300.00	8.35	65.13	4,260.01	268.18	486.90	555.48	0.00	0.00	0.00	0.00
4,400.00	8.35	65.13	4,358.95	274.29	500.07	570.00	0.00	0.00	0.00	0.00
4,500.00	8.35	65.13	4,457.89	280.40	513.25	584.52	0.00	0.00	0.00	0.00
4,600.00	8.35	65.13	4,556.83	286.51	526.43	599.03	0.00	0.00	0.00	0.00
4,700.00	8.35	65.13	4,655.77	292.61	539.61	613.55	0.00	0.00	0.00	0.00
4,800.00	8.35	65.13	4,754.71	298.72	552.78	628.07	0.00	0.00	0.00	0.00
4,900.00	8.35	65.13	4,853.65	304.83	565.96	642.59	0.00	0.00	0.00	0.00
5,000.00	8.35	65.13	4,952.59	310.94	579.14	657.10	0.00	0.00	0.00	0.00
5,100.00	8.35	65.13	5,051.53	317.05	592.32	671.62	0.00	0.00	0.00	0.00
5,200.00	8.35	65.13	5,150.47	323.16	605.49	686.14	0.00	0.00	0.00	0.00
5,300.00	8.35	65.13	5,249.41	329.27	618.67	700.65	0.00	0.00	0.00	0.00
5,400.00	8.35	65.13	5,348.35	335.38	631.85	715.17	0.00	0.00	0.00	0.00
5,500.00	8.35	65.13	5,447.29	341.49	645.03	729.69	0.00	0.00	0.00	0.00
5,600.00	8.35	65.13	5,546.23	347.60	658.20	744.21	0.00	0.00	0.00	0.00
5,700.00	8.35	65.13	5,645.17	353.71	671.38	758.72	0.00	0.00	0.00	0.00
5,800.00	8.35	65.13	5,744.11	359.82	684.56	773.24	0.00	0.00	0.00	0.00
5,900.00	8.35	65.13	5,843.05	365.93	697.74	787.76	0.00	0.00	0.00	0.00
6,000.00	8.35	65.13	5,941.99	372.04	710.91	802.28	0.00	0.00	0.00	0.00
6,025.48	8.35	65.13	5,967.20	373.59	714.27	805.97	0.00	0.00	0.00	0.00
Begin Drop at 6025.48ft										
6,100.00	7.23	65.13	6,041.03	377.84	723.44	816.07	1.50	-1.50	0.00	180.00
6,200.00	5.73	65.13	6,140.38	382.59	733.68	827.36	1.50	-1.50	0.00	180.00
6,300.00	4.23	65.13	6,240.00	386.25	741.56	836.04	1.50	-1.50	0.00	-180.00
Drop Rate = 1.50°/100ft										
6,400.00	2.73	65.13	6,339.81	388.80	747.08	842.12	1.50	-1.50	0.00	180.00
6,500.00	1.23	65.13	6,439.75	390.26	750.22	845.57	1.50	-1.50	0.00	180.00
6,582.25	0.00	0.00	6,522.00	390.63	751.02	846.46	1.50	-1.50	0.00	-180.00
End Drop at 6582.25ft - Williams Fork - Long 20-22B Plan #1 Driller's Tgt										
6,600.00	0.01	224.42	6,539.75	390.63	751.02	846.46	0.05	0.05	0.00	224.42
6,700.00	0.06	224.42	6,639.75	390.59	750.98	846.40	0.05	0.05	0.00	0.00
6,800.00	0.11	224.42	6,739.75	390.48	750.88	846.26	0.05	0.05	0.00	0.00
6,900.00	0.16	224.42	6,839.75	390.32	750.71	846.04	0.05	0.05	0.00	0.00
7,000.00	0.21	224.42	6,939.74	390.09	750.49	845.74	0.05	0.05	0.00	0.00
7,100.00	0.26	224.42	7,039.74	389.79	750.20	845.35	0.05	0.05	0.00	0.00
7,200.00	0.31	224.42	7,139.74	389.44	749.85	844.88	0.05	0.05	0.00	0.00
7,300.00	0.36	224.42	7,239.74	389.02	749.45	844.33	0.05	0.05	0.00	0.00
7,400.00	0.41	224.42	7,339.74	388.55	748.98	843.70	0.05	0.05	0.00	0.00
7,400.26	0.41	224.42	7,340.00	388.54	748.98	843.70	0.00	0.00	0.00	0.00
Top of Gas										
7,500.00	0.46	224.42	7,439.74	388.01	748.45	842.98	0.05	0.05	0.00	0.00
7,600.00	0.51	224.42	7,539.73	387.40	747.86	842.18	0.05	0.05	0.00	0.00
7,700.00	0.56	224.42	7,639.73	386.74	747.20	841.30	0.05	0.05	0.00	0.00
7,800.00	0.61	224.42	7,739.72	386.01	746.49	840.34	0.05	0.05	0.00	0.00
7,900.00	0.66	224.42	7,839.72	385.22	745.72	839.29	0.05	0.05	0.00	0.00
8,000.00	0.71	224.42	7,939.71	384.37	744.88	838.16	0.05	0.05	0.00	0.00
8,100.00	0.76	224.42	8,039.70	383.45	743.99	836.95	0.05	0.05	0.00	0.00
8,200.00	0.81	224.42	8,139.69	382.47	743.03	835.65	0.05	0.05	0.00	0.00
8,300.00	0.86	224.42	8,239.68	381.43	742.01	834.28	0.05	0.05	0.00	0.00
8,400.00	0.91	224.42	8,339.67	380.33	740.93	832.82	0.05	0.05	0.00	0.00
8,500.00	0.96	224.42	8,439.66	379.17	739.79	831.28	0.05	0.05	0.00	0.00
8,600.00	1.01	224.42	8,539.64	377.94	738.59	829.65	0.05	0.05	0.00	0.00
8,613.88	1.02	224.42	8,553.52	377.77	738.41	829.42	0.05	0.05	0.00	0.00
8,700.00	0.97	224.42	8,639.63	376.70	737.37	828.01	0.05	-0.05	0.00	180.00
8,800.00	0.92	224.42	8,739.61	375.53	736.22	826.45	0.05	-0.05	0.00	180.00
8,900.00	0.86	224.42	8,839.60	374.42	735.13	824.98	0.05	-0.05	0.00	180.00
9,000.00	0.81	224.42	8,939.59	373.37	734.11	823.59	0.05	-0.05	0.00	180.00
9,100.00	0.76	224.42	9,039.58	372.39	733.15	822.30	0.05	-0.05	0.00	180.00
9,173.43	0.72	224.42	9,113.00	371.72	732.48	821.40	0.05	-0.05	0.00	180.00
Cameo										

Plan Report for Long 20-22B - 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 (°)
9,200.00	0.71	224.42	9,139.57	371.48	732.25	821.09	0.05	-0.05	0.00	-180.00
9,300.00	0.65	224.42	9,239.57	370.63	731.42	819.97	0.05	-0.05	0.00	180.00
9,400.00	0.60	224.42	9,339.56	369.85	730.66	818.93	0.05	-0.05	0.00	180.00
9,500.00	0.55	224.42	9,439.55	369.14	729.96	817.99	0.05	-0.05	0.00	180.00
9,600.00	0.49	224.42	9,539.55	368.49	729.32	817.13	0.05	-0.05	0.00	180.00
9,633.45	0.48	224.42	9,573.00	368.29	729.13	816.86	0.05	-0.05	0.00	-180.00
Rollins										
9,700.00	0.44	224.42	9,639.55	367.91	728.75	816.36	0.05	-0.05	0.00	180.00
9,800.00	0.39	224.42	9,739.54	367.39	728.25	815.67	0.05	-0.05	0.00	180.00
9,900.00	0.33	224.42	9,839.54	366.94	727.81	815.08	0.05	-0.05	0.00	180.00
9,972.46	0.30	224.42	9,912.00	366.66	727.53	814.70	0.05	-0.05	0.00	-180.00
Cozzette										
10,000.00	0.28	224.42	9,939.54	366.56	727.43	814.57	0.05	-0.05	0.00	180.00
10,100.00	0.23	224.42	10,039.54	366.24	727.12	814.15	0.05	-0.05	0.00	180.00
10,200.00	0.18	224.42	10,139.54	365.99	726.87	813.81	0.05	-0.05	0.00	180.00
10,251.46	0.15	224.42	10,191.00	365.89	726.77	813.68	0.05	-0.05	0.00	-180.00
Corcoran										
10,300.00	0.12	224.42	10,239.54	365.80	726.69	813.57	0.05	-0.05	0.00	180.00
10,381.46	0.08	224.42	10,321.00	365.70	726.59	813.43	0.05	-0.05	0.00	180.00
Mancos										
10,400.00	0.07	224.42	10,339.54	365.68	726.57	813.41	0.05	-0.05	0.00	-180.00
10,500.00	0.02	224.42	10,439.54	365.63	726.52	813.34	0.05	-0.05	0.00	180.00
10,531.46	0.00	0.00	10,471.00	365.63	726.52	813.33	0.05	-0.05	430.96	180.00
Total Depth = 10531.46ft - Long 20-22B Plan #1 BH Tgt										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
250.00	250.00	0.00	0.00	Kickoff at 250.00ft
465.00	464.80	4.63	6.61	Build Rate = 2.00°/100ft
667.50	666.02	17.42	24.88	End Build at 667.50ft
1,300.00	1,291.82	70.10	100.12	8.35 Inclination
1,917.50	1,902.77	121.54	173.57	Begin Turn at 1917.50ft
1,960.00	1,944.82	124.87	178.75	Turn Rate = 1.50°/100ft
2,015.42	1,999.66	128.61	185.85	End Turn at 2015.42ft
4,000.00	3,963.19	249.85	447.37	8.35 Inclination
6,025.48	5,967.20	373.59	714.27	Begin Drop at 6025.48ft
6,300.00	6,240.00	386.25	741.56	Drop Rate = 1.50°/100ft
6,582.25	6,522.00	390.63	751.02	End Drop at 6582.25ft
10,531.46	10,471.00	365.63	726.52	Total Depth = 10531.46ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	+E/-W (ft)	Start TVD (ft)
Target	Long 20-22B Plan #1 BH Tgt	63.29	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,531.46	Plan #1 Proposal	MWD

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

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,479.10	8 5/8" Casing Pt.	8-5/8	11

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,582.25	6,522.00	Williams Fork		0.00	
7,400.26	7,340.00	Top of Gas		0.00	
9,173.43	9,113.00	Cameo		0.00	
9,633.45	9,573.00	Rollins		0.00	
9,972.46	9,912.00	Cozzette		0.00	
10,251.46	10,191.00	Corcoran		0.00	
10,381.46	10,321.00	Mancos		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Long 20-22B Plan #1 Zone Tgt	7,340.00	365.63	726.52	Rectangle
Long 20-22B Plan #1 Driller's Tgt	6,522.00	390.63	751.02	Rectangle
Long 20-22B Hardline	0.00	0.00	0.00	Polygon
Long 20-22B Plan #1 BH Tgt	10,471.00	365.63	726.52	Point

North Reference Sheet for Sec. 20-T7S-R94W - Long 20-22B - 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 20-22B

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

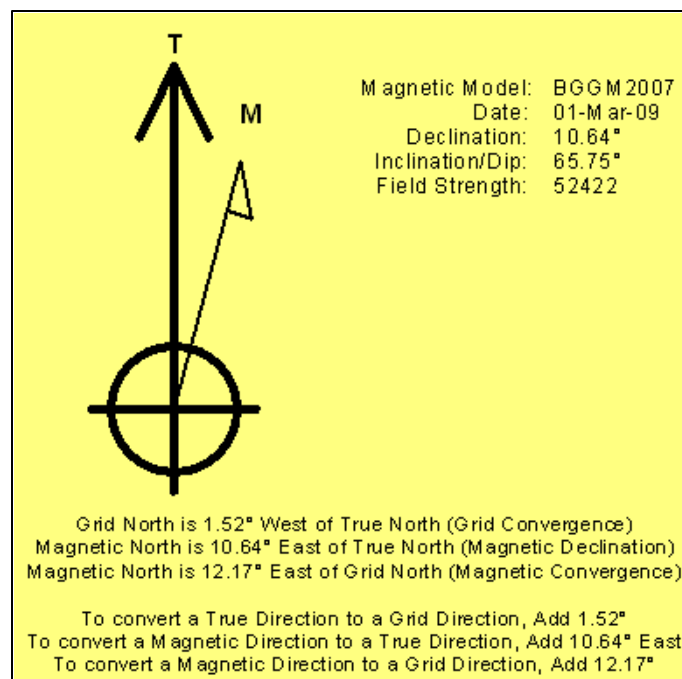
Grid Coordinates of Well: 589,022.77 ft N, 1,317,909.03 ft E

Geographical Coordinates of Well: 39° 25' 32.79" N, 107° 54' 53.48" W

Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,531.46ft
the Bottom Hole Displacement is 813.33ft in the Direction of 63.29° (True).

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



Project: Garfield County, CO
Site: Sec. 20-T7S-R94W
Well: Long 20-22B
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	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00
3	667.50	8.35	55.00	666.02	17.42	24.88	2.00	55.00	30.05
4	1917.50	8.35	55.00	1902.77	121.54	173.57	0.00	0.00	209.68
5	2015.42	8.35	65.13	1999.66	128.61	185.95	1.50	94.95	223.83
6	6025.48	8.35	65.13	5967.20	373.59	714.27	0.00	0.00	805.97
7	6582.25	0.00	0.00	6522.00	390.63	751.02	1.50	180.00	846.46
8	8613.88	1.02	224.42	8553.52	377.77	738.41	0.05	224.42	829.42
9	10531.46	0.00	0.00	10471.00	365.63	726.52	0.05	180.00	813.33

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Long 20-22B Hardline	0.00	0.00	0.00	Polygon
Long 20-22B Plan #1 Driller's Tgt	6522.00	390.63	751.02	Rectangle (Sides: L25.00 W25.00)
Long 20-22B Plan #1 Zone Tgt	7340.00	365.63	726.52	Rectangle (Sides: L100.00 W200.00)
Long 20-22B Plan #1 BH Tgt	10471.00	365.63	726.52	Point

WELL DETAILS: Long 20-22B

Northing	Easting	Ground Level:	Latitude	Longitude
589022.77	1317909.03	7906.00	39° 25' 32.791 N	107° 54' 53.484 W

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6522.00	6582.25	Williams Fork
7340.00	7400.26	Top of Gas
9113.00	9173.43	Cameo
9573.00	9633.45	Rollins
9912.00	9972.46	Cozzette
10191.00	10251.46	Corcoran
10321.00	10381.46	Mancos



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

West(-)/East(+) (250 ft/in)

