

Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Long 20-23D

Plan #1

Plan: Plan #1 Proposal

Sperry Drilling Services

Proposal Report

22 January, 2009

Well Coordinates: 589,013.27 N, 1,317,886.53 E (39° 25' 32.69" N, 107° 54' 53.77" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin:

Centered on Well Long 20-23D

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 20-23D - 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
Kickoff at 225.00ft										
300.00	1.50	153.98	299.99	-0.88	0.43	0.98	2.00	2.00	0.00	153.98
400.00	3.50	153.98	399.89	-4.80	2.34	5.34	2.00	2.00	0.00	0.00
500.00	5.50	153.98	499.58	-11.85	5.79	13.19	2.00	2.00	0.00	0.00
600.00	7.50	153.98	598.93	-22.02	10.75	24.50	2.00	2.00	0.00	0.00
700.00	9.50	153.98	697.83	-35.31	17.24	39.28	2.00	2.00	0.00	0.00
Build Rate = 2.00°/100ft										
800.00	11.50	153.98	796.15	-51.68	25.23	57.50	2.00	2.00	0.00	0.00
900.00	13.50	153.98	893.77	-71.13	34.73	79.14	2.00	2.00	0.00	0.00
1,000.00	15.50	153.98	990.58	-93.63	45.71	104.18	2.00	2.00	0.00	0.00
1,100.00	17.50	153.98	1,086.46	-119.15	58.17	132.57	2.00	2.00	0.00	0.00
1,168.62	18.87	153.98	1,151.65	-138.39	67.57	153.98	2.00	2.00	0.00	0.00
End Build at 1168.62ft										
1,200.00	18.87	153.98	1,181.34	-147.52	72.02	164.13	0.00	0.00	0.00	0.00
1,300.00	18.87	153.98	1,275.97	-176.58	86.21	196.47	0.00	0.00	0.00	0.00
1,400.00	18.87	153.98	1,370.59	-205.65	100.40	228.82	0.00	0.00	0.00	0.00
1,500.00	18.87	153.98	1,465.21	-234.72	114.59	261.16	0.00	0.00	0.00	0.00
1,600.00	18.87	153.98	1,559.84	-263.78	128.78	293.50	0.00	0.00	0.00	0.00
1,700.00	18.87	153.98	1,654.46	-292.85	142.98	325.84	0.00	0.00	0.00	0.00
1,800.00	18.87	153.98	1,749.09	-321.92	157.17	358.18	0.00	0.00	0.00	0.00
1,900.00	18.87	153.98	1,843.71	-350.98	171.36	390.52	0.00	0.00	0.00	0.00
2,000.00	18.87	153.98	1,938.34	-380.05	185.55	422.86	0.00	0.00	0.00	0.00
2,100.00	18.87	153.98	2,032.96	-409.12	199.74	455.20	0.00	0.00	0.00	0.00
2,200.00	18.87	153.98	2,127.58	-438.18	213.93	487.54	0.00	0.00	0.00	0.00
2,300.00	18.87	153.98	2,222.21	-467.25	228.12	519.89	0.00	0.00	0.00	0.00
2,400.00	18.87	153.98	2,316.83	-496.32	242.31	552.23	0.00	0.00	0.00	0.00
2,500.00	18.87	153.98	2,411.46	-525.38	256.50	584.57	0.00	0.00	0.00	0.00
8 5/8" Casing Pt.										
2,600.00	18.87	153.98	2,506.08	-554.45	270.70	616.91	0.00	0.00	0.00	0.00
2,700.00	18.87	153.98	2,600.70	-583.52	284.89	649.25	0.00	0.00	0.00	0.00
2,800.00	18.87	153.98	2,695.33	-612.58	299.08	681.59	0.00	0.00	0.00	0.00
2,900.00	18.87	153.98	2,789.95	-641.65	313.27	713.93	0.00	0.00	0.00	0.00
3,000.00	18.87	153.98	2,884.58	-670.72	327.46	746.27	0.00	0.00	0.00	0.00
3,100.00	18.87	153.98	2,979.20	-699.78	341.65	778.62	0.00	0.00	0.00	0.00
3,200.00	18.87	153.98	3,073.83	-728.85	355.84	810.96	0.00	0.00	0.00	0.00
3,300.00	18.87	153.98	3,168.45	-757.92	370.03	843.30	0.00	0.00	0.00	0.00
18.87 Inclination										
3,400.00	18.87	153.98	3,263.07	-786.99	384.22	875.64	0.00	0.00	0.00	0.00
3,500.00	18.87	153.98	3,357.70	-816.05	398.41	907.98	0.00	0.00	0.00	0.00
3,600.00	18.87	153.98	3,452.32	-845.12	412.61	940.32	0.00	0.00	0.00	0.00
3,700.00	18.87	153.98	3,546.95	-874.19	426.80	972.66	0.00	0.00	0.00	0.00
3,800.00	18.87	153.98	3,641.57	-903.25	440.99	1,005.00	0.00	0.00	0.00	0.00
3,900.00	18.87	153.98	3,736.20	-932.32	455.18	1,037.34	0.00	0.00	0.00	0.00
4,000.00	18.87	153.98	3,830.82	-961.39	469.37	1,069.69	0.00	0.00	0.00	0.00
4,100.00	18.87	153.98	3,925.44	-990.45	483.56	1,102.03	0.00	0.00	0.00	0.00
4,200.00	18.87	153.98	4,020.07	-1,019.52	497.75	1,134.37	0.00	0.00	0.00	0.00
4,300.00	18.87	153.98	4,114.69	-1,048.59	511.94	1,166.71	0.00	0.00	0.00	0.00
4,400.00	18.87	153.98	4,209.32	-1,077.65	526.13	1,199.05	0.00	0.00	0.00	0.00
4,500.00	18.87	153.98	4,303.94	-1,106.72	540.33	1,231.39	0.00	0.00	0.00	0.00
4,600.00	18.87	153.98	4,398.56	-1,135.79	554.52	1,263.73	0.00	0.00	0.00	0.00
4,700.00	18.87	153.98	4,493.19	-1,164.85	568.71	1,296.07	0.00	0.00	0.00	0.00
4,800.00	18.87	153.98	4,587.81	-1,193.92	582.90	1,328.42	0.00	0.00	0.00	0.00
4,900.00	18.87	153.98	4,682.44	-1,222.99	597.09	1,360.76	0.00	0.00	0.00	0.00
5,000.00	18.87	153.98	4,777.06	-1,252.05	611.28	1,393.10	0.00	0.00	0.00	0.00

Plan Report for Long 20-23D - 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	18.87	153.98	4,871.69	-1,281.12	625.47	1,425.44	0.00	0.00	0.00	0.00
5,200.00	18.87	153.98	4,966.31	-1,310.19	639.66	1,457.78	0.00	0.00	0.00	0.00
5,300.00	18.87	153.98	5,060.93	-1,339.25	653.85	1,490.12	0.00	0.00	0.00	0.00
5,400.00	18.87	153.98	5,155.56	-1,368.32	668.04	1,522.46	0.00	0.00	0.00	0.00
5,422.10	18.87	153.98	5,176.47	-1,374.75	671.18	1,529.61	0.00	0.00	0.00	0.00
Begin Drop at 5422.10ft										
5,500.00	17.70	153.98	5,250.43	-1,396.71	681.91	1,554.05	1.50	-1.50	0.00	180.00
5,600.00	16.20	153.98	5,346.08	-1,422.91	694.70	1,583.21	1.50	-1.50	0.00	180.00
5,700.00	14.70	153.98	5,442.47	-1,446.86	706.39	1,609.85	1.50	-1.50	0.00	180.00
5,800.00	13.20	153.98	5,539.51	-1,468.53	716.97	1,633.96	1.50	-1.50	0.00	180.00
5,900.00	11.70	153.98	5,637.16	-1,487.91	726.43	1,655.52	1.50	-1.50	0.00	180.00
6,000.00	10.20	153.98	5,735.33	-1,504.98	734.76	1,674.52	1.50	-1.50	0.00	180.00
6,100.00	8.70	153.98	5,833.97	-1,519.74	741.97	1,690.94	1.50	-1.50	0.00	180.00
6,150.00	7.95	153.98	5,883.44	-1,526.25	745.15	1,698.18	1.50	-1.50	0.00	180.00
Drop Rate = 1.50°/100ft										
6,200.00	7.20	153.98	5,933.01	-1,532.18	748.04	1,704.77	1.50	-1.50	0.00	-180.00
6,300.00	5.70	153.98	6,032.37	-1,542.28	752.97	1,716.01	1.50	-1.50	0.00	180.00
6,400.00	4.20	153.98	6,131.99	-1,550.04	756.76	1,724.65	1.50	-1.50	0.00	180.00
6,500.00	2.70	153.98	6,231.81	-1,555.45	759.40	1,730.67	1.50	-1.50	0.00	180.00
6,600.00	1.20	153.98	6,331.75	-1,558.51	760.90	1,734.08	1.50	-1.50	0.00	180.00
6,680.26	0.00	0.00	6,412.00	-1,559.27	761.27	1,734.92	1.50	-1.50	0.00	-180.00
End Drop at 6680.26ft - Williams Fork - Long 20-23D Plan #1 Driller's Tgt										
6,700.00	0.02	220.69	6,431.74	-1,559.27	761.27	1,734.92	0.08	0.08	0.00	220.69
6,800.00	0.10	220.69	6,531.74	-1,559.35	761.20	1,734.96	0.08	0.08	0.00	0.00
6,900.00	0.18	220.69	6,631.74	-1,559.53	761.05	1,735.06	0.08	0.08	0.00	0.00
7,000.00	0.26	220.69	6,731.74	-1,559.81	760.80	1,735.22	0.08	0.08	0.00	0.00
7,100.00	0.34	220.69	6,831.74	-1,560.20	760.47	1,735.43	0.08	0.08	0.00	0.00
7,200.00	0.42	220.69	6,931.74	-1,560.70	760.04	1,735.70	0.08	0.08	0.00	0.00
7,300.00	0.50	220.69	7,031.73	-1,561.30	759.52	1,736.02	0.08	0.08	0.00	0.00
7,400.00	0.58	220.69	7,131.73	-1,562.01	758.91	1,736.41	0.08	0.08	0.00	0.00
7,498.28	0.65	220.69	7,230.00	-1,562.81	758.22	1,736.84	0.08	0.08	0.00	0.00
Top of Gas										
7,500.00	0.66	220.69	7,231.72	-1,562.83	758.21	1,736.85	0.08	0.08	0.00	0.00
7,600.00	0.74	220.69	7,331.72	-1,563.75	757.42	1,737.35	0.08	0.08	0.00	0.00
7,700.00	0.82	220.69	7,431.71	-1,564.77	756.54	1,737.91	0.08	0.08	0.00	0.00
7,800.00	0.90	220.69	7,531.70	-1,565.91	755.56	1,738.52	0.08	0.08	0.00	0.00
7,876.10	0.96	220.69	7,607.79	-1,566.84	754.76	1,739.03	0.08	0.08	0.00	0.00
7,900.00	0.95	220.69	7,631.68	-1,567.14	754.50	1,739.19	0.03	-0.03	0.00	-180.00
8,000.00	0.91	220.69	7,731.67	-1,568.37	753.44	1,739.86	0.03	-0.03	0.00	180.00
8,100.00	0.88	220.69	7,831.66	-1,569.56	752.42	1,740.50	0.03	-0.03	0.00	180.00
8,200.00	0.84	220.69	7,931.65	-1,570.70	751.44	1,741.12	0.03	-0.03	0.00	180.00
8,300.00	0.81	220.69	8,031.64	-1,571.79	750.50	1,741.71	0.03	-0.03	0.00	180.00
8,400.00	0.77	220.69	8,131.63	-1,572.84	749.60	1,742.28	0.03	-0.03	0.00	-180.00
8,500.00	0.74	220.69	8,231.62	-1,573.84	748.74	1,742.82	0.03	-0.03	0.00	180.00
8,600.00	0.71	220.69	8,331.61	-1,574.80	747.92	1,743.34	0.03	-0.03	0.00	180.00
8,700.00	0.67	220.69	8,431.60	-1,575.71	747.13	1,743.84	0.03	-0.03	0.00	180.00
8,800.00	0.64	220.69	8,531.60	-1,576.57	746.39	1,744.30	0.03	-0.03	0.00	-180.00
8,900.00	0.60	220.69	8,631.59	-1,577.39	745.69	1,744.75	0.03	-0.03	0.00	180.00
9,000.00	0.57	220.69	8,731.59	-1,578.16	745.02	1,745.17	0.03	-0.03	0.00	180.00
9,100.00	0.53	220.69	8,831.58	-1,578.89	744.40	1,745.56	0.03	-0.03	0.00	180.00
9,200.00	0.50	220.69	8,931.58	-1,579.57	743.81	1,745.93	0.03	-0.03	0.00	180.00
9,271.43	0.47	220.69	9,003.00	-1,580.03	743.42	1,746.18	0.03	-0.03	0.00	-180.00
Cameo										
9,300.00	0.46	220.69	9,031.57	-1,580.21	743.27	1,746.27	0.03	-0.03	0.00	180.00
9,400.00	0.43	220.69	9,131.57	-1,580.79	742.76	1,746.59	0.03	-0.03	0.00	180.00
9,500.00	0.39	220.69	9,231.57	-1,581.34	742.30	1,746.89	0.03	-0.03	0.00	180.00
9,600.00	0.36	220.69	9,331.57	-1,581.83	741.87	1,747.16	0.03	-0.03	0.00	180.00
9,700.00	0.32	220.69	9,431.56	-1,582.28	741.48	1,747.40	0.03	-0.03	0.00	-180.00
9,731.44	0.31	220.69	9,463.00	-1,582.41	741.37	1,747.47	0.03	-0.03	0.00	180.00

Plan Report for Long 20-23D - 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 (°)
Rollins										
9,800.00	0.29	220.69	9,531.56	-1,582.69	741.13	1,747.62	0.03	-0.03	0.00	-180.00
9,900.00	0.25	220.69	9,631.56	-1,583.05	740.83	1,747.81	0.03	-0.03	0.00	180.00
10,000.00	0.22	220.69	9,731.56	-1,583.36	740.56	1,747.98	0.03	-0.03	0.00	180.00
10,070.44	0.19	220.69	9,802.00	-1,583.55	740.39	1,748.09	0.03	-0.03	0.00	-180.00
Cozzette										
10,100.00	0.18	220.69	9,831.56	-1,583.62	740.33	1,748.13	0.03	-0.03	0.00	180.00
10,200.00	0.15	220.69	9,931.56	-1,583.84	740.14	1,748.25	0.03	-0.03	0.00	180.00
10,300.00	0.11	220.69	10,031.56	-1,584.02	739.99	1,748.34	0.03	-0.03	0.00	180.00
10,349.44	0.10	220.69	10,081.00	-1,584.09	739.93	1,748.38	0.03	-0.03	0.00	180.00
Corcoran										
10,400.00	0.08	220.69	10,131.56	-1,584.15	739.88	1,748.41	0.03	-0.03	0.00	-180.00
10,479.44	0.05	220.69	10,211.00	-1,584.22	739.82	1,748.45	0.03	-0.03	0.00	180.00
Mancos										
10,500.00	0.04	220.69	10,231.56	-1,584.23	739.81	1,748.46	0.04	-0.04	0.00	-180.00
10,600.00	0.01	220.69	10,331.56	-1,584.27	739.78	1,748.48	0.03	-0.03	0.00	180.00
10,629.44	0.00	0.00	10,361.00	-1,584.27	739.77	1,748.48	0.03	-0.03	0.00	180.00
Total Depth = 10629.44ft - Long 20-23D Plan #1 BH Tgt										

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
700.00	697.83	-35.31	17.24	Build Rate = 2.00°/100ft
1,168.62	1,151.65	-138.39	67.57	End Build at 1168.62ft
3,300.00	3,168.45	-757.92	370.03	18.87 Inclination
5,422.10	5,176.47	-1,374.75	671.18	Begin Drop at 5422.10ft
6,150.00	5,883.44	-1,526.25	745.15	Drop Rate = 1.50°/100ft
6,680.26	6,412.00	-1,559.27	761.27	End Drop at 6680.26ft
10,629.44	10,361.00	-1,584.27	739.77	Total Depth = 10629.44ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Long 20-23D Plan #1 BH Tgt	154.97	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,629.44	Plan #1 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,411.46	8 5/8" Casing Pt.	8-5/8	11

Plan Report for Long 20-23D - Plan #1 Proposal

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,680.26	6,412.00	Williams Fork		0.00	
7,498.28	7,230.00	Top of Gas		0.00	
9,271.43	9,003.00	Cameo		0.00	
9,731.44	9,463.00	Rollins		0.00	
10,070.44	9,802.00	Cozzette		0.00	
10,349.44	10,081.00	Corcoran		0.00	
10,479.44	10,211.00	Mancos		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Long 20-23D Plan #1 Zone Tgt	7,230.00	-1,584.27	739.78	Rectangle
Long 20-23D E. Hardline	0.00	0.00	0.00	Polygon
Long 20-23D S. Hardline	0.00	0.00	0.00	Polygon
Long 20-23D Plan #1 BH Tgt	10,361.00	-1,584.27	739.77	Point
Long 20-23D Plan #1 Driller's Tgt	6,412.00	-1,559.27	761.27	Rectangle

North Reference Sheet for Sec. 20-T7S-R94W - Long 20-23D - 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 20-23D

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

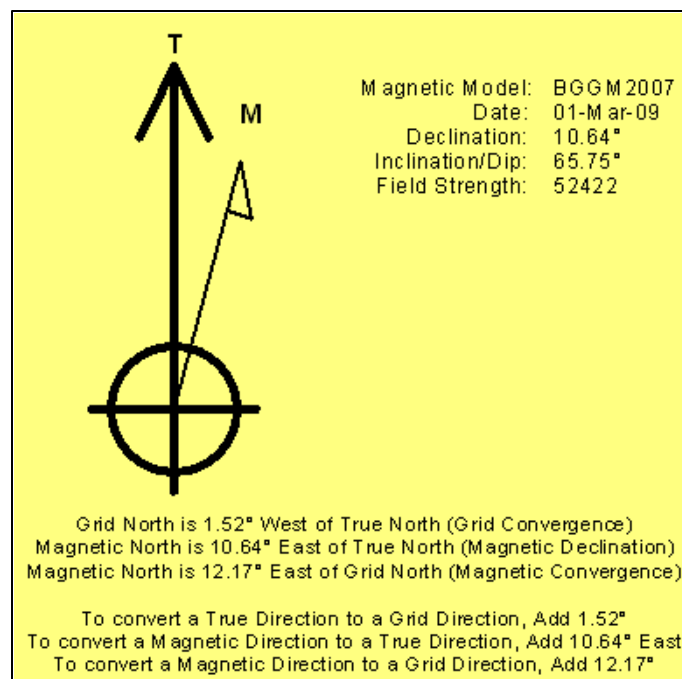
Grid Coordinates of Well: 589,013.27 ft N, 1,317,886.53 ft E

Geographical Coordinates of Well: 39° 25' 32.69" N, 107° 54' 53.77" W

Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,629.44ft
the Bottom Hole Displacement is 1,748.48ft in the Direction of 154.97° (True).

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



Project: Garfield County, CO
Site: Sec. 20-T7S-R94W
Well: Long 20-23D
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	1168.62	18.87	153.98	1151.65	-138.39	67.57	2.00	153.98	153.98
4	5422.10	18.87	153.98	5176.47	-1374.75	671.18	0.00	0.00	1529.61
5	6680.26	0.00	0.00	6412.00	-1559.27	761.27	1.50	180.00	1734.92
6	7876.10	0.96	220.69	7607.79	-1586.84	754.76	0.08	220.69	1739.03
7	10629.44	0.00	0.00	10361.00	-1584.27	739.77	0.03	180.00	1748.48

Long 20-23D Plan #1 Driller's Tgt
Long 20-23D Plan #1 BH Tgt

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Long 20-23D E. Hardline	0.00	0.00	0.00	Polygon
Long 20-23D S. Hardline	0.00	0.00	0.00	Polygon
Long 20-23D Plan #1 Driller's Tgt	6412.00	-1559.27	761.27	Rectangle (Sides: L25.00 W25.00)
Long 20-23D Plan #1 Zone Tgt	7230.00	-1584.27	739.78	Rectangle (Sides: L100.00 W200.00)
Long 20-23D Plan #1 BH Tgt	10361.00	-1584.27	739.77	Point

WELL DETAILS: Long 20-23D

Northing	Easting	Ground Level:	Latitude	Longitude
589013.27	1317886.53	7906.00	39°25'32.691 N	107°54'53.768 W

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6412.00	6680.26	Williams Fork
7230.00	7498.28	Top of Gas
9003.00	9271.43	Cameo
9463.00	9731.44	Rollins
9802.00	10070.44	Cozzette
10081.00	10349.44	Corcoran
10211.00	10479.44	Mancos



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

West(-)/East(+) (400 ft/in)

