

# Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Long 20-22D

Plan #1

Plan: Plan #1 Proposal

## Sperry Drilling Services

# Proposal Report

22 January, 2009

Well Coordinates: 589,013.27 N, 1,317,916.53 E (39° 25' 32.70" N, 107° 54' 53.39" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin:

Centered on Well Long 20-22D

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 20-22D - 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	107.99	299.99	-0.30	0.93	0.98	2.00	2.00	0.00	107.99
400.00	3.50	107.99	399.89	-1.65	5.08	5.34	2.00	2.00	0.00	0.00
420.00	3.90	107.99	419.85	-2.05	6.31	6.63	2.00	2.00	0.00	0.00
<b>Build Rate = 2.00°/100ft</b>										
500.00	5.50	107.99	499.58	-4.07	12.54	13.18	2.00	2.00	0.00	0.00
600.00	7.50	107.99	598.93	-7.57	23.31	24.49	2.00	2.00	0.00	0.00
606.10	7.62	107.99	604.98	-7.82	24.07	25.29	2.00	2.00	0.00	0.00
<b>End Build at 606.10ft</b>										
700.00	7.62	107.99	698.05	-11.66	35.92	37.73	0.00	0.00	0.00	0.00
800.00	7.62	107.99	797.16	-15.76	48.53	50.99	0.00	0.00	0.00	0.00
900.00	7.62	107.99	896.28	-19.86	61.15	64.24	0.00	0.00	0.00	0.00
1,000.00	7.62	107.99	995.40	-23.95	73.76	77.49	0.00	0.00	0.00	0.00
1,100.00	7.62	107.99	1,094.51	-28.05	86.38	90.74	0.00	0.00	0.00	0.00
1,200.00	7.62	107.99	1,193.63	-32.15	99.00	103.99	0.00	0.00	0.00	0.00
1,300.00	7.62	107.99	1,292.75	-36.24	111.61	117.25	0.00	0.00	0.00	0.00
1,400.00	7.62	107.99	1,391.86	-40.34	124.23	130.50	0.00	0.00	0.00	0.00
1,500.00	7.62	107.99	1,490.98	-44.44	136.84	143.75	0.00	0.00	0.00	0.00
1,600.00	7.62	107.99	1,590.10	-48.53	149.46	157.00	0.00	0.00	0.00	0.00
1,700.00	7.62	107.99	1,689.21	-52.63	162.07	170.26	0.00	0.00	0.00	0.00
1,800.00	7.62	107.99	1,788.33	-56.73	174.69	183.51	0.00	0.00	0.00	0.00
1,900.00	7.62	107.99	1,887.45	-60.82	187.30	196.76	0.00	0.00	0.00	0.00
2,000.00	7.62	107.99	1,986.56	-64.92	199.92	210.01	0.00	0.00	0.00	0.00
2,100.00	7.62	107.99	2,085.68	-69.02	212.53	223.26	0.00	0.00	0.00	0.00
2,200.00	7.62	107.99	2,184.79	-73.11	225.15	236.52	0.00	0.00	0.00	0.00
2,300.00	7.62	107.99	2,283.91	-77.21	237.76	249.77	0.00	0.00	0.00	0.00
2,400.00	7.62	107.99	2,383.03	-81.31	250.38	263.02	0.00	0.00	0.00	0.00
2,500.00	7.62	107.99	2,482.14	-85.40	262.99	276.27	0.00	0.00	0.00	0.00
<b>8 5/8" Casing Pt.</b>										
2,600.00	7.62	107.99	2,581.26	-89.50	275.61	289.52	0.00	0.00	0.00	0.00
2,700.00	7.62	107.99	2,680.38	-93.60	288.22	302.78	0.00	0.00	0.00	0.00
2,800.00	7.62	107.99	2,779.49	-97.69	300.84	316.03	0.00	0.00	0.00	0.00
2,900.00	7.62	107.99	2,878.61	-101.79	313.45	329.28	0.00	0.00	0.00	0.00
3,000.00	7.62	107.99	2,977.73	-105.89	326.07	342.53	0.00	0.00	0.00	0.00
3,100.00	7.62	107.99	3,076.84	-109.98	338.68	355.79	0.00	0.00	0.00	0.00
3,200.00	7.62	107.99	3,175.96	-114.08	351.30	369.04	0.00	0.00	0.00	0.00
3,300.00	7.62	107.99	3,275.08	-118.17	363.91	382.29	0.00	0.00	0.00	0.00
<b>7.62 Inclination</b>										
3,400.00	7.62	107.99	3,374.19	-122.27	376.53	395.54	0.00	0.00	0.00	0.00
3,500.00	7.62	107.99	3,473.31	-126.37	389.14	408.79	0.00	0.00	0.00	0.00
3,600.00	7.62	107.99	3,572.43	-130.46	401.76	422.05	0.00	0.00	0.00	0.00
3,700.00	7.62	107.99	3,671.54	-134.56	414.37	435.30	0.00	0.00	0.00	0.00
3,800.00	7.62	107.99	3,770.66	-138.66	426.99	448.55	0.00	0.00	0.00	0.00
3,900.00	7.62	107.99	3,869.77	-142.75	439.60	461.80	0.00	0.00	0.00	0.00
4,000.00	7.62	107.99	3,968.89	-146.85	452.22	475.06	0.00	0.00	0.00	0.00
4,100.00	7.62	107.99	4,068.01	-150.95	464.83	488.31	0.00	0.00	0.00	0.00
4,200.00	7.62	107.99	4,167.12	-155.04	477.45	501.56	0.00	0.00	0.00	0.00
4,300.00	7.62	107.99	4,266.24	-159.14	490.06	514.81	0.00	0.00	0.00	0.00
4,400.00	7.62	107.99	4,365.36	-163.24	502.68	528.06	0.00	0.00	0.00	0.00
4,500.00	7.62	107.99	4,464.47	-167.33	515.30	541.32	0.00	0.00	0.00	0.00
4,600.00	7.62	107.99	4,563.59	-171.43	527.91	554.57	0.00	0.00	0.00	0.00
4,700.00	7.62	107.99	4,662.71	-175.53	540.53	567.82	0.00	0.00	0.00	0.00
4,800.00	7.62	107.99	4,761.82	-179.62	553.14	581.07	0.00	0.00	0.00	0.00
4,900.00	7.62	107.99	4,860.94	-183.72	565.76	594.33	0.00	0.00	0.00	0.00

## Plan Report for Long 20-22D - 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	7.62	107.99	4,960.06	-187.82	578.37	607.58	0.00	0.00	0.00	0.00
5,100.00	7.62	107.99	5,059.17	-191.91	590.99	620.83	0.00	0.00	0.00	0.00
5,200.00	7.62	107.99	5,158.29	-196.01	603.60	634.08	0.00	0.00	0.00	0.00
5,300.00	7.62	107.99	5,257.41	-200.11	616.22	647.33	0.00	0.00	0.00	0.00
5,400.00	7.62	107.99	5,356.52	-204.20	628.83	660.59	0.00	0.00	0.00	0.00
5,500.00	7.62	107.99	5,455.64	-208.30	641.45	673.84	0.00	0.00	0.00	0.00
5,600.00	7.62	107.99	5,554.75	-212.40	654.06	687.09	0.00	0.00	0.00	0.00
5,700.00	7.62	107.99	5,653.87	-216.49	666.68	700.34	0.00	0.00	0.00	0.00
5,800.00	7.62	107.99	5,752.99	-220.59	679.29	713.60	0.00	0.00	0.00	0.00
5,900.00	7.62	107.99	5,852.10	-224.69	691.91	726.85	0.00	0.00	0.00	0.00
6,000.00	7.62	107.99	5,951.22	-228.78	704.52	740.10	0.00	0.00	0.00	0.00
6,029.41	7.62	107.99	5,980.37	-229.99	708.23	744.00	0.00	0.00	0.00	0.00
<b>Begin Drop at 6029.41ft</b>										
6,100.00	6.56	107.99	6,050.42	-232.68	716.52	752.71	1.50	-1.50	0.00	180.00
6,200.00	5.06	107.99	6,149.90	-235.81	726.15	762.82	1.50	-1.50	0.00	180.00
6,250.00	4.31	107.99	6,199.73	-237.07	730.04	766.91	1.50	-1.50	0.00	-180.00
<b>Drop Rate = 1.50°/100ft</b>										
6,300.00	3.56	107.99	6,249.62	-238.13	733.31	770.34	1.50	-1.50	0.00	180.00
6,400.00	2.06	107.99	6,349.49	-239.65	737.98	775.24	1.50	-1.50	0.00	180.00
6,500.00	0.56	107.99	6,449.46	-240.35	740.15	777.53	1.50	-1.50	0.00	180.00
6,537.54	0.00	0.00	6,487.00	-240.41	740.33	777.72	1.50	-1.50	0.00	-180.00
<b>End Drop at 6537.54ft - Williams Fork - Long 20-22D Plan #1 Driller's Tgt</b>										
6,600.00	0.05	225.56	6,549.46	-240.43	740.31	777.70	0.08	0.08	0.00	225.56
6,700.00	0.13	225.56	6,649.46	-240.54	740.20	777.64	0.08	0.08	0.00	0.00
6,800.00	0.21	225.56	6,749.46	-240.75	739.99	777.51	0.08	0.08	0.00	0.00
6,900.00	0.29	225.56	6,849.46	-241.05	739.68	777.32	0.08	0.08	0.00	0.00
7,000.00	0.37	225.56	6,949.46	-241.46	739.26	777.08	0.08	0.08	0.00	0.00
7,100.00	0.45	225.56	7,049.46	-241.96	738.75	776.78	0.08	0.08	0.00	0.00
7,200.00	0.53	225.56	7,149.45	-242.56	738.14	776.41	0.08	0.08	0.00	0.00
7,300.00	0.61	225.56	7,249.45	-243.25	737.43	775.99	0.08	0.08	0.00	0.00
7,355.55	0.65	225.56	7,305.00	-243.68	736.99	775.73	0.08	0.08	0.00	0.00
<b>Top of Gas</b>										
7,400.00	0.69	225.56	7,349.44	-244.05	736.62	775.50	0.08	0.08	0.00	0.00
7,500.00	0.77	225.56	7,449.43	-244.94	735.71	774.96	0.08	0.08	0.00	0.00
7,600.00	0.85	225.56	7,549.42	-245.93	734.70	774.36	0.08	0.08	0.00	0.00
7,700.00	0.93	225.56	7,649.41	-247.01	733.59	773.70	0.08	0.08	0.00	0.00
7,800.00	1.01	225.56	7,749.40	-248.20	732.39	772.98	0.08	0.08	0.00	0.00
7,832.93	1.04	225.56	7,782.32	-248.61	731.97	772.73	0.08	0.08	0.00	0.00
7,900.00	1.01	225.56	7,849.38	-249.45	731.11	772.22	0.04	-0.04	0.00	180.00
8,000.00	0.97	225.56	7,949.37	-250.66	729.88	771.48	0.04	-0.04	0.00	180.00
8,100.00	0.93	225.56	8,049.35	-251.82	728.69	770.78	0.04	-0.04	0.00	180.00
8,200.00	0.89	225.56	8,149.34	-252.94	727.55	770.10	0.04	-0.04	0.00	180.00
8,300.00	0.85	225.56	8,249.33	-254.01	726.46	769.45	0.04	-0.04	0.00	180.00
8,400.00	0.81	225.56	8,349.32	-255.03	725.43	768.83	0.04	-0.04	0.00	180.00
8,500.00	0.78	225.56	8,449.31	-256.00	724.43	768.24	0.04	-0.04	0.00	180.00
8,600.00	0.74	225.56	8,549.30	-256.92	723.49	767.68	0.04	-0.04	0.00	180.00
8,700.00	0.70	225.56	8,649.29	-257.80	722.60	767.14	0.04	-0.04	0.00	180.00
8,800.00	0.66	225.56	8,749.29	-258.63	721.75	766.64	0.04	-0.04	0.00	180.00
8,900.00	0.62	225.56	8,849.28	-259.41	720.96	766.17	0.04	-0.04	0.00	180.00
9,000.00	0.58	225.56	8,949.27	-260.14	720.21	765.72	0.04	-0.04	0.00	180.00
9,100.00	0.54	225.56	9,049.27	-260.83	719.51	765.30	0.04	-0.04	0.00	180.00
9,128.73	0.53	225.56	9,078.00	-261.01	719.32	765.19	0.04	-0.04	0.00	180.00
<b>Cameo</b>										
9,200.00	0.50	225.56	9,149.26	-261.46	718.86	764.92	0.04	-0.04	0.00	-180.00
9,300.00	0.46	225.56	9,249.26	-262.05	718.26	764.56	0.04	-0.04	0.00	180.00
9,400.00	0.42	225.56	9,349.26	-262.60	717.70	764.23	0.04	-0.04	0.00	180.00
9,500.00	0.39	225.56	9,449.26	-263.09	717.20	763.93	0.04	-0.04	0.00	180.00
9,588.75	0.35	225.56	9,538.00	-263.49	716.79	763.68	0.04	-0.04	0.00	-180.00
<b>Rollins</b>										

## Plan Report for Long 20-22D - 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 (°)
9,600.00	0.35	225.56	9,549.25	-263.54	716.74	763.65	0.04	-0.04	0.00	180.00
9,700.00	0.31	225.56	9,649.25	-263.94	716.34	763.41	0.04	-0.04	0.00	180.00
9,800.00	0.27	225.56	9,749.25	-264.29	715.98	763.20	0.04	-0.04	0.00	180.00
9,900.00	0.23	225.56	9,849.25	-264.59	715.67	763.01	0.04	-0.04	0.00	180.00
9,927.75	0.22	225.56	9,877.00	-264.67	715.59	762.97	0.04	-0.04	0.00	-180.00
<b>Cozzette</b>										
10,000.00	0.19	225.56	9,949.25	-264.85	715.41	762.86	0.04	-0.04	0.00	180.00
10,100.00	0.15	225.56	10,049.25	-265.06	715.19	762.73	0.04	-0.04	0.00	180.00
10,200.00	0.11	225.56	10,149.25	-265.22	715.03	762.63	0.04	-0.04	0.00	-180.00
10,206.75	0.11	225.56	10,156.00	-265.23	715.02	762.63	0.04	-0.04	0.00	-180.00
<b>Corcoran</b>										
10,300.00	0.07	225.56	10,249.25	-265.33	714.91	762.56	0.04	-0.04	0.00	180.00
10,336.75	0.06	225.56	10,286.00	-265.36	714.88	762.55	0.04	-0.04	0.00	180.00
<b>Mancos</b>										
10,400.00	0.03	225.56	10,349.25	-265.40	714.85	762.52	0.04	-0.04	0.00	-180.00
10,486.75	0.00	0.00	10,436.00	-265.41	714.83	762.51	0.04	-0.04	154.97	180.00
<b>Total Depth = 10486.75ft - Long 20-22D 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
420.00	419.85	-2.05	6.31	Build Rate = 2.00°/100ft
606.10	604.98	-7.82	24.07	End Build at 606.10ft
3,300.00	3,275.08	-118.17	363.91	7.62 Inclination
6,029.41	5,980.37	-229.99	708.23	Begin Drop at 6029.41ft
6,250.00	6,199.73	-237.07	730.04	Drop Rate = 1.50°/100ft
6,537.54	6,487.00	-240.41	740.33	End Drop at 6537.54ft
10,486.75	10,436.00	-265.41	714.83	Total Depth = 10486.75ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Long 20-22D Plan #1 BH Tgt	110.37	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,486.75	Plan #1 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,482.14	8 5/8" Casing Pt.	8-5/8	11

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

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,537.54	6,487.00	Williams Fork		0.00	
7,355.55	7,305.00	Top of Gas		0.00	
9,128.73	9,078.00	Cameo		0.00	
9,588.75	9,538.00	Rollins		0.00	
9,927.75	9,877.00	Cozzette		0.00	
10,206.75	10,156.00	Corcoran		0.00	
10,336.75	10,286.00	Mancos		0.00	

*Targets associated with this wellbore*

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Long 20-22D Plan #1 Zone Tgt	7,305.00	-265.41	714.83	Rectangle
Long 20-22D E. Hardline	0.00	0.00	0.00	Polygon
Long 20-22D Plan #1 Driller's Tgt	6,487.00	-240.41	740.33	Rectangle
Long 20-22D S. Hardline	0.00	0.00	0.00	Polygon
Long 20-22D Plan #1 BH Tgt	10,436.00	-265.41	714.83	Point

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

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

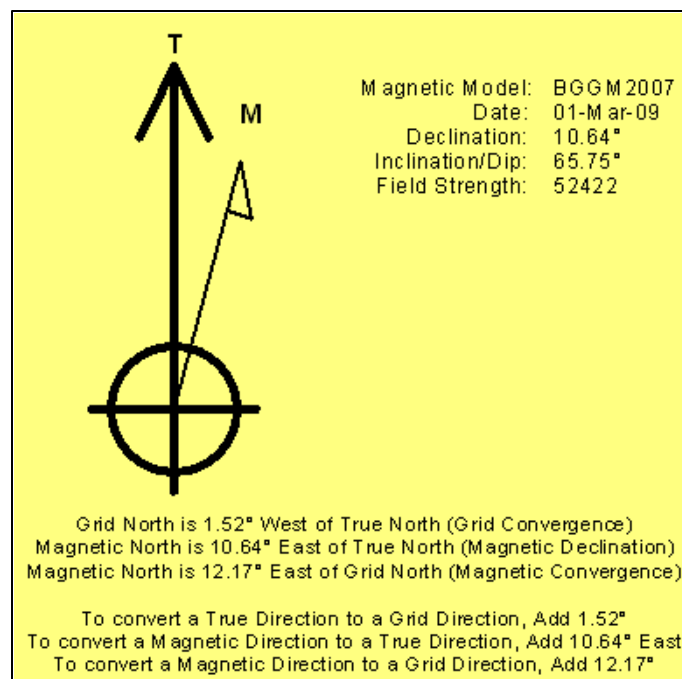
Grid Coordinates of Well: 589,013.27 ft N, 1,317,916.53 ft E

Geographical Coordinates of Well: 39° 25' 32.70" N, 107° 54' 53.39" W

Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,486.75ft  
the Bottom Hole Displacement is 762.51ft in the Direction of 110.37° (True).

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



Project: Garfield County, CO  
Site: Sec. 20-T7S-R94W  
Well: Long 20-22D  
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	606.10	7.62	107.99	604.97	-7.82	24.07	2.00	107.99	25.29	
4	6029.41	7.62	107.99	5980.37	-229.99	708.23	0.00	0.00	744.00	Long 20-22D Plan #1 Driller's Tgt
5	6537.54	0.00	0.00	6487.00	-240.41	740.33	1.50	180.00	777.72	
6	7832.93	1.04	225.56	7782.32	-248.61	731.97	0.08	225.56	772.73	
7	10486.75	0.00	0.00	10436.00	-265.41	714.83	0.04	180.00	762.51	Long 20-22D Plan #1 BH Tgt

#### WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Long 20-22D E. Hardline	0.00	0.00	0.00	Polygon
Long 20-22D S. Hardline	0.00	0.00	0.00	Polygon
Long 20-22D Plan #1 Driller's Tgt	6487.00	-240.41	740.33	Rectangle (Sides: L25.00 W25.00)
Long 20-22D Plan #1 Zone Tgt	7305.00	-265.41	714.83	Rectangle (Sides: L100.00 W200.00)
Long 20-22D Plan #1 BH Tgt	10436.00	-265.41	714.83	Point

#### WELL DETAILS: Long 20-22D

Northing	Easting	Ground Level:	Latitude	Longitude
589013.27	1317916.53	7906.00	39° 25' 32.699 N	107° 54' 53.386 W

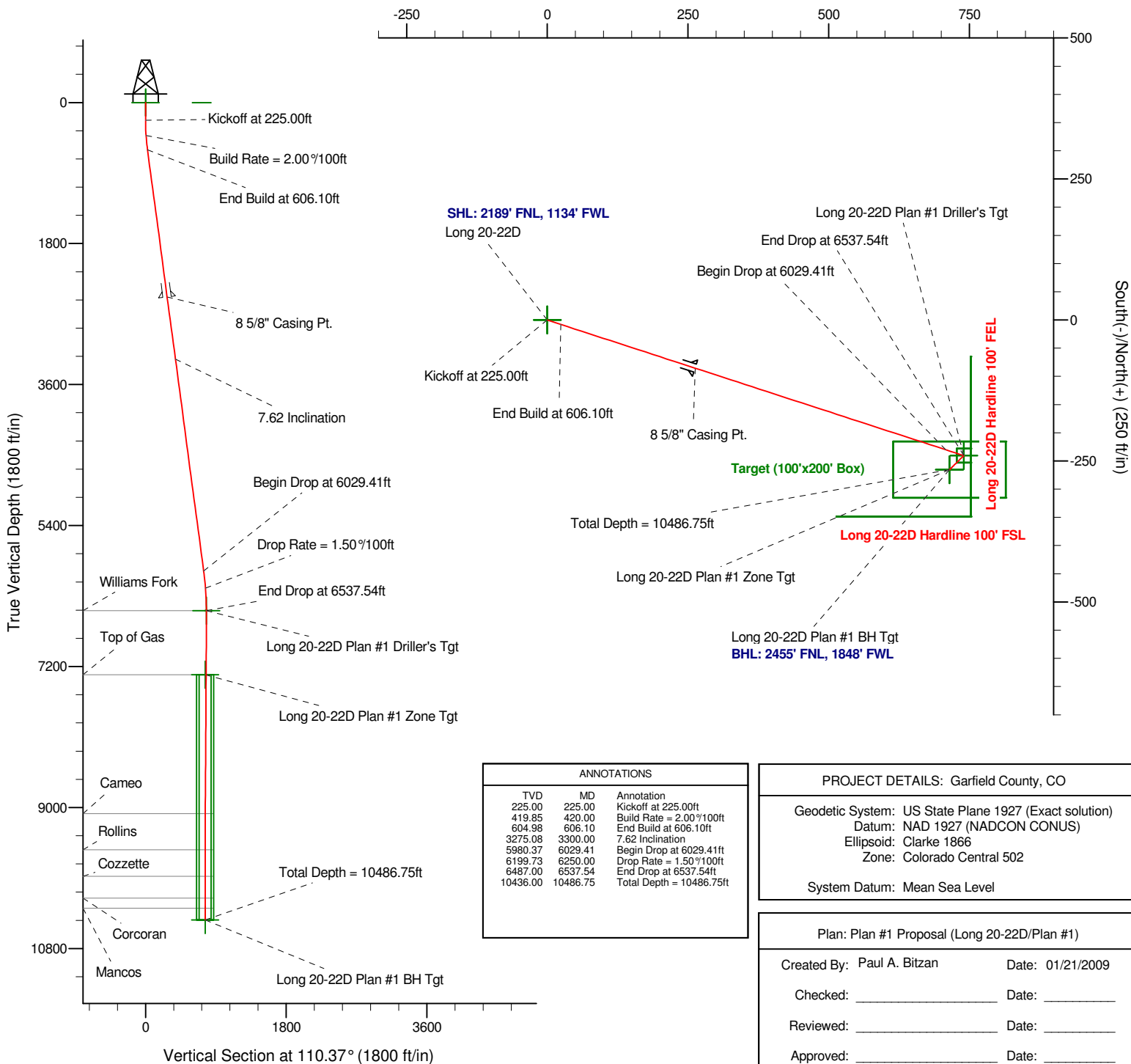
#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6487.00	6537.54	Williams Fork
7305.00	7355.55	Top of Gas
9078.00	9128.73	Cameo
9538.00	9588.75	Rollins
9877.00	9927.75	Cozzette
10156.00	10206.75	Corcoran
10286.00	10336.75	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(+) (250 ft/in)



#### ANNOTATIONS

TVD	MD	Annotation
225.00	225.00	Kickoff at 225.00ft
419.85	420.00	Build Rate = 2.00%/100ft
604.98	606.10	End Build at 606.10ft
3275.08	3300.00	7.62 Inclination
5980.37	6029.41	Begin Drop at 6029.41ft
6199.73	6250.00	Drop Rate = 1.50%/100ft
6487.00	6537.54	End Drop at 6537.54ft
10436.00	10486.75	Total Depth = 10486.75ft

#### PROJECT DETAILS: Garfield County, CO

Geodetic System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: Colorado Central 502

System Datum: Mean Sea Level

#### Plan: Plan #1 Proposal (Long 20-22D/Plan #1)

Created By: Paul A. Bitzan Date: 01/21/2009  
Checked: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed: \_\_\_\_\_ Date: \_\_\_\_\_  
Approved: \_\_\_\_\_ Date: \_\_\_\_\_