

Noble Energy

Garfield County, CO

Sec. 20-T7S-R94W

Rulison Federal 20-21D

Plan #1

Plan: Plan #1 Proposal

Sperry Drilling Services

Proposal Report

22 January, 2009

Well Coordinates: 589,022.77 N, 1,317,894.03 E (39° 25' 32.79" N, 107° 54' 53.68" W)

Ground Level: 7,906.00 ft

Local Coordinate Origin: Centered on Well Rulison Federal 20-21D

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 Rulison Federal 20-21D - 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	2.25	40.99	299.98	1.11	0.97	1.47	3.00	3.00	0.00	40.99
400.00	5.25	40.99	399.76	6.05	5.26	8.01	3.00	3.00	0.00	0.00
500.00	8.25	40.99	499.05	14.92	12.96	19.76	3.00	3.00	0.00	0.00
515.00	8.70	40.99	513.89	16.59	14.41	21.97	3.00	3.00	0.00	0.00
Build Rate = 3.00°/100ft										
600.00	11.25	40.99	597.60	27.70	24.07	36.69	3.00	3.00	0.00	0.00
700.00	14.25	40.99	695.12	44.36	38.55	58.76	3.00	3.00	0.00	0.00
704.89	14.40	40.99	699.86	45.27	39.34	59.97	3.00	3.00	0.00	0.00
End Build at 704.89ft										
800.00	14.40	40.99	791.98	63.12	54.85	83.61	0.00	0.00	0.00	0.00
900.00	14.40	40.99	888.84	81.88	71.16	108.47	0.00	0.00	0.00	0.00
1,000.00	14.40	40.99	985.70	100.65	87.47	133.33	0.00	0.00	0.00	0.00
1,100.00	14.40	40.99	1,082.56	119.42	103.78	158.19	0.00	0.00	0.00	0.00
1,200.00	14.40	40.99	1,179.42	138.18	120.09	183.05	0.00	0.00	0.00	0.00
1,300.00	14.40	40.99	1,276.28	156.95	136.40	207.91	0.00	0.00	0.00	0.00
1,400.00	14.40	40.99	1,373.14	175.72	152.71	232.77	0.00	0.00	0.00	0.00
1,500.00	14.40	40.99	1,470.00	194.48	169.02	257.63	0.00	0.00	0.00	0.00
1,600.00	14.40	40.99	1,566.86	213.25	185.33	282.49	0.00	0.00	0.00	0.00
1,700.00	14.40	40.99	1,663.72	232.02	201.64	307.35	0.00	0.00	0.00	0.00
1,800.00	14.40	40.99	1,760.58	250.78	217.95	332.21	0.00	0.00	0.00	0.00
1,900.00	14.40	40.99	1,857.44	269.55	234.25	357.07	0.00	0.00	0.00	0.00
2,000.00	14.40	40.99	1,954.30	288.32	250.56	381.94	0.00	0.00	0.00	0.00
2,100.00	14.40	40.99	2,051.16	307.08	266.87	406.80	0.00	0.00	0.00	0.00
2,200.00	14.40	40.99	2,148.02	325.85	283.18	431.66	0.00	0.00	0.00	0.00
2,300.00	14.40	40.99	2,244.88	344.62	299.49	456.52	0.00	0.00	0.00	0.00
2,400.00	14.40	40.99	2,341.74	363.38	315.80	481.38	0.00	0.00	0.00	0.00
2,500.00	14.40	40.99	2,438.60	382.15	332.11	506.24	0.00	0.00	0.00	0.00
8 5/8" Casing Pt.										
2,600.00	14.40	40.99	2,535.46	400.92	348.42	531.10	0.00	0.00	0.00	0.00
2,700.00	14.40	40.99	2,632.32	419.68	364.73	555.96	0.00	0.00	0.00	0.00
2,800.00	14.40	40.99	2,729.18	438.45	381.04	580.82	0.00	0.00	0.00	0.00
2,900.00	14.40	40.99	2,826.04	457.22	397.35	605.68	0.00	0.00	0.00	0.00
3,000.00	14.40	40.99	2,922.90	475.98	413.66	630.54	0.00	0.00	0.00	0.00
3,100.00	14.40	40.99	3,019.75	494.75	429.97	655.40	0.00	0.00	0.00	0.00
3,200.00	14.40	40.99	3,116.61	513.52	446.27	680.26	0.00	0.00	0.00	0.00
3,300.00	14.40	40.99	3,213.47	532.28	462.58	705.12	0.00	0.00	0.00	0.00
14.40 Inclination										
3,400.00	14.40	40.99	3,310.33	551.05	478.89	729.98	0.00	0.00	0.00	0.00
3,500.00	14.40	40.99	3,407.19	569.82	495.20	754.84	0.00	0.00	0.00	0.00
3,600.00	14.40	40.99	3,504.05	588.58	511.51	779.70	0.00	0.00	0.00	0.00
3,700.00	14.40	40.99	3,600.91	607.35	527.82	804.56	0.00	0.00	0.00	0.00
3,800.00	14.40	40.99	3,697.77	626.12	544.13	829.42	0.00	0.00	0.00	0.00
3,900.00	14.40	40.99	3,794.63	644.88	560.44	854.28	0.00	0.00	0.00	0.00
4,000.00	14.40	40.99	3,891.49	663.65	576.75	879.14	0.00	0.00	0.00	0.00
4,100.00	14.40	40.99	3,988.35	682.42	593.06	904.00	0.00	0.00	0.00	0.00
4,200.00	14.40	40.99	4,085.21	701.18	609.37	928.86	0.00	0.00	0.00	0.00
4,300.00	14.40	40.99	4,182.07	719.95	625.68	953.72	0.00	0.00	0.00	0.00
4,400.00	14.40	40.99	4,278.93	738.72	641.99	978.58	0.00	0.00	0.00	0.00
4,500.00	14.40	40.99	4,375.79	757.48	658.30	1,003.44	0.00	0.00	0.00	0.00
4,600.00	14.40	40.99	4,472.65	776.25	674.60	1,028.30	0.00	0.00	0.00	0.00
4,700.00	14.40	40.99	4,569.51	795.02	690.91	1,053.16	0.00	0.00	0.00	0.00
4,800.00	14.40	40.99	4,666.37	813.78	707.22	1,078.02	0.00	0.00	0.00	0.00
4,900.00	14.40	40.99	4,763.23	832.55	723.53	1,102.88	0.00	0.00	0.00	0.00

Plan Report for Rulison Federal 20-21D - 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	14.40	40.99	4,860.09	851.32	739.84	1,127.74	0.00	0.00	0.00	0.00
5,100.00	14.40	40.99	4,956.95	870.08	756.15	1,152.60	0.00	0.00	0.00	0.00
5,200.00	14.40	40.99	5,053.81	888.85	772.46	1,177.46	0.00	0.00	0.00	0.00
5,300.00	14.40	40.99	5,150.67	907.62	788.77	1,202.32	0.00	0.00	0.00	0.00
5,400.00	14.40	40.99	5,247.53	926.38	805.08	1,227.18	0.00	0.00	0.00	0.00
5,500.00	14.40	40.99	5,344.39	945.15	821.39	1,252.04	0.00	0.00	0.00	0.00
5,600.00	14.40	40.99	5,441.25	963.92	837.70	1,276.90	0.00	0.00	0.00	0.00
5,700.00	14.40	40.99	5,538.11	982.68	854.01	1,301.77	0.00	0.00	0.00	0.00
5,781.75	14.40	40.99	5,617.29	998.02	867.34	1,322.09	0.00	0.00	0.00	0.00
Begin Drop at 5781.75ft										
5,800.00	14.12	40.99	5,634.98	1,001.42	870.29	1,326.58	1.50	-1.50	0.00	180.00
5,900.00	12.62	40.99	5,732.27	1,018.87	885.46	1,349.71	1.50	-1.50	0.00	180.00
6,000.00	11.12	40.99	5,830.12	1,034.40	898.95	1,370.28	1.50	-1.50	0.00	180.00
6,100.00	9.62	40.99	5,928.49	1,047.99	910.76	1,388.28	1.50	-1.50	0.00	180.00
6,200.00	8.12	40.99	6,027.29	1,059.63	920.88	1,403.70	1.50	-1.50	0.00	180.00
6,260.00	7.22	40.99	6,086.75	1,065.68	926.14	1,411.71	1.50	-1.50	0.00	-180.00
Drop Rate = 1.50°/100ft										
6,300.00	6.62	40.99	6,126.46	1,069.32	929.30	1,416.54	1.50	-1.50	0.00	180.00
6,400.00	5.12	40.99	6,225.93	1,077.04	936.01	1,426.77	1.50	-1.50	0.00	180.00
6,500.00	3.62	40.99	6,325.64	1,082.80	941.01	1,434.39	1.50	-1.50	0.00	180.00
6,600.00	2.12	40.99	6,425.51	1,086.58	944.30	1,439.40	1.50	-1.50	0.00	180.00
6,700.00	0.62	40.99	6,525.48	1,088.39	945.87	1,441.80	1.50	-1.50	0.00	180.00
6,741.52	0.00	0.00	6,567.00	1,088.56	946.02	1,442.02	1.50	-1.50	0.00	-180.00
End Drop at 6741.52ft - Williams Fork - Rulison Federal 20-21D Plan #1 Driller's Tgt										
6,800.00	0.05	243.43	6,625.48	1,088.55	946.00	1,442.00	0.08	0.08	0.00	243.43
6,900.00	0.13	243.43	6,725.48	1,088.48	945.86	1,441.86	0.08	0.08	0.00	0.00
7,000.00	0.21	243.43	6,825.47	1,088.35	945.60	1,441.59	0.08	0.08	0.00	0.00
7,100.00	0.29	243.43	6,925.47	1,088.16	945.22	1,441.20	0.08	0.08	0.00	0.00
7,200.00	0.37	243.43	7,025.47	1,087.90	944.71	1,440.67	0.08	0.08	0.00	0.00
7,300.00	0.45	243.43	7,125.47	1,087.59	944.07	1,440.02	0.08	0.08	0.00	0.00
7,400.00	0.53	243.43	7,225.47	1,087.21	943.31	1,439.24	0.08	0.08	0.00	0.00
7,500.00	0.61	243.43	7,325.46	1,086.76	942.43	1,438.33	0.08	0.08	0.00	0.00
7,559.54	0.65	243.43	7,385.00	1,086.47	941.84	1,437.73	0.08	0.08	0.00	0.00
Top of Gas										
7,600.00	0.69	243.43	7,425.45	1,086.26	941.42	1,437.30	0.08	0.08	0.00	0.00
7,700.00	0.77	243.43	7,525.45	1,085.69	940.28	1,436.13	0.08	0.08	0.00	0.00
7,800.00	0.85	243.43	7,625.44	1,085.06	939.02	1,434.84	0.08	0.08	0.00	0.00
7,900.00	0.93	243.43	7,725.42	1,084.37	937.64	1,433.42	0.08	0.08	0.00	0.00
8,000.00	1.01	243.43	7,825.41	1,083.62	936.13	1,431.87	0.08	0.08	0.00	0.00
8,100.00	1.09	243.43	7,925.39	1,082.80	934.50	1,430.19	0.08	0.08	0.00	0.00
8,200.00	1.17	243.43	8,025.37	1,081.92	932.74	1,428.39	0.08	0.08	0.00	0.00
8,300.00	1.25	243.43	8,125.35	1,080.98	930.85	1,426.45	0.08	0.08	0.00	0.00
8,400.00	1.33	243.43	8,225.33	1,079.97	928.85	1,424.39	0.08	0.08	0.00	0.00
8,500.00	1.41	243.43	8,325.30	1,078.91	926.71	1,422.20	0.08	0.08	0.00	0.00
8,600.00	1.49	243.43	8,425.27	1,077.78	924.45	1,419.88	0.08	0.08	0.00	0.00
8,700.00	1.57	243.43	8,525.23	1,076.59	922.07	1,417.43	0.08	0.08	0.00	0.00
8,769.28	1.62	243.43	8,594.48	1,075.72	920.35	1,415.66	0.08	0.08	0.00	0.00
8,800.00	1.60	243.43	8,625.19	1,075.34	919.57	1,414.87	0.08	-0.08	0.00	180.00
8,900.00	1.51	243.43	8,725.16	1,074.12	917.15	1,412.38	0.08	-0.08	0.00	180.00
9,000.00	1.43	243.43	8,825.12	1,072.98	914.86	1,410.03	0.08	-0.08	0.00	180.00
9,100.00	1.34	243.43	8,925.09	1,071.90	912.69	1,407.81	0.08	-0.08	0.00	180.00
9,200.00	1.26	243.43	9,025.07	1,070.88	910.66	1,405.72	0.08	-0.08	0.00	180.00
9,300.00	1.17	243.43	9,125.04	1,069.93	908.76	1,403.77	0.08	-0.08	0.00	180.00
9,332.96	1.15	243.43	9,158.00	1,069.63	908.17	1,403.16	0.08	-0.08	0.00	180.00
Cameo										
9,400.00	1.09	243.43	9,225.03	1,069.05	907.00	1,401.96	0.08	-0.08	0.00	-180.00
9,500.00	1.01	243.43	9,325.01	1,068.23	905.36	1,400.28	0.08	-0.08	0.00	180.00
9,600.00	0.92	243.43	9,424.99	1,067.48	903.86	1,398.73	0.08	-0.08	0.00	180.00
9,700.00	0.84	243.43	9,524.98	1,066.79	902.49	1,397.33	0.08	-0.08	0.00	180.00

Plan Report for Rulison Federal 20-21D - 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 (°)
9,793.03	0.76	243.43	9,618.00	1,066.21	901.33	1,396.14	0.08	-0.08	0.00	-180.00
Rollins										
9,800.00	0.75	243.43	9,624.97	1,066.17	901.25	1,396.05	0.08	-0.08	0.00	180.00
9,900.00	0.67	243.43	9,724.97	1,065.62	900.14	1,394.92	0.08	-0.08	0.00	180.00
10,000.00	0.58	243.43	9,824.96	1,065.13	899.16	1,393.91	0.08	-0.08	0.00	180.00
10,100.00	0.50	243.43	9,924.96	1,064.71	898.32	1,393.05	0.08	-0.08	0.00	180.00
10,132.05	0.47	243.43	9,957.00	1,064.59	898.07	1,392.80	0.08	-0.08	0.00	-180.00
Cozzette										
10,200.00	0.41	243.43	10,024.95	1,064.35	897.60	1,392.31	0.08	-0.08	0.00	180.00
10,300.00	0.33	243.43	10,124.95	1,064.06	897.02	1,391.72	0.08	-0.08	0.00	180.00
10,400.00	0.25	243.43	10,224.95	1,063.84	896.57	1,391.26	0.08	-0.08	0.00	180.00
10,411.05	0.24	243.43	10,236.00	1,063.82	896.53	1,391.21	0.08	-0.08	0.00	180.00
Corcoran										
10,500.00	0.16	243.43	10,324.95	1,063.68	896.26	1,390.93	0.08	-0.08	0.00	-180.00
10,541.05	0.13	243.43	10,366.00	1,063.63	896.16	1,390.83	0.08	-0.08	0.00	180.00
Mancos										
10,600.00	0.08	243.43	10,424.95	1,063.58	896.07	1,390.74	0.08	-0.08	0.00	-180.00
10,691.05	0.00	0.00	10,516.00	1,063.56	896.02	1,390.68	0.08	-0.08	128.02	180.00
Total Depth = 10691.05ft - Rulison Federal 20-21D Plan #1 BH Tgt										

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	Kickoff at 225.00ft
515.00	513.89	16.59	14.41	Build Rate = 3.00°/100ft
704.89	699.86	45.27	39.34	End Build at 704.89ft
3,300.00	3,213.47	532.28	462.58	14.40 Inclination
5,781.75	5,617.29	998.02	867.34	Begin Drop at 5781.75ft
6,260.00	6,086.75	1,065.68	926.14	Drop Rate = 1.50°/100ft
6,741.52	6,567.00	1,088.56	946.02	End Drop at 6741.52ft
10,691.05	10,516.00	1,063.56	896.02	Total Depth = 10691.05ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Rulison Federal 20-21D Plan #1 BH Tgt	40.11	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	10,691.05	Plan #1 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
2,500.00	2,438.60	8 5/8" Casing Pt.	8-5/8	11

Plan Report for Rulison Federal 20-21D - Plan #1 Proposal

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,741.52	6,567.00	Williams Fork		0.00	
7,559.54	7,385.00	Top of Gas		0.00	
9,332.96	9,158.00	Cameo		0.00	
9,793.03	9,618.00	Rollins		0.00	
10,132.05	9,957.00	Cozzette		0.00	
10,411.05	10,236.00	Corcoran		0.00	
10,541.05	10,366.00	Mancos		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Rulison Federal 20-21D Plan #1 Zone Tgt	7,385.00	1,063.56	896.02	Rectangle
Rulison Federal 20-21D Plan #1 BH Tgt	10,516.00	1,063.56	896.02	Point
Rulison Federal 20-21D Hardline	0.00	0.00	0.00	Polygon
Rulison Federal 20-21D Plan #1 Driller's Tgt	6,567.00	1,088.56	946.02	Rectangle

North Reference Sheet for Sec. 20-T7S-R94W - Rulison Federal 20-21D - 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 Rulison Federal 20-21D

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

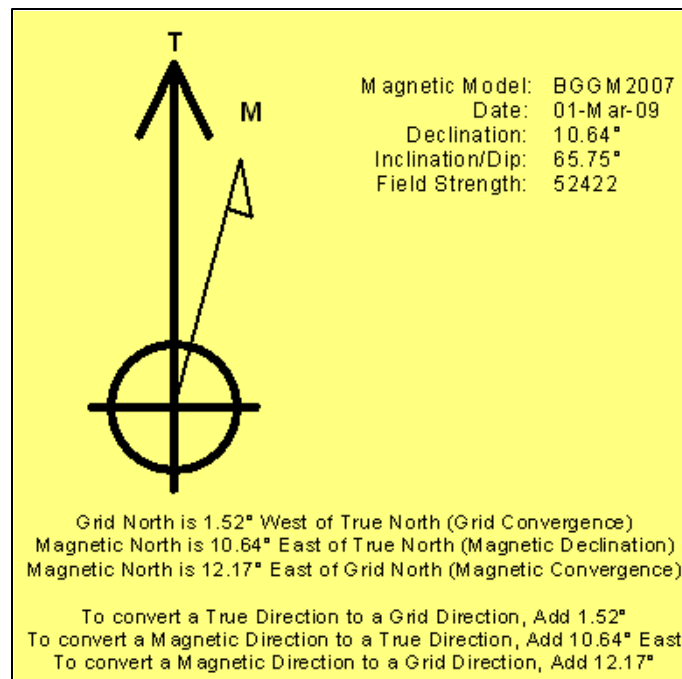
Grid Coordinates of Well: 589,022.77 ft N, 1,317,894.03 ft E

Geographical Coordinates of Well: 39° 25' 32.79" N, 107° 54' 53.68" W

Grid Convergence at Surface is: -1.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,691.05ft
the Bottom Hole Displacement is 1,390.68ft in the Direction of 40.11° (True).

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



Project: Garfield County, CO
Site: Sec. 20-T7S-R94W
Well: Rulison Federal 20-21D
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	704.89	14.40	40.99	699.85	45.27	39.34	3.00	40.99	59.97	
4	5781.75	14.40	40.99	5617.30	998.02	867.34	0.00	0.00	1322.09	Rulison Federal 20-21D Plan #1 Driller's Tgt
5	6741.52	0.00	0.00	6567.00	1088.56	946.02	1.50	180.00	1442.02	
6	8769.28	1.62	243.43	8594.48	1075.72	920.35	0.08	243.43	1415.86	
7	10691.05	0.00	0.00	10516.00	1063.56	896.02	0.08	180.00	1390.68	Rulison Federal 20-21D Plan #1 BH Tgt

WELL DETAILS: Rulison Federal 20-21D

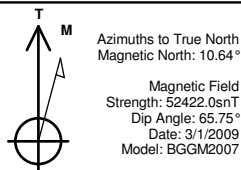
Northing	Easting	Ground Level:	Latitude	Longitude
589022.77	1317894.03	7906.00	39° 25' 32.787 N	107° 54' 53.675 W

FORMATION TOP DETAILS

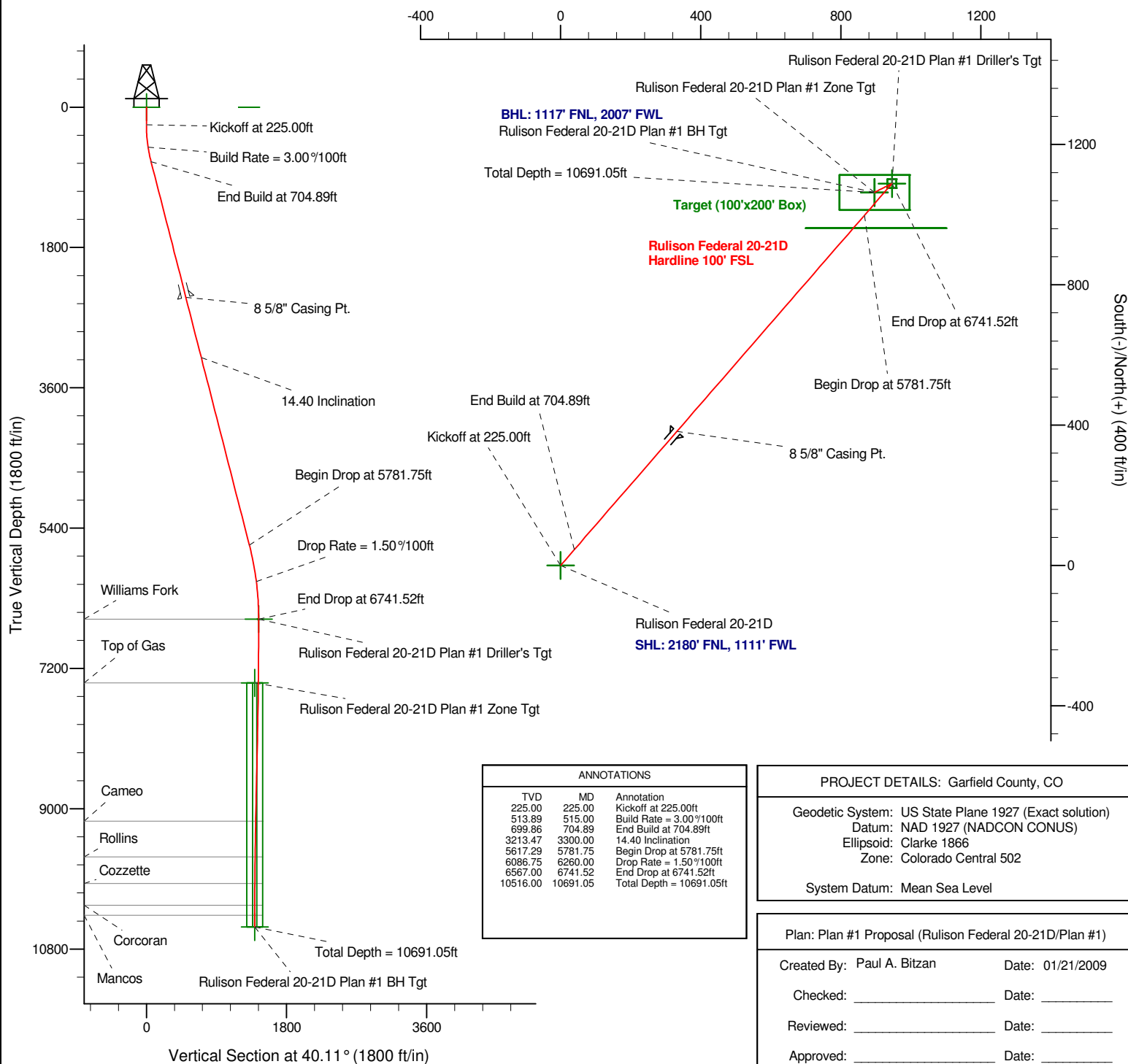
TVDPath	MDPath	Formation
6567.00	6741.52	Williams Fork
7385.00	7559.54	Top of Gas
9158.00	9332.96	Cameo
9618.00	9793.03	Rollins
9957.00	10132.05	Cozzette
10236.00	10411.05	Corcoran
10366.00	10541.05	Mancos

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
Rulison Federal 20-21D Hardline	0.00	0.00	0.00	Polygon
Rulison Federal 20-21D Plan #1 Driller's Tgt	6567.00	1088.56	946.02	Rectangle (Sides: L25.00 W25.00)
Rulison Federal 20-21D Plan #1 Zone Tgt	7385.00	1063.56	896.02	Rectangle (Sides: L100.00 W200.00)
Rulison Federal 20-21D Plan #1 BH Tgt	10516.00	1063.56	896.02	Point



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



ANNOTATIONS

TVD	MD	Annotation
225.00	225.00	Kickoff at 225.00ft
513.89	515.00	Build Rate = 3.00%/100ft
699.86	704.89	End Build at 704.89ft
3213.47	3300.00	14.40 Inclination
5617.29	5781.75	Begin Drop at 5781.75ft
6086.75	6260.00	Drop Rate = 1.50%/100ft
6567.00	6741.52	End Drop at 6741.52ft
10516.00	10691.05	Total Depth = 10691.05ft

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 (Rulison Federal 20-21D/Plan #1)

Created By: Paul A. Bitzan Date: 01/21/2009

Checked: _____ Date: _____

Reviewed: _____ Date: _____

Approved: _____ Date: _____