

Noble Energy

Garfield County, CO (NAD 83)
Sec. 2-T8S-R96W (SGV 20 PAD)
Hyrup 11-31A

Plan #2

Design: Vaughn Gyro and Sperry MWD Survey

Sperry Drilling Services

Final Survey Report

07 March, 2011

Well Coordinates: 1,571,008.46 N, 2,272,724.93 E (39° 22' 22.43" N, 108° 04' 22.81" W)
Ground Level: 5,800.60 ft

Local Coordinate Origin:	Centered on Well Hyrup 11-31A
Viewing Datum:	RKB 24' @ 5824.60ft (Original Well Elev)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 2003.16 Build: 43I

HALLIBURTON

Design Report for Hyrup 11-31A - Vaughn Gyro and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97.00	0.48	218.69	97.00	-0.32	-0.25	0.40	0.49
Surveys from 97.00ft to 311.00ft are Vaughn Gyro Surveys							
128.00	1.16	223.75	128.00	-0.65	-0.55	0.84	2.20
159.00	2.95	214.39	158.97	-1.53	-1.22	1.93	5.86
220.00	4.15	220.64	219.86	-4.50	-3.54	5.65	2.06
281.00	5.36	228.06	280.65	-8.08	-7.10	10.69	2.22
311.00	5.66	230.77	310.51	-9.95	-9.29	13.56	1.32
Tie-On to Vaughn Gyro Survey							
339.00	5.72	238.21	338.37	-11.56	-11.54	16.32	2.64
First Sperry MWD Survey							
431.00	7.69	227.76	429.74	-18.11	-20.00	26.98	2.51
522.00	9.45	225.77	519.72	-27.42	-29.86	40.54	1.96
614.00	11.13	225.62	610.24	-38.90	-41.62	56.96	1.83
708.00	13.31	222.00	702.10	-53.29	-55.35	76.79	2.46
803.00	14.97	222.74	794.22	-70.43	-70.99	99.89	1.76
897.00	17.11	223.52	884.56	-89.37	-88.76	125.78	2.29
992.00	17.98	222.30	975.14	-110.35	-108.25	154.30	0.99
1,086.00	18.49	230.51	1,064.43	-130.56	-129.52	183.64	2.78
1,180.00	19.53	229.48	1,153.30	-150.25	-152.97	214.23	1.16
1,275.00	19.02	230.12	1,242.98	-170.50	-176.92	245.58	0.58
1,369.00	16.93	231.73	1,332.39	-188.80	-199.42	274.54	2.29
1,463.00	17.73	231.24	1,422.12	-206.23	-221.33	302.49	0.87
1,483.00	17.72	228.43	1,441.17	-210.16	-225.98	308.57	4.28
1,558.00	18.87	230.88	1,512.38	-225.39	-243.93	332.09	1.84
1,653.00	17.82	230.40	1,602.55	-244.35	-267.05	361.96	1.12
1,747.00	15.68	225.83	1,692.56	-262.37	-287.24	389.03	2.67
1,841.00	16.73	227.61	1,782.82	-280.34	-306.35	415.25	1.24
1,936.00	17.82	229.13	1,873.54	-299.07	-327.44	443.46	1.24
2,030.00	17.00	228.03	1,963.23	-317.67	-348.53	471.58	0.94
2,124.00	16.63	227.22	2,053.21	-336.00	-368.62	498.77	0.47
2,219.00	15.70	226.62	2,144.45	-354.06	-387.94	525.22	0.99
2,313.00	16.89	227.59	2,234.68	-372.00	-407.27	551.59	1.30
2,407.00	15.95	224.70	2,324.84	-390.40	-426.44	578.14	1.32
2,502.00	14.83	225.20	2,416.44	-408.24	-444.25	603.32	1.19
2,596.00	15.11	227.75	2,507.25	-424.96	-461.85	627.59	0.76
2,690.00	14.48	229.26	2,598.13	-440.86	-479.82	651.59	0.79
2,784.00	13.03	228.76	2,689.43	-455.52	-496.70	673.93	1.55
2,879.00	13.78	228.56	2,781.84	-470.07	-513.23	695.95	0.79
2,973.00	12.43	227.93	2,873.39	-484.26	-529.14	717.27	1.44
3,067.00	11.45	227.94	2,965.36	-497.28	-543.57	736.71	1.04
3,162.00	10.45	227.51	3,058.63	-509.42	-556.93	754.76	1.06
3,256.00	9.86	225.49	3,151.15	-520.82	-568.95	771.32	0.73
3,350.00	9.30	224.11	3,243.84	-531.92	-579.98	786.94	0.64
3,445.00	7.36	221.96	3,337.84	-541.95	-589.39	800.66	2.07
3,539.00	6.84	222.70	3,431.12	-550.55	-597.21	812.22	0.56
3,633.00	4.47	221.26	3,524.65	-557.41	-603.43	821.44	2.53
3,727.00	4.52	222.71	3,618.36	-562.89	-608.35	828.76	0.13
3,822.00	2.71	214.99	3,713.17	-567.48	-612.18	834.68	1.97
3,916.00	0.45	152.67	3,807.13	-569.63	-613.29	836.94	2.69

Design Report for Hyrup 11-31A - Vaughn Gyro and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,010.00	0.67	188.64	3,901.13	-570.50	-613.20	837.46	0.43
4,105.00	1.04	205.59	3,996.12	-571.83	-613.66	838.69	0.47
4,199.00	1.64	199.92	4,090.09	-573.86	-614.48	840.67	0.65
4,293.00	2.09	206.11	4,184.04	-576.66	-615.69	843.45	0.52
4,387.00	2.16	200.35	4,277.98	-579.86	-617.06	846.61	0.24
4,482.00	1.91	210.98	4,372.92	-582.90	-618.50	849.71	0.48
4,576.00	2.45	213.35	4,466.85	-585.92	-620.41	853.16	0.58
4,670.00	2.55	212.01	4,560.76	-589.37	-622.63	857.11	0.12
4,765.00	2.66	208.76	4,655.66	-593.10	-624.81	861.23	0.19
4,859.00	3.08	214.41	4,749.54	-597.09	-627.28	865.75	0.54
4,953.00	3.27	211.35	4,843.40	-601.47	-630.11	870.77	0.27
5,048.00	2.96	219.62	4,938.26	-605.67	-633.08	875.80	0.57
5,142.00	3.26	212.42	5,032.12	-609.80	-636.06	880.78	0.52
5,237.00	2.43	212.16	5,127.00	-613.78	-638.58	885.32	0.87
5,331.00	2.11	213.75	5,220.93	-616.91	-640.60	888.91	0.35
5,425.00	2.30	220.43	5,314.86	-619.78	-642.79	892.46	0.34
5,520.00	2.55	217.62	5,409.77	-622.91	-645.31	896.43	0.29
5,581.00	2.59	217.03	5,470.71	-625.08	-646.97	899.12	0.08
Final Sperry MWD Survey							
5,640.00	2.59	217.03	5,529.65	-627.21	-648.58	901.74	0.00
Survey Projection to TD - Estimated BHL: 303' FNL, 2309' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
97.00	97.00	-0.32	-0.25	Surveys from 97.00ft to 311.00ft are Vaughn Gyro Surveys
311.00	310.51	-9.95	-9.29	Tie-On to Vaughn Gyro Survey
339.00	338.37	-11.56	-11.54	First Sperry MWD Survey
5,581.00	5,470.71	-625.08	-646.97	Final Sperry MWD Survey
5,640.00	5,529.65	-627.21	-648.58	Survey Projection to TD
5,640.00	5,529.65	-627.21	-648.58	Estimated BHL: 303' FNL, 2309' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	Hyrup 11-31A Plan #2 BH Tgt	227.87	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
97.00	311.00	Vaughn Gyro Surveys	NS-GYRO-MS
339.00	5,640.00	Sperry MWD Surveys	MWD

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Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Hyrup 11-31A Plan - actual wellpath misses target center by 58.01ft at 4060.52ft MD (3951.65 TVD, -571.15 N, -613.37 E) - Rectangle (sides W100.00 H200.00 D1,644.00)	0.00	0.00	3,951.00	-600.16	-663.60	1,570,408.33	2,272,061.37	39° 22' 16.314 N	108° 4' 31.037 W
Hyrup 11-31A N. - actual wellpath hits target center - Polygon Point 1 Point 2	0.00	0.00	0.00	0.00	0.00	1,571,008.46	2,272,724.93	39° 22' 22.429 N	108° 4' 22.807 W
Hyrup 11-31A Plan - actual wellpath misses target center by 4.03ft at 4059.93ft MD (3951.06 TVD, -571.14 N, -613.37 E) - Rectangle (sides W25.00 H25.00 D0.00)	0.00	0.00	3,951.00	-575.16	-613.60	1,570,433.33	2,272,111.36	39° 22' 16.575 N	108° 4' 30.410 W
Hyrup 11-31A Plan - actual wellpath misses target center by 72.30ft at 5640.00ft MD (5529.65 TVD, -627.21 N, -648.58 E) - Point	0.00	1.63	5,595.00	-600.16	-663.60	1,570,408.33	2,272,061.37	39° 22' 16.314 N	108° 4' 31.037 W

North Reference Sheet for Sec. 2-T8S-R96W (SGV 2O PAD) - Hyrup 11-31A - Plan #2

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 24' @ 5824.60ft (Original Well Elev). Northing and Easting are relative to Hyrup 11-31A

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99994714

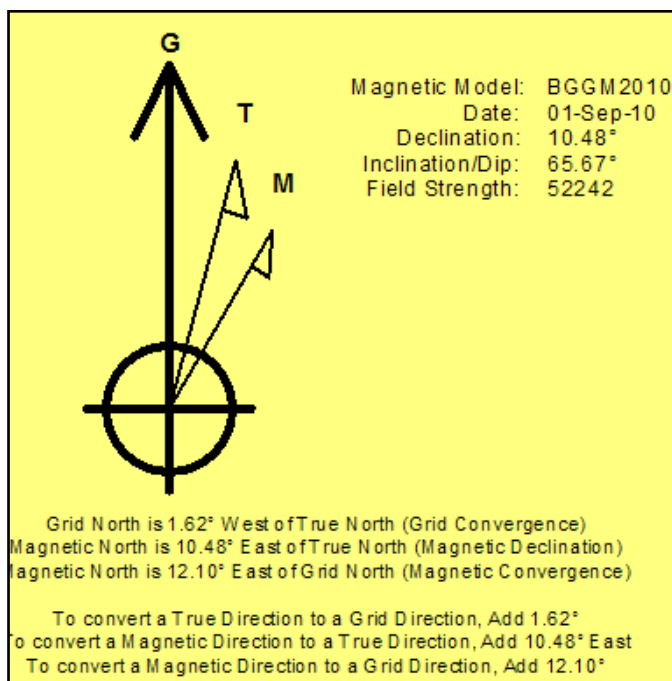
Grid Coordinates of Well: 1,571,008.46 ft N, 2,272,724.93 ft E

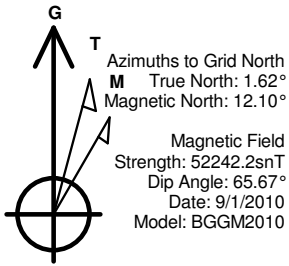
Geographical Coordinates of Well: 39° 22' 22.43" N, 108° 04' 22.81" W

Grid Convergence at Surface is: -1.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 5,640.00ft the Bottom Hole Displacement is 902.24ft in the Direction of 225.96° (Grid).

Magnetic Convergence at surface is: -12.10° (1 September 2010, , BGGM2010)

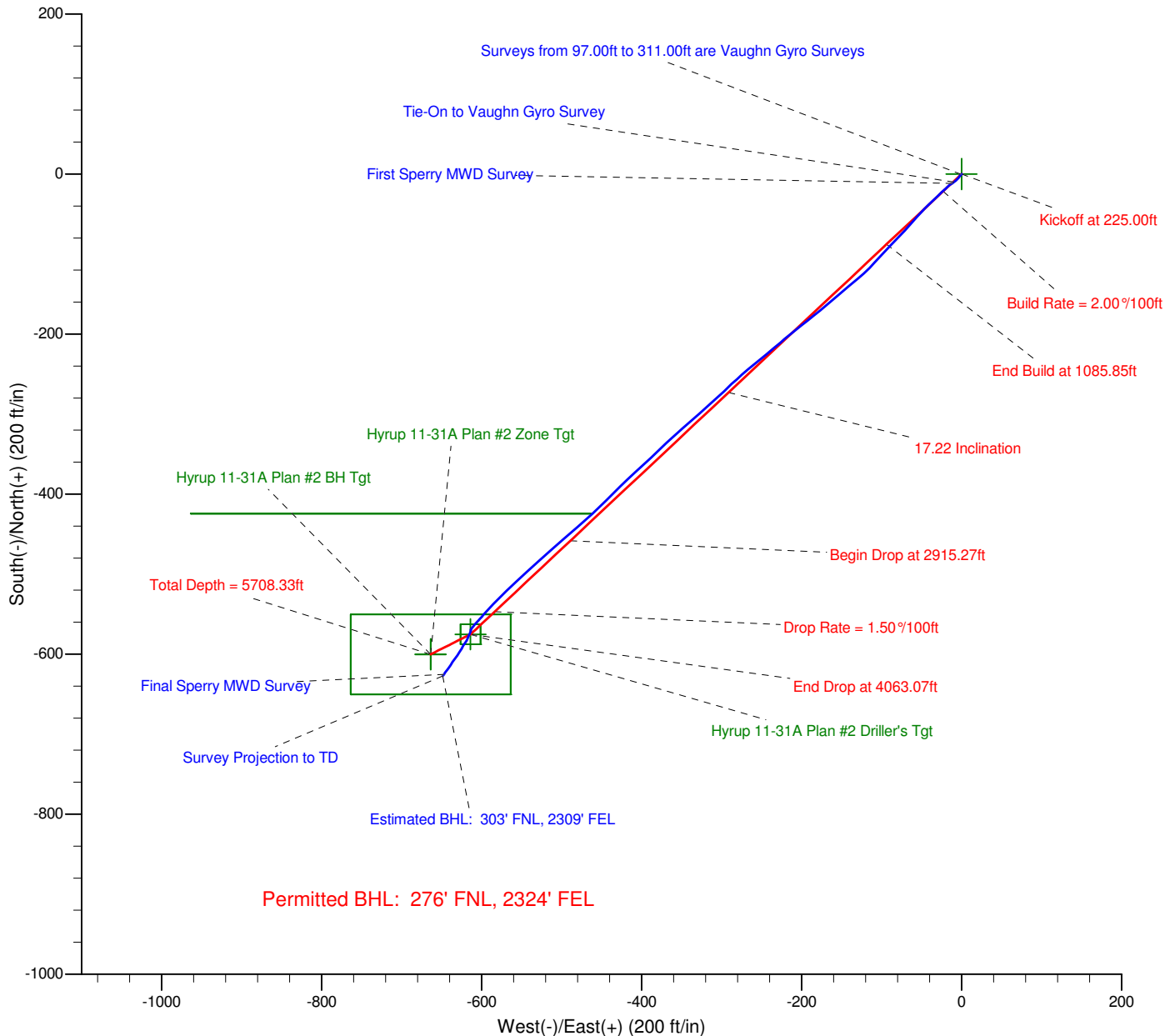




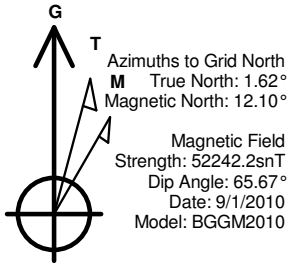
LEGEND

- Hyrup 11-31A, Plan #2, Plan #2 Proposal V0
- Vaughn Gyro and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Hyrup 11-31A well located at Garfield County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



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LEGEND

- Hyrup 11-31A, Plan #2, Plan #2 Proposal V0
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