

Noble Energy

Weld County, CO (NAD 83)

Sec. 28-T9N-R58W (Greyson & Brecken PAD)

Greyson LD28-753

05-123-41586

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

10 August, 2015

Surface UWI : 05-123-41586

Well Coordinates: 1,507,998.69 N, 3,451,186.82 E (40° 42' 59.33" N, 103° 52' 20.32" W)

Ground Level: 4,853.00 usft

Local Coordinate Origin:

Centered on Well Greyson LD28-753

Viewing Datum:

KB = 24' @ 4877.00usft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

HALLIBURTON

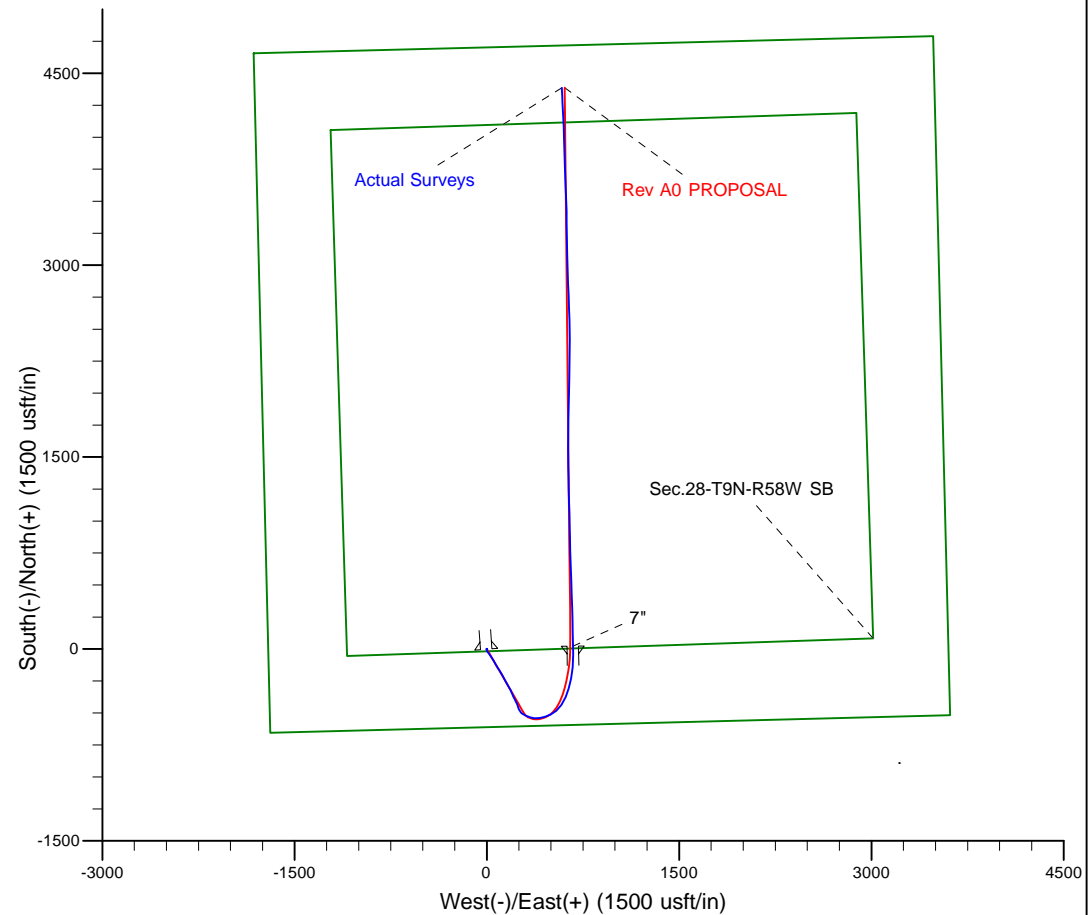
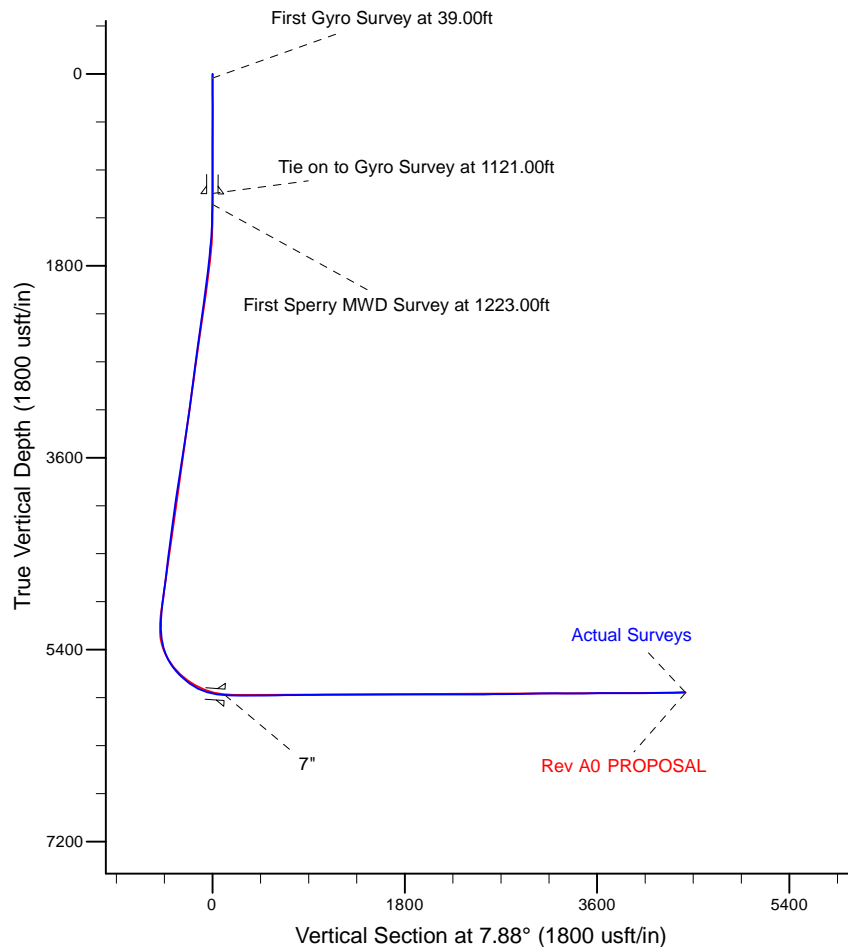
Project: Weld County, CO (NAD 83)
 Site: Sec. 28-T9N-R58W (Greyson & Brecken PAD)
 Well: Greyson LD28-753
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 610' FSL, 1710' FWL
 Platted Lat/Long: 40.716480, -103.872310
 Location: Sec. 28-T9N-R58W

~7" Casing: 615' FSL, 2377' FWL
 Lat/Long: 40.716505 N, -103.869886 W
 State Planes - CO Northern: 1,508,020.10 N, 3,451,858.58 E
 Sec. 28-T9N-R58W

Platted BHL: 330' FNL, 2420' FWL
 Platted Lat/Long: 40.728299 N, -103.869902 W
 State Planes - CO Northern: 1,512,316.02 N, 3,451,775.24 E
 Location: Sec. 28-T9N-R58W



LEGEND

- ▬ Greyson LD28-753, Plan A, Rev A0 PROPOSAL V0
- ▬ Actual Surveys

WELL DETAILS: Greyson LD28-753	
Ground Level:	4853.00
KB = 24' @ 4877.00usft (H&P 343)	
Created By:	Tatiana Gomez
Created On:	8/10/2015

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39.00	0.20	282.17	39.00	0.01	-0.07	0.01	0.51
First Gyro Survey at 39.00ft							
102.00	0.29	252.81	102.00	-0.01	-0.33	-0.05	0.24
193.00	0.51	331.37	193.00	0.28	-0.74	0.17	0.59
284.00	0.50	327.41	283.99	0.97	-1.15	0.80	0.04
375.00	0.58	348.27	374.99	1.75	-1.46	1.54	0.23
466.00	0.21	313.08	465.99	2.32	-1.67	2.07	0.47
557.00	0.20	243.13	556.99	2.36	-1.93	2.07	0.26
648.00	0.51	209.64	647.99	1.94	-2.28	1.61	0.40
1,121.00	0.45	175.48	1,120.97	-1.74	-3.17	-2.16	0.06
Tie on to Gyro Survey at 1121.00ft							
1,124.00	0.44	175.58	1,123.97	-1.77	-3.17	-2.19	0.31
9 5/8"							
1,223.00	0.14	185.86	1,222.97	-2.27	-3.15	-2.68	0.31
First Sperry MWD Survey at 1223.00ft							
1,315.00	0.34	165.61	1,314.97	-2.64	-3.10	-3.04	0.23
1,407.00	2.09	170.57	1,406.94	-4.56	-2.75	-4.90	1.90
1,500.00	4.42	159.39	1,499.79	-9.59	-1.21	-9.67	2.58
1,592.00	6.19	151.06	1,591.39	-17.25	2.43	-16.75	2.09
1,686.00	7.39	142.99	1,684.73	-26.51	8.53	-25.10	1.63
1,778.00	9.55	144.99	1,775.72	-37.49	16.47	-34.88	2.37
1,871.00	10.13	145.62	1,867.36	-50.56	25.51	-46.59	0.63
1,964.00	9.86	144.95	1,958.94	-63.83	34.70	-58.47	0.32
2,055.00	9.05	143.99	2,048.71	-76.00	43.39	-69.33	0.91
2,147.00	9.62	150.85	2,139.49	-88.56	51.38	-80.69	1.36
2,239.00	9.13	152.52	2,230.26	-101.75	58.50	-92.78	0.61
2,331.00	10.26	151.21	2,320.95	-115.41	65.81	-105.30	1.25
2,424.00	10.45	147.51	2,412.43	-129.78	74.33	-118.37	0.74
2,517.00	10.74	146.54	2,503.85	-144.13	83.64	-131.30	0.37
2,610.00	9.82	147.09	2,595.35	-158.01	92.72	-143.82	0.99
2,703.00	9.68	148.60	2,687.01	-171.34	101.11	-155.87	0.31
2,797.00	9.43	148.42	2,779.71	-184.65	109.26	-167.94	0.27
2,889.00	9.20	146.54	2,870.49	-197.21	117.26	-179.28	0.41
2,984.00	9.50	156.00	2,964.24	-210.71	124.64	-191.64	1.65
3,079.00	8.03	153.68	3,058.13	-223.82	130.77	-203.79	1.59
3,174.00	8.91	151.60	3,152.09	-236.23	137.21	-215.20	0.98
3,268.00	11.01	151.73	3,244.67	-250.55	144.92	-228.32	2.23
3,363.00	10.73	149.16	3,337.96	-266.13	153.75	-242.55	0.59
3,457.00	11.29	150.10	3,430.23	-281.62	162.83	-256.65	0.63
3,552.00	10.80	150.05	3,523.47	-297.39	171.90	-271.03	0.52
3,647.00	11.02	148.66	3,616.75	-312.86	181.07	-285.10	0.36
3,742.00	10.55	158.78	3,710.09	-328.72	188.94	-299.73	2.05
3,836.00	10.44	158.08	3,802.51	-344.65	195.24	-314.64	0.18
3,930.00	9.89	155.94	3,895.04	-359.92	201.71	-328.88	0.71
4,025.00	9.43	154.47	3,988.69	-374.39	208.39	-342.30	0.55
4,119.00	8.91	153.69	4,081.49	-387.86	214.93	-354.75	0.57
4,214.00	8.40	155.97	4,175.41	-400.80	221.02	-366.73	0.65
4,309.00	9.76	153.85	4,269.21	-414.36	227.39	-379.30	1.47
4,403.00	9.37	154.07	4,361.91	-428.40	234.25	-392.26	0.42

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,498.00	8.15	158.03	4,455.80	-441.60	240.15	-404.52	1.43
4,592.00	7.30	166.03	4,548.95	-453.57	244.09	-415.85	1.46
4,687.00	9.08	153.80	4,642.98	-466.16	248.85	-427.66	2.61
4,782.00	9.13	150.07	4,736.79	-479.42	255.92	-439.82	0.62
4,876.00	8.14	152.20	4,829.72	-491.77	262.75	-451.12	1.11
4,971.00	17.94	125.18	4,922.23	-506.19	277.89	-463.34	11.88
5,066.00	19.85	113.26	5,012.14	-521.00	304.68	-474.33	4.52
5,160.00	21.81	108.46	5,100.00	-532.83	335.91	-481.78	2.76
5,255.00	24.07	95.06	5,187.54	-540.13	371.98	-484.07	5.97
5,349.00	25.64	83.77	5,272.88	-539.62	411.32	-478.16	5.31
5,444.00	27.93	73.20	5,357.73	-530.95	453.08	-463.86	5.55
5,539.00	31.74	62.16	5,440.19	-512.83	496.52	-439.95	7.02
5,633.00	39.51	51.04	5,516.62	-482.40	541.75	-403.62	10.73
5,728.00	43.77	32.78	5,587.86	-435.58	583.22	-351.55	13.49
5,823.00	46.14	22.27	5,655.18	-376.17	614.03	-288.48	8.20
5,917.00	55.03	17.57	5,714.82	-307.93	638.56	-217.52	10.21
6,012.00	61.84	11.04	5,764.56	-229.56	658.37	-137.18	9.25
6,106.00	74.56	3.68	5,799.44	-143.23	669.27	-50.17	15.35
6,201.00	82.49	0.05	5,818.33	-50.26	672.25	42.33	9.15
6,226.00	84.60	359.62	5,821.14	-25.42	672.18	66.92	8.61
6,273.00	85.98	359.36	5,825.00	21.41	671.76	113.26	2.98
7"							
6,390.00	89.41	358.71	5,829.71	138.28	669.79	228.76	2.98
6,482.00	90.22	358.67	5,830.00	230.26	667.69	319.58	0.88
6,575.00	90.15	358.29	5,829.70	323.23	665.22	411.33	0.42
6,667.00	90.68	358.06	5,829.04	415.18	662.29	502.01	0.63
6,759.00	91.26	357.87	5,827.48	507.10	659.03	592.63	0.66
6,850.00	90.31	358.05	5,826.23	598.04	655.79	682.26	1.06
6,943.00	90.80	358.12	5,825.33	690.98	652.68	773.90	0.53
7,035.00	90.09	359.08	5,824.62	782.95	650.43	864.69	1.30
7,128.00	90.37	358.66	5,824.24	875.93	648.60	956.54	0.54
7,221.00	90.86	358.29	5,823.25	968.89	646.12	1,048.29	0.66
7,314.00	89.97	358.74	5,822.57	1,061.86	643.71	1,140.05	1.07
7,407.00	90.43	358.54	5,822.25	1,154.83	641.51	1,231.84	0.54
7,501.00	90.83	358.17	5,821.21	1,248.78	638.81	1,324.54	0.58
7,593.00	89.66	359.06	5,820.82	1,340.75	636.58	1,415.34	1.60
7,688.00	90.62	0.24	5,820.59	1,435.75	636.00	1,509.36	1.60
7,782.00	90.83	359.60	5,819.40	1,529.74	635.87	1,602.44	0.72
7,877.00	89.26	0.10	5,819.32	1,624.74	635.62	1,696.51	1.73
7,972.00	90.03	359.97	5,819.91	1,719.73	635.68	1,790.62	0.82
8,067.00	90.00	0.48	5,819.89	1,814.73	636.06	1,884.77	0.54
8,161.00	90.28	1.15	5,819.66	1,908.72	637.39	1,978.06	0.77
8,256.00	89.88	1.89	5,819.53	2,003.69	639.91	2,072.47	0.89
8,351.00	90.40	2.14	5,819.29	2,098.63	643.25	2,166.98	0.61
8,445.00	90.49	1.24	5,818.56	2,192.58	646.03	2,260.43	0.96
8,540.00	89.94	0.35	5,818.21	2,287.57	647.34	2,354.70	1.10
8,635.00	90.03	359.47	5,818.23	2,382.57	647.19	2,448.78	0.93
8,729.00	90.15	358.84	5,818.08	2,476.56	645.81	2,541.69	0.68
8,824.00	89.97	358.43	5,817.98	2,571.53	643.54	2,635.46	0.47
8,918.00	90.68	358.26	5,817.45	2,665.49	640.83	2,728.16	0.78
9,013.00	91.17	358.08	5,815.92	2,760.43	637.80	2,821.79	0.55

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,108.00	92.13	357.68	5,813.18	2,855.33	634.28	2,915.31	1.09
9,202.00	90.77	358.36	5,810.80	2,949.24	631.04	3,007.89	1.62
9,297.00	91.20	358.48	5,809.17	3,044.19	628.42	3,101.58	0.47
9,391.00	89.35	358.80	5,808.72	3,138.16	626.19	3,194.36	2.00
9,486.00	89.38	358.70	5,809.77	3,233.13	624.12	3,288.15	0.11
9,581.00	90.18	359.29	5,810.14	3,328.11	622.45	3,382.01	1.05
9,675.00	90.83	359.41	5,809.31	3,422.10	621.38	3,474.97	0.70
9,770.00	90.06	356.94	5,808.57	3,517.04	618.36	3,568.60	2.72
9,865.00	89.94	358.11	5,808.57	3,611.95	614.26	3,662.05	1.24
9,960.00	90.40	357.83	5,808.29	3,706.89	610.89	3,755.63	0.57
10,054.00	90.06	358.85	5,807.91	3,800.85	608.17	3,848.33	1.14
10,148.00	89.75	358.29	5,808.07	3,894.82	605.82	3,941.09	0.68
10,243.00	90.49	358.01	5,807.87	3,989.77	602.75	4,034.73	0.83
10,338.00	90.74	357.33	5,806.85	4,084.68	598.89	4,128.22	0.76
10,432.00	91.33	357.50	5,805.15	4,178.57	594.65	4,220.64	0.65
10,527.00	91.82	357.49	5,802.54	4,273.45	590.50	4,314.05	0.52
10,571.00	91.94	357.10	5,801.10	4,317.37	588.43	4,357.28	0.93
Final Sperry MWD Survey at 10571.00ft							
10,640.00	91.94	357.10	5,798.76	4,386.24	584.94	4,425.02	0.00
Striaight Line Projection to TD at 10640.00ft							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
39.00	39.00	0.01	-0.07	First Gyro Survey at 39.00ft
1,121.00	1,120.97	-1.74	-3.17	Tie on to Gyro Survey at 1121.00ft
1,223.00	1,222.97	-2.27	-3.15	First Sperry MWD Survey at 1223.00ft
10,571.00	5,801.10	4,317.37	588.43	Final Sperry MWD Survey at 10571.00ft
10,640.00	5,798.76	4,386.24	584.94	Striaight Line Projection to TD at 10640.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Greyson LD28-753_Rev A0_BHL	7.88	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
39.00	648.00	Surface Surveys	Flexi-Shot
739.00	6,226.00	Intermediate Survey	MWD
6,390.00	10,640.00	Production Survey	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,124.00	1,123.97	9 5/8"	9-5/8	13-3/4
6,273.00	5,825.00	7"	7	8-3/4

Design Report for Greyson LD28-753 - Actual Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Greyson LD28-753_Rc - actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.01	0.00	1,507,998.70	3,451,186.82	40.716480	-103.872310
Greyson LD28-753_Rc - actual wellpath misses target center by 22.44usft at 10640.00usft MD (5798.76 TVD, 4386.24 N, 584.94 E) - Point	0.00	0.00	5,803.00	4,387.53	606.94	1,512,386.17	3,451,793.75	40.728490	-103.869830

Directional Difficulty Index

Average Dogleg over Survey:	1.87 °/100usft	Maximum Dogleg over Survey:	15.35 °/100usft at 6,106.00 usft
Net Tortousity applicable to Plans:	0.69 °/100usft	Directional Difficulty Index:	6.323

Audit Info

North Reference Sheet for Sec. 28-T9N-R58W (Greyson & Brecken PAD) -
Greyson LD28-753 - Plan A

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

Vertical Depths are relative to KB = 24' @ 4877.00usft (H&P 343). Northing and Easting are relative to Greyson LD28-753

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

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99998984

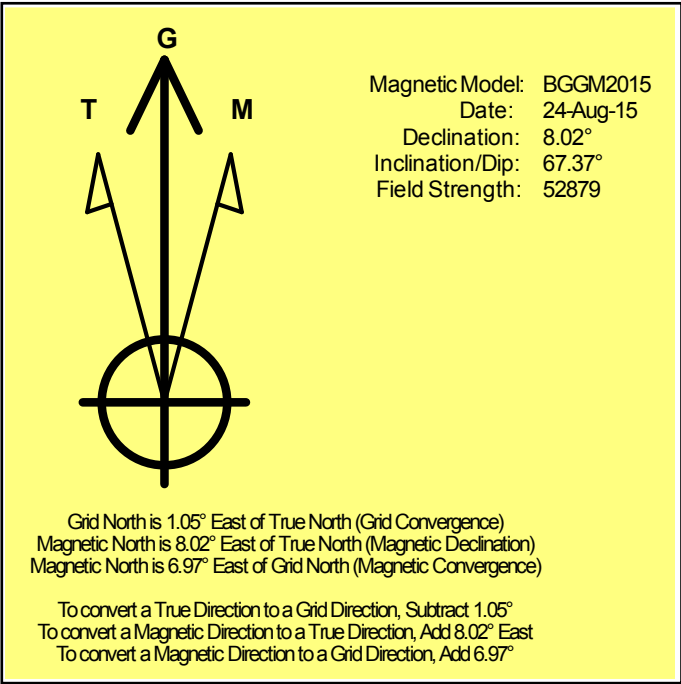
Grid Coordinates of Well: 1,507,998.69 usft N, 3,451,186.82 usft E

Geographical Coordinates of Well: 40° 42' 59.33" N, 103° 52' 20.32" W

Grid Convergence at Surface is: 1.05°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,640.00usft
the Bottom Hole Displacement is 4,425.08usft in the Direction of 7.60° (Grid).

Magnetic Convergence at surface is: -6.97° (24 August 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

Sec. 28-T9N-R58W (Greyson & Brecken PAD)

Greyson LD28-753

05-123-41586

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

10 August, 2015

Well Coordinates: 1,507,998.69 N, 3,451,186.82 E (40° 42' 59.33" N, 103° 52' 20.32" W)

Ground Level: 4,853.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Greyson LD28-753

KB = 24' @ 4877.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.716480	-103.872310	1,507,998.69	3,451,186.82
39.00	0.20	282.17	39.00	0.01	-0.07	40.716480	-103.872311	1,507,998.70	3,451,186.75
102.00	0.29	252.81	102.00	-0.01	-0.33	40.716480	-103.872311	1,507,998.68	3,451,186.49
193.00	0.51	331.37	193.00	0.28	-0.74	40.716481	-103.872313	1,507,998.96	3,451,186.08
284.00	0.50	327.41	283.99	0.97	-1.15	40.716483	-103.872314	1,507,999.65	3,451,185.67
375.00	0.58	348.27	374.99	1.75	-1.46	40.716485	-103.872315	1,508,000.44	3,451,185.37
466.00	0.21	313.08	465.99	2.32	-1.67	40.716487	-103.872316	1,508,001.01	3,451,185.15
557.00	0.20	243.13	556.99	2.36	-1.93	40.716487	-103.872317	1,508,001.05	3,451,184.89
648.00	0.51	209.64	647.99	1.94	-2.28	40.716485	-103.872318	1,508,000.62	3,451,184.54
1,121.00	0.45	175.48	1,120.97	-1.74	-3.17	40.716475	-103.872322	1,507,996.94	3,451,183.65
1,124.00	0.44	175.58	1,123.97	-1.77	-3.17	40.716475	-103.872322	1,507,996.92	3,451,183.65
1,223.00	0.14	185.86	1,222.97	-2.27	-3.15	40.716474	-103.872322	1,507,996.42	3,451,183.67
1,315.00	0.34	165.61	1,314.97	-2.64	-3.10	40.716473	-103.872322	1,507,996.04	3,451,183.72
1,407.00	2.09	170.57	1,406.94	-4.56	-2.75	40.716468	-103.872320	1,507,994.12	3,451,184.07
1,500.00	4.42	159.39	1,499.79	-9.59	-1.21	40.716454	-103.872315	1,507,989.10	3,451,185.61
1,592.00	6.19	151.06	1,591.39	-17.25	2.43	40.716433	-103.872303	1,507,981.44	3,451,189.26
1,686.00	7.39	142.99	1,684.73	-26.51	8.53	40.716407	-103.872281	1,507,972.17	3,451,195.35
1,778.00	9.55	144.99	1,775.72	-37.49	16.47	40.716376	-103.872253	1,507,961.20	3,451,203.29
1,871.00	10.13	145.62	1,867.36	-50.56	25.51	40.716340	-103.872222	1,507,948.13	3,451,212.33
1,964.00	9.86	144.95	1,958.94	-63.83	34.70	40.716303	-103.872189	1,507,934.86	3,451,221.52
2,055.00	9.05	143.99	2,048.71	-76.00	43.39	40.716269	-103.872159	1,507,922.69	3,451,230.21
2,147.00	9.62	150.85	2,139.49	-88.56	51.38	40.716234	-103.872131	1,507,910.12	3,451,238.20
2,239.00	9.13	152.52	2,230.26	-101.75	58.50	40.716198	-103.872106	1,507,896.94	3,451,245.32
2,331.00	10.26	151.21	2,320.95	-115.41	65.81	40.716160	-103.872081	1,507,883.28	3,451,252.63
2,424.00	10.45	147.51	2,412.43	-129.78	74.33	40.716120	-103.872051	1,507,868.91	3,451,261.15
2,517.00	10.74	146.54	2,503.85	-144.13	83.64	40.716080	-103.872018	1,507,854.56	3,451,270.46
2,610.00	9.82	147.09	2,595.35	-158.01	92.72	40.716042	-103.871986	1,507,840.68	3,451,279.54
2,703.00	9.68	148.60	2,687.01	-171.34	101.11	40.716005	-103.871957	1,507,827.34	3,451,287.93
2,797.00	9.43	148.42	2,779.71	-184.65	109.26	40.715968	-103.871928	1,507,814.04	3,451,296.08
2,889.00	9.20	146.54	2,870.49	-197.21	117.26	40.715933	-103.871900	1,507,801.48	3,451,304.08
2,984.00	9.50	156.00	2,964.24	-210.71	124.64	40.715896	-103.871875	1,507,787.98	3,451,311.46
3,079.00	8.03	153.68	3,058.13	-223.82	130.77	40.715859	-103.871853	1,507,774.87	3,451,317.59
3,174.00	8.91	151.60	3,152.09	-236.23	137.21	40.715825	-103.871831	1,507,762.45	3,451,324.03
3,268.00	11.01	151.73	3,244.67	-250.55	144.92	40.715785	-103.871804	1,507,748.14	3,451,331.74
3,363.00	10.73	149.16	3,337.96	-266.13	153.75	40.715742	-103.871773	1,507,732.56	3,451,340.57
3,457.00	11.29	150.10	3,430.23	-281.62	162.83	40.715699	-103.871742	1,507,717.07	3,451,349.64
3,552.00	10.80	150.05	3,523.47	-297.39	171.90	40.715655	-103.871710	1,507,701.30	3,451,358.72
3,647.00	11.02	148.66	3,616.75	-312.86	181.07	40.715612	-103.871678	1,507,685.83	3,451,367.89
3,742.00	10.55	158.78	3,710.09	-328.72	188.94	40.715568	-103.871651	1,507,669.97	3,451,375.76
3,836.00	10.44	158.08	3,802.51	-344.65	195.24	40.715524	-103.871629	1,507,654.05	3,451,382.06
3,930.00	9.89	155.94	3,895.04	-359.92	201.71	40.715482	-103.871607	1,507,638.77	3,451,388.53
4,025.00	9.43	154.47	3,988.69	-374.39	208.39	40.715442	-103.871583	1,507,624.30	3,451,395.21

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
4,119.00	8.91	153.69	4,081.49	-387.86	214.93	40.715405	-103.871561	1,507,610.83	3,451,401.75
4,214.00	8.40	155.97	4,175.41	-400.80	221.02	40.715369	-103.871540	1,507,597.89	3,451,407.84
4,309.00	9.76	153.85	4,269.21	-414.36	227.39	40.715331	-103.871518	1,507,584.33	3,451,414.21
4,403.00	9.37	154.07	4,361.91	-428.40	234.25	40.715293	-103.871494	1,507,570.29	3,451,421.07
4,498.00	8.15	158.03	4,455.80	-441.60	240.15	40.715256	-103.871473	1,507,557.09	3,451,426.97
4,592.00	7.30	166.03	4,548.95	-453.57	244.09	40.715223	-103.871460	1,507,545.12	3,451,430.91
4,687.00	9.08	153.80	4,642.98	-466.16	248.85	40.715188	-103.871444	1,507,532.53	3,451,435.67
4,782.00	9.13	150.07	4,736.79	-479.42	255.92	40.715152	-103.871419	1,507,519.28	3,451,442.74
4,876.00	8.14	152.20	4,829.72	-491.77	262.75	40.715117	-103.871395	1,507,506.93	3,451,449.57
4,971.00	17.94	125.18	4,922.23	-506.19	277.89	40.715077	-103.871342	1,507,492.50	3,451,464.71
5,066.00	19.85	113.26	5,012.14	-521.00	304.68	40.715035	-103.871246	1,507,477.70	3,451,491.50
5,160.00	21.81	108.46	5,100.00	-532.83	335.91	40.715001	-103.871134	1,507,465.86	3,451,522.73
5,255.00	24.07	95.06	5,187.54	-540.13	371.98	40.714979	-103.871004	1,507,458.56	3,451,558.80
5,349.00	25.64	83.77	5,272.88	-539.62	411.32	40.714978	-103.870863	1,507,459.08	3,451,598.13
5,444.00	27.93	73.20	5,357.73	-530.95	453.08	40.715000	-103.870711	1,507,467.74	3,451,639.89
5,539.00	31.74	62.16	5,440.19	-512.83	496.52	40.715048	-103.870553	1,507,485.86	3,451,683.34
5,633.00	39.51	51.04	5,516.62	-482.40	541.75	40.715129	-103.870388	1,507,516.29	3,451,728.57
5,728.00	43.77	32.78	5,587.86	-435.58	583.22	40.715255	-103.870236	1,507,563.11	3,451,770.03
5,823.00	46.14	22.27	5,655.18	-376.17	614.03	40.715417	-103.870121	1,507,622.52	3,451,800.85
5,917.00	55.03	17.57	5,714.82	-307.93	638.56	40.715603	-103.870028	1,507,690.76	3,451,825.37
6,012.00	61.84	11.04	5,764.56	-229.56	658.37	40.715817	-103.869951	1,507,769.13	3,451,845.18
6,106.00	74.56	3.68	5,799.44	-143.23	669.27	40.716053	-103.869906	1,507,855.46	3,451,856.08
6,201.00	82.49	0.05	5,818.33	-50.26	672.25	40.716308	-103.869889	1,507,948.42	3,451,859.07
6,226.00	84.60	359.62	5,821.14	-25.42	672.18	40.716376	-103.869888	1,507,973.26	3,451,859.00
6,273.00	85.98	359.36	5,825.00	21.41	671.76	40.716505	-103.869886	1,508,020.10	3,451,858.58
6,390.00	89.41	358.71	5,829.71	138.28	669.79	40.716826	-103.869885	1,508,136.97	3,451,856.61
6,482.00	90.22	358.67	5,830.00	230.26	667.69	40.717078	-103.869887	1,508,228.94	3,451,854.50
6,575.00	90.15	358.29	5,829.70	323.23	665.22	40.717334	-103.869890	1,508,321.91	3,451,852.04
6,667.00	90.68	358.06	5,829.04	415.18	662.29	40.717586	-103.869894	1,508,413.86	3,451,849.11
6,759.00	91.26	357.87	5,827.48	507.10	659.03	40.717838	-103.869900	1,508,505.79	3,451,845.84
6,850.00	90.31	358.05	5,826.23	598.04	655.79	40.718088	-103.869905	1,508,596.72	3,451,842.60
6,943.00	90.80	358.12	5,825.33	690.98	652.68	40.718343	-103.869910	1,508,689.66	3,451,839.49
7,035.00	90.09	359.08	5,824.62	782.95	650.43	40.718596	-103.869912	1,508,781.63	3,451,837.25
7,128.00	90.37	358.66	5,824.24	875.93	648.60	40.718851	-103.869913	1,508,874.61	3,451,835.41
7,221.00	90.86	358.29	5,823.25	968.89	646.12	40.719106	-103.869916	1,508,967.57	3,451,832.94
7,314.00	89.97	358.74	5,822.57	1,061.86	643.71	40.719362	-103.869918	1,509,060.53	3,451,830.53
7,407.00	90.43	358.54	5,822.25	1,154.83	641.51	40.719617	-103.869920	1,509,153.50	3,451,828.32
7,501.00	90.83	358.17	5,821.21	1,248.78	638.81	40.719875	-103.869923	1,509,247.46	3,451,825.62
7,593.00	89.66	359.06	5,820.82	1,340.75	636.58	40.720127	-103.869925	1,509,339.43	3,451,823.40
7,688.00	90.62	0.24	5,820.59	1,435.75	636.00	40.720388	-103.869921	1,509,434.42	3,451,822.82
7,782.00	90.83	359.60	5,819.40	1,529.74	635.87	40.720646	-103.869915	1,509,528.41	3,451,822.69
7,877.00	89.26	0.10	5,819.32	1,624.74	635.62	40.720907	-103.869910	1,509,623.41	3,451,822.44

Design Report for Greyson LD28-753 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
7,972.00	90.03	359.97	5,819.91	1,719.73	635.68	40.721167	-103.869903	1,509,718.40	3,451,822.50
8,067.00	90.00	0.48	5,819.89	1,814.73	636.06	40.721428	-103.869896	1,509,813.40	3,451,822.87
8,161.00	90.28	1.15	5,819.66	1,908.72	637.39	40.721686	-103.869885	1,509,907.39	3,451,824.21
8,256.00	89.88	1.89	5,819.53	2,003.69	639.91	40.721947	-103.869869	1,510,002.36	3,451,826.73
8,351.00	90.40	2.14	5,819.29	2,098.63	643.25	40.722207	-103.869851	1,510,097.30	3,451,830.07
8,445.00	90.49	1.24	5,818.56	2,192.58	646.03	40.722465	-103.869835	1,510,191.25	3,451,832.84
8,540.00	89.94	0.35	5,818.21	2,287.57	647.34	40.722725	-103.869824	1,510,286.24	3,451,834.16
8,635.00	90.03	359.47	5,818.23	2,382.57	647.19	40.722986	-103.869818	1,510,381.24	3,451,834.01
8,729.00	90.15	358.84	5,818.08	2,476.56	645.81	40.723244	-103.869817	1,510,475.22	3,451,832.62
8,824.00	89.97	358.43	5,817.98	2,571.53	643.54	40.723505	-103.869819	1,510,570.20	3,451,830.36
8,918.00	90.68	358.26	5,817.45	2,665.49	640.83	40.723763	-103.869822	1,510,664.15	3,451,827.64
9,013.00	91.17	358.08	5,815.92	2,760.43	637.80	40.724023	-103.869827	1,510,759.09	3,451,824.61
9,108.00	92.13	357.68	5,813.18	2,855.33	634.28	40.724284	-103.869833	1,510,853.98	3,451,821.10
9,202.00	90.77	358.36	5,810.80	2,949.24	631.04	40.724542	-103.869839	1,510,947.89	3,451,817.85
9,297.00	91.20	358.48	5,809.17	3,044.19	628.42	40.724803	-103.869842	1,511,042.84	3,451,815.23
9,391.00	89.35	358.80	5,808.72	3,138.16	626.19	40.725060	-103.869844	1,511,136.81	3,451,813.00
9,486.00	89.38	358.70	5,809.77	3,233.13	624.12	40.725321	-103.869845	1,511,231.78	3,451,810.93
9,581.00	90.18	359.29	5,810.14	3,328.11	622.45	40.725582	-103.869845	1,511,326.76	3,451,809.26
9,675.00	90.83	359.41	5,809.31	3,422.10	621.38	40.725840	-103.869842	1,511,420.75	3,451,808.20
9,770.00	90.06	356.94	5,808.57	3,517.04	618.36	40.726101	-103.869847	1,511,515.69	3,451,805.17
9,865.00	89.94	358.11	5,808.57	3,611.95	614.26	40.726361	-103.869855	1,511,610.60	3,451,801.07
9,960.00	90.40	357.83	5,808.29	3,706.89	610.89	40.726622	-103.869861	1,511,705.54	3,451,797.70
10,054.00	90.06	358.85	5,807.91	3,800.85	608.17	40.726880	-103.869865	1,511,799.50	3,451,794.98
10,148.00	89.75	358.29	5,808.07	3,894.82	605.82	40.727138	-103.869867	1,511,893.47	3,451,792.64
10,243.00	90.49	358.01	5,807.87	3,989.77	602.75	40.727399	-103.869872	1,511,988.41	3,451,789.57
10,338.00	90.74	357.33	5,806.85	4,084.68	598.89	40.727659	-103.869879	1,512,083.33	3,451,785.71
10,432.00	91.33	357.50	5,805.15	4,178.57	594.65	40.727917	-103.869888	1,512,177.22	3,451,781.47
10,527.00	91.82	357.49	5,802.54	4,273.45	590.50	40.728178	-103.869897	1,512,272.09	3,451,777.32
10,571.00	91.94	357.10	5,801.10	4,317.37	588.43	40.728299	-103.869902	1,512,316.02	3,451,775.24
10,640.00	91.94	357.10	5,798.76	4,386.24	584.94	40.728488	-103.869910	1,512,384.89	3,451,771.75

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,121.00	1,120.97	-1.74	-3.17	Tie on to Gyro Survey at 1121.00ft
1,223.00	1,222.97	-2.27	-3.15	First Sperry MWD Survey at 1223.00ft
10,571.00	5,801.10	4,317.37	588.43	Final Sperry MWD Survey at 10571.00ft
10,640.00	5,798.76	4,386.24	584.94	Striaight Line Projection to TD at 10640.00ft

Design Report for Greyson LD28-753 - Actual Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Greyson LD28-753_Rev A0_BHL	7.88	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
39.00	648.00	Surface Surveys	Flexi-Shot
739.00	6,226.00	Intermediate Survey	MWD
6,390.00	10,640.00	Production Survey	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,124.00	1,123.97	9 5/8"	9-5/8	13-3/4
6,273.00	5,825.00	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD (°)	Northing (°)	Easting (°)	+N/-S	+E/-W	Created	Updated
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Directional Difficulty Index

Average Dogleg over Survey:	1.87 °/100usft	Maximum Dogleg over Survey:	15.35 °/100usft at 6,106.00 usft
Net Tortousity applicable to Plans:	0.69 °/100usft	Directional Difficulty Index:	6.323

Design Report for Greyson LD28-753 - Actual Surveys

Audit Info

North Reference Sheet for Sec. 28-T9N-R58W (Greyson & Brecken PAD) - Greyson LD28-753 - Plan A

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

Vertical Depths are relative to KB = 24' @ 4877.00usft (H&P 343). Northing and Easting are relative to Greyson LD28-753

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

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99998984

Grid Coordinates of Well: 1,507,998.69 usft N, 3,451,186.82 usft E

Geographical Coordinates of Well: 40° 42' 59.33" N, 103° 52' 20.32" W

Grid Convergence at Surface is: 1.05°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,640.00usft

the Bottom Hole Displacement is 4,425.08usft in the Direction of 7.60° (Grid).

Magnetic Convergence at surface is: -6.97° (24 August 2015, , BGGM2015)

