

Noble Energy

Weld County, CO (NAD 83)

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

Brecken LD28-734

05-123-41565

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

23 September, 2015

Surface UWI : 05-123-41565

Well Coordinates: 1,507,796.12 N, 3,453,050.95 E (40° 42' 56.99" N, 103° 51' 56.16" W)

Ground Level: 4,831.00 usft

Local Coordinate Origin:

Centered on Well Brecken LD28-734

Viewing Datum:

KB = 24' @ 4855.00usft (H&P 273)

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

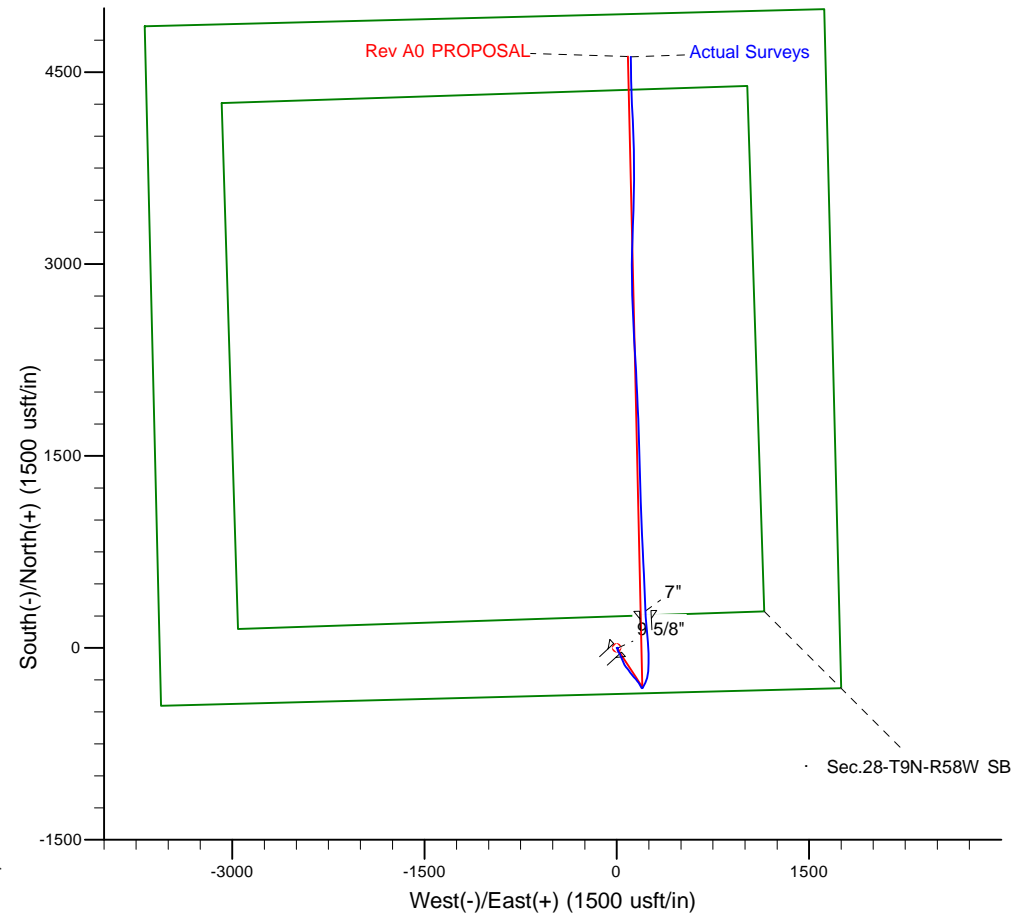
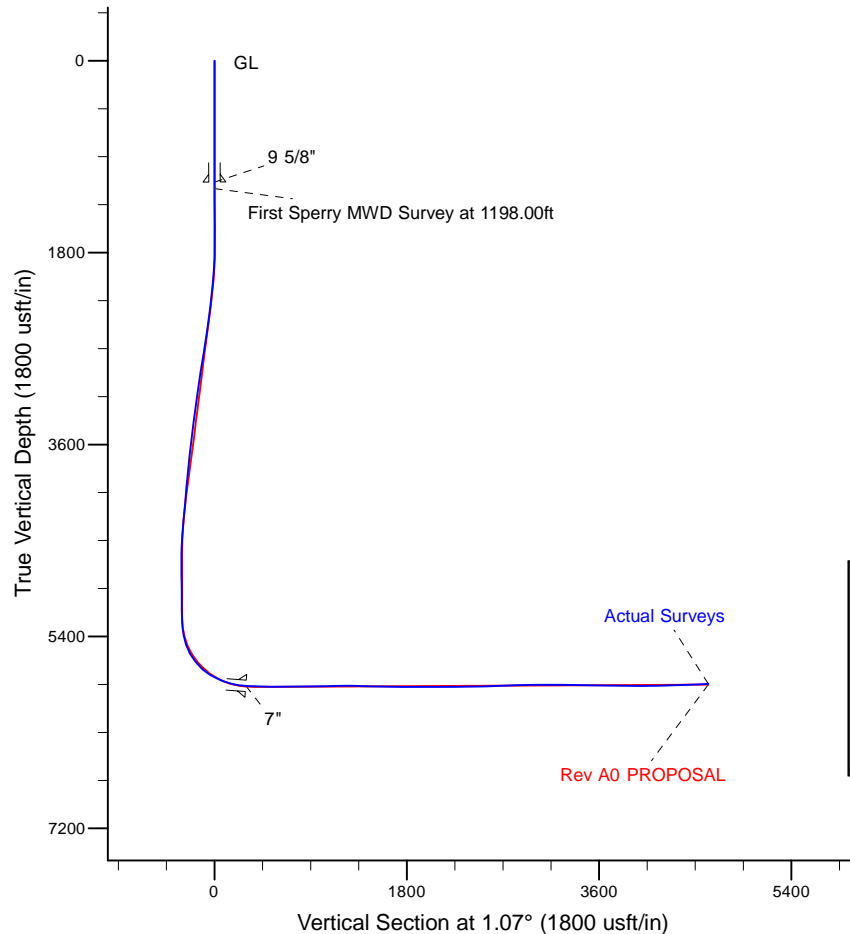
Project: Weld County, CO (NAD 83)
 Site: Sec. 28-T9N-R58W (Greyson & Brecken PAD)
 Well: Brecken LD28-734
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 358' FSL, 1742' FEL
 Platted Lat/Long: 40.71583, -103.8656
 Location: Sec. 28-T9N-R58W

~7" Casing: 646' FSL, 1515' FEL
 Lat/Long: 40.716613 S, -103.864777 W
 State Planes - CO Northern: 1,508,085.45 N, 3,453,273.80 E
 Sec. 28-T9N-R58W

Platted BHL: 330' FNL, 1540' FEL
 Platted Lat/Long: 40.728320 N, -103.864899 W
 State Planes - CO Northern: 1,512,349.40 N, 3,453,161.41 E
 Location: Sec. 28-T9N-R58W



LEGEND

- ◆ Brecken LD28-734, Plan A, Rev A0 PROPOSAL V0
- ▣ Actual Surveys

WELL DETAILS: Brecken LD28-734

Ground Level: 4831.00
 KB = 24' @ 4855.00usft (H&P 273)

Created By: Tatiana Gomez
 Created On: 9/22/2015

Design Report for Brecken LD28-734 - 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
Brecken LD28-734_Rev A0_SHL							
89.42	0.38	133.49	89.42	-0.20	0.22	-0.20	0.42
First Gyro Survey at 89.42ft							
180.20	0.22	81.35	180.20	-0.39	0.61	-0.37	0.33
270.98	0.23	44.98	270.98	-0.23	0.91	-0.21	0.16
361.76	0.16	83.59	361.76	-0.09	1.16	-0.07	0.16
452.54	0.47	92.15	452.54	-0.09	1.66	-0.06	0.34
543.32	0.41	85.64	543.31	-0.08	2.36	-0.03	0.09
634.10	0.45	99.12	634.09	-0.11	3.03	-0.05	0.12
724.88	0.38	94.29	724.87	-0.19	3.68	-0.12	0.09
815.66	0.53	95.98	815.65	-0.25	4.40	-0.17	0.17
1,088.00	0.41	89.67	1,087.98	-0.38	6.63	-0.25	0.05
1,137.00	0.22	47.50	1,136.98	-0.31	6.87	-0.19	0.59
9 5/8"							
1,198.00	0.36	335.37	1,197.97	-0.06	6.88	0.07	0.59
First Sperry MWD Survey at 1198.00ft							
1,290.00	0.41	323.99	1,289.97	0.47	6.56	0.59	0.10
1,381.00	0.48	328.23	1,380.97	1.05	6.17	1.17	0.08
1,472.00	0.39	336.30	1,471.97	1.66	5.85	1.77	0.12
1,564.00	0.25	345.84	1,563.97	2.14	5.67	2.25	0.16
1,747.00	0.62	63.71	1,746.96	2.97	6.46	3.09	0.34
1,838.00	2.75	177.01	1,837.93	1.01	7.02	1.14	3.35
1,930.00	3.87	188.23	1,929.77	-4.27	6.69	-4.14	1.40
2,021.00	5.14	180.08	2,020.49	-11.39	6.24	-11.27	1.56
2,113.00	5.71	161.72	2,112.09	-19.85	7.67	-19.71	1.98
2,205.00	6.86	145.21	2,203.54	-28.71	12.24	-28.48	2.32
2,297.00	8.16	152.73	2,294.75	-39.03	18.37	-38.68	1.77
2,389.00	7.54	148.61	2,385.89	-49.99	24.51	-49.52	0.91
2,480.00	8.71	159.42	2,475.98	-61.53	30.04	-60.96	2.11
2,572.00	10.04	157.82	2,566.75	-75.48	35.51	-74.80	1.47
2,663.00	9.56	157.16	2,656.42	-89.79	41.44	-89.00	0.54
2,758.00	9.56	157.66	2,750.10	-104.36	47.50	-103.45	0.09
2,853.00	10.07	158.92	2,843.71	-119.41	53.49	-118.38	0.58
2,947.00	11.29	143.78	2,936.10	-134.50	61.88	-133.32	3.24
3,042.00	10.01	143.27	3,029.46	-148.62	72.32	-147.24	1.35
3,137.00	9.05	143.32	3,123.15	-161.23	81.72	-159.67	1.01
3,232.00	9.69	141.99	3,216.88	-173.52	91.10	-171.78	0.71
3,326.00	9.80	143.89	3,309.52	-186.22	100.69	-184.30	0.36
3,421.00	10.21	144.29	3,403.08	-199.59	110.37	-197.48	0.44
3,516.00	9.44	140.04	3,496.69	-212.39	120.29	-210.10	1.11
3,611.00	9.33	140.96	3,590.41	-224.35	130.14	-221.87	0.20
3,705.00	8.04	136.45	3,683.34	-235.03	139.47	-232.37	1.55
3,800.00	7.07	136.00	3,777.51	-244.05	148.11	-241.23	1.02
3,989.00	6.67	145.36	3,965.16	-261.45	162.43	-258.36	0.63
4,084.00	5.83	144.28	4,059.59	-269.91	168.38	-266.70	0.89
4,179.00	6.29	148.61	4,154.06	-278.27	173.91	-274.96	0.68
4,273.00	6.61	153.36	4,247.47	-287.50	179.02	-284.09	0.66
4,368.00	5.69	149.30	4,341.92	-296.43	183.87	-292.93	1.07
4,463.00	4.65	146.90	4,436.53	-303.71	188.38	-300.12	1.12

Design Report for Brecken LD28-734 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,557.00	4.17	147.66	4,530.25	-309.79	192.29	-306.13	0.51
4,652.00	1.74	132.65	4,625.12	-313.69	195.20	-309.97	2.66
4,747.00	1.27	67.75	4,720.10	-314.26	197.23	-310.51	1.75
4,842.00	1.05	53.39	4,815.08	-313.35	198.91	-309.56	0.38
4,936.00	1.15	58.15	4,909.06	-312.33	200.40	-308.52	0.14
5,031.00	1.15	60.83	5,004.04	-311.37	202.04	-307.52	0.06
5,126.00	0.96	62.73	5,099.02	-310.54	203.58	-306.67	0.20
5,220.00	0.10	28.91	5,193.02	-310.10	204.32	-306.22	0.93
5,315.00	5.69	20.06	5,287.86	-305.61	205.98	-301.69	5.89
5,410.00	10.39	28.92	5,381.90	-293.68	211.74	-289.65	5.10
5,504.00	19.96	25.33	5,472.52	-271.70	222.73	-267.48	10.23
5,599.00	29.32	16.85	5,558.80	-234.69	236.44	-230.22	10.51
5,694.00	38.15	4.41	5,637.82	-183.01	245.47	-178.38	11.76
5,789.00	48.30	0.08	5,706.97	-118.11	247.78	-113.44	11.13
5,883.00	58.84	358.87	5,762.71	-42.59	247.04	-37.95	11.26
5,978.00	67.76	355.67	5,805.36	42.08	242.91	46.63	9.86
6,073.00	73.81	353.71	5,836.62	131.35	234.58	135.73	6.66
6,187.00	83.61	356.73	5,858.91	242.61	225.33	246.79	8.98
6,234.00	85.37	357.19	5,863.43	289.33	222.85	293.45	3.88
7"							
6,340.00	89.35	358.23	5,868.30	395.11	218.62	399.14	3.88
6,432.00	89.94	357.99	5,868.87	487.06	215.59	491.01	0.69
6,523.00	89.51	357.36	5,869.31	577.98	211.90	581.85	0.84
6,615.00	89.11	356.77	5,870.42	669.85	207.19	673.62	0.77
6,707.00	90.86	357.30	5,870.44	761.72	202.43	765.38	1.99
6,799.00	91.20	357.27	5,868.79	853.61	198.07	857.17	0.37
6,891.00	91.20	357.21	5,866.86	945.48	193.64	948.94	0.07
6,982.00	91.33	358.49	5,864.85	1,036.39	190.23	1,039.77	1.41
7,074.00	90.40	358.50	5,863.47	1,128.35	187.81	1,131.67	1.01
7,165.00	90.49	358.28	5,862.76	1,219.31	185.26	1,222.57	0.26
7,260.00	88.46	358.04	5,863.63	1,314.25	182.21	1,317.44	2.15
7,354.00	88.15	357.82	5,866.41	1,408.15	178.81	1,411.25	0.40
7,449.00	88.00	358.66	5,869.60	1,503.05	175.90	1,506.08	0.90
7,543.00	89.60	358.57	5,871.57	1,597.00	173.62	1,599.97	1.70
7,638.00	89.66	358.19	5,872.18	1,691.96	170.94	1,694.86	0.40
7,733.00	89.82	357.49	5,872.61	1,786.89	167.36	1,789.71	0.76
7,828.00	89.85	357.11	5,872.89	1,881.78	162.88	1,884.51	0.40
7,922.00	90.12	357.27	5,872.91	1,975.67	158.28	1,978.29	0.33
8,017.00	90.43	357.25	5,872.46	2,070.56	153.73	2,073.08	0.33
8,112.00	89.78	357.21	5,872.28	2,165.45	149.14	2,167.86	0.69
8,207.00	90.18	357.19	5,872.31	2,260.33	144.50	2,262.65	0.42
8,301.00	89.45	355.57	5,872.62	2,354.14	138.57	2,356.33	1.89
8,396.00	91.85	357.53	5,871.54	2,448.95	132.85	2,451.01	3.26
8,491.00	92.22	356.99	5,868.17	2,543.78	128.31	2,545.74	0.69
8,586.00	92.31	357.93	5,864.41	2,638.61	124.11	2,640.48	0.99
8,680.00	92.71	358.07	5,860.30	2,732.47	120.83	2,734.25	0.45
8,775.00	91.36	359.54	5,856.92	2,827.38	118.85	2,829.11	2.10
8,870.00	91.11	359.72	5,854.87	2,922.36	118.24	2,924.06	0.32
8,965.00	90.09	0.81	5,853.88	3,017.35	118.68	3,019.04	1.57
9,060.00	90.43	1.08	5,853.45	3,112.33	120.24	3,114.04	0.46
9,154.00	89.54	1.68	5,853.47	3,206.31	122.51	3,208.04	1.14

Design Report for Brecken LD28-734 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,249.00	89.35	1.76	5,854.39	3,301.26	125.36	3,303.03	0.22
9,344.00	89.41	1.56	5,855.42	3,396.21	128.11	3,398.02	0.22
9,439.00	89.51	1.58	5,856.32	3,491.17	130.71	3,493.01	0.11
9,533.00	88.74	1.78	5,857.75	3,585.12	133.47	3,586.99	0.85
9,628.00	88.18	0.13	5,860.31	3,680.07	135.05	3,681.95	1.83
9,723.00	89.11	359.66	5,862.55	3,775.04	134.88	3,776.91	1.10
9,817.00	89.45	358.41	5,863.73	3,869.02	133.29	3,870.84	1.38
9,912.00	90.43	358.06	5,863.83	3,963.97	130.37	3,965.72	1.10
10,006.00	90.34	357.90	5,863.20	4,057.91	127.05	4,059.58	0.20
10,101.00	91.48	357.30	5,861.69	4,152.81	123.08	4,154.39	1.36
10,196.00	91.60	357.75	5,859.14	4,247.69	118.98	4,249.18	0.49
10,386.00	92.10	358.40	5,853.01	4,437.48	112.60	4,438.81	0.43
10,502.00	93.36	359.49	5,847.48	4,553.33	110.46	4,554.60	1.44
Final Sperry MWD Survey at 10502.00ft							
10,569.00	93.36	359.49	5,843.55	4,620.21	109.87	4,621.46	0.00
Straight Line Projection to TD at 10569.00 - Brecken LD28-734_Rev A0_BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
89.42	89.42	-0.20	0.22	First Gyro Survey at 89.42ft
1,198.00	1,197.97	-0.06	6.88	First Sperry MWD Survey at 1198.00ft
10,502.00	5,847.48	4,553.33	110.46	Final Sperry MWD Survey at 10502.00ft
10,569.00	5,843.55	4,620.21	109.87	Straight Line Projection to TD at 10569.00

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Brecken LD28-734_Rev A0_BHL	1.07	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
89.42	816.00	Surface Surveys	Flexi-Shot
906.00	6,187.00	Intermediate Surveys	MWD
6,340.00	10,569.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,137.00	1,136.98	9 5/8"	9-5/8	13-3/4
6,234.00	5,863.43	7"	7	8-3/4

Design Report for Brecken LD28-734 - 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
Brecken LD28-734_Re	0.00	0.00	0.00	0.01	0.00	1,507,796.13	3,453,050.95	40.715830	-103.865600
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Brecken LD28-734_Re	0.00	0.00	5,851.00	4,622.13	86.67	1,512,418.20	3,453,137.62	40.728510	-103.864980
- actual wellpath misses target center by 24.44usft at 10569.00usft MD (5843.55 TVD, 4620.21 N, 109.87 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.65 °/100usft	Maximum Dogleg over Survey:	11.76 °/100usft at 5,694.00 usft
Net Tortosity applicable to Plans:	0.63 °/100usft	Directional Difficulty Index:	6.224

Audit Info

North Reference Sheet for Sec. 28-T9N-R58W (Greyson & Brecken PAD) - Brecken LD28-734 - 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' @ 4855.00usft (H&P 273). Northing and Easting are relative to Brecken LD28-734

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: 0.99998974

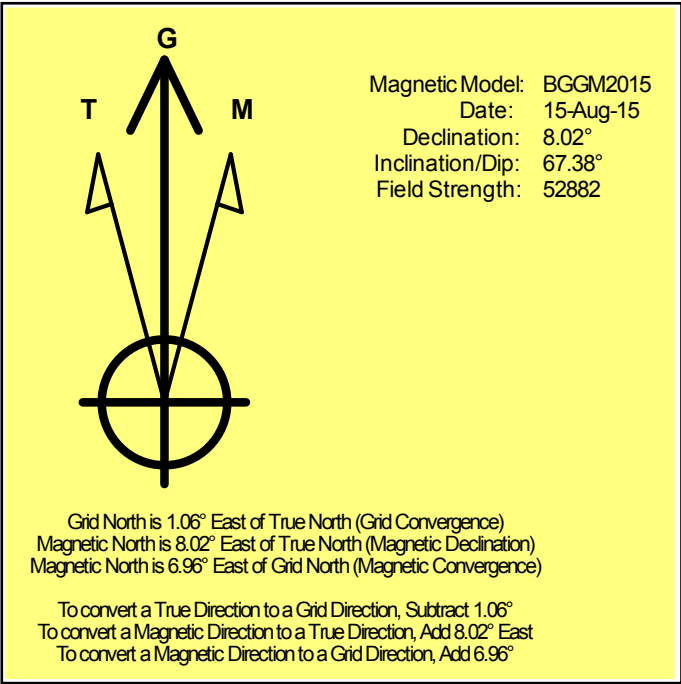
Grid Coordinates of Well: 1,507,796.12 usft N, 3,453,050.95 usft E

Geographical Coordinates of Well: 40° 42' 56.99" N, 103° 51' 56.16" W

Grid Convergence at Surface is: 1.06°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,569.00usft the Bottom Hole Displacement is 4,621.52usft in the Direction of 1.36° (Grid).

Magnetic Convergence at surface is: -6.96° (15 August 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

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

Brecken LD28-734

05-123-41565

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

23 September, 2015

Well Coordinates: 1,507,796.12 N, 3,453,050.95 E (40° 42' 56.99" N, 103° 51' 56.16" W)

Ground Level: 4,831.00 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 Brecken LD28-734

KB = 24' @ 4855.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Brecken LD28-734 - 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	40.715830	-103.865600	1,507,796.12	3,453,050.95
89.42	0.38	133.49	89.42	-0.20	0.22	40.715829	-103.865599	1,507,795.92	3,453,051.17
180.20	0.22	81.35	180.20	-0.39	0.61	40.715829	-103.865598	1,507,795.74	3,453,051.56
270.98	0.23	44.98	270.98	-0.23	0.91	40.715829	-103.865597	1,507,795.89	3,453,051.86
361.76	0.16	83.59	361.76	-0.09	1.16	40.715830	-103.865596	1,507,796.03	3,453,052.11
452.54	0.47	92.15	452.54	-0.09	1.66	40.715830	-103.865594	1,507,796.04	3,453,052.61
543.32	0.41	85.64	543.31	-0.08	2.36	40.715830	-103.865592	1,507,796.05	3,453,053.31
634.10	0.45	99.12	634.09	-0.11	3.03	40.715830	-103.865589	1,507,796.01	3,453,053.98
724.88	0.38	94.29	724.87	-0.19	3.68	40.715829	-103.865587	1,507,795.94	3,453,054.63
815.66	0.53	95.98	815.65	-0.25	4.40	40.715829	-103.865584	1,507,795.87	3,453,055.35
1,088.00	0.41	89.67	1,087.98	-0.38	6.63	40.715829	-103.865576	1,507,795.74	3,453,057.58
1,137.00	0.22	47.50	1,136.98	-0.31	6.87	40.715829	-103.865575	1,507,795.81	3,453,057.82
1,198.00	0.36	335.37	1,197.97	-0.06	6.88	40.715830	-103.865575	1,507,796.06	3,453,057.83
1,290.00	0.41	323.99	1,289.97	0.47	6.56	40.715831	-103.865577	1,507,796.59	3,453,057.51
1,381.00	0.48	328.23	1,380.97	1.05	6.17	40.715833	-103.865578	1,507,797.18	3,453,057.12
1,472.00	0.39	336.30	1,471.97	1.66	5.85	40.715834	-103.865579	1,507,797.78	3,453,056.80
1,564.00	0.25	345.84	1,563.97	2.14	5.67	40.715836	-103.865580	1,507,798.26	3,453,056.62
1,747.00	0.62	63.71	1,746.96	2.97	6.46	40.715838	-103.865577	1,507,799.09	3,453,057.41
1,838.00	2.75	177.01	1,837.93	1.01	7.02	40.715832	-103.865575	1,507,797.13	3,453,057.97
1,930.00	3.87	188.23	1,929.77	-4.27	6.69	40.715818	-103.865576	1,507,791.85	3,453,057.64
2,021.00	5.14	180.08	2,020.49	-11.39	6.24	40.715798	-103.865579	1,507,784.74	3,453,057.19
2,113.00	5.71	161.72	2,112.09	-19.85	7.67	40.715775	-103.865574	1,507,776.27	3,453,058.62
2,205.00	6.86	145.21	2,203.54	-28.71	12.24	40.715751	-103.865558	1,507,767.41	3,453,063.19
2,297.00	8.16	152.73	2,294.75	-39.03	18.37	40.715722	-103.865537	1,507,757.09	3,453,069.32
2,389.00	7.54	148.61	2,385.89	-49.99	24.51	40.715692	-103.865515	1,507,746.14	3,453,075.46
2,480.00	8.71	159.42	2,475.98	-61.53	30.04	40.715660	-103.865496	1,507,734.59	3,453,080.99
2,572.00	10.04	157.82	2,566.75	-75.48	35.51	40.715621	-103.865477	1,507,720.64	3,453,086.47
2,663.00	9.56	157.16	2,656.42	-89.79	41.44	40.715582	-103.865457	1,507,706.33	3,453,092.39
2,758.00	9.56	157.66	2,750.10	-104.36	47.50	40.715541	-103.865436	1,507,691.76	3,453,098.45
2,853.00	10.07	158.92	2,843.71	-119.41	53.49	40.715500	-103.865415	1,507,676.72	3,453,104.44
2,947.00	11.29	143.78	2,936.10	-134.50	61.88	40.715458	-103.865386	1,507,661.62	3,453,112.83
3,042.00	10.01	143.27	3,029.46	-148.62	72.32	40.715419	-103.865349	1,507,647.50	3,453,123.27
3,137.00	9.05	143.32	3,123.15	-161.23	81.72	40.715383	-103.865316	1,507,634.89	3,453,132.67
3,232.00	9.69	141.99	3,216.88	-173.52	91.10	40.715349	-103.865283	1,507,622.60	3,453,142.05
3,326.00	9.80	143.89	3,309.52	-186.22	100.69	40.715314	-103.865249	1,507,609.91	3,453,151.64
3,421.00	10.21	144.29	3,403.08	-199.59	110.37	40.715277	-103.865215	1,507,596.54	3,453,161.32
3,516.00	9.44	140.04	3,496.69	-212.39	120.29	40.715241	-103.865181	1,507,583.73	3,453,171.24
3,611.00	9.33	140.96	3,590.41	-224.35	130.14	40.715208	-103.865146	1,507,571.78	3,453,181.09
3,705.00	8.04	136.45	3,683.34	-235.03	139.47	40.715178	-103.865113	1,507,561.09	3,453,190.42
3,800.00	7.07	136.00	3,777.51	-244.05	148.11	40.715153	-103.865082	1,507,552.07	3,453,199.06
3,989.00	6.67	145.36	3,965.16	-261.45	162.43	40.715104	-103.865032	1,507,534.68	3,453,213.38
4,084.00	5.83	144.28	4,059.59	-269.91	168.38	40.715081	-103.865011	1,507,526.22	3,453,219.33

Design Report for Brecken LD28-734 - 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)
4,179.00	6.29	148.61	4,154.06	-278.27	173.91	40.715058	-103.864992	1,507,517.86	3,453,224.86
4,273.00	6.61	153.36	4,247.47	-287.50	179.02	40.715032	-103.864974	1,507,508.63	3,453,229.97
4,368.00	5.69	149.30	4,341.92	-296.43	183.87	40.715007	-103.864957	1,507,499.69	3,453,234.82
4,463.00	4.65	146.90	4,436.53	-303.71	188.38	40.714987	-103.864941	1,507,492.42	3,453,239.33
4,557.00	4.17	147.66	4,530.25	-309.79	192.29	40.714970	-103.864927	1,507,486.34	3,453,243.24
4,652.00	1.74	132.65	4,625.12	-313.69	195.20	40.714959	-103.864917	1,507,482.44	3,453,246.15
4,747.00	1.27	67.75	4,720.10	-314.26	197.23	40.714958	-103.864910	1,507,481.86	3,453,248.18
4,842.00	1.05	53.39	4,815.08	-313.35	198.91	40.714960	-103.864904	1,507,482.78	3,453,249.86
4,936.00	1.15	58.15	4,909.06	-312.33	200.40	40.714963	-103.864898	1,507,483.79	3,453,251.35
5,031.00	1.15	60.83	5,004.04	-311.37	202.04	40.714965	-103.864892	1,507,484.76	3,453,252.99
5,126.00	0.96	62.73	5,099.02	-310.54	203.58	40.714968	-103.864887	1,507,485.59	3,453,254.53
5,220.00	0.10	28.91	5,193.02	-310.10	204.32	40.714969	-103.864884	1,507,486.02	3,453,255.27
5,315.00	5.69	20.06	5,287.86	-305.61	205.98	40.714981	-103.864878	1,507,490.52	3,453,256.93
5,410.00	10.39	28.92	5,381.90	-293.68	211.74	40.715013	-103.864856	1,507,502.45	3,453,262.69
5,504.00	19.96	25.33	5,472.52	-271.70	222.73	40.715073	-103.864815	1,507,524.42	3,453,273.68
5,599.00	29.32	16.85	5,558.80	-234.69	236.44	40.715174	-103.864763	1,507,561.43	3,453,287.39
5,694.00	38.15	4.41	5,637.82	-183.01	245.47	40.715315	-103.864727	1,507,613.11	3,453,296.42
5,789.00	48.30	0.08	5,706.97	-118.11	247.78	40.715493	-103.864714	1,507,678.02	3,453,298.73
5,883.00	58.84	358.87	5,762.71	-42.59	247.04	40.715701	-103.864712	1,507,753.53	3,453,297.99
5,978.00	67.76	355.67	5,805.36	42.08	242.91	40.715933	-103.864721	1,507,838.20	3,453,293.85
6,073.00	73.81	353.71	5,836.62	131.35	234.58	40.716179	-103.864745	1,507,927.47	3,453,285.53
6,187.00	83.61	356.73	5,858.91	242.61	225.33	40.716484	-103.864771	1,508,038.73	3,453,276.28
6,234.00	85.37	357.19	5,863.43	289.33	222.85	40.716613	-103.864777	1,508,085.45	3,453,273.80
6,340.00	89.35	358.23	5,868.30	395.11	218.62	40.716903	-103.864785	1,508,191.23	3,453,269.57
6,432.00	89.94	357.99	5,868.87	487.06	215.59	40.717156	-103.864790	1,508,283.17	3,453,266.54
6,523.00	89.51	357.36	5,869.31	577.98	211.90	40.717405	-103.864798	1,508,374.09	3,453,262.85
6,615.00	89.11	356.77	5,870.42	669.85	207.19	40.717658	-103.864808	1,508,465.97	3,453,258.14
6,707.00	90.86	357.30	5,870.44	761.72	202.43	40.717910	-103.864820	1,508,557.84	3,453,253.38
6,799.00	91.20	357.27	5,868.79	853.61	198.07	40.718163	-103.864829	1,508,649.72	3,453,249.02
6,891.00	91.20	357.21	5,866.86	945.48	193.64	40.718415	-103.864839	1,508,741.59	3,453,244.59
6,982.00	91.33	358.49	5,864.85	1,036.39	190.23	40.718665	-103.864845	1,508,832.50	3,453,241.18
7,074.00	90.40	358.50	5,863.47	1,128.35	187.81	40.718917	-103.864848	1,508,924.46	3,453,238.76
7,165.00	90.49	358.28	5,862.76	1,219.31	185.26	40.719167	-103.864851	1,509,015.42	3,453,236.20
7,260.00	88.46	358.04	5,863.63	1,314.25	182.21	40.719428	-103.864856	1,509,110.36	3,453,233.15
7,354.00	88.15	357.82	5,866.41	1,408.15	178.81	40.719685	-103.864862	1,509,204.26	3,453,229.76
7,449.00	88.00	358.66	5,869.60	1,503.05	175.90	40.719946	-103.864866	1,509,299.15	3,453,226.85
7,543.00	89.60	358.57	5,871.57	1,597.00	173.62	40.720204	-103.864868	1,509,393.10	3,453,224.57
7,638.00	89.66	358.19	5,872.18	1,691.96	170.94	40.720465	-103.864871	1,509,488.06	3,453,221.89
7,733.00	89.82	357.49	5,872.61	1,786.89	167.36	40.720725	-103.864878	1,509,582.99	3,453,218.31
7,828.00	89.85	357.11	5,872.89	1,881.78	162.88	40.720986	-103.864888	1,509,677.88	3,453,213.83
7,922.00	90.12	357.27	5,872.91	1,975.67	158.28	40.721244	-103.864898	1,509,771.77	3,453,209.22
8,017.00	90.43	357.25	5,872.46	2,070.56	153.73	40.721504	-103.864908	1,509,866.66	3,453,204.68

Design Report for Brecken LD28-734 - 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)
8,112.00	89.78	357.21	5,872.28	2,165.45	149.14	40.721765	-103.864918	1,509,961.55	3,453,200.09
8,207.00	90.18	357.19	5,872.31	2,260.33	144.50	40.722026	-103.864929	1,510,056.43	3,453,195.45
8,301.00	89.45	355.57	5,872.62	2,354.14	138.57	40.722283	-103.864944	1,510,150.24	3,453,189.52
8,396.00	91.85	357.53	5,871.54	2,448.95	132.85	40.722544	-103.864958	1,510,245.05	3,453,183.80
8,491.00	92.22	356.99	5,868.17	2,543.78	128.31	40.722804	-103.864968	1,510,339.88	3,453,179.26
8,586.00	92.31	357.93	5,864.41	2,638.61	124.11	40.723065	-103.864977	1,510,434.71	3,453,175.06
8,680.00	92.71	358.07	5,860.30	2,732.47	120.83	40.723323	-103.864983	1,510,528.56	3,453,171.78
8,775.00	91.36	359.54	5,856.92	2,827.38	118.85	40.723583	-103.864984	1,510,623.47	3,453,169.80
8,870.00	91.11	359.72	5,854.87	2,922.36	118.24	40.723844	-103.864979	1,510,718.45	3,453,169.19
8,965.00	90.09	0.81	5,853.88	3,017.35	118.68	40.724105	-103.864972	1,510,813.44	3,453,169.62
9,060.00	90.43	1.08	5,853.45	3,112.33	120.24	40.724365	-103.864960	1,510,908.42	3,453,171.19
9,154.00	89.54	1.68	5,853.47	3,206.31	122.51	40.724623	-103.864945	1,511,002.39	3,453,173.46
9,249.00	89.35	1.76	5,854.39	3,301.26	125.36	40.724883	-103.864929	1,511,097.35	3,453,176.31
9,344.00	89.41	1.56	5,855.42	3,396.21	128.11	40.725144	-103.864912	1,511,192.30	3,453,179.06
9,439.00	89.51	1.58	5,856.32	3,491.17	130.71	40.725404	-103.864897	1,511,287.26	3,453,181.66
9,533.00	88.74	1.78	5,857.75	3,585.12	133.47	40.725662	-103.864880	1,511,381.21	3,453,184.42
9,628.00	88.18	0.13	5,860.31	3,680.07	135.05	40.725922	-103.864868	1,511,476.15	3,453,186.00
9,723.00	89.11	359.66	5,862.55	3,775.04	134.88	40.726183	-103.864863	1,511,571.13	3,453,185.83
9,817.00	89.45	358.41	5,863.73	3,869.02	133.29	40.726441	-103.864862	1,511,665.10	3,453,184.24
9,912.00	90.43	358.06	5,863.83	3,963.97	130.37	40.726702	-103.864866	1,511,760.05	3,453,181.32
10,006.00	90.34	357.90	5,863.20	4,057.91	127.05	40.726960	-103.864872	1,511,853.99	3,453,178.00
10,101.00	91.48	357.30	5,861.69	4,152.81	123.08	40.727220	-103.864880	1,511,948.89	3,453,174.03
10,196.00	91.60	357.75	5,859.14	4,247.69	118.98	40.727481	-103.864889	1,512,043.77	3,453,169.92
10,386.00	92.10	358.40	5,853.01	4,437.48	112.60	40.728002	-103.864899	1,512,233.56	3,453,163.55
10,502.00	93.36	359.49	5,847.48	4,553.33	110.46	40.728320	-103.864899	1,512,349.40	3,453,161.41
10,569.00	93.36	359.49	5,843.55	4,620.21	109.87	40.728504	-103.864897	1,512,416.29	3,453,160.82

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
89.42	89.42	-0.20	0.22	First Gyro Survey at 89.42ft
1,198.00	1,197.97	-0.06	6.88	First Sperry MWD Survey at 1198.00ft
10,502.00	5,847.48	4,553.33	110.46	Final Sperry MWD Survey at 10502.00ft
10,569.00	5,843.55	4,620.21	109.87	Straight Line Projection to TD at 10569.00

Design Report for Brecken LD28-734 - Actual Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Brecken LD28-734_Rev A0_BHL	1.07	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
89.42	816.00	Surface Surveys	Flexi-Shot
906.00	6,187.00	Intermediate Surveys	MWD
6,340.00	10,569.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,137.00	1,136.98	9 5/8"	9-5/8	13-3/4
6,234.00	5,863.43	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:	1.65 °/100usft	Maximum Dogleg over Survey:	11.76 °/100usft at 5,694.00 usft
Net Tortousity applicable to Plans:	0.63 °/100usft	Directional Difficulty Index:	6.224

Design Report for Brecken LD28-734 - Actual Surveys

Audit Info

North Reference Sheet for Sec. 28-T9N-R58W (Greyson & Brecken PAD) - Brecken LD28-734 - 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' @ 4855.00usft (H&P 273). Northing and Easting are relative to Brecken LD28-734

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: 0.99998974

Grid Coordinates of Well: 1,507,796.12 usft N, 3,453,050.95 usft E

Geographical Coordinates of Well: 40° 42' 56.99" N, 103° 51' 56.16" W

Grid Convergence at Surface is: 1.06°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,569.00usft

the Bottom Hole Displacement is 4,621.52usft in the Direction of 1.36° (Grid).

Magnetic Convergence at surface is: -6.96° (15 August 2015, , BGGM2015)

