

Noble Energy

Weld County, CO (NAD 83)
Sec. 10-T2N-R64W (Oscar PAD)
Oscar Y10-74-HN - A3
05-123-38205
Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Report

16 November, 2014

Surface UWI : 05-123-38205

Well Coordinates: 1,299,767.41 N, 3,269,644.38 E (40° 09' 08.03" N, 104° 32' 07.22" W)
Ground Level: 4,923.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Oscar Y10-74-HN - Slot A3

KB = 24' @ 4947.00usft (H&P 315)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 10-T2N-R64W (Oscar PAD)
 Well: Oscar Y10-74-HN
 Wellbore: Plan A
 Design: Actual Surveys



HALLIBURTON
 Sperry Drilling

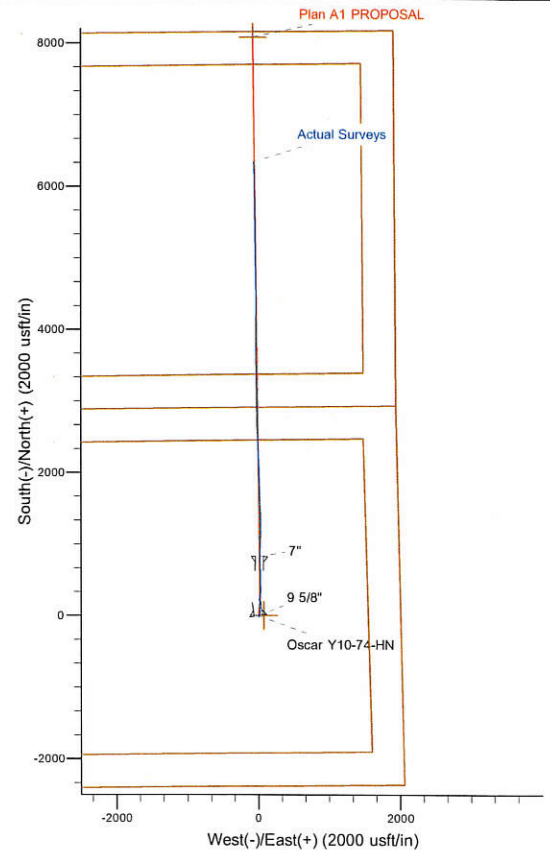
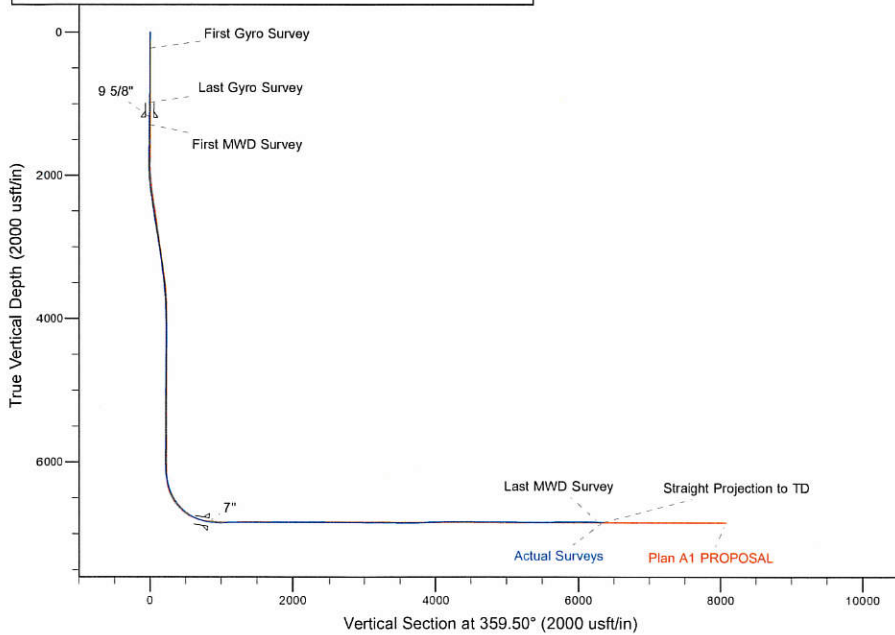
Platted SHL: 2380' FSL, 2023' FEL
 Platted Lat/Long: 40.15223 N, 104.53534 W
 Location: Sec. 10-T2N-R64W

~7" Casing: 3204' FSL, 1974' FEL
 Lat/Long: 40.154493 N, 104.535247 W
 State Planes - CO Northern: 1300592.01 N, 3269661.32 E
 Location: Sec. 10-T2N-R64W

Platted BHL: 75' FNL, 1980' FEL
 Lat/Long: 40.174420 N, 104.535280 W
 State Planes - CO Northern: 1307650.51 N, 3269573.21 E
 Location: Sec. 10-T2N-R64W

LEGEND

- Oscar Y10-74-HN, Plan A, Plan A1 PROPOSAL V0
- Actual Surveys



WELL DETAILS: Oscar Y10-74-HN

Ground Level: 4923.00

KB = 24' @ 4947.00usft (H&P 315)

Created By: Gordy Roth
 Created On: 11/16/2014

Design Report for Oscar Y10-74-HN - 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
225.00	0.30	266.71	225.00	-0.03	-0.59	-0.03	0.13
First Gyro Survey							
485.00	0.08	223.84	485.00	-0.20	-1.39	-0.19	0.10
733.00	0.60	215.20	732.99	-1.39	-2.26	-1.37	0.21
984.00	0.40	141.01	983.98	-3.14	-2.47	-3.12	0.25
Last Gyro Survey							
1,293.00	0.81	179.70	1,292.97	-6.17	-1.78	-6.15	0.18
First MWD Survey							
1,386.00	0.81	174.42	1,385.96	-7.48	-1.71	-7.46	0.08
1,478.00	0.81	174.09	1,477.95	-8.77	-1.58	-8.76	0.01
1,570.00	0.90	170.35	1,569.94	-10.13	-1.39	-10.12	0.12
1,663.00	1.07	162.38	1,662.93	-11.68	-1.01	-11.67	0.23
1,755.00	1.10	163.81	1,754.91	-13.35	-0.50	-13.34	0.04
1,847.00	2.22	89.32	1,846.88	-14.17	1.53	-14.19	2.39
1,938.00	3.06	55.90	1,937.79	-12.79	5.30	-12.84	1.89
2,031.00	4.06	36.23	2,030.61	-8.74	9.30	-8.82	1.68
2,123.00	6.11	12.63	2,122.25	-1.34	12.30	-1.44	3.14
2,216.00	7.89	8.81	2,214.55	9.80	14.36	9.67	1.98
2,309.00	8.39	1.76	2,306.62	22.89	15.54	22.75	1.20
2,402.00	8.87	2.24	2,398.57	36.84	16.03	36.70	0.52
2,495.00	9.10	5.42	2,490.43	51.32	17.01	51.17	0.59
2,589.00	8.78	355.76	2,583.29	65.88	17.18	65.73	1.63
2,681.00	8.75	356.50	2,674.21	79.87	16.23	79.72	0.13
2,773.00	8.40	1.27	2,765.19	93.57	15.96	93.43	0.86
2,865.00	9.20	359.46	2,856.10	107.64	16.04	107.50	0.92
2,960.00	9.39	357.34	2,949.86	122.98	15.60	122.84	0.41
3,055.00	9.26	1.86	3,043.60	138.36	15.49	138.22	0.78
3,150.00	8.57	358.56	3,137.45	153.07	15.56	152.93	0.90
3,245.00	8.59	5.91	3,231.39	167.21	16.12	167.06	1.15
3,340.00	7.28	3.50	3,325.48	180.27	17.21	180.11	1.42
3,435.00	6.38	359.91	3,419.81	191.56	17.57	191.40	1.05
3,530.00	5.33	352.04	3,514.31	201.21	16.95	201.05	1.39
3,624.00	4.52	344.44	3,607.97	209.10	15.35	208.96	1.10
3,719.00	3.46	347.82	3,702.73	215.51	13.75	215.38	1.14
3,814.00	2.44	339.98	3,797.61	220.21	12.45	220.09	1.15
3,909.00	1.94	329.32	3,892.54	223.49	10.94	223.39	0.68
4,004.00	1.60	298.75	3,987.49	225.52	8.95	225.43	1.04
4,099.00	1.46	320.55	4,082.46	227.09	7.02	227.02	0.63
4,194.00	0.52	347.25	4,177.45	228.44	6.16	228.38	1.08
4,289.00	0.95	259.97	4,272.44	228.73	5.29	228.67	1.12
4,383.00	0.99	113.01	4,366.44	228.27	5.27	228.22	1.98
4,478.00	0.92	132.89	4,461.42	227.43	6.58	227.37	0.35
4,573.00	0.50	162.08	4,556.42	226.52	7.27	226.45	0.57
4,668.00	0.88	179.25	4,651.41	225.40	7.40	225.32	0.45
4,763.00	0.34	139.69	4,746.40	224.45	7.60	224.38	0.69
4,858.00	0.31	188.49	4,841.40	223.98	7.74	223.91	0.28
4,953.00	0.72	190.54	4,936.40	223.14	7.59	223.07	0.43
5,048.00	0.91	172.35	5,031.39	221.81	7.58	221.73	0.34
5,143.00	0.84	159.49	5,126.38	220.41	7.93	220.33	0.22

Design Report for Oscar Y10-74-HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,238.00	0.61	143.92	5,221.37	219.35	8.47	219.26	0.32
5,333.00	0.74	95.65	5,316.36	218.88	9.38	218.79	0.59
5,428.00	0.98	96.54	5,411.35	218.72	10.80	218.62	0.25
5,522.00	0.98	103.79	5,505.34	218.44	12.38	218.32	0.13
5,617.00	0.83	95.38	5,600.33	218.18	13.85	218.05	0.21
5,712.00	0.85	85.36	5,695.32	218.18	15.24	218.03	0.16
5,807.00	0.37	46.44	5,790.31	218.44	16.16	218.29	0.64
5,902.00	0.20	11.82	5,885.31	218.82	16.42	218.66	0.25
5,997.00	0.36	351.81	5,980.31	219.27	16.41	219.12	0.19
6,091.00	0.47	317.90	6,074.31	219.85	16.11	219.70	0.28
6,234.00	7.76	355.06	6,216.85	229.92	14.88	229.78	5.17
6,281.00	12.19	1.78	6,263.13	238.05	14.76	237.91	9.73
6,329.00	14.95	8.92	6,309.79	249.23	15.88	249.08	6.72
6,376.00	18.01	7.19	6,354.85	262.43	17.73	262.27	6.59
6,424.00	22.24	8.90	6,399.91	278.78	20.07	278.59	8.90
6,471.00	26.62	10.53	6,442.69	297.93	23.37	297.71	9.43
6,519.00	27.87	5.29	6,485.37	319.67	26.37	319.43	5.63
6,566.00	32.02	2.20	6,526.09	343.07	27.86	342.82	9.42
6,661.00	40.68	357.22	6,602.55	399.29	27.32	399.03	9.62
6,709.00	44.81	356.72	6,637.79	431.81	25.60	431.57	8.63
6,756.00	48.01	358.04	6,670.19	465.81	24.05	465.58	7.11
6,804.00	51.58	359.22	6,701.18	502.46	23.19	502.23	7.67
6,850.00	56.42	358.90	6,728.21	539.65	22.57	539.43	10.54
6,898.00	61.52	358.62	6,752.94	580.76	21.68	580.55	10.64
6,945.00	65.52	358.82	6,773.89	622.81	20.74	622.60	8.52
7,040.00	71.51	357.88	6,808.67	711.13	18.18	710.94	6.37
7,102.00	76.63	359.37	6,825.68	770.71	16.76	770.53	8.58
7,232.00	86.55	3.18	6,844.68	899.10	19.67	898.89	8.16
7,353.00	91.85	1.43	6,846.37	1,019.94	24.54	1,019.68	4.61
7,448.00	92.43	1.67	6,842.82	1,114.84	27.10	1,114.56	0.66
7,543.00	89.91	359.86	6,840.88	1,209.80	28.37	1,209.50	3.27
7,638.00	90.12	0.03	6,840.86	1,304.80	28.28	1,304.50	0.28
7,733.00	90.03	358.60	6,840.73	1,399.79	27.14	1,399.49	1.51
7,826.00	89.57	357.39	6,841.06	1,492.73	23.89	1,492.46	1.39
7,920.00	89.75	357.84	6,841.62	1,586.65	19.98	1,586.41	0.52
8,013.00	90.34	358.26	6,841.54	1,679.59	16.81	1,679.38	0.78
8,106.00	90.40	358.58	6,840.94	1,772.55	14.25	1,772.36	0.35
8,198.00	89.97	357.98	6,840.65	1,864.51	11.49	1,864.34	0.80
8,291.00	90.40	357.59	6,840.35	1,957.44	7.90	1,957.29	0.62
8,384.00	90.28	357.72	6,839.79	2,050.36	4.09	2,050.25	0.19
8,476.00	90.65	357.23	6,839.05	2,142.27	0.04	2,142.18	0.67
8,567.00	89.97	357.95	6,838.55	2,233.18	-3.79	2,233.13	1.09
8,659.00	90.15	358.32	6,838.46	2,325.14	-6.78	2,325.11	0.45
8,751.00	89.82	357.48	6,838.48	2,417.07	-10.15	2,417.07	0.98
8,844.00	89.20	358.10	6,839.28	2,510.00	-13.74	2,510.02	0.94
8,936.00	89.91	357.31	6,839.99	2,601.92	-17.42	2,601.97	1.15
9,030.00	89.32	359.10	6,840.62	2,695.87	-20.37	2,695.94	2.00
9,123.00	89.29	359.20	6,841.75	2,788.85	-21.75	2,788.94	0.11
9,216.00	89.45	359.03	6,842.77	2,881.84	-23.19	2,881.93	0.25
9,309.00	89.41	358.74	6,843.70	2,974.81	-24.99	2,974.92	0.31
9,401.00	89.45	358.53	6,844.61	3,066.78	-27.19	3,066.90	0.23

Design Report for Oscar Y10-74-HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,493.00	90.25	359.33	6,844.86	3,158.76	-28.90	3,158.90	1.23
9,585.00	90.43	359.56	6,844.31	3,250.76	-29.80	3,250.89	0.32
9,680.00	91.08	0.00	6,843.06	3,345.75	-30.16	3,345.88	0.83
9,775.00	89.44	359.75	6,842.63	3,440.74	-30.37	3,440.88	1.75
9,870.00	88.49	359.44	6,844.34	3,535.73	-31.04	3,535.86	1.05
9,965.00	88.98	358.99	6,846.44	3,630.69	-32.34	3,630.84	0.70
10,059.00	90.28	359.21	6,847.05	3,724.68	-33.82	3,724.83	1.40
10,154.00	93.11	359.66	6,844.24	3,819.62	-34.75	3,819.78	3.02
10,249.00	93.21	0.13	6,839.00	3,914.48	-34.93	3,914.63	0.51
10,344.00	91.91	359.91	6,834.76	4,009.38	-34.89	4,009.53	1.39
10,439.00	90.49	0.70	6,832.77	4,104.35	-34.39	4,104.50	1.71
10,534.00	89.23	0.88	6,833.00	4,199.34	-33.08	4,199.47	1.34
10,628.00	90.22	0.85	6,833.45	4,293.33	-31.66	4,293.44	1.05
10,724.00	90.34	0.56	6,832.98	4,389.32	-30.48	4,389.42	0.33
10,818.00	89.81	0.12	6,832.86	4,483.32	-29.92	4,483.41	0.73
10,913.00	89.14	359.88	6,833.73	4,578.31	-29.92	4,578.40	0.75
11,008.00	89.04	359.65	6,835.24	4,673.30	-30.31	4,673.39	0.26
11,103.00	88.74	359.04	6,837.08	4,768.28	-31.40	4,768.37	0.72
11,198.00	90.31	358.42	6,837.87	4,863.25	-33.50	4,863.35	1.78
11,293.00	89.51	358.15	6,838.02	4,958.20	-36.34	4,958.33	0.89
11,388.00	88.58	358.97	6,839.60	5,053.16	-38.73	5,053.30	1.31
11,483.00	88.55	357.99	6,841.98	5,148.09	-41.25	5,148.26	1.03
11,577.00	89.01	358.71	6,843.98	5,242.03	-43.96	5,242.22	0.91
11,672.00	90.89	359.09	6,844.06	5,337.01	-45.78	5,337.21	2.02
11,767.00	90.96	359.68	6,842.53	5,431.99	-46.80	5,432.19	0.63
11,862.00	89.66	0.04	6,842.01	5,526.99	-47.03	5,527.19	1.42
11,957.00	90.18	358.63	6,842.15	5,621.98	-48.13	5,622.19	1.58
12,052.00	90.62	359.35	6,841.48	5,716.96	-49.81	5,717.18	0.89
12,147.00	91.45	0.16	6,839.77	5,811.94	-50.21	5,812.16	1.22
12,242.00	90.37	0.66	6,838.26	5,906.93	-49.53	5,907.13	1.25
12,337.00	90.06	359.75	6,837.90	6,001.92	-49.20	6,002.13	1.01
12,431.00	89.69	359.70	6,838.11	6,095.92	-49.65	6,096.12	0.40
12,526.00	89.04	357.09	6,839.16	6,190.87	-52.31	6,191.09	2.83
12,621.00	88.39	357.00	6,841.29	6,285.72	-57.20	6,285.98	0.69
Last MWD Survey							
12,678.00	88.39	357.00	6,842.89	6,342.62	-60.18	6,342.90	0.00
Straight Projection to TD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
225.00	225.00	-0.03	-0.59	First Gyro Survey
984.00	983.98	-3.14	-2.47	Last Gyro Survey
1,293.00	1,292.97	-6.17	-1.78	First MWD Survey
12,621.00	6,841.29	6,285.72	-57.20	Last MWD Survey
12,678.00	6,842.89	6,342.62	-60.18	Straight Projection to TD

Design Report for Oscar Y10-74-HN - Actual Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Oscar Y10-74-HN_BH	359.50	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
225.00	984.00	Surface Surveys	Flexi-Shot
1,293.00	7,102.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,232.00	12,678.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,189.00	1,188.98	9 5/8"	9-5/8	13-3/4
7,157.00	6,836.44	7"	7	8-3/4

Design Report for Oscar Y10-74-HN - 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
Oscar Y10-74-HN_SHI - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,299,767.41	3,269,644.38	40.152230	-104.535340
Waste 10-7K4 (Well N - actual wellpath misses target center by 1314.05usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Circle (radius 0.00)	0.00	0.00	1.00	1,274.24	321.03	1,301,041.59	3,269,965.40	40.155718	-104.534142
Oscar Y10-74-1HN_Se - actual wellpath misses target center by 75.48usft at 0.80usft MD (0.80 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	1.00	0.82	75.47	1,299,768.23	3,269,719.85	40.152230	-104.535070
Point 1				1.00	7,667.48	-2,948.46	1,307,435.39	3,266,771.51	
Point 2				1.00	7,720.73	1,373.68	1,307,488.64	3,271,093.47	
Point 3				1.00	3,394.94	1,406.01	1,303,163.03	3,271,125.80	
Point 4				1.00	3,337.59	-2,959.12	1,303,105.68	3,266,760.85	
Oscar Y10-74-1HN_Se - actual wellpath misses target center by 75.48usft at 0.80usft MD (0.80 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	1.00	0.82	75.47	1,299,768.23	3,269,719.85	40.152230	-104.535070
Point 1				1.00	8,127.50	-3,408.48	1,307,895.39	3,266,311.51	
Point 2				1.00	8,180.75	1,833.70	1,307,948.64	3,271,553.47	
Point 3				1.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80	
Point 4				1.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85	
Oscar Y10-74-1HN_Se - actual wellpath misses target center by 75.48usft at 0.80usft MD (0.80 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	1.00	0.82	75.47	1,299,768.23	3,269,719.85	40.152230	-104.535070
Point 1				1.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85	
Point 2				1.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80	
Point 3				1.00	-2,364.62	1,982.81	1,297,403.71	3,271,702.58	
Point 4				1.00	-2,407.43	-3,303.64	1,297,360.90	3,266,416.35	
Oscar Y10-74-1HN_Se - actual wellpath misses target center by 75.48usft at 0.80usft MD (0.80 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	1.00	0.82	75.47	1,299,768.23	3,269,719.85	40.152230	-104.535070
Point 1				1.00	2,417.55	-2,959.12	1,302,185.68	3,266,760.85	
Point 2				1.00	2,474.90	1,406.01	1,302,243.03	3,271,125.80	
Point 3				1.00	-1,904.60	1,522.79	1,297,863.71	3,271,242.58	
Point 4				1.00	-1,947.41	-2,843.62	1,297,820.90	3,266,876.35	
Oscar Y10-74-HN_BH - actual wellpath misses target center by 1740.86usft at 12678.00usft MD (6842.89 TVD, 6342.62 N, -60.18 E) - Point	0.00	0.00	6,845.17	8,083.44	-71.17	1,307,850.51	3,269,573.21	40.174420	-104.535280

Directional Difficulty Index

Average Dogleg over Survey:	1.50 °/100usft	Maximum Dogleg over Survey:	10.64 °/100usft at 6,898.00 usft
Net Tortousity applicable to Plans:	0.66 °/100usft	Directional Difficulty Index:	6.355

Audit Info

North Reference Sheet for Sec. 10-T2N-R64W (Oscar PAD) - Oscar Y10-74-HN - 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' @ 4947.00usft (H&P 315). Northing and Easting are relative to Oscar Y10-74-HN - Slot A3

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: 0.99995832

Grid Coordinates of Well: 1,299,767.41 usft N, 3,269,644.38 usft E

Geographical Coordinates of Well: 40° 09' 08.03" N, 104° 32' 07.22" W

Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,678.00usft the Bottom Hole Displacement is 6,342.91usft in the Direction of 359.46° (Grid).

Magnetic Convergence at surface is: -7.74° (4 November 2014, , BGGM2014)

