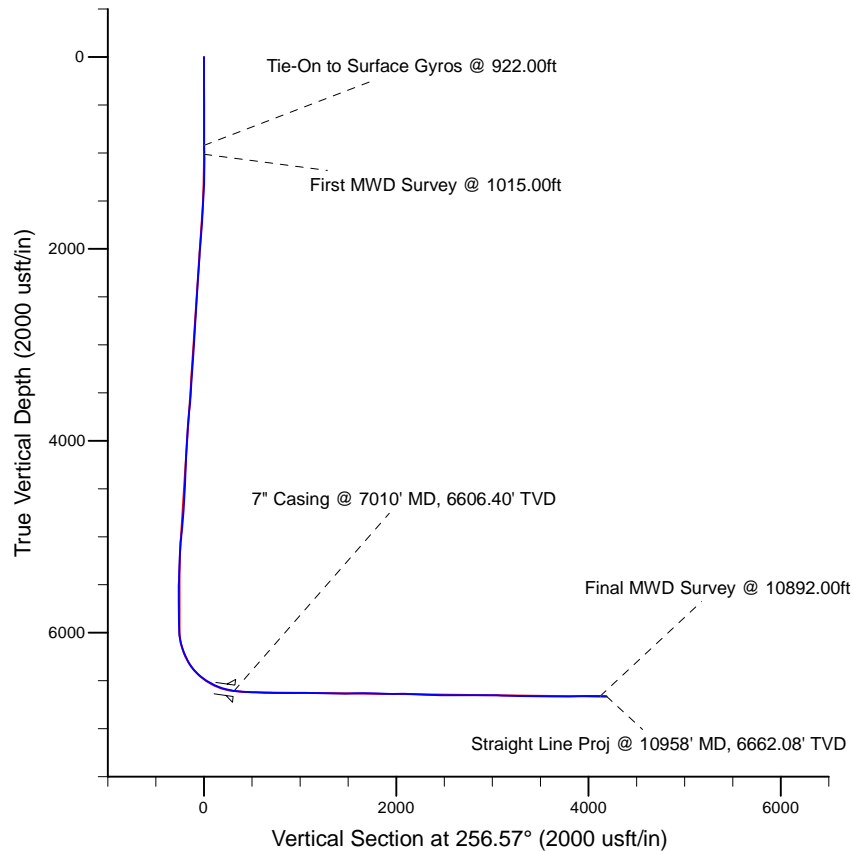
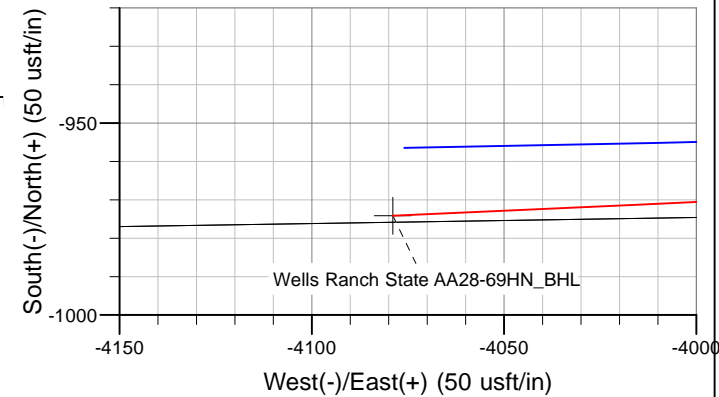
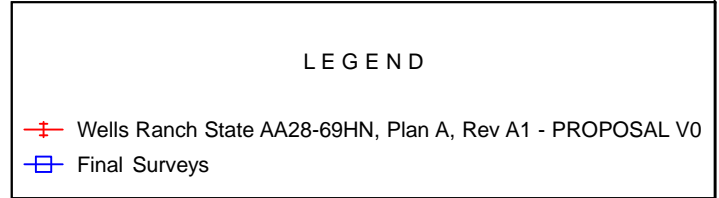
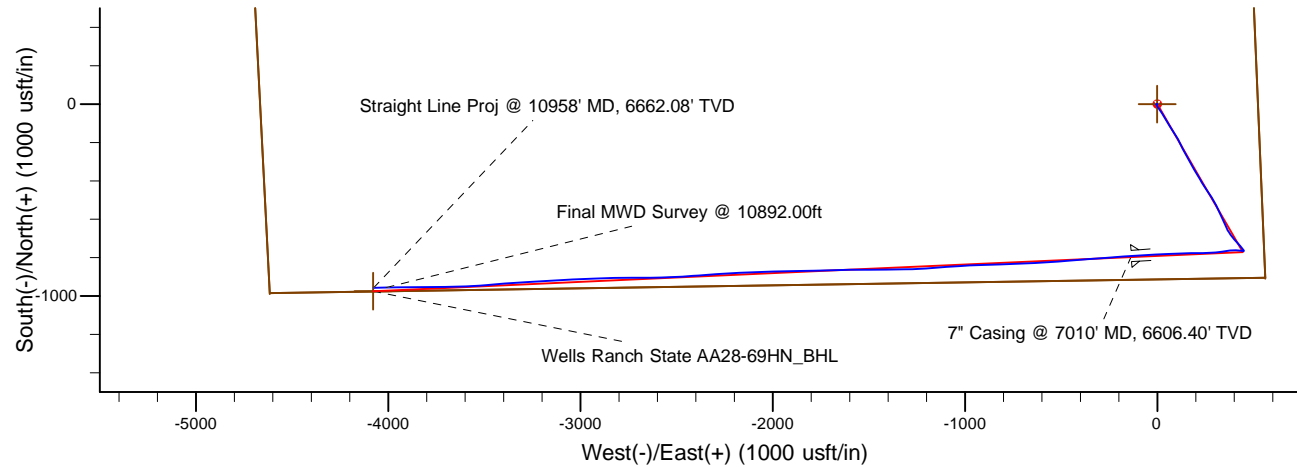


Project: Weld County, CO (NAD 83)
 Site: Sec. 21-T6N-R63W (Wells Ranch AA South 21)
 Well: Wells Ranch State AA28-69HN
 Wellbore: Plan A
 Design: Final Surveys

Noble Energy



Platted SHL:	913' FSL, 530' FEL
Platted Lat/Long:	40.46737° N, 104.43414° W
Location:	Sec. 21-T6N-R63W
7" Casing:	~123.54' FSL, ~690.76' FEL
Lat/Long:	40.465203 N, 104.434657 W
State Planes - CO Northern:	1,414,094.27' N, 3,296,416.69' E
Location:	Sec. 21-T6N-R63W
BHL:	~19.33 FSL, ~540.58' FWL
Lat/Long:	40.464879 N, 104.448829 W
State Planes - CO Northern:	1,413,929.13' N, 3,292,475.07' E
Location:	Sec. 21-T6N-R63W

WELL DETAILS: Wells Ranch State AA28-69HN	
Ground Level:	4731.00
RKB=24 @ 4755.00usft (H&P 322)	
Created By:	Fred Hartmann
Created On:	01/10/2014

Noble Energy

Weld County, CO (NAD 83)

Sec. 21-T6N-R63W (Wells Ranch AA South 21)

Wells Ranch State AA28-69HN

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

10 January, 2014

Surface UWI : 900918620 :: 05-123-38140

Well Coordinates: 1,414,885.52 N, 3,296,550.91 E (40° 28' 02.53" N, 104° 26' 02.90" W)

Ground Level: 4,731.00 usft

Local Coordinate Origin:

Centered on Well Wells Ranch State AA28-69HN

Viewing Datum:

RKB=24 @ 4755.00usft (H&P 322)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

Design Report for Wells Ranch State AA28-69HN - Final 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
242.00	0.50	251.29	242.00	-0.34	-1.00	1.05	0.21
487.00	0.40	294.39	486.99	-0.33	-2.79	2.79	0.14
756.00	0.20	274.49	755.99	0.10	-4.11	3.98	0.08
922.00	0.50	68.59	921.98	0.38	-3.73	3.54	0.41
Tie-On to Surface Gyros @ 922.00ft							
1,015.00	0.48	274.03	1,014.98	0.56	-3.74	3.51	1.03
First MWD Survey @ 1015.00ft							
1,108.00	0.38	281.99	1,107.98	0.65	-4.43	4.16	0.13
1,201.00	2.25	171.86	1,200.96	-1.09	-4.47	4.61	2.59
1,295.00	4.62	150.27	1,294.79	-6.21	-2.33	3.71	2.83
1,387.00	7.37	148.41	1,386.27	-14.45	2.59	0.83	3.00
1,480.00	9.02	145.60	1,478.32	-25.55	9.84	-3.63	1.83
1,575.00	11.55	146.49	1,571.79	-39.63	19.30	-9.57	2.67
1,670.00	13.07	149.11	1,664.60	-56.78	30.06	-16.05	1.70
1,765.00	12.95	146.97	1,757.16	-74.92	41.38	-22.85	0.52
1,860.00	13.49	148.73	1,849.65	-93.31	52.94	-29.81	0.71
1,955.00	13.62	150.57	1,942.00	-112.53	64.18	-36.29	0.47
2,050.00	11.59	148.39	2,034.71	-130.40	74.68	-42.35	2.19
2,144.00	12.82	146.55	2,126.58	-147.14	85.38	-48.87	1.37
2,239.00	13.30	147.50	2,219.12	-165.15	97.06	-56.04	0.55
2,334.00	12.91	150.67	2,311.65	-183.62	108.13	-62.52	0.86
2,429.00	12.21	153.68	2,404.38	-201.88	117.78	-67.67	1.01
2,524.00	13.32	154.59	2,497.03	-220.77	126.93	-72.18	1.19
2,619.00	13.49	150.33	2,589.44	-240.28	137.12	-77.55	1.05
2,714.00	13.80	154.31	2,681.76	-260.12	147.51	-83.06	1.04
2,809.00	13.51	150.60	2,774.08	-280.00	157.87	-88.51	0.97
2,904.00	14.65	151.31	2,866.22	-300.21	169.09	-94.73	1.21
2,999.00	13.79	150.41	2,958.31	-320.59	180.44	-101.04	0.93
3,093.00	12.38	148.91	3,049.87	-338.96	191.18	-107.22	1.54
3,189.00	13.21	149.08	3,143.48	-357.19	202.13	-113.63	0.87
3,283.00	11.61	148.34	3,235.28	-374.45	212.62	-119.82	1.71
3,378.00	11.41	150.77	3,328.37	-390.79	222.22	-125.37	0.55
3,473.00	11.43	150.87	3,421.49	-407.21	231.39	-130.48	0.03
3,568.00	12.11	147.33	3,514.50	-423.82	241.35	-136.31	1.04
3,663.00	14.54	146.46	3,606.93	-442.15	253.32	-143.69	2.57
3,757.00	15.99	145.86	3,697.61	-462.71	267.11	-152.33	1.55
3,852.00	15.76	149.21	3,788.99	-484.62	281.06	-160.80	0.99
3,947.00	15.32	147.74	3,880.52	-506.31	294.36	-168.70	0.62
4,041.00	12.92	153.60	3,971.68	-526.23	305.66	-175.07	2.97
4,136.00	12.76	153.35	4,064.30	-545.12	315.09	-179.85	0.18
4,231.00	12.23	153.72	4,157.05	-563.52	324.25	-184.49	0.56
4,326.00	12.18	160.16	4,249.91	-581.97	332.11	-187.84	1.43
4,421.00	11.95	157.83	4,342.81	-600.51	339.22	-190.46	0.57
4,516.00	13.30	152.80	4,435.51	-619.33	347.93	-194.55	1.83
4,611.00	12.66	154.78	4,528.09	-638.47	357.36	-199.28	0.82
4,706.00	12.91	151.40	4,620.73	-657.21	366.88	-204.18	0.83
4,801.00	12.00	146.53	4,713.50	-674.76	377.40	-210.34	1.46
4,895.00	11.26	141.51	4,805.57	-690.10	388.50	-217.58	1.33
4,990.00	11.86	138.52	4,898.64	-704.67	400.74	-226.10	0.89

Design Report for Wells Ranch State AA28-69HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,085.00	11.25	138.66	4,991.72	-718.94	413.33	-235.03	0.64
5,180.00	8.68	137.96	5,085.28	-731.23	424.25	-242.80	2.71
5,275.00	6.79	139.98	5,179.41	-740.85	432.67	-248.74	2.01
5,370.00	5.32	139.52	5,273.88	-748.50	439.14	-253.26	1.55
5,464.00	4.02	139.12	5,367.56	-754.31	444.12	-256.76	1.38
5,559.00	3.23	144.73	5,462.37	-759.01	447.85	-259.29	0.91
5,654.00	1.43	143.27	5,557.29	-762.15	450.10	-260.76	1.90
5,750.00	0.34	175.18	5,653.28	-763.39	450.84	-261.19	1.20
5,845.00	1.17	222.26	5,748.27	-764.39	450.21	-260.34	1.02
5,940.00	0.19	239.96	5,843.26	-765.19	449.43	-259.39	1.04
6,014.00	0.25	141.15	5,917.26	-765.38	449.42	-259.34	0.45
6,029.00	0.31	216.36	5,932.26	-765.43	449.42	-259.33	2.30
6,076.00	1.82	273.83	5,979.25	-765.49	448.60	-258.52	3.56
6,123.00	7.25	279.35	6,026.09	-764.95	444.92	-255.07	11.58
6,170.00	11.94	279.51	6,072.42	-763.67	437.20	-247.85	9.98
6,218.00	16.71	275.52	6,118.91	-762.18	425.42	-236.75	10.14
6,265.00	19.98	271.91	6,163.52	-761.27	410.67	-222.61	7.36
6,313.00	21.50	270.07	6,208.41	-760.98	393.68	-206.15	3.45
6,360.00	24.06	263.21	6,251.74	-762.10	375.54	-188.25	7.84
6,408.00	28.45	259.58	6,294.78	-765.33	354.57	-167.10	9.73
6,455.00	33.03	261.48	6,335.17	-769.26	330.88	-143.14	9.96
6,503.00	38.11	264.20	6,374.20	-772.69	303.19	-115.41	11.08
6,550.00	44.25	267.81	6,409.57	-774.79	272.34	-84.92	14.00
6,598.00	49.45	269.85	6,442.39	-775.48	237.34	-50.72	11.27
6,645.00	54.02	269.84	6,471.48	-775.58	200.45	-14.81	9.72
6,693.00	58.41	268.45	6,498.17	-776.18	160.57	24.12	9.46
6,740.00	60.64	268.23	6,522.01	-777.36	120.08	63.77	4.76
6,788.00	63.81	267.14	6,544.37	-779.08	77.65	105.44	6.90
6,835.00	68.59	266.67	6,563.33	-781.40	34.73	147.73	10.21
6,883.00	73.19	266.87	6,579.04	-783.96	-10.55	192.36	9.59
7,010.00	81.91	266.36	6,606.40	-791.28	-134.22	314.35	6.87
7" Casing @ 7010' MD, 6606.40' TVD							
7,051.00	84.72	266.20	6,611.17	-793.92	-174.85	354.48	6.87
7,145.00	86.06	265.93	6,618.73	-800.35	-268.32	446.89	1.45
7,240.00	88.43	265.11	6,623.30	-807.77	-362.92	540.62	2.64
7,335.00	88.09	265.54	6,626.18	-815.51	-457.56	634.47	0.58
7,430.00	89.57	266.48	6,628.12	-822.11	-552.30	728.16	1.85
7,525.00	89.94	266.49	6,628.53	-827.94	-647.12	821.74	0.39
7,620.00	89.69	268.06	6,628.83	-832.45	-742.01	915.08	1.67
7,715.00	90.28	268.59	6,628.86	-835.23	-836.97	1,008.09	0.83
7,809.00	90.12	267.66	6,628.53	-838.31	-930.92	1,100.18	1.00
7,904.00	88.52	266.50	6,629.66	-843.15	-1,025.78	1,193.58	2.08
7,999.00	88.67	265.41	6,631.99	-849.85	-1,120.52	1,287.27	1.16
8,094.00	88.73	266.03	6,634.14	-856.93	-1,215.23	1,381.04	0.66
8,189.00	90.90	269.26	6,634.45	-860.84	-1,310.13	1,474.25	4.10
8,283.00	91.51	269.73	6,632.47	-861.66	-1,404.10	1,565.85	0.82
8,378.00	90.28	269.76	6,630.99	-862.09	-1,499.09	1,658.34	1.30
8,473.00	87.47	269.18	6,632.85	-862.97	-1,594.06	1,750.91	3.02
8,567.00	88.27	268.24	6,636.35	-865.08	-1,687.97	1,842.74	1.31
8,663.00	90.46	268.30	6,637.41	-867.98	-1,783.91	1,936.74	2.28
8,757.00	90.34	269.27	6,636.75	-869.97	-1,877.89	2,028.60	1.04

Design Report for Wells Ranch State AA28-69HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,852.00	88.09	268.70	6,638.06	-871.65	-1,972.86	2,121.37	2.44
8,947.00	87.10	268.20	6,642.04	-874.22	-2,067.74	2,214.25	1.17
9,042.00	87.25	266.86	6,646.72	-878.31	-2,162.53	2,307.40	1.42
9,137.00	88.18	266.44	6,650.51	-883.86	-2,257.29	2,400.86	1.07
9,232.00	89.11	265.62	6,652.76	-890.43	-2,352.04	2,494.54	1.30
9,327.00	91.02	267.00	6,652.65	-896.55	-2,446.83	2,588.16	2.48
9,421.00	89.41	266.87	6,652.30	-901.57	-2,540.69	2,680.62	1.72
9,516.00	90.00	270.08	6,652.79	-904.10	-2,635.65	2,773.56	3.44
9,611.00	89.32	269.24	6,653.35	-904.66	-2,730.64	2,866.09	1.14
9,706.00	90.19	269.38	6,653.76	-905.81	-2,825.63	2,958.75	0.93
9,801.00	89.54	267.53	6,653.98	-908.37	-2,920.59	3,051.71	2.06
9,896.00	87.69	267.81	6,656.28	-912.23	-3,015.48	3,144.90	1.97
9,990.00	87.78	267.03	6,659.99	-916.46	-3,109.31	3,237.15	0.83
10,085.00	88.58	265.83	6,663.01	-922.37	-3,204.08	3,330.69	1.52
10,180.00	91.14	266.52	6,663.24	-928.71	-3,298.86	3,424.35	2.79
10,275.00	88.89	266.04	6,663.22	-934.87	-3,393.65	3,517.98	2.42
10,370.00	88.65	264.84	6,665.26	-942.42	-3,488.33	3,611.82	1.29
10,465.00	90.92	267.37	6,665.61	-948.87	-3,583.09	3,705.50	3.58
10,560.00	90.92	269.25	6,664.09	-951.67	-3,678.04	3,798.49	1.98
10,655.00	90.22	269.52	6,663.14	-952.69	-3,773.02	3,891.12	0.79
10,750.00	91.23	269.85	6,661.94	-953.22	-3,868.01	3,983.63	1.12
10,845.00	89.57	268.96	6,661.28	-954.20	-3,963.00	4,076.25	1.98
10,892.00	89.60	268.85	6,661.62	-955.10	-4,009.99	4,122.17	0.24
Final MWD Survey @ 10892.00ft							
10,958.00	89.60	268.85	6,662.08	-956.43	-4,075.98	4,186.65	0.00
Straight Line Proj @ 10958' MD, 6662.08' TVD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
922.00	921.98	0.38	-3.73	Tie-On to Surface Gyros @ 922.00ft
1,015.00	1,014.98	0.56	-3.74	First MWD Survey @ 1015.00ft
10,892.00	6,661.62	-955.10	-4,009.99	Final MWD Survey @ 10892.00ft
10,958.00	6,662.08	-956.43	-4,075.98	Straight Line Proj @ 10958' MD, 6662.08' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch State AA28-69HN_BHL	256.57	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
242.00	922.00	Surface Gyros	Flexi-Shot
1,015.00	6,883.00	MWD Surveys - Vert/Build	MWD
7,051.00	10,892.00	MWD Surveys - Lateral	MWD

Design Report for Wells Ranch State AA28-69HN - Final Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,010.00	6,606.40	7" Casing @ 7010' MD, 6606.40' TVD	7	8-3/4

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
Wells Ranch State AA28-69HN - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,414,885.52	3,296,550.91	40.467370	-104.434140
Point 1				0.00	3,879.37	-4,424.72	1,418,764.75	3,292,126.34	
Point 2				0.00	-524.09	-4,155.86	1,414,361.45	3,292,395.20	
Point 3				0.00	-444.07	101.84	1,414,441.47	3,296,652.74	
Point 4				0.00	3,901.65	-117.38	1,418,787.03	3,296,433.53	
Point 5				0.00	3,879.37	-4,424.72	1,418,764.75	3,292,126.34	
Wells Ranch State AA28-69HN - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,414,885.52	3,296,550.91	40.467370	-104.434140
Point 1				0.00	4,339.38	-4,884.74	1,419,224.75	3,291,666.34	
Point 2				0.00	-984.11	-4,615.87	1,413,901.45	3,291,935.20	
Point 3				0.00	-904.09	561.85	1,413,981.47	3,297,112.74	
Point 4				0.00	4,361.66	342.64	1,419,247.03	3,296,893.53	
Point 5				0.00	4,339.38	-4,884.74	1,419,224.75	3,291,666.34	
Wells Ranch State AA28-69HN - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,414,885.52	3,296,550.91	40.467370	-104.434140
Wells Ranch State AA28-69HN - actual wellpath misses target center by 18.60usft at 10958.00usft MD (6662.08 TVD, -956.43 N, -4075.98 E) - Point	0.00	0.00	6,667.06	-974.11	-4,078.92	1,413,911.45	3,292,472.13	40.464830	-104.448840

Directional Difficulty Index

Average Dogleg over Survey:	2.00 °/100usft	Maximum Dogleg over Survey:	14.00 °/100usft at 6,550.00 usft
Net Tortousity applicable to Plans:	0.94 °/100usft	Directional Difficulty Index:	6.292

Audit Info

North Reference Sheet for Sec. 21-T6N-R63W (Wells Ranch AA South 21) - Wells Ranch State AA28-69HN

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 @ 4755.00usft (H&P 322). Northing and Easting are relative to Wells Ranch State AA28-69HN

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: 0.99996398

Grid Coordinates of Well: 1,414,885.52 usft N, 3,296,550.91 usft E

Geographical Coordinates of Well: 40° 28' 02.53" N, 104° 26' 02.90" W

Grid Convergence at Surface is: 0.69°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,958.00usft the Bottom Hole Displacement is 4,186.69usft in the Direction of 256.79° (Grid).

Magnetic Convergence at surface is: -7.69° (1 January 2014, , BGGM2013)

