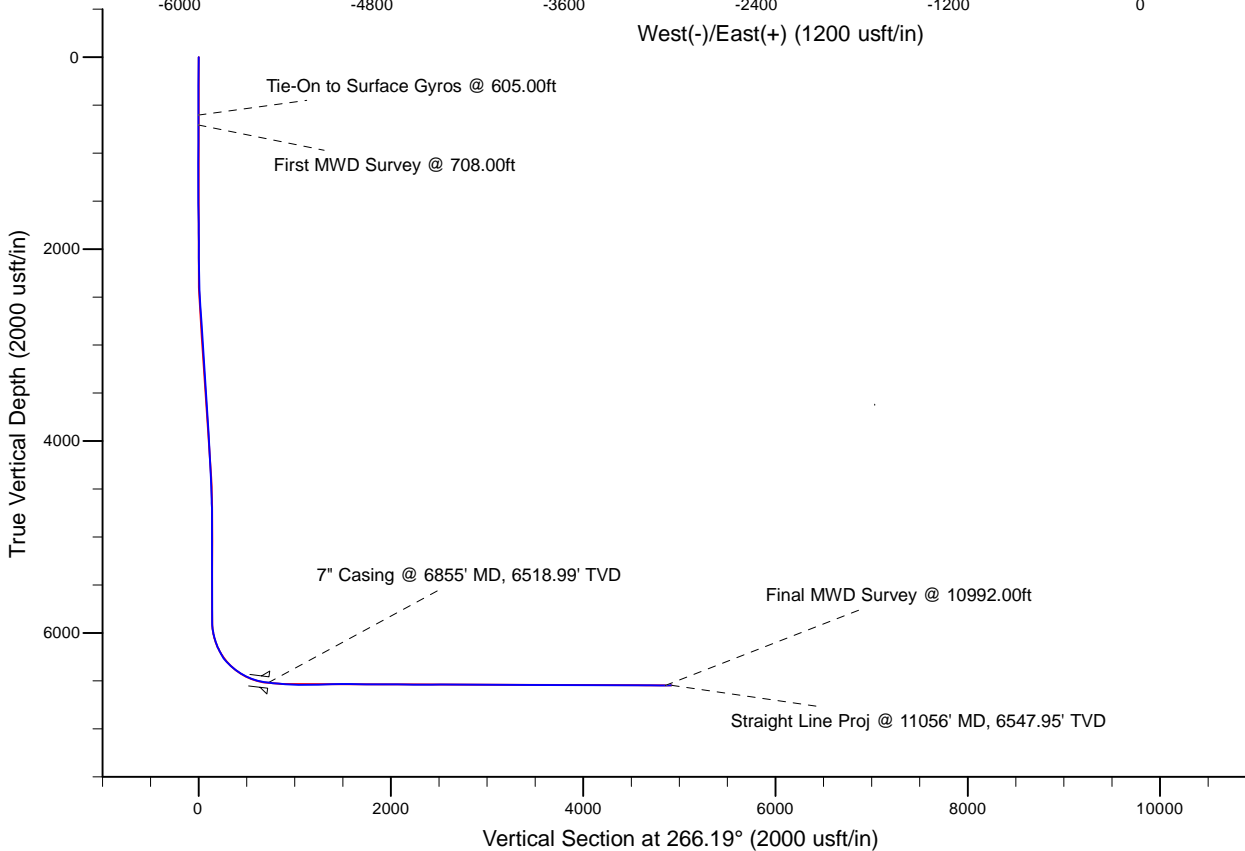
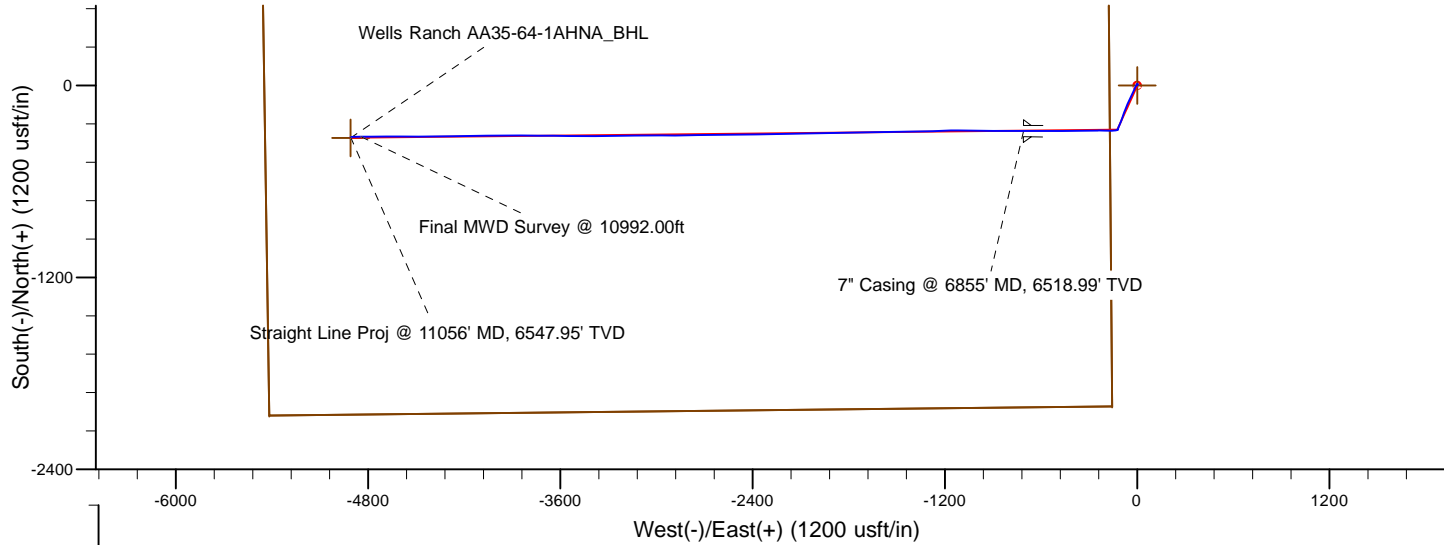


Project: Weld County, CO (NAD 83)
 Site: Sec. 36-T6N-R63W (Wells Ranch AA35)
 Well: Wells Ranch AA35-64-1AHNA
 Wellbore: Plan B
 Design: Final Surveys

Noble Energy



LEGEND

- Wells Ranch AA35-64-1AHNA, Plan B, Rev B0 - PROPOSAL V0
- Final Surveys

Platted SHL: 2004' FSL, 174' FWL
 Platted Lat/Long: 40.44112 N, 103.39410 W
 Location: Sec. 36-T6N-R63W

7" Casing: ~1726.48' FSL, ~539.67' FEL
 Lat/Long: 40.440361 N, 104.396663 W
 State Planes - CO Northern: 1,405,174.54' N, 3,307,099.97' E
 Location: Sec. 35-T6N-R63W

BHL: ~1737.28' FSL, ~533.66' FWL
 Lat/Long: 40.440407 N, 104.411749 W
 State Planes - CO Northern: 1,405,139.27' N, 3,302,900.90' E
 Location: Sec. 35-T6N-R63W

WELL DETAILS: Wells Ranch AA35-64-1AHNA	
Ground Level:	4773.00
RKB=24 @ 4797.00usft (H&P 343)	

Created By:	Fred Hartmann
Created On:	03/03/2014

Noble Energy

Weld County, CO (NAD 83)

Sec. 36-T6N-R63W (Wells Ranch AA35)

Wells Ranch AA35-64-1AHNA

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

03 March, 2014

Well Coordinates: 1,405,459.78 N, 3,307,809.80 E (40° 26' 28.03" N, 104° 23' 38.76" W)

Ground Level: 4,773.00 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 Wells Ranch AA35-64-1AHNA

RKB=24 @ 4797.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Wells Ranch AA35-64-1AHNA - 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
301.00	0.80	4.23	300.99	2.10	0.15	-0.29	0.27
605.00	1.00	8.43	604.95	6.84	0.70	-1.15	0.07
Tie-On to Surface Gyros @ 605.00ft							
708.00	0.34	36.63	707.95	7.97	1.01	-1.54	0.70
First MWD Survey @ 708.00ft							
802.00	0.31	27.49	801.94	8.42	1.30	-1.85	0.06
895.00	0.26	357.68	894.94	8.85	1.41	-1.99	0.17
988.00	0.28	9.65	987.94	9.29	1.44	-2.05	0.06
1,082.00	0.17	42.96	1,081.94	9.62	1.57	-2.20	0.18
1,173.00	0.34	15.12	1,172.94	9.98	1.73	-2.39	0.23
1,267.00	0.31	12.93	1,266.94	10.49	1.86	-2.55	0.03
1,360.00	0.28	7.82	1,359.94	10.96	1.95	-2.67	0.04
1,453.00	0.96	219.00	1,452.93	10.58	1.49	-2.19	1.30
1,548.00	1.09	210.05	1,547.92	9.18	0.54	-1.14	0.22
1,643.00	1.13	210.83	1,642.90	7.60	-0.40	-0.11	0.05
1,738.00	0.64	218.63	1,737.89	6.38	-1.21	0.78	0.53
1,833.00	0.53	228.77	1,832.88	5.67	-1.87	1.49	0.16
1,928.00	0.37	242.63	1,927.88	5.24	-2.47	2.12	0.20
2,023.00	0.26	319.45	2,022.88	5.27	-2.89	2.53	0.42
2,118.00	0.58	320.18	2,117.88	5.80	-3.33	2.94	0.34
2,213.00	1.44	216.30	2,212.87	5.21	-4.35	3.99	1.76
2,307.00	3.13	209.12	2,306.79	2.01	-6.30	6.15	1.82
2,402.00	4.65	206.36	2,401.57	-3.70	-9.27	9.49	1.61
2,497.00	6.07	202.31	2,496.15	-11.80	-12.89	13.64	1.55
2,592.00	6.93	202.22	2,590.54	-21.75	-16.96	18.37	0.91
2,687.00	8.28	205.83	2,684.70	-33.22	-22.11	24.26	1.51
2,782.00	7.49	204.77	2,778.80	-45.00	-27.68	30.61	0.85
2,877.00	8.40	206.62	2,872.89	-56.82	-33.39	37.08	0.99
2,971.00	8.10	206.31	2,965.92	-68.90	-39.40	43.89	0.32
3,066.00	7.17	204.64	3,060.07	-80.29	-44.84	50.07	1.01
3,160.00	7.91	202.56	3,153.26	-91.59	-49.76	55.73	0.84
3,254.00	8.52	204.26	3,246.30	-103.91	-55.11	61.88	0.70
3,349.00	6.83	205.18	3,340.44	-115.44	-60.40	67.93	1.78
3,443.00	8.32	202.59	3,433.62	-126.78	-65.39	73.67	1.63
3,536.00	8.41	200.69	3,525.63	-139.35	-70.38	79.48	0.31
3,631.00	8.50	200.44	3,619.60	-152.43	-75.29	85.24	0.10
3,725.00	8.69	201.03	3,712.54	-165.57	-80.26	91.08	0.22
3,819.00	9.08	199.99	3,805.41	-179.17	-85.34	97.05	0.45
3,914.00	9.16	199.35	3,899.21	-193.35	-90.41	103.05	0.14
4,008.00	7.77	200.45	3,992.19	-206.36	-95.11	108.60	1.49
4,103.00	7.36	201.99	4,086.36	-218.02	-99.63	113.89	0.48
4,197.00	6.56	199.45	4,179.67	-228.67	-103.68	118.63	0.91
4,292.00	6.29	202.65	4,274.07	-238.59	-107.49	123.09	0.47
4,387.00	5.59	202.92	4,368.56	-247.65	-111.29	127.49	0.74
4,482.00	5.35	205.38	4,463.13	-255.91	-114.99	131.73	0.35
4,577.00	4.03	200.98	4,557.81	-263.03	-118.09	135.29	1.44
4,671.00	2.68	198.28	4,651.64	-268.20	-119.96	137.50	1.45
4,766.00	1.55	182.82	4,746.58	-271.60	-120.72	138.49	1.32
4,861.00	0.50	179.98	4,841.56	-273.29	-120.78	138.66	1.11



Design Report for Wells Ranch AA35-64-1AHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,955.00	0.25	208.24	4,935.56	-273.89	-120.88	138.80	0.32
5,050.00	0.43	150.53	5,030.56	-274.38	-120.80	138.75	0.38
5,145.00	0.43	214.75	5,125.55	-274.98	-120.83	138.82	0.48
5,240.00	0.41	234.08	5,220.55	-275.47	-121.31	139.33	0.15
5,335.00	0.38	269.39	5,315.55	-275.68	-121.90	139.93	0.25
5,525.00	0.39	227.17	5,505.55	-276.12	-123.00	141.07	0.15
5,619.00	0.10	284.91	5,599.55	-276.32	-123.32	141.39	0.37
5,714.00	0.11	323.92	5,694.55	-276.22	-123.45	141.52	0.07
5,791.00	0.32	133.51	5,771.54	-276.31	-123.34	141.41	0.56
5,903.00	0.52	168.65	5,883.54	-277.03	-123.01	141.13	0.28
5,951.00	4.87	256.94	5,931.48	-277.70	-124.95	143.12	10.17
5,997.00	9.27	259.37	5,977.12	-278.83	-130.50	148.73	9.59
6,045.00	13.26	261.11	6,024.19	-280.39	-139.74	158.05	8.34
6,091.00	16.71	263.92	6,068.62	-281.91	-151.53	169.92	7.66
6,139.00	20.52	268.99	6,114.10	-282.79	-166.81	185.22	8.62
6,186.00	24.88	274.29	6,157.45	-282.19	-184.92	203.25	10.24
6,281.00	29.64	270.02	6,241.89	-280.69	-228.37	246.50	5.41
6,329.00	38.08	268.95	6,281.71	-280.95	-255.09	273.18	17.63
6,376.00	45.77	268.54	6,316.65	-281.65	-286.46	304.53	16.37
6,424.00	49.42	268.81	6,349.02	-282.47	-321.89	339.93	7.62
6,471.00	52.81	269.73	6,378.52	-282.93	-358.46	376.46	7.37
6,519.00	54.62	269.83	6,406.92	-283.07	-397.15	415.07	3.77
6,566.00	59.25	270.16	6,432.56	-283.08	-436.53	454.36	9.87
6,614.00	63.63	270.52	6,455.50	-282.82	-478.68	496.40	9.15
6,661.00	68.79	269.56	6,474.46	-282.80	-521.67	539.30	11.14
6,709.00	72.49	268.88	6,490.36	-283.42	-566.94	584.51	7.82
6,755.00	76.75	268.66	6,502.56	-284.37	-611.27	628.81	9.27
6,812.00	81.71	269.67	6,513.21	-285.18	-667.25	684.71	8.87
6,855.00	82.85	270.17	6,518.99	-285.24	-709.86	727.23	2.88
7" Casing @ 6855' MD, 6518.99' TVD							
6,960.00	85.62	271.39	6,529.54	-283.81	-814.30	831.35	2.88
7,053.00	85.87	271.28	6,536.44	-281.65	-907.02	923.72	0.29
7,147.00	88.21	269.97	6,541.29	-280.63	-1,000.88	1,017.31	2.85
7,239.00	89.63	270.50	6,543.03	-280.25	-1,092.86	1,109.06	1.65
7,333.00	92.50	268.16	6,541.28	-281.35	-1,186.82	1,202.88	3.94
7,424.00	91.39	267.94	6,538.19	-284.45	-1,277.72	1,293.78	1.24
7,518.00	91.29	268.26	6,535.99	-287.56	-1,371.64	1,387.71	0.36
7,612.00	91.26	269.19	6,533.90	-289.65	-1,465.59	1,481.59	0.99
7,705.00	89.88	268.93	6,532.98	-291.18	-1,558.57	1,574.47	1.51
7,800.00	88.64	269.24	6,534.20	-292.70	-1,653.55	1,669.33	1.35
7,894.00	89.08	269.41	6,536.07	-293.80	-1,747.52	1,763.18	0.50
7,989.00	89.42	268.82	6,537.32	-295.27	-1,842.50	1,858.04	0.72
8,084.00	89.63	269.49	6,538.10	-296.67	-1,937.49	1,952.91	0.74
8,179.00	90.58	269.52	6,537.93	-297.49	-2,032.48	2,047.75	1.00
8,274.00	88.71	268.17	6,538.52	-299.41	-2,127.46	2,142.64	2.43
8,369.00	89.23	268.15	6,540.23	-302.46	-2,222.39	2,237.57	0.55
8,463.00	90.09	269.24	6,540.78	-304.60	-2,316.36	2,331.48	1.48
8,558.00	90.43	268.20	6,540.35	-306.72	-2,411.34	2,426.38	1.15
8,653.00	90.03	270.08	6,539.97	-308.14	-2,506.32	2,521.25	2.02
8,748.00	90.74	269.71	6,539.33	-308.32	-2,601.32	2,616.05	0.84
8,842.00	89.78	269.78	6,538.91	-308.74	-2,695.32	2,709.87	1.02

Design Report for Wells Ranch AA35-64-1AHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,937.00	90.12	268.24	6,538.99	-310.38	-2,790.30	2,804.75	1.66
9,032.00	90.19	269.66	6,538.73	-312.12	-2,885.28	2,899.64	1.50
9,127.00	89.20	269.89	6,539.24	-312.49	-2,980.28	2,994.45	1.07
9,222.00	90.03	270.11	6,539.88	-312.49	-3,075.27	3,089.24	0.90
9,316.00	88.34	269.46	6,541.21	-312.84	-3,169.26	3,183.04	1.93
9,411.00	88.80	269.38	6,543.59	-313.81	-3,264.22	3,277.86	0.49
9,506.00	89.01	268.54	6,545.40	-315.53	-3,359.19	3,372.73	0.91
9,600.00	90.93	270.45	6,545.45	-316.36	-3,453.18	3,466.56	2.88
9,695.00	90.12	270.87	6,544.58	-315.26	-3,548.17	3,561.27	0.96
9,790.00	89.82	270.37	6,544.63	-314.24	-3,643.16	3,655.99	0.61
9,885.00	90.19	270.31	6,544.62	-313.67	-3,738.16	3,750.74	0.39
9,980.00	90.00	270.37	6,544.46	-313.11	-3,833.16	3,845.49	0.21
10,075.00	90.00	270.20	6,544.46	-312.64	-3,928.16	3,940.25	0.18
10,171.00	89.85	269.50	6,544.59	-312.89	-4,024.16	4,036.05	0.75
10,265.00	89.63	268.94	6,545.02	-314.17	-4,118.15	4,129.92	0.64
10,360.00	89.88	268.83	6,545.42	-316.02	-4,213.13	4,224.81	0.29
10,454.00	90.56	269.57	6,545.06	-317.33	-4,307.12	4,318.68	1.07
10,549.00	89.04	269.33	6,545.39	-318.24	-4,402.11	4,413.52	1.62
10,644.00	89.32	269.92	6,546.75	-318.86	-4,497.10	4,508.34	0.69
10,739.00	90.12	270.02	6,547.22	-318.91	-4,592.09	4,603.13	0.85
10,834.00	89.45	269.82	6,547.57	-319.04	-4,687.09	4,697.93	0.74
10,928.00	89.91	269.62	6,548.10	-319.50	-4,781.09	4,791.75	0.53
10,992.00	90.12	269.52	6,548.08	-319.98	-4,845.09	4,855.64	0.36
Final MWD Survey @ 10992.00ft							
11,056.00	90.12	269.52	6,547.95	-320.52	-4,909.08	4,919.53	0.00
Straight Line Proj @ 11056' MD, 6547.95' TVD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
605.00	604.95	6.84	0.70	Tie-On to Surface Gyros @ 605.00ft
708.00	707.95	7.97	1.01	First MWD Survey @ 708.00ft
10,992.00	6,548.08	-319.98	-4,845.09	Final MWD Survey @ 10992.00ft
11,056.00	6,547.95	-320.52	-4,909.08	Straight Line Proj @ 11056' MD, 6547.95' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Wells Ranch AA35-64-1AHNA_BHL	266.19	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
301.00	605.00	Surface Gyros	Flexi-Shot
708.00	6,960.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
7,053.00	10,992.00	MWD Surveys - Production	MWD+IFR1+MS_WY

Design Report for Wells Ranch AA35-64-1AHNA - Final Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,855.00	6,518.99	7" Casing @ 6855' MD, 6518.99' 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 AA35-64- - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,405,459.78	3,307,809.80	40.441120	-104.394100
Wells Ranch AA35-64- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,405,459.78	3,307,809.80	40.441120	-104.394100
Point 1				0.00	3,254.86	-5,495.98	1,408,714.52	3,302,314.03	
Point 2				0.00	-2,063.55	-5,416.91	1,403,396.31	3,302,393.10	
Point 3				0.00	-2,005.83	-155.94	1,403,454.03	3,307,653.87	
Point 4				0.00	3,287.52	-199.65	1,408,747.18	3,307,610.16	
Point 5				0.00	3,254.86	-5,495.98	1,408,714.52	3,302,314.03	
Wells Ranch AA35-64- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,405,459.78	3,307,809.80	40.441120	-104.394100
Point 1				0.00	2,794.85	-5,035.96	1,408,254.52	3,302,774.03	
Point 2				0.00	-1,603.53	-4,956.89	1,403,856.31	3,302,853.10	
Point 3				0.00	-1,545.81	-615.96	1,403,914.03	3,307,193.87	
Point 4				0.00	2,827.51	-659.67	1,408,287.18	3,307,150.16	
Point 5				0.00	2,794.85	-5,035.96	1,408,254.52	3,302,774.03	
Wells Ranch AA35-64- - actual wellpath misses target center by 6.23usft at 11056.00usft MD (6547.95 TVD, -320.52 N, -4909.08 E) - Point	0.00	0.00	6,547.17	-326.70	-4,909.27	1,405,133.09	3,302,900.72	40.440390	-104.411750

Directional Difficulty Index

Average Dogleg over Survey:	1.52 °/100usft	Maximum Dogleg over Survey:	17.63 °/100usft at 6,329.00 usft
Net Tortousity applicable to Plans:	0.56 °/100usft	Directional Difficulty Index:	6.161

Audit Info

North Reference Sheet for Sec. 36-T6N-R63W (Wells Ranch AA35) - Wells Ranch AA35-64-1AHNA -

Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB=24 @ 4797.00usft (H&P 343). Northing and Easting are relative to Wells Ranch AA35-64-1AHNA

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: 0.99996235

Grid Coordinates of Well: 1,405,459.78 usft N, 3,307,809.80 usft E

Geographical Coordinates of Well: 40° 26' 28.03" N, 104° 23' 38.76" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,056.00usft the Bottom Hole Displacement is 4,919.54usft in the Direction of 266.26° (Grid).

Magnetic Convergence at surface is: -7.63° (20 February 2014, , BGGM2013)

Magnetic Model: BGGM2013
 Date: 20-Feb-14
 Declination: 8.34°
 Inclination/Dip: 67.04°
 Field Strength: 52829

Grid North is 0.71° East of True North (Grid Convergence)
 Magnetic North is 8.34° East of True North (Magnetic Declination)
 Magnetic North is 7.63° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 0.71°
 To convert a Magnetic Direction to a True Direction, Add 8.34° East
 To convert a Magnetic Direction to a Grid Direction, Add 7.63°