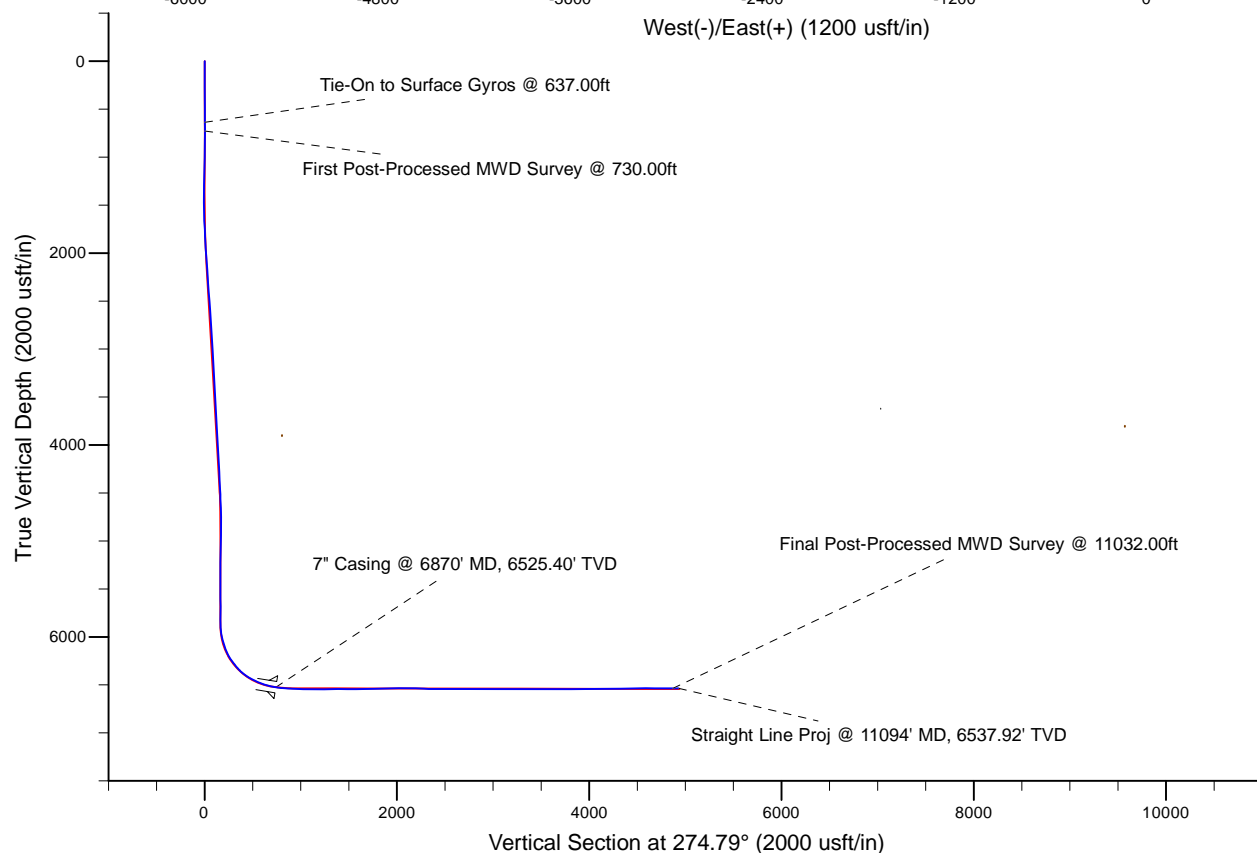
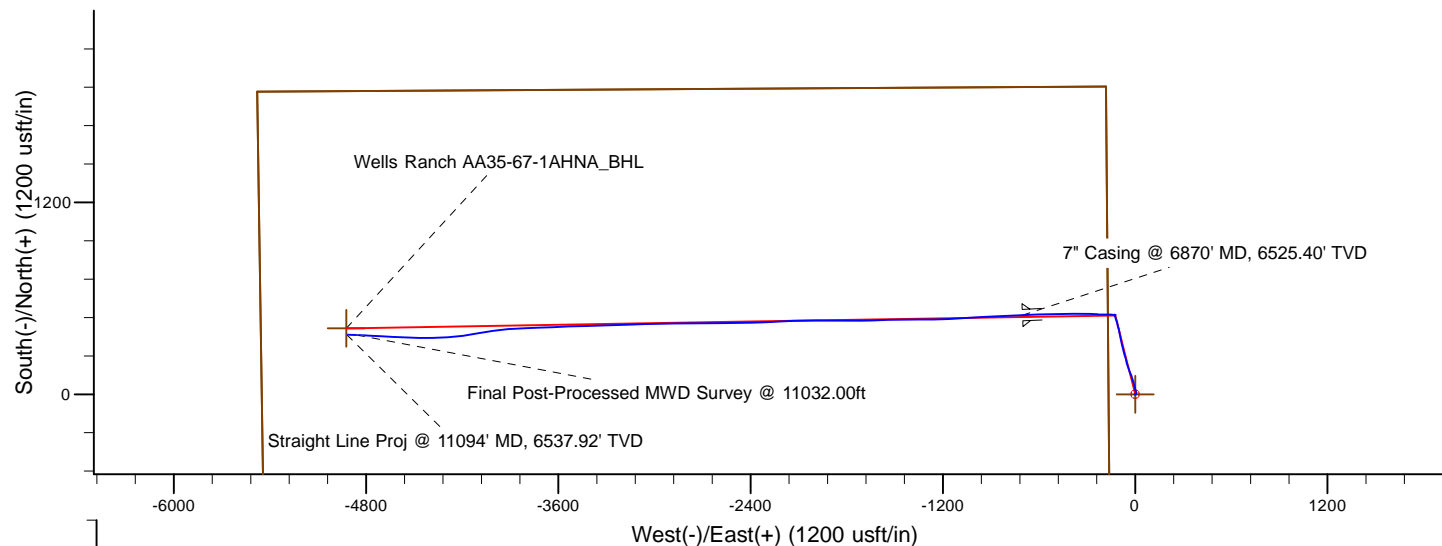


Project: Weld County, CO (NAD 83)
Site: Sec. 36-T6N-R63W (Wells Ranch AA35)
Well: Wells Ranch AA35-67-1AHNA
Wellbore: Plan B
Design: Final Surveys

Noble Energy

HALLIBURTON
Sperry Drilling



LEGEND

- Wells Ranch AA35-67-1AHNA, Plan B, Rev B1 - PROPOSAL V0
- Final Surveys

Platted SHL: 1929' FNL, 168' FWL
Platted Lat/Long: 40.44486 N, 104.39410 W
Location: Sec. 36-T6N-R63W

7" Casing: ~1427.45' FNL, ~532.67' FEL
Lat/Long: 40.446241 N, 104.396606 W
State Planes - CO Northern: 1,407,316.49' N, 3,307,089.29' E
Location: Sec. 35-T6N-R63W

BHL: ~1522.46' FNL, ~536.36' FWL
Lat/Long: 40.446052 N, 104.411759 W
State Planes - CO Northern: 1,407,195.48' N, 3,302,873.03' E
Location: Sec. 35-T6N-R63W

WELL DETAILS: Wells Ranch AA35-67-1AHNA

Ground Level: 4790.00
RKB=24 @ 4814.00usft (H&P 322)

Created By: Fred Hartmann
Created On: 03/04/2014

Noble Energy

Weld County, CO (NAD 83)

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

Wells Ranch AA35-67-1AHNA

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

04 March, 2014

Well Coordinates: 1,406,822.15 N, 3,307,792.81 E (40° 26' 41.50" N, 104° 23' 38.76" W)

Ground Level: 4,790.00 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 AA35-67-1AHNA

RKB=24 @ 4814.00usft (H&P 322)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Wells Ranch AA35-67-1AHNA - 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
265.00	0.50	256.33	265.00	-0.27	-1.12	1.10	0.19
490.00	0.40	288.03	489.99	-0.26	-2.82	2.79	0.12
637.00	0.60	250.33	636.98	-0.36	-4.04	3.99	0.25
Tie-On to Surface Gyros @ 637.00ft							
730.00	0.49	101.97	729.98	-0.61	-4.11	4.04	1.13
First Post-Processed MWD Survey @ 730.00ft							
823.00	0.55	78.68	822.98	-0.60	-3.28	3.22	0.23
916.00	0.94	54.61	915.97	-0.07	-2.22	2.21	0.53
1,009.00	1.31	55.06	1,008.95	0.98	-0.73	0.81	0.40
1,102.00	1.20	68.70	1,101.93	1.94	1.05	-0.89	0.34
1,195.00	1.18	64.47	1,194.91	2.71	2.82	-2.59	0.10
1,287.00	1.18	72.63	1,286.89	3.40	4.58	-4.28	0.18
1,381.00	1.19	78.50	1,380.87	3.88	6.46	-6.12	0.13
1,474.00	2.22	2.18	1,473.84	5.87	7.48	-6.96	2.43
1,570.00	4.24	346.72	1,569.68	11.19	6.73	-5.77	2.27
1,665.00	6.29	339.50	1,664.28	19.48	4.10	-2.46	2.26
1,759.00	7.58	342.68	1,757.59	30.22	0.45	2.07	1.43
1,854.00	9.20	345.49	1,851.57	43.56	-3.31	6.94	1.76
1,949.00	10.38	347.99	1,945.18	59.28	-7.00	11.93	1.32
2,043.00	10.74	341.81	2,037.60	75.88	-11.49	17.79	1.26
2,138.00	9.55	340.37	2,131.11	91.72	-16.91	24.51	1.28
2,233.00	10.36	342.72	2,224.68	107.30	-22.09	30.98	0.95
2,328.00	9.27	341.32	2,318.29	122.70	-27.08	37.23	1.17
2,422.00	9.41	338.61	2,411.04	137.03	-32.31	43.64	0.49
2,517.00	9.87	337.19	2,504.70	151.77	-38.29	50.84	0.55
2,612.00	10.62	338.40	2,598.18	167.41	-44.67	58.50	0.82
2,707.00	10.66	345.81	2,691.55	184.07	-50.05	65.25	1.44
2,802.00	9.07	344.56	2,785.15	199.81	-54.20	70.70	1.69
2,896.00	9.19	350.18	2,877.96	214.34	-57.45	75.16	0.96
2,991.00	10.26	343.81	2,971.59	229.95	-61.10	80.10	1.60
3,086.00	9.24	341.83	3,065.22	245.32	-65.84	86.10	1.13
3,181.00	9.98	342.28	3,158.89	260.41	-70.73	92.23	0.78
3,276.00	9.54	347.63	3,252.51	275.94	-74.92	97.71	1.06
3,371.00	8.98	346.56	3,346.28	290.84	-78.33	102.35	0.62
3,465.00	9.78	348.96	3,439.02	305.81	-81.56	106.82	0.95
3,560.00	8.86	346.94	3,532.76	320.86	-84.76	111.27	1.03
3,655.00	11.06	346.44	3,626.33	336.84	-88.55	116.38	2.32
3,750.00	12.57	347.97	3,719.31	355.81	-92.84	122.24	1.62
3,844.00	11.83	351.25	3,811.19	375.34	-96.44	127.46	1.08
3,939.00	10.88	346.97	3,904.33	393.70	-99.94	132.48	1.34
4,034.00	10.06	346.48	3,997.75	410.50	-103.90	137.83	0.87
4,129.00	9.50	346.05	4,091.37	426.18	-107.73	142.96	0.59
4,224.00	8.60	344.16	4,185.18	440.62	-111.56	147.98	1.00
4,319.00	7.44	343.08	4,279.25	453.34	-115.29	152.76	1.23
4,414.00	6.88	340.93	4,373.51	464.60	-118.94	157.34	0.65
4,509.00	6.60	339.68	4,467.85	475.10	-122.70	161.95	0.33
4,604.00	4.89	345.81	4,562.37	484.15	-125.58	165.59	1.91
4,699.00	4.16	329.95	4,657.08	491.05	-128.30	168.87	1.52
4,793.00	2.35	341.25	4,750.93	495.83	-130.63	171.59	2.03

Design Report for Wells Ranch AA35-67-1AHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,888.00	0.54	125.20	4,845.90	497.42	-130.89	171.98	2.95
4,983.00	1.15	86.32	4,940.89	497.22	-129.57	170.65	0.85
5,077.00	1.09	103.06	5,034.88	497.08	-127.76	168.84	0.35
5,173.00	1.00	98.96	5,130.86	496.74	-126.04	167.10	0.12
5,268.00	0.59	123.73	5,225.85	496.34	-124.82	165.84	0.55
5,362.00	0.07	85.39	5,319.85	496.08	-124.36	165.36	0.57
5,457.00	0.14	244.92	5,414.85	496.03	-124.41	165.41	0.22
5,553.00	0.10	205.11	5,510.85	495.91	-124.55	165.54	0.09
5,647.00	0.19	237.56	5,604.85	495.75	-124.71	165.69	0.13
5,742.00	0.22	213.36	5,699.85	495.51	-124.95	165.90	0.10
5,814.00	0.14	224.89	5,771.85	495.34	-125.08	166.02	0.12
5,875.00	0.14	151.85	5,832.85	495.22	-125.10	166.03	0.27
5,925.00	0.44	241.41	5,882.85	495.07	-125.24	166.16	0.92
5,972.00	5.10	281.53	5,929.78	495.40	-127.45	168.39	10.15
6,020.00	10.96	277.37	5,977.29	496.42	-134.07	175.07	12.26
6,067.00	14.10	278.30	6,023.16	497.82	-144.17	185.25	6.69
6,115.00	17.00	274.31	6,069.40	499.19	-156.95	198.10	6.44
6,162.00	19.28	268.22	6,114.07	499.46	-171.56	212.69	6.30
6,210.00	23.84	267.44	6,158.70	498.78	-189.18	230.19	9.52
6,257.00	29.40	270.61	6,200.70	498.48	-210.23	251.13	12.21
6,305.00	34.48	274.34	6,241.43	499.64	-235.57	276.49	11.35
6,352.00	38.21	274.39	6,279.28	501.76	-263.34	304.34	7.94
6,400.00	40.07	271.33	6,316.51	503.25	-293.60	334.61	5.59
6,447.00	44.68	269.29	6,351.22	503.40	-325.26	366.17	10.23
6,495.00	51.55	268.78	6,383.25	502.79	-360.97	401.71	14.33
6,542.00	57.86	268.69	6,410.39	501.94	-399.30	439.83	13.43
6,589.00	60.77	271.77	6,434.38	502.12	-439.71	480.12	8.37
6,636.00	63.41	271.35	6,456.38	503.25	-481.22	521.58	5.67
6,684.00	67.14	268.56	6,476.45	503.20	-524.81	565.01	9.39
6,731.00	71.35	266.58	6,493.10	501.32	-568.71	608.60	9.78
6,779.00	75.20	267.13	6,506.92	498.80	-614.60	654.12	8.10
6,823.00	78.34	267.01	6,516.98	496.61	-657.37	696.55	7.14
6,870.00	81.02	267.38	6,525.40	494.35	-703.55	742.38	5.75
7" Casing @ 6870' MD, 6525.40' TVD							
6,954.00	85.81	268.02	6,535.03	491.00	-786.90	825.17	5.75
7,049.00	87.41	266.96	6,540.65	486.85	-881.64	919.23	2.02
7,143.00	87.38	266.93	6,544.92	481.84	-975.41	1,012.25	0.05
7,238.00	90.43	265.78	6,546.74	475.81	-1,070.19	1,106.19	3.43
7,333.00	90.22	267.25	6,546.20	470.03	-1,165.01	1,200.20	1.56
7,427.00	91.60	270.35	6,544.71	468.06	-1,258.96	1,293.66	3.61
7,522.00	89.54	269.07	6,543.76	467.58	-1,353.95	1,388.28	2.55
7,617.00	89.60	270.39	6,544.47	467.14	-1,448.94	1,482.90	1.39
7,712.00	89.14	267.82	6,545.52	465.65	-1,543.92	1,577.42	2.75
7,807.00	91.17	268.21	6,545.26	462.36	-1,638.85	1,671.75	2.18
7,902.00	92.62	269.10	6,542.12	460.13	-1,733.77	1,766.15	1.79
7,997.00	92.90	270.48	6,537.55	459.78	-1,828.66	1,860.68	1.48
8,091.00	90.31	271.29	6,534.91	461.24	-1,922.60	1,954.41	2.89
8,186.00	90.34	269.57	6,534.37	461.95	-2,017.59	2,049.13	1.81
8,281.00	87.50	267.86	6,536.17	459.82	-2,112.54	2,143.57	3.49
8,376.00	87.56	267.07	6,540.26	455.62	-2,207.36	2,237.70	0.83
8,470.00	89.45	267.19	6,542.71	450.92	-2,301.20	2,330.83	2.01

Design Report for Wells Ranch AA35-67-1AHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,566.00	90.80	269.13	6,542.50	447.83	-2,397.15	2,426.18	2.46
8,661.00	89.57	268.94	6,542.20	446.23	-2,492.13	2,520.70	1.31
8,756.00	90.00	270.08	6,542.55	445.42	-2,587.13	2,615.29	1.28
8,851.00	88.27	269.00	6,543.99	444.66	-2,682.11	2,709.88	2.15
8,946.00	89.94	269.24	6,545.47	443.20	-2,777.08	2,804.40	1.78
9,041.00	91.08	269.61	6,544.62	442.25	-2,872.07	2,898.98	1.26
9,136.00	89.38	268.77	6,544.24	440.91	-2,967.06	2,993.52	2.00
9,230.00	89.69	268.26	6,545.01	438.47	-3,061.02	3,086.95	0.63
9,325.00	90.22	268.30	6,545.08	435.62	-3,155.98	3,181.34	0.56
9,420.00	89.54	267.99	6,545.28	432.54	-3,250.93	3,275.70	0.79
9,515.00	91.11	268.42	6,544.74	429.57	-3,345.88	3,370.07	1.71
9,610.00	90.80	268.79	6,543.16	427.25	-3,440.83	3,464.50	0.51
9,704.00	89.51	267.80	6,542.90	424.46	-3,534.79	3,557.89	1.73
9,799.00	89.47	266.96	6,543.75	420.12	-3,629.69	3,652.09	0.89
9,894.00	89.48	267.67	6,544.62	415.67	-3,724.58	3,746.28	0.75
9,989.00	90.25	268.36	6,544.84	412.37	-3,819.52	3,840.62	1.09
10,084.00	89.82	265.53	6,544.79	407.31	-3,914.37	3,934.72	3.01
10,179.00	90.00	262.08	6,544.93	397.06	-4,008.80	4,027.96	3.64
10,273.00	90.06	259.14	6,544.89	381.73	-4,101.53	4,119.09	3.13
10,368.00	91.33	261.95	6,543.73	366.12	-4,195.23	4,211.15	3.25
10,463.00	92.41	265.98	6,540.63	356.14	-4,289.63	4,304.38	4.39
10,558.00	90.65	269.28	6,538.09	352.22	-4,384.50	4,398.59	3.94
10,653.00	91.11	271.38	6,536.63	352.76	-4,479.48	4,493.29	2.26
10,748.00	89.72	272.86	6,535.95	356.28	-4,574.40	4,588.18	2.14
10,843.00	89.04	273.40	6,536.97	361.47	-4,669.26	4,683.13	0.91
10,937.00	90.37	272.01	6,537.46	365.90	-4,763.15	4,777.06	2.05
11,032.00	89.60	273.02	6,537.48	370.07	-4,858.05	4,871.99	1.34
Final Post-Processed MWD Survey @ 11032.00ft							
11,094.00	89.60	273.02	6,537.92	373.34	-4,919.97	4,933.96	0.00
Straight Line Proj @ 11094' MD, 6537.92' TVD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
637.00	636.98	-0.36	-4.04	Tie-On to Surface Gyros @ 637.00ft
730.00	729.98	-0.61	-4.11	First Post-Processed MWD Survey @ 730.00ft
11,032.00	6,537.48	370.07	-4,858.05	Final Post-Processed MWD Survey @ 11032.00ft
11,094.00	6,537.92	373.34	-4,919.97	Straight Line Proj @ 11094' MD, 6537.92' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch AA35-67-1AHNA_BHL	274.79	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
265.00	637.00	Surface Gyros	Flexi-Shot

Design Report for Wells Ranch AA35-67-1AHNA - Final Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
730.00	6,823.00	post-processed MWD - Intermediate	MWD+IFR1+MS_WY
6,954.00	11,032.00	post-processed MWD - Production	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,870.00	6,525.40	7" Casing @ 6870' MD, 6525.40' 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 AA35-67- - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,406,822.16	3,307,792.81	40.444860	-104.394100
Wells Ranch AA35-67- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,406,822.16	3,307,792.81	40.444860	-104.394100
Point 1				0.00	1,432.42	-5,018.97	1,408,254.52	3,302,774.03	
Point 2				0.00	-2,965.96	-4,939.90	1,403,856.31	3,302,853.10	
Point 3				0.00	-2,908.24	-598.96	1,403,914.03	3,307,193.87	
Point 4				0.00	1,465.08	-642.68	1,408,287.18	3,307,150.16	
Point 5				0.00	1,432.42	-5,018.97	1,408,254.52	3,302,774.03	
Wells Ranch AA35-67- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,406,822.16	3,307,792.81	40.444860	-104.394100
Point 1				0.00	1,892.43	-5,478.99	1,408,714.52	3,302,314.03	
Point 2				0.00	-3,425.98	-5,399.91	1,403,396.31	3,302,393.10	
Point 3				0.00	-3,368.25	-138.95	1,403,454.03	3,307,653.87	
Point 4				0.00	1,925.09	-182.66	1,408,747.18	3,307,610.16	
Point 5				0.00	1,892.43	-5,478.99	1,408,714.52	3,302,314.03	
Wells Ranch AA35-67- - actual wellpath misses target center by 39.98usft at 11094.00usft MD (6537.92 TVD, 373.34 N, -4919.97 E) - Point	0.00	0.00	6,543.63	412.74	-4,923.64	1,407,234.87	3,302,869.35	40.446160	-104.411770

Directional Difficulty Index

Average Dogleg over Survey:	2.02 °/100usft	Maximum Dogleg over Survey:	14.33 °/100usft at 6,495.00 usft
Net Tortousity applicable to Plans:	1.02 °/100usft	Directional Difficulty Index:	6.308

Audit Info

North Reference Sheet for Sec. 36-T6N-R63W (Wells Ranch AA35) - Wells Ranch
AA35-67-1AHNA

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 @ 4814.00usft (H&P 322). Northing and Easting are relative to Wells Ranch AA35-67-1AHNA

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: 0.99996257

Grid Coordinates of Well: 1,406,822.15 usft N, 3,307,792.81 usft E

Geographical Coordinates of Well: 40° 26' 41.50" N, 104° 23' 38.76" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,094.00usft
the Bottom Hole Displacement is 4,934.11usft in the Direction of 274.34° (Grid).

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

