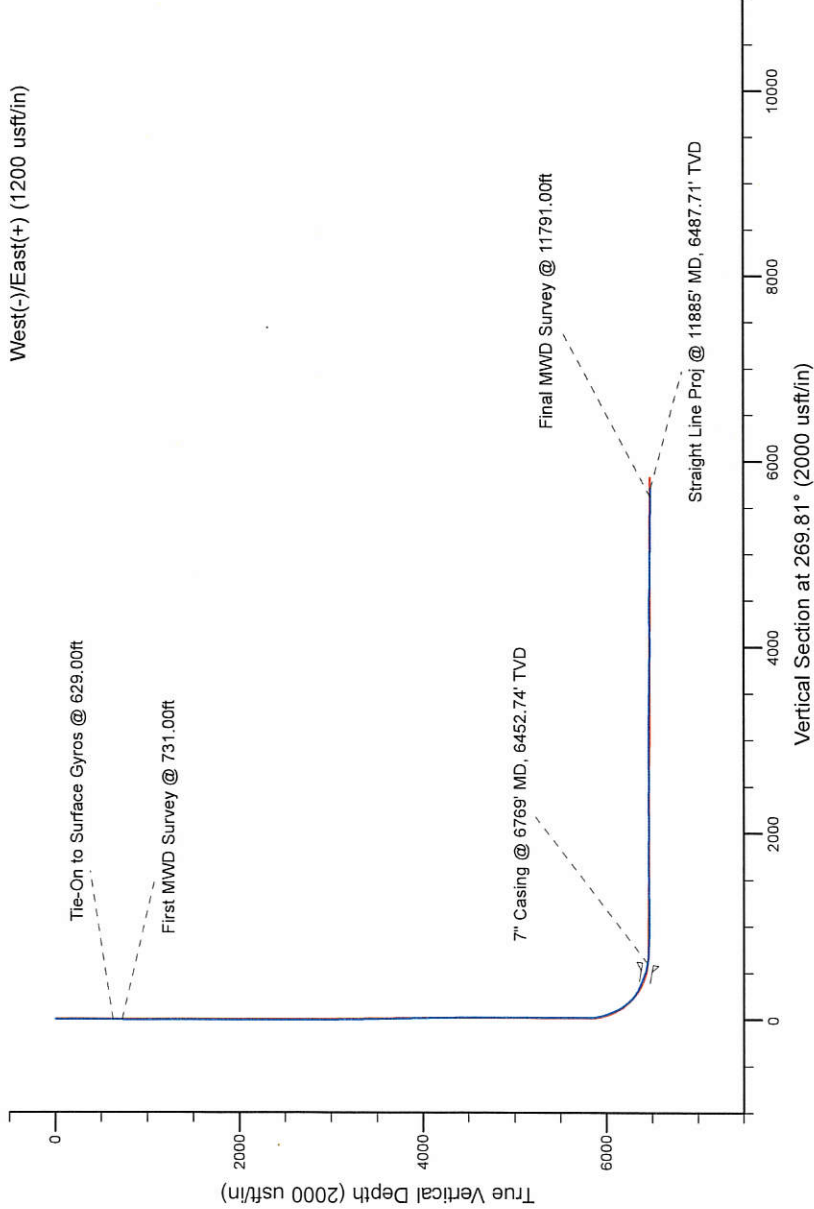
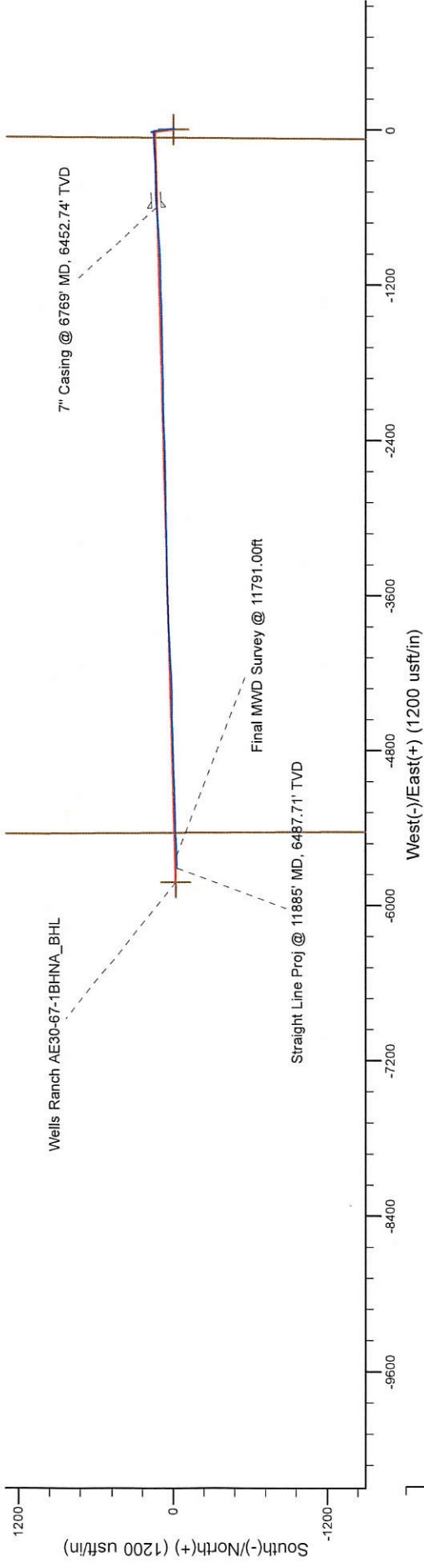


Project: Weld County, CO (NAD 83)
Site: Sec. 29-T6N-R62W (Wells Ranch AE29-31-A Pad)
Well: Wells Ranch AE30-67-1BHNA
Wellbore: Plan B
Design: Final Surveys

Noble Energy



LEGEND

Wells Ranch AE30-67-1BHNA, Plan B, Rev B0 - PROPOSAL V0
Final Surveys

Platted SHL: 1959' FNL, 65' FWL
Platted Lat/Long: 40.45958 N, 104.35608 W
Location: Sec. 29-T6N-R62W

7" Casing: ~1811.18' FNL, ~538.59' FEL
Lat/Long: 40.459981 N, 104.358236 W
State Planes - CO Northern: 1,412,449.64' N, 3,317,703.03' E
Location: Sec. 30-T6N-R62W

BHL: ~1826.13' FNL, ~272.97' FEL
Lat/Long: 40.459699 N, 104.376609 W
State Planes - CO Northern: 1,412,288.78' N, 3,312,592.09' E
Location: Sec. 25-T6N-R63W

WELL DETAILS: Wells Ranch AE30-67-1BHNA
Ground Level: 4764.00
RKB=24th @ 4788.00usft (H&P 322)

Created By: Fred Hartmann
Created On: 04/17/2014

Noble Energy

Weld County, CO (NAD 83)

Sec. 29-T6N-R62W (Wells Ranch AE29-31-A Pad)

Wells Ranch AE30-67-1BHNA

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

17 April, 2014

Well Coordinates: 1,412,318.46 N, 3,318,304.74 E (40° 27' 34.49" N, 104° 21' 21.89" W)

Ground Level: 4,764.00 usft

Local Coordinate Origin:

Centered on Well Wells Ranch AE30-67-1BHNA

Viewing Datum:

RKB=24ft @ 4788.00usft (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 AE30-67-1BHNA - 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
250.00	0.50	22.07	250.00	1.01	0.41	-0.41	0.20
500.00	0.20	214.17	499.99	1.66	0.57	-0.58	0.28
629.00	0.70	180.17	628.99	0.69	0.45	-0.45	0.42
Tie-On to Surface Gyros @ 629.00ft							
731.00	0.42	201.32	730.99	-0.28	0.31	-0.31	0.34
First MWD Survey @ 731.00ft							
824.00	0.46	171.23	823.98	-0.97	0.24	-0.24	0.25
917.00	0.72	164.92	916.98	-1.90	0.45	-0.44	0.29
1,010.00	0.81	163.79	1,009.97	-3.10	0.79	-0.78	0.10
1,103.00	0.72	156.43	1,102.96	-4.27	1.20	-1.19	0.14
1,196.00	0.57	156.70	1,195.96	-5.23	1.62	-1.60	0.16
1,289.00	0.37	172.58	1,288.95	-5.95	1.84	-1.82	0.25
1,382.00	0.64	158.53	1,381.95	-6.73	2.07	-2.05	0.32
1,475.00	0.75	55.71	1,474.94	-6.87	2.76	-2.74	1.17
1,570.00	0.79	47.66	1,569.94	-6.08	3.76	-3.74	0.12
1,664.00	0.64	60.78	1,663.93	-5.39	4.70	-4.68	0.24
1,759.00	0.19	43.81	1,758.93	-5.01	5.27	-5.25	0.49
1,853.00	0.40	36.19	1,852.92	-4.64	5.57	-5.56	0.23
1,948.00	0.30	298.21	1,947.92	-4.25	5.55	-5.53	0.56
2,042.00	0.66	285.02	2,041.92	-4.00	4.81	-4.79	0.40
2,137.00	0.90	303.07	2,136.91	-3.45	3.65	-3.64	0.36
2,232.00	1.05	307.89	2,231.90	-2.50	2.34	-2.33	0.18
2,327.00	0.61	91.67	2,326.89	-1.98	2.16	-2.15	1.67
2,422.00	1.27	100.39	2,421.88	-2.19	3.70	-3.69	0.71
2,516.00	0.52	75.53	2,515.87	-2.27	5.14	-5.13	0.88
2,611.00	1.14	10.94	2,610.86	-1.24	5.74	-5.73	1.08
2,706.00	2.33	11.97	2,705.81	1.58	6.32	-6.32	1.25
2,801.00	3.72	358.03	2,800.68	6.55	6.61	-6.63	1.65
2,896.00	4.89	347.57	2,895.41	13.59	5.63	-5.68	1.48
2,990.00	6.20	350.49	2,988.97	22.50	3.93	-4.01	1.43
3,085.00	7.50	353.35	3,083.29	33.72	2.37	-2.48	1.41
3,179.00	8.00	353.39	3,176.43	46.31	0.90	-1.06	0.53
3,274.00	8.33	353.65	3,270.47	59.72	-0.62	0.42	0.35
3,369.00	8.29	347.52	3,364.47	73.25	-2.86	2.61	0.93
3,464.00	9.65	356.79	3,458.31	87.89	-4.79	4.49	2.08
3,559.00	9.30	354.58	3,552.02	103.48	-5.96	5.60	0.53
3,653.00	9.61	354.11	3,644.74	118.84	-7.48	7.08	0.34
3,748.00	9.19	349.34	3,738.47	134.19	-9.70	9.24	0.93
3,843.00	8.20	350.00	3,832.37	148.31	-12.28	11.77	1.05
3,938.00	6.26	345.41	3,926.61	160.00	-14.76	14.21	2.13
4,033.00	3.98	338.21	4,021.23	168.07	-17.29	16.72	2.49
4,129.00	1.84	340.93	4,117.10	172.63	-19.03	18.44	2.23
4,224.00	0.76	186.89	4,212.09	173.44	-19.60	19.01	2.68
4,318.00	0.59	192.84	4,306.08	172.35	-19.78	19.20	0.20
4,413.00	1.31	179.77	4,401.07	170.79	-19.89	19.31	0.79
4,508.00	1.62	195.35	4,496.04	168.41	-20.24	19.67	0.53
4,602.00	0.85	204.40	4,590.01	166.49	-20.88	20.31	0.84
4,697.00	1.08	205.24	4,685.00	165.04	-21.55	20.99	0.24
4,793.00	0.64	209.11	4,780.99	163.75	-22.20	21.64	0.46

Design Report for Wells Ranch AE30-67-1BHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,887.00	0.73	120.85	4,874.98	162.99	-21.94	21.39	1.02
4,982.00	0.68	142.11	4,969.98	162.23	-21.07	20.52	0.28
5,077.00	0.44	119.93	5,064.97	161.60	-20.41	19.86	0.34
5,171.00	0.45	204.22	5,158.97	161.09	-20.25	19.70	0.64
5,266.00	0.59	251.01	5,253.97	160.59	-20.87	20.32	0.46
5,361.00	0.47	119.63	5,348.97	160.24	-20.99	20.44	1.02
5,456.00	0.63	133.01	5,443.96	159.69	-20.27	19.73	0.21
5,550.00	0.62	160.80	5,537.96	158.85	-19.72	19.18	0.32
5,709.00	0.39	189.54	5,696.95	157.51	-19.53	18.99	0.21
5,769.00	0.22	190.28	5,756.95	157.19	-19.58	19.05	0.28
5,782.00	0.13	218.25	5,769.95	157.16	-19.60	19.06	0.94
5,830.00	1.38	257.93	5,817.94	156.99	-20.20	19.66	2.67
5,877.00	5.87	268.01	5,864.84	156.79	-23.15	22.62	9.61
5,925.00	10.94	269.80	5,912.31	156.69	-30.17	29.63	10.58
5,972.00	16.76	264.15	5,957.92	155.98	-41.38	40.85	12.70
6,020.00	19.66	262.76	6,003.51	154.26	-56.28	55.75	6.11
6,067.00	19.40	265.17	6,047.81	152.61	-71.90	71.38	1.80
6,114.00	22.25	265.18	6,091.74	151.20	-88.55	88.03	6.06
6,161.00	28.33	266.00	6,134.21	149.68	-108.56	108.05	12.96
6,209.00	35.61	267.37	6,174.90	148.24	-133.91	133.41	15.24
6,256.00	38.33	268.33	6,212.45	147.18	-162.15	161.65	5.92
6,303.00	40.68	268.75	6,248.71	146.43	-192.04	191.54	5.03
6,350.00	44.99	268.03	6,283.17	145.52	-223.97	223.48	9.23
6,398.00	52.97	267.60	6,314.65	144.13	-260.13	259.64	16.64
6,445.00	61.02	267.18	6,340.23	142.33	-299.48	298.99	17.14
6,493.00	64.44	267.58	6,362.22	140.38	-342.09	341.61	7.16
6,540.00	67.02	268.29	6,381.54	138.84	-384.90	384.43	5.66
6,588.00	67.94	269.66	6,399.92	138.05	-429.24	428.76	3.26
6,635.00	68.86	269.20	6,417.22	137.62	-472.93	472.46	2.16
6,683.00	73.11	267.51	6,432.86	136.31	-518.28	517.81	9.46
6,721.00	76.17	266.27	6,442.92	134.32	-554.86	554.40	8.65
6,769.00	80.23	266.10	6,452.74	131.19	-601.74	601.29	8.47
7" Casing @ 6769' MD, 6452.74' TVD							
6,822.00	84.72	265.91	6,459.67	127.53	-654.14	653.70	8.47
6,871.00	85.93	265.25	6,463.67	123.76	-702.83	702.40	2.81
6,964.00	87.53	266.00	6,468.97	116.68	-795.40	795.00	1.90
7,057.00	90.80	266.90	6,470.33	110.92	-888.20	887.82	3.65
7,150.00	90.03	267.37	6,469.65	106.27	-981.08	980.72	0.97
7,242.00	89.20	267.37	6,470.27	102.05	-1,072.98	1,072.63	0.90
7,335.00	89.54	271.15	6,471.30	100.85	-1,165.95	1,165.60	4.08
7,429.00	89.85	267.25	6,471.80	99.54	-1,259.92	1,259.58	4.16
7,521.00	91.11	268.02	6,471.03	95.74	-1,351.84	1,351.51	1.61
7,616.00	91.29	267.84	6,469.04	92.31	-1,446.76	1,446.43	0.27
7,711.00	91.45	268.74	6,466.76	89.48	-1,541.69	1,541.37	0.96
7,806.00	90.46	268.73	6,465.18	87.38	-1,636.65	1,636.34	1.04
7,901.00	89.29	269.76	6,465.39	86.13	-1,731.64	1,731.33	1.64
7,997.00	90.00	268.60	6,465.98	84.76	-1,827.62	1,827.32	1.42
8,091.00	89.08	268.53	6,466.74	82.40	-1,921.59	1,921.30	0.98
8,186.00	89.23	269.17	6,468.14	80.50	-2,016.56	2,016.27	0.69
8,281.00	90.99	269.66	6,467.96	79.53	-2,111.55	2,111.27	1.92
8,376.00	90.15	268.59	6,467.01	78.08	-2,206.53	2,206.25	1.43

Design Report for Wells Ranch AE30-67-1BHNA - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,471.00	89.72	266.67	6,467.12	74.15	-2,301.45	2,301.18	2.07
8,566.00	90.31	269.06	6,467.09	70.61	-2,396.37	2,396.12	2.59
8,660.00	88.68	267.61	6,467.92	67.88	-2,490.32	2,490.08	2.32
8,755.00	90.52	268.30	6,468.59	64.49	-2,585.26	2,585.02	2.07
8,850.00	92.00	268.68	6,466.50	61.99	-2,680.20	2,679.97	1.61
8,945.00	90.83	269.54	6,464.15	60.51	-2,775.16	2,774.93	1.53
9,040.00	90.65	269.70	6,462.92	59.88	-2,870.14	2,869.92	0.25
9,135.00	89.69	267.99	6,462.64	57.97	-2,965.12	2,964.91	2.06
9,230.00	89.17	268.51	6,463.59	55.06	-3,060.07	3,059.87	0.77
9,324.00	88.12	269.24	6,465.81	53.22	-3,154.02	3,153.83	1.36
9,419.00	89.29	269.30	6,467.96	52.01	-3,248.99	3,248.80	1.23
9,514.00	90.25	269.53	6,468.34	51.04	-3,343.98	3,343.79	1.04
9,609.00	88.80	269.27	6,469.13	50.04	-3,438.97	3,438.78	1.55
9,704.00	88.43	268.78	6,471.42	48.43	-3,533.93	3,533.75	0.65
9,799.00	89.23	268.40	6,473.36	46.09	-3,628.88	3,628.70	0.93
9,894.00	89.32	267.40	6,474.56	42.61	-3,723.81	3,723.64	1.06
9,989.00	90.06	267.68	6,475.08	38.53	-3,818.72	3,818.57	0.83
10,084.00	87.59	264.91	6,477.03	32.40	-3,913.48	3,913.35	3.91
10,179.00	90.22	268.28	6,478.84	26.76	-4,008.28	4,008.16	4.50
10,274.00	91.91	267.20	6,477.08	23.01	-4,103.18	4,103.08	2.11
10,369.00	91.63	266.07	6,474.14	17.44	-4,197.97	4,197.89	1.22
10,464.00	90.86	267.59	6,472.08	12.19	-4,292.80	4,292.73	1.79
10,558.00	89.72	269.41	6,471.60	9.73	-4,386.76	4,386.70	2.28
10,653.00	89.69	270.01	6,472.09	9.25	-4,481.76	4,481.70	0.63
10,748.00	87.35	268.44	6,474.55	7.96	-4,576.71	4,576.65	2.97
10,843.00	88.77	268.85	6,477.76	5.72	-4,671.62	4,671.58	1.56
10,938.00	90.59	268.09	6,478.29	3.18	-4,766.58	4,766.55	2.08
11,032.00	89.32	268.45	6,478.37	0.34	-4,860.54	4,860.51	1.40
11,127.00	88.40	268.77	6,480.26	-1.96	-4,955.49	4,955.47	1.03
11,222.00	88.40	268.36	6,482.91	-4.34	-5,050.42	5,050.41	0.43
11,317.00	90.00	267.58	6,484.23	-7.70	-5,145.35	5,145.35	1.87
11,412.00	90.56	267.83	6,483.77	-11.51	-5,240.27	5,240.28	0.65
11,507.00	88.92	268.35	6,484.20	-14.67	-5,335.22	5,335.24	1.81
11,602.00	90.09	267.40	6,485.02	-18.20	-5,430.15	5,430.18	1.59
11,697.00	90.77	268.16	6,484.31	-21.88	-5,525.07	5,525.11	1.07
11,791.00	88.36	267.44	6,485.02	-25.48	-5,618.99	5,619.04	2.68
Final MWD Survey @ 11791.00ft							
11,885.00	88.36	267.44	6,487.71	-29.68	-5,712.86	5,712.93	0.00
Straight Line Proj @ 11885' MD, 6487.71' TVD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
629.00	628.99	0.69	0.45	Tie-On to Surface Gyros @ 629.00ft
731.00	730.99	-0.28	0.31	First MWD Survey @ 731.00ft
11,791.00	6,485.02	-25.48	-5,618.99	Final MWD Survey @ 11791.00ft
11,885.00	6,487.71	-29.68	-5,712.86	Straight Line Proj @ 11885' MD, 6487.71' TVD

Design Report for Wells Ranch AE30-67-1BHNA - Final Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Wells Ranch AE30-67-1BHNA_BHL	269.81	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
250.00	629.00	Surface Gyros	Flexi-Shot
731.00	6,721.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
6,822.00	11,791.00	MWD Surveys - Production	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,769.00	6,452.74	7" Casing @ 6769' MD, 6452.74' 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 AE30-67- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,412,318.46	3,318,304.74	40.459580	-104.356080
Point 1				0.00	1,743.78	-10,741.75	1,414,062.18	3,307,563.38	
Point 2				0.00	-3,571.41	-10,694.97	1,408,747.18	3,307,610.16	
Point 3				0.00	-3,505.10	-5,421.33	1,408,813.49	3,312,883.61	
Point 4				0.00	1,799.38	-5,449.63	1,414,117.78	3,312,855.31	
Point 5				0.00	-3,505.10	-5,421.33	1,408,813.49	3,312,883.61	
Point 6				0.00	-3,342.10	-82.13	1,408,976.48	3,318,222.61	
Point 7				0.00	1,959.50	-53.10	1,414,277.89	3,318,251.64	
Point 8				0.00	1,799.38	-5,449.63	1,414,117.78	3,312,855.31	
Point 9				0.00	1,743.78	-10,741.75	1,414,062.18	3,307,563.38	
Wells Ranch AE30-67- - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,412,318.46	3,318,304.74	40.459580	-104.356080
Wells Ranch AE30-67- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,412,318.46	3,318,304.74	40.459580	-104.356080
Point 1				0.00	1,283.77	-10,281.74	1,413,602.18	3,308,023.38	
Point 2				0.00	-3,111.40	-10,234.95	1,409,207.18	3,308,070.16	
Point 3				0.00	-3,045.08	-5,881.35	1,409,273.49	3,312,423.61	
Point 4				0.00	1,339.37	-5,909.65	1,413,657.78	3,312,395.31	
Point 5				0.00	1,283.77	-10,281.74	1,413,602.18	3,308,023.38	
Wells Ranch AE30-67- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,412,318.46	3,318,304.74	40.459580	-104.356080
Point 1				0.00	1,339.37	-4,989.61	1,413,657.78	3,313,315.31	
Point 2				0.00	-3,045.08	-4,961.31	1,409,273.49	3,313,343.61	
Point 3				0.00	-2,882.09	-542.15	1,409,436.48	3,317,762.61	
Point 4				0.00	1,499.48	-513.12	1,413,817.89	3,317,791.64	
Point 5				0.00	1,339.37	-4,989.61	1,413,657.78	3,313,315.31	
Wells Ranch AE30-67- - actual wellpath misses target center by 112.23usft at 11885.00usft MD (6487.71 TVD, -29.68 N, -5712.86 E) - Point	0.00	0.00	6,482.33	-19.80	-5,824.53	1,412,298.66	3,312,480.43	40.459730	-104.377010

Design Report for Wells Ranch AE30-67-1BHNA - Final Surveys

Directional Difficulty Index

Average Dogleg over Survey:	1.79 °/100usft	Maximum Dogleg over Survey:	17.14 °/100usft at 6,445.00 usft
Net Tortosity applicable to Plans:	0.89 °/100usft	Directional Difficulty Index:	6.362

Audit Info

North Reference Sheet for Sec. 29-T6N-R62W (Wells Ranch AE29-31-A Pad) - Wells Ranch AE30-67-1BHNA

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB=24ft @ 4788.00usft (H&P 322). Northing and Easting are relative to Wells Ranch AE30-67-1BHNA

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: 0.99996347

Grid Coordinates of Well: 1,412,318.46 usft N, 3,318,304.74 usft E

Geographical Coordinates of Well: 40° 27' 34.49" N, 104° 21' 21.89" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,885.00usft

the Bottom Hole Displacement is 5,712.94usft in the Direction of 269.70° (Grid).

Magnetic Convergence at surface is: -7.57° (2 April 2014, , BGGM2013)

