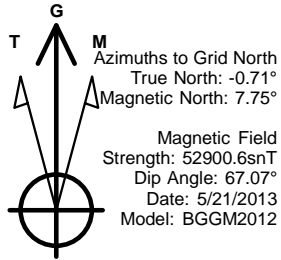


Project: Weld County, CO (NAD 83)  
 Site: Sec. 24-T6N-R63W (Wells Ranch USX AA23 PAD)  
 Well: Wells Ranch USX AA23-63HN

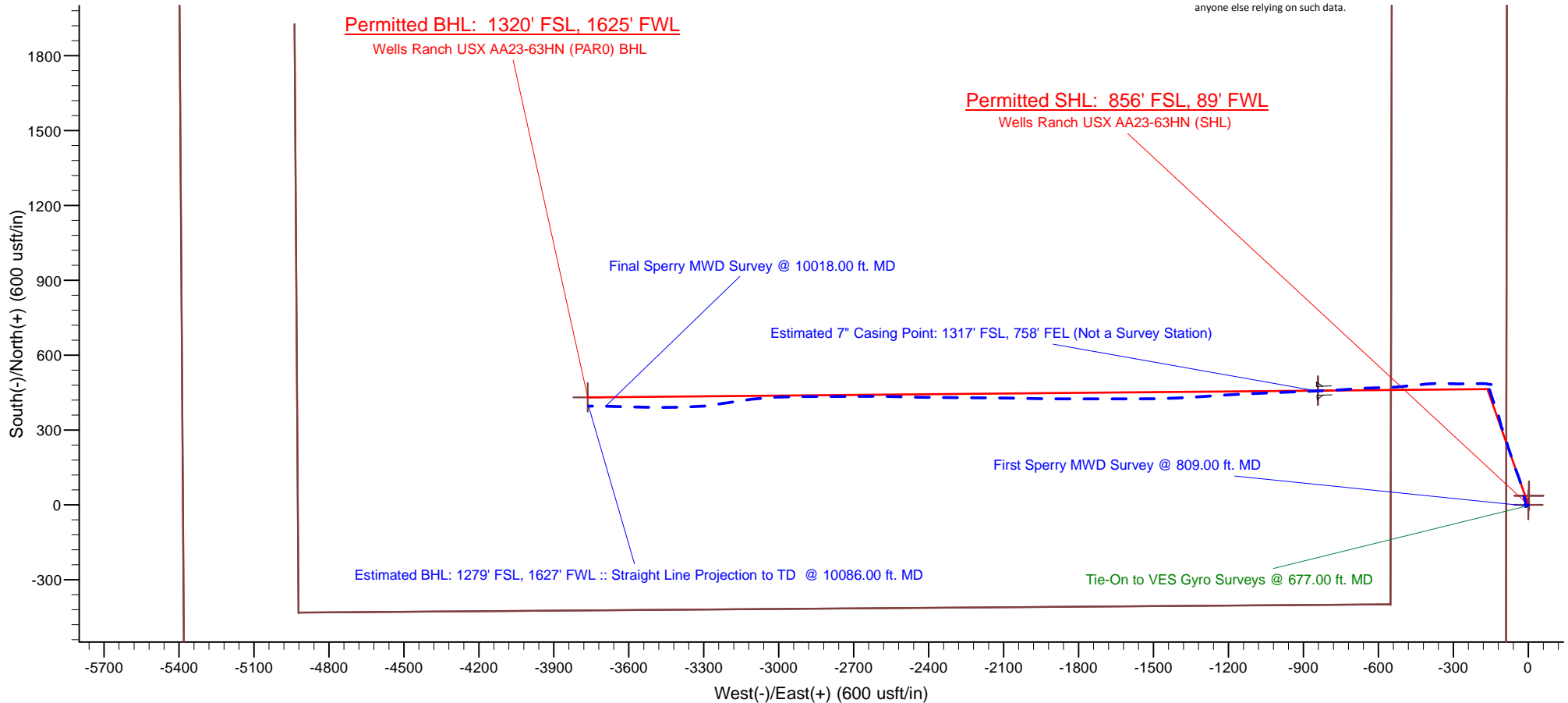
# Noble Energy



## LEGEND

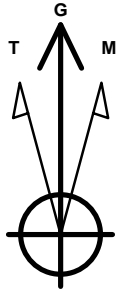
- Wells Ranch USX AA23-63HN, Plan A Rev 0, PAR0 Proposal V0
- - Vaughn ESS and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the "Wells Ranch AA23-63HN" well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



Project: Weld County, CO (NAD 83)  
Site: Sec. 24-T6N-R63W (Wells Ranch USX AA23 PAD)  
Well: Wells Ranch USX AA23-63HN

# Noble Energy



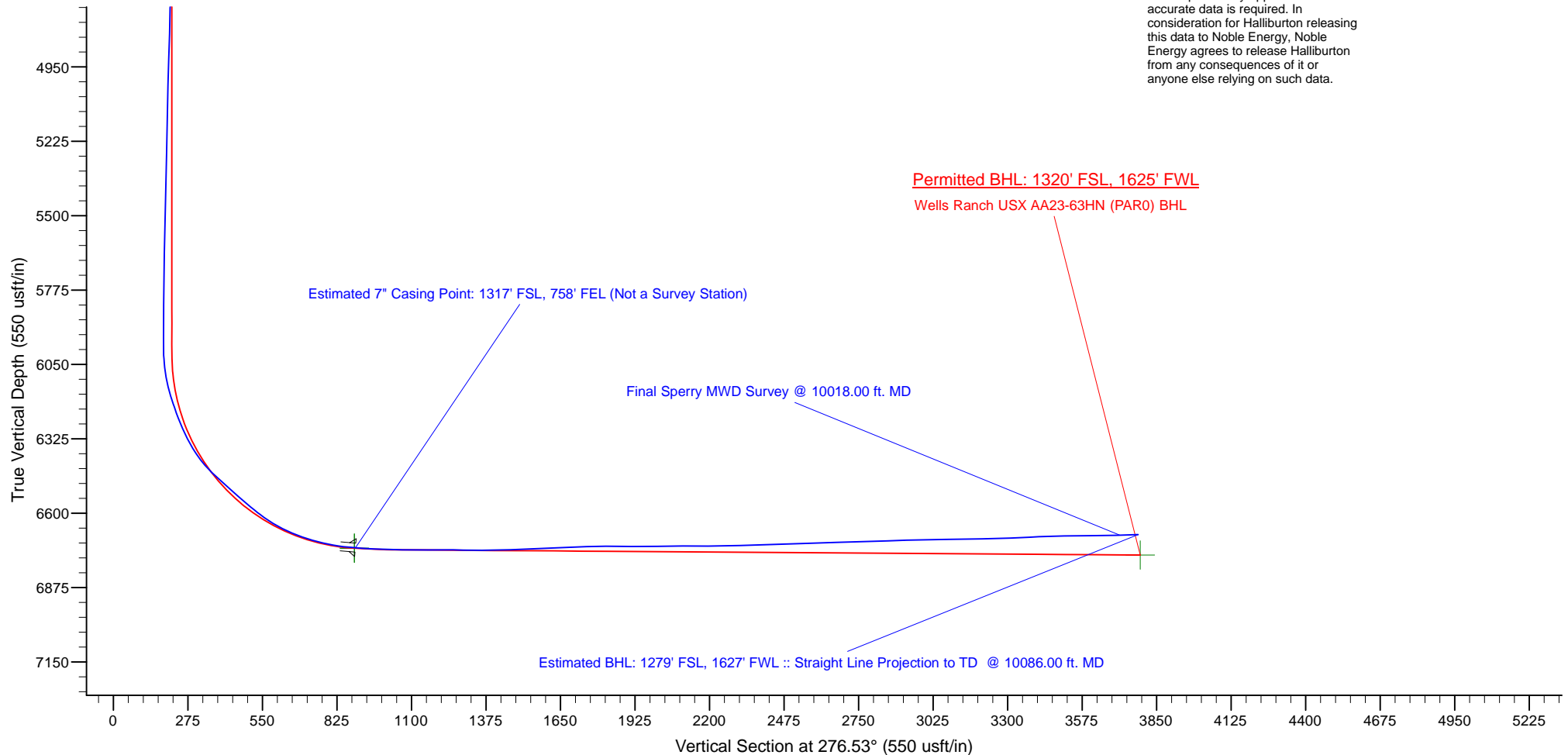
Azimuths to Grid North  
True North:  $-0.71^\circ$   
Magnetic North:  $7.75^\circ$

Magnetic Field  
Strength: 52900.6snT  
Dip Angle:  $67.07^\circ$   
Date: 5/21/2013  
Model: BGGM2012

## LEGEND

- Wells Ranch USX AA23-63HN, Plan A Rev 0, PAR0 Proposal V0
- Vaughn ESS and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the "Wells Ranch AA23-63HN" well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



# Noble Energy

Weld County, CO (NAD 83)

Sec. 24-T6N-R63W (Wells Ranch USX AA23 PAD)

Wells Ranch USX AA23-63HN

Design: Vaughn ESS and Sperry MWD Survey

## Sperry Drilling Services

### Final Survey Report

16 September, 2013

Well Coordinates: 1,414,919.47 N, 3,307,652.87 E (40° 28' 01.52" N, 104° 23' 39.26" W)

Ground Level: 4,836.00 usft

Local Coordinate Origin:

Centered on Well Wells Ranch USX AA23-63HN - Slot A2

Viewing Datum:

RKB 24 ft. @ 4860.00usft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

**HALLIBURTON**

## Design Report for Wells Ranch USX AA23-63HN - Vaughn ESS and Sperry MWD Survey

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
330.00	0.60	234.75	329.99	-1.00	-1.41	1.29	0.18
677.00	0.60	215.75	676.98	-3.52	-3.96	3.53	0.06
<b>Tie-On to VES Gyro Surveys @ 677.00 ft. MD</b>							
809.00	0.46	244.94	808.97	-4.31	-4.84	4.32	0.23
<b>First Sperry MWD Survey @ 809.00 ft. MD</b>							
901.00	0.55	229.16	900.97	-4.75	-5.51	4.93	0.18
993.00	0.62	251.94	992.96	-5.19	-6.32	5.68	0.26
1,273.00	0.80	241.36	1,272.94	-6.60	-9.47	8.66	0.08
1,460.00	0.49	326.46	1,459.93	-6.56	-11.06	10.24	0.48
1,555.00	0.55	314.26	1,554.93	-5.90	-11.61	10.86	0.13
1,650.00	0.81	325.40	1,649.92	-5.03	-12.32	11.67	0.31
1,745.00	0.96	348.71	1,744.91	-3.70	-12.86	12.35	0.41
1,840.00	3.11	21.40	1,839.85	-0.52	-12.07	11.93	2.48
1,935.00	3.50	5.29	1,934.69	4.77	-10.86	11.33	1.06
2,030.00	6.10	345.19	2,029.36	12.54	-11.89	13.23	3.22
2,125.00	5.22	341.65	2,123.89	21.52	-14.54	16.89	1.00
2,220.00	7.97	348.27	2,218.26	32.07	-17.24	20.77	3.00
2,315.00	10.92	350.13	2,311.96	47.39	-20.12	25.37	3.12
2,410.00	13.07	344.97	2,404.88	66.63	-24.45	31.86	2.53
2,505.00	14.69	341.50	2,497.10	88.43	-31.06	40.90	1.92
2,599.00	13.42	339.09	2,588.29	109.92	-38.73	50.97	1.49
2,694.00	13.68	341.37	2,680.65	130.87	-46.25	60.83	0.63
2,789.00	13.28	337.51	2,773.03	151.59	-54.02	70.90	1.04
2,884.00	14.11	342.54	2,865.33	172.72	-61.67	80.90	1.53
2,979.00	15.35	341.79	2,957.21	195.71	-69.07	90.86	1.32
3,074.00	15.62	341.55	3,048.76	219.79	-77.05	101.53	0.29
3,169.00	12.68	342.92	3,140.87	241.89	-84.16	111.10	3.11
3,264.00	13.85	342.07	3,233.33	262.68	-90.72	119.99	1.25
3,359.00	13.77	341.37	3,325.59	284.21	-97.83	129.50	0.20
3,454.00	13.31	339.90	3,417.94	305.20	-105.20	139.21	0.60
3,549.00	11.85	345.61	3,510.67	324.92	-111.39	147.59	2.02
3,643.00	9.82	346.99	3,602.98	342.08	-115.59	153.72	2.18
3,738.00	10.16	343.96	3,696.54	358.02	-119.73	159.64	0.66
3,833.00	10.03	336.27	3,790.08	373.65	-125.37	167.02	1.42
3,928.00	10.85	339.32	3,883.51	389.59	-131.86	175.28	1.04
4,023.00	10.57	341.70	3,976.85	406.23	-137.75	183.03	0.55
4,118.00	10.07	342.09	4,070.31	422.40	-143.04	190.12	0.53
4,213.00	8.58	344.18	4,164.06	437.12	-147.53	196.25	1.61
4,308.00	6.76	340.71	4,258.20	449.22	-151.31	201.38	1.98
4,403.00	4.90	340.89	4,352.71	458.33	-154.49	205.57	1.96
4,497.00	2.78	341.20	4,446.49	464.28	-156.53	208.28	2.26
4,592.00	0.81	341.35	4,541.44	467.10	-157.49	209.56	2.07
4,687.00	0.46	32.85	4,636.43	468.06	-157.50	209.67	0.67
4,782.00	1.32	35.56	4,731.42	469.27	-156.66	208.97	0.91
4,877.00	1.85	64.12	4,826.39	470.83	-154.64	207.15	0.98
4,972.00	2.38	78.93	4,921.32	471.88	-151.32	203.97	0.80
5,067.00	1.40	71.25	5,016.27	472.63	-148.29	201.04	1.06
5,162.00	1.54	72.03	5,111.24	473.39	-145.98	198.83	0.15
5,257.00	1.26	66.88	5,206.21	474.20	-143.80	196.76	0.32

## Design Report for Wells Ranch USX AA23-63HN - Vaughn ESS and Sperry MWD Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,351.00	1.20	68.72	5,300.19	474.96	-141.93	194.99	0.08
5,446.00	1.76	39.18	5,395.16	476.45	-140.09	193.32	0.98
5,541.00	1.79	58.34	5,490.11	478.36	-137.90	191.37	0.62
5,635.00	1.85	47.20	5,584.07	480.16	-135.54	189.23	0.38
5,730.00	1.08	55.84	5,679.03	481.71	-133.67	187.55	0.84
5,825.00	1.18	75.87	5,774.02	482.45	-131.98	185.96	0.43
5,920.00	0.47	58.28	5,869.01	482.89	-130.70	184.73	0.78
6,013.00	0.77	152.89	5,962.00	482.54	-130.09	184.09	1.00
6,108.00	5.89	264.94	6,056.84	481.54	-134.66	188.51	6.55
6,203.00	15.71	277.15	6,150.05	482.71	-152.32	206.20	10.56
6,251.00	18.75	279.12	6,195.89	484.75	-166.39	220.40	6.45
6,298.00	20.46	270.43	6,240.18	486.01	-182.07	236.12	7.18
6,392.00	27.18	267.16	6,326.12	485.06	-219.99	273.69	7.28
6,487.00	37.57	270.89	6,406.26	484.44	-270.76	324.06	11.13
6,535.00	45.25	272.40	6,442.23	485.38	-302.47	355.67	16.13
6,582.00	47.55	271.92	6,474.64	486.66	-336.48	389.61	4.95
6,630.00	48.48	267.64	6,506.76	486.51	-372.14	425.02	6.90
6,676.00	49.43	264.73	6,536.97	484.20	-406.75	459.14	5.20
6,724.00	50.36	264.08	6,567.89	480.62	-443.29	495.04	2.20
6,771.00	52.75	263.65	6,597.11	476.68	-479.88	530.95	5.14
6,819.00	56.45	265.36	6,624.91	472.95	-518.82	569.21	8.24
6,866.00	60.91	267.36	6,649.34	470.42	-558.88	608.72	10.16
6,914.00	67.34	269.34	6,670.28	469.19	-602.03	651.45	13.90
6,961.00	70.90	267.89	6,687.02	468.13	-645.92	694.93	8.10
7,009.00	73.76	265.67	6,701.59	465.55	-691.57	740.00	7.41
7,056.00	77.88	265.37	6,713.11	461.99	-736.99	784.72	8.79
7,122.00	83.77	267.89	6,723.63	458.18	-802.00	848.87	9.69
7,167.00	85.22	267.85	6,727.94	456.51	-846.76	893.16	3.23
<b>Estimated 7" Casing Point: 1317' FSL, 758' FEL (Not a Survey Station)</b>							
7,247.00	87.81	267.78	6,732.80	453.47	-926.55	972.08	3.23
7,342.00	88.83	267.26	6,735.59	449.36	-1,021.42	1,065.87	1.21
7,437.00	91.05	267.74	6,735.69	445.21	-1,116.32	1,159.69	2.39
7,532.00	89.35	266.16	6,735.35	440.16	-1,211.18	1,253.35	2.44
7,627.00	89.57	265.89	6,736.25	433.57	-1,305.95	1,346.76	0.37
7,722.00	90.68	267.79	6,736.04	428.34	-1,400.80	1,440.40	2.32
7,817.00	92.99	268.71	6,733.00	425.44	-1,495.70	1,534.35	2.62
7,912.00	92.78	270.32	6,728.22	424.64	-1,590.57	1,628.52	1.71
8,007.00	92.56	269.96	6,723.79	424.87	-1,685.46	1,722.83	0.44
8,102.00	89.54	269.60	6,722.05	424.50	-1,780.44	1,817.14	3.20
8,197.00	89.20	270.41	6,723.10	424.51	-1,875.43	1,911.52	0.92
8,292.00	91.36	271.28	6,722.63	425.91	-1,970.41	2,006.05	2.45
8,387.00	90.37	270.98	6,721.20	427.78	-2,065.38	2,100.62	1.09
8,482.00	89.41	270.11	6,721.38	428.69	-2,160.38	2,195.10	1.36
8,577.00	91.57	270.85	6,720.57	429.48	-2,255.36	2,289.56	2.40
8,672.00	92.74	270.21	6,717.00	430.36	-2,350.29	2,383.97	1.40
8,767.00	90.74	271.28	6,714.11	431.60	-2,445.23	2,478.44	2.39
8,862.00	92.28	271.43	6,711.61	433.84	-2,540.17	2,573.02	1.63
8,957.00	92.19	269.80	6,707.90	434.86	-2,635.09	2,667.44	1.72
9,052.00	91.45	269.70	6,704.89	434.45	-2,730.04	2,761.72	0.79
9,147.00	91.79	269.79	6,702.20	434.02	-2,825.00	2,856.02	0.37
9,242.00	91.94	269.80	6,699.11	433.69	-2,919.95	2,950.32	0.16

## Design Report for Wells Ranch USX AA23-63HN - Vaughn ESS and Sperry MWD Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,337.00	90.68	267.64	6,696.94	431.56	-3,014.89	3,044.40	2.63
9,432.00	90.00	262.55	6,696.37	423.44	-3,109.51	3,137.49	5.41
9,527.00	91.76	259.86	6,694.91	408.92	-3,203.37	3,229.09	3.38
9,622.00	93.12	264.48	6,690.87	395.99	-3,297.37	3,321.01	5.07
9,717.00	91.60	269.34	6,686.95	390.88	-3,392.12	3,414.57	5.36
9,812.00	91.39	270.34	6,684.47	390.62	-3,487.09	3,508.89	1.08
9,907.00	89.97	271.68	6,683.35	392.29	-3,582.06	3,603.44	2.06
10,002.00	91.60	271.58	6,682.04	394.99	-3,677.01	3,698.08	1.72
10,018.00	91.79	270.61	6,681.57	395.30	-3,693.00	3,714.00	6.18
<b>Final Sperry MWD Survey @ 10018.00 ft. MD</b>							
10,086.00	91.79	270.61	6,679.45	396.02	-3,760.96	3,781.60	0.00
<b>Estimated BHL: 1279' FSL, 1627' FWL :: Straight Line Projection to TD @ 10086.00 ft. MD</b>							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
677.00	676.98	-3.52	-3.96	Tie-On to VES Gyro Surveys @ 677.00 ft. MD
809.00	808.97	-4.31	-4.84	First Sperry MWD Survey @ 809.00 ft. MD
7,167.00	6,727.94	456.51	-846.76	Estimated 7" Casing Point: 1317' FSL, 758' FEL (Not a Survey Station)
10,018.00	6,681.57	395.30	-3,693.00	Final Sperry MWD Survey @ 10018.00 ft. MD
10,086.00	6,679.45	396.02	-3,760.96	Estimated BHL: 1279' FSL, 1627' FWL :: Straight Line Projection to TD @ 10086.00 ft. MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch USX AA23-63HN (PARO) BHL	276.53	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
330.00	677.00	Vaughn ESS Survey	Flexi-Shot
677.00	7,167.00	Sperry MWD Survey	MWD
7,167.00	10,086.00	Sperry MWD Survey	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,167.00	6,727.94	7"	7	7-1/2

## Design Report for Wells Ranch USX AA23-63HN - Vaughn ESS and Sperry MWD Survey

**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 USX - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,414,919.47	3,307,652.87	40° 28' 1.524 N	104° 23' 39.264 W
Wells Ranch USX - actual wellpath misses target center by 36.54usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	36.46	2.32	1,414,955.93	3,307,655.19	40° 28' 1.884 N	104° 23' 39.228 W
Point 1				0.00	-468.01	-4,924.39	1,414,487.94	3,302,730.98	
Point 2				0.00	-434.79	-553.82	1,414,521.16	3,307,101.39	
Point 3				0.00	3,942.50	-545.57	1,418,898.29	3,307,109.64	
Point 4				0.00	3,897.50	-4,952.85	1,418,853.29	3,302,702.52	
Point 5				0.00	-468.01	-4,924.39	1,414,487.94	3,302,730.98	
Wells Ranch USX - actual wellpath misses target center by 36.54usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	36.46	2.32	1,414,955.93	3,307,655.19	40° 28' 1.884 N	104° 23' 39.228 W
Point 1				0.00	-930.01	-5,381.39	1,414,025.95	3,302,274.00	
Point 2				0.00	-893.79	-91.82	1,414,062.17	3,307,563.38	
Point 3				0.00	-838.18	5,200.30	1,414,117.78	3,312,855.31	
Point 4				0.00	-893.79	-91.82	1,414,062.17	3,307,563.38	
Point 5				0.00	4,407.50	-85.57	1,419,363.27	3,307,569.63	
Point 6				0.00	4,462.69	5,172.03	1,419,418.46	3,312,827.04	
Point 7				0.00	4,407.50	-85.57	1,419,363.27	3,307,569.63	
Point 8				0.00	4,352.55	-5,415.50	1,419,308.32	3,302,239.89	
Point 9				0.00	-930.01	-5,381.39	1,414,025.95	3,302,274.00	
Wells Ranch USX - actual wellpath misses target center by 2.09usft at 7163.04usft MD (6727.61 TVD, 456.66 N, -842.82 E) - Point	0.00	0.00	6,729.41	457.72	-842.68	1,415,377.18	3,306,810.22	40° 28' 6.150 N	104° 23' 50.092 W
Interp @ 6729.41 - actual wellpath misses target center by 2.09usft at 7163.04usft MD (6727.61 TVD, 456.66 N, -842.82 E) - Point	0.00	0.00	6,729.41	457.72	-842.68	1,415,377.18	3,306,810.22	40° 28' 6.150 N	104° 23' 50.092 W
Wells Ranch USX - actual wellpath misses target center by 82.89usft at 10086.00usft MD (6679.45 TVD, 396.02 N, -3760.96 E) - Point	0.00	0.00	6,754.68	430.63	-3,764.68	1,415,350.08	3,303,888.32	40° 28' 6.240 N	104° 24' 27.900 W

**Directional Difficulty Index**

Average Dogleg over Survey:	2.11 °/100usft	Maximum Dogleg over Survey:	16.13 °/100usft at 6,535.00 usft
Net Tortousity applicable to Plans:	0.95 °/100usft	Directional Difficulty Index:	6.126

**Audit Info**

## North Reference Sheet for Sec. 24-T6N-R63W (Wells Ranch USX AA23 PAD) - Wells Ranch USX AA23-63HN

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 ft. @ 4860.00usft (H&P 343). Northing and Easting are relative to Wells Ranch USX AA23-63HN - Slot A2

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° 30' 0.000 W°, Longitude Origin: 0° 0' 0.000 E°, Latitude Origin: 40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996396

Grid Coordinates of Well: 1,414,919.47 usft N, 3,307,652.87 usft E

Geographical Coordinates of Well: 40° 28' 01.52" N, 104° 23' 39.26" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,086.00usft the Bottom Hole Displacement is 3,781.76usft in the Direction of 276.01° (Grid).

Magnetic Convergence at surface is: -7.75° (21 May 2013, , BGGM2012)

