



# **Noble Energy, Inc**

Weld County, CO (NAD 83)

Sec 21 - T6N - R63W (Wells Ranch AA21)

Wells Ranch State AA27-79HN

Wellbore #1

Design: OH

## **Final Survey Report**

21 December, 2013





# IDS Final Survey Report



<b>Company:</b>	Noble Energy, Inc	<b>Local Co-ordinate Reference:</b>	Well Wells Ranch State AA27-79HN
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Site:</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)	<b>MD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Well:</b>	Wells Ranch State AA27-79HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Single User Db

<b>Project</b>	Weld County, CO (NAD 83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

<b>Site</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)		
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<b>Site Position:</b>		<b>Northing:</b>	1,417,534.22 usft	<b>Latitude:</b>	40° 28' 28.704 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,296,552.45 usft	<b>Longitude:</b>	104° 26' 2.472 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	0.69 °

<b>Well</b>	Wells Ranch State AA27-79HN				
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<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	1,417,497.79 usft	<b>Latitude:</b>	40° 28' 28.344 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	3,296,552.89 usft	<b>Longitude:</b>	104° 26' 2.472 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	4,727.0 usft

<b>Wellbore</b>	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/17/2013	8.36	67.08	52,950

<b>Design</b>	OH				
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<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	176.89	

Survey Program		Date	12/21/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
275.0	875.0	Survey #1 (Wellbore #1)	EMS	EMS - Standard	
934.0	14,568.0	Survey #2 (Wellbore #1)	MWD	MWD - Standard	

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00
275.0	0.10	310.22	275.0	0.2	-0.2	-0.2	0.04
560.0	0.10	221.42	560.0	0.1	-0.5	-0.2	0.05
875.0	0.40	282.92	875.0	0.2	-1.8	-0.3	0.12
934.0	0.40	293.00	934.0	0.3	-2.2	-0.4	0.12
<b>First MWD</b>							
1,028.0	0.40	256.80	1,028.0	0.3	-2.8	-0.5	0.26
1,123.0	0.20	211.80	1,123.0	0.1	-3.2	-0.3	0.31
1,217.0	0.20	184.50	1,217.0	-0.2	-3.3	0.0	0.10
1,311.0	0.40	193.00	1,311.0	-0.7	-3.4	0.5	0.22
1,406.0	0.40	187.90	1,406.0	-1.3	-3.5	1.1	0.04



**IDS**  
Final Survey Report



<b>Company:</b>	Noble Energy, Inc	<b>Local Co-ordinate Reference:</b>	Well Wells Ranch State AA27-79HN
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Site:</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)	<b>MD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Well:</b>	Wells Ranch State AA27-79HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,500.0	2.50	108.20	1,500.0	-2.3	-1.6	2.2	2.62
1,595.0	4.90	98.40	1,594.8	-3.5	4.4	3.7	2.60
1,689.0	6.70	92.40	1,688.3	-4.3	13.8	5.1	2.02
1,784.0	9.50	91.70	1,782.3	-4.8	27.2	6.3	2.95
1,878.0	11.30	94.50	1,874.8	-5.7	44.1	8.1	1.99
1,973.0	12.10	102.60	1,967.8	-8.6	63.1	12.1	1.92
2,068.0	13.00	110.00	2,060.5	-14.5	82.9	19.0	1.94
2,163.0	12.50	107.70	2,153.2	-21.3	102.7	26.8	0.75
2,257.0	13.40	114.90	2,244.8	-28.9	122.3	35.5	1.96
2,352.0	12.80	115.10	2,337.3	-38.0	141.8	45.7	0.63
2,447.0	12.10	113.00	2,430.1	-46.4	160.5	55.0	0.88
2,541.0	11.80	112.30	2,522.1	-53.9	178.5	63.5	0.35
2,636.0	11.40	111.90	2,615.1	-61.1	196.2	71.6	0.43
2,731.0	10.90	111.70	2,708.3	-67.9	213.2	79.4	0.53
2,825.0	12.00	106.30	2,800.5	-73.9	230.9	86.3	1.63
2,920.0	12.30	104.90	2,893.3	-79.3	250.1	92.8	0.44
3,014.0	12.70	104.90	2,985.1	-84.5	269.8	99.0	0.43
3,109.0	12.00	104.90	3,077.9	-89.8	289.4	105.3	0.74
3,204.0	11.80	103.80	3,170.9	-94.6	308.4	111.2	0.32
3,209.0	11.30	102.40	3,175.8	-94.8	309.4	111.5	11.46
3,394.0	9.50	111.20	3,357.7	-104.3	341.3	122.6	1.30
3,488.0	8.60	107.90	3,450.6	-109.2	355.2	128.3	1.10
3,583.0	9.10	116.50	3,544.4	-114.8	368.7	134.6	1.49
3,678.0	9.00	118.80	3,638.2	-121.7	381.9	142.2	0.40
3,773.0	9.30	119.80	3,732.0	-129.1	395.1	150.3	0.36
3,868.0	9.30	108.10	3,825.8	-135.3	409.1	157.3	1.99
3,962.0	7.20	97.20	3,918.8	-138.4	422.1	161.1	2.78
4,057.0	5.30	76.40	4,013.3	-138.1	432.3	161.3	3.08
4,152.0	1.80	62.70	4,108.1	-136.4	437.9	159.9	3.76
4,247.0	0.70	19.50	4,203.0	-135.1	439.4	158.8	1.45
4,341.0	0.40	45.50	4,297.0	-134.4	439.9	158.0	0.41
4,436.0	0.50	49.00	4,392.0	-133.9	440.4	157.6	0.11
4,531.0	0.70	308.60	4,487.0	-133.2	440.3	156.9	0.98
4,626.0	1.20	311.30	4,582.0	-132.2	439.1	155.8	0.53
4,720.0	1.60	320.60	4,676.0	-130.6	437.5	154.1	0.49
4,815.0	2.30	270.60	4,770.9	-129.5	434.7	152.9	1.86
4,909.0	2.50	289.60	4,864.9	-128.8	430.9	152.0	0.87
5,004.0	2.80	256.40	4,959.8	-128.7	426.7	151.6	1.62
5,099.0	2.10	249.20	5,054.7	-129.8	422.8	152.6	0.80
5,194.0	1.80	245.70	5,149.6	-131.0	419.8	153.6	0.34
5,289.0	1.80	194.20	5,244.6	-133.1	418.1	155.6	1.65
5,384.0	1.40	185.90	5,339.5	-135.7	417.6	158.2	0.49
5,479.0	1.10	193.70	5,434.5	-137.7	417.3	160.2	0.36
5,573.0	1.80	151.10	5,528.5	-139.9	417.8	162.4	1.32
5,668.0	1.60	147.80	5,623.5	-142.3	419.2	164.9	0.23



**IDS**  
Final Survey Report



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<b>Site:</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)	<b>MD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Well:</b>	Wells Ranch State AA27-79HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,763.0	1.20	139.20	5,718.4	-144.2	420.6	166.8	0.47
5,858.0	0.90	123.70	5,813.4	-145.4	421.9	168.1	0.43
5,953.0	0.70	116.00	5,908.4	-146.1	423.0	168.8	0.24
6,047.0	2.70	189.40	6,002.4	-148.5	423.2	171.2	2.75
6,094.0	10.30	185.50	6,049.0	-153.8	422.6	176.5	16.19
6,141.0	15.80	188.90	6,094.8	-164.3	421.2	186.9	11.81
6,189.0	19.40	184.20	6,140.5	-178.7	419.6	201.2	8.06
6,236.0	23.90	175.30	6,184.2	-196.0	419.8	218.5	11.83
6,284.0	26.70	173.40	6,227.6	-216.4	421.8	239.0	6.07
6,330.0	29.00	173.40	6,268.3	-237.7	424.3	260.4	5.00
6,378.0	32.00	176.90	6,309.6	-262.0	426.3	284.7	7.26
6,425.0	36.80	178.00	6,348.4	-288.5	427.5	311.3	10.30
6,472.0	39.50	177.70	6,385.4	-317.5	428.6	340.3	5.76
6,520.0	42.10	178.00	6,421.7	-348.9	429.7	371.7	5.43
6,567.0	42.60	179.10	6,456.4	-380.5	430.5	403.3	1.90
6,614.0	48.50	181.00	6,489.3	-414.1	430.5	436.8	12.88
6,662.0	55.10	180.90	6,519.0	-451.8	429.9	474.4	13.75
6,709.0	60.90	179.90	6,543.9	-491.6	429.6	514.2	12.47
6,756.0	65.20	179.80	6,565.2	-533.5	429.7	556.0	9.15
6,804.0	68.90	179.80	6,583.9	-577.7	429.9	600.1	7.71
6,851.0	73.00	179.90	6,599.2	-622.1	430.0	644.5	8.73
6,898.0	82.40	180.20	6,609.3	-668.0	429.9	690.3	20.01
6,920.0	86.80	179.90	6,611.3	-689.9	429.9	712.2	20.05
6,957.0	88.58	179.49	6,612.8	-726.8	430.1	749.1	4.92
<b>Actual 7" Csg 14 FEL &amp; 2402' FNL Sec 21</b>							
7,020.0	91.60	178.80	6,612.7	-789.8	431.1	812.0	4.92
7,115.0	89.50	179.90	6,611.8	-884.8	432.1	906.9	2.50
7,209.0	89.40	180.00	6,612.7	-978.8	432.2	1,000.8	0.15
7,304.0	88.60	180.30	6,614.4	-1,073.8	432.0	1,095.6	0.90
7,398.0	87.70	180.40	6,617.4	-1,167.7	431.4	1,189.4	0.96
7,492.0	89.20	180.00	6,619.9	-1,261.7	431.1	1,283.2	1.65
7,587.0	87.80	179.90	6,622.4	-1,356.6	431.1	1,378.0	1.48
7,682.0	88.50	179.60	6,625.5	-1,451.6	431.6	1,472.9	0.80
7,776.0	89.20	179.30	6,627.4	-1,545.6	432.5	1,566.8	0.81
7,871.0	90.20	178.70	6,627.9	-1,640.6	434.1	1,661.7	1.23
7,965.0	90.70	180.00	6,627.1	-1,734.5	435.2	1,755.6	1.48
8,053.0	92.00	179.10	6,625.1	-1,822.5	435.9	1,843.5	1.80
8,148.0	92.20	179.60	6,621.6	-1,917.4	437.0	1,938.3	0.57
8,243.0	90.90	180.70	6,619.0	-2,012.4	436.7	2,033.1	1.79
8,337.0	89.70	180.60	6,618.5	-2,106.4	435.6	2,126.9	1.28
8,431.0	90.50	180.30	6,618.4	-2,200.4	434.9	2,220.7	0.91
8,525.0	88.50	180.20	6,619.2	-2,294.4	434.5	2,314.6	2.13
8,620.0	89.40	180.30	6,620.9	-2,389.4	434.1	2,409.4	0.95
8,714.0	90.50	179.80	6,621.0	-2,483.4	434.0	2,503.2	1.29



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Final Survey Report



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<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Site:</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)	<b>MD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Well:</b>	Wells Ranch State AA27-79HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
8,807.0	87.60	178.90	6,622.5	-2,576.3	435.0	2,596.1	3.26
8,902.0	88.10	178.60	6,626.1	-2,671.2	437.1	2,691.0	0.61
8,996.0	89.00	177.50	6,628.5	-2,765.2	440.3	2,785.0	1.51
9,089.0	90.00	177.50	6,629.3	-2,858.1	444.4	2,878.0	1.08
9,184.0	91.20	176.90	6,628.3	-2,952.9	449.0	2,973.0	1.41
9,279.0	89.70	178.50	6,627.6	-3,047.9	452.8	3,067.9	2.31
9,374.0	90.90	178.20	6,627.1	-3,142.8	455.6	3,162.9	1.30
9,469.0	90.10	180.90	6,626.2	-3,237.8	456.3	3,257.8	2.96
9,563.0	90.60	180.20	6,625.7	-3,331.8	455.4	3,351.6	0.92
9,657.0	91.30	179.80	6,624.1	-3,425.8	455.4	3,445.4	0.86
9,752.0	90.80	181.80	6,622.4	-3,520.7	454.1	3,540.2	2.17
9,846.0	89.30	182.10	6,622.3	-3,614.7	450.9	3,633.8	1.63
9,940.0	89.60	182.10	6,623.2	-3,708.6	447.4	3,727.4	0.32
10,035.0	91.00	181.70	6,622.7	-3,803.6	444.3	3,822.1	1.53
10,130.0	89.40	182.50	6,622.4	-3,898.5	440.8	3,916.7	1.88
10,223.0	90.80	181.90	6,622.2	-3,991.4	437.2	4,009.3	1.64
10,315.0	88.50	181.40	6,622.7	-4,083.4	434.6	4,100.9	2.56
10,410.0	88.80	180.70	6,625.0	-4,178.3	432.8	4,195.7	0.80
10,505.0	88.30	180.00	6,627.4	-4,273.3	432.3	4,290.5	0.91
10,600.0	88.40	179.40	6,630.1	-4,368.3	432.8	4,385.3	0.64
10,695.0	87.80	178.50	6,633.3	-4,463.2	434.5	4,480.2	1.14
10,790.0	87.70	177.20	6,637.0	-4,558.0	438.1	4,575.1	1.37
10,885.0	91.70	176.60	6,637.5	-4,652.9	443.2	4,670.1	4.26
10,979.0	92.10	177.20	6,634.4	-4,746.7	448.3	4,764.0	0.77
11,074.0	91.10	178.80	6,631.7	-4,841.6	451.6	4,859.0	1.99
11,169.0	90.50	180.40	6,630.4	-4,936.6	452.3	4,953.9	1.80
11,264.0	91.20	179.90	6,629.0	-5,031.6	452.0	5,048.7	0.91
11,358.0	91.70	181.20	6,626.6	-5,125.5	451.1	5,142.5	1.48
11,453.0	90.50	181.50	6,624.8	-5,220.5	448.9	5,237.2	1.30
11,548.0	91.70	180.50	6,623.0	-5,315.5	447.2	5,331.9	1.64
11,643.0	90.10	181.20	6,621.5	-5,410.4	445.8	5,426.6	1.84
11,738.0	90.80	180.50	6,620.7	-5,505.4	444.4	5,521.4	1.04
11,832.0	88.50	179.80	6,621.3	-5,599.4	444.1	5,615.3	2.56
11,927.0	89.30	179.60	6,623.1	-5,694.4	444.6	5,710.1	0.87
12,022.0	90.00	178.80	6,623.7	-5,789.4	446.0	5,805.0	1.12
12,117.0	90.80	178.30	6,623.0	-5,884.3	448.4	5,900.0	0.99
12,212.0	91.90	177.60	6,620.8	-5,979.3	451.8	5,995.0	1.37
12,307.0	91.10	178.90	6,618.3	-6,074.2	454.7	6,089.9	1.61
12,401.0	89.10	180.30	6,618.2	-6,168.2	455.3	6,183.8	2.60
12,496.0	90.40	180.40	6,618.6	-6,263.2	454.7	6,278.6	1.37
12,591.0	91.70	179.90	6,616.8	-6,358.1	454.5	6,373.4	1.47
12,686.0	90.30	181.20	6,615.2	-6,453.1	453.6	6,468.2	2.01
12,781.0	91.40	180.60	6,613.8	-6,548.1	452.1	6,563.0	1.32
12,876.0	89.80	182.60	6,612.8	-6,643.0	449.4	6,657.6	2.70



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<b>Site:</b>	Sec 21 - T6N - R63W (Wells Ranch AA21)	<b>MD Reference:</b>	Well @ 4751.0usft (HP 277)
<b>Well:</b>	Wells Ranch State AA27-79HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
12,971.0	90.60	182.10	6,612.4	-6,738.0	445.5	6,752.2	0.99
13,066.0	89.10	182.40	6,612.7	-6,832.9	441.8	6,846.8	1.61
13,160.0	90.30	182.60	6,613.2	-6,926.8	437.7	6,940.3	1.29
13,255.0	91.70	182.60	6,611.5	-7,021.7	433.4	7,034.8	1.47
13,350.0	89.90	181.10	6,610.2	-7,116.6	430.3	7,129.5	2.47
13,445.0	88.30	180.20	6,611.7	-7,211.6	429.3	7,224.3	1.93
13,540.0	89.30	180.10	6,613.7	-7,306.6	429.0	7,319.1	1.06
13,634.0	90.50	180.00	6,613.8	-7,400.6	428.9	7,412.9	1.28
13,729.0	88.10	179.50	6,615.0	-7,495.6	429.3	7,507.8	2.58
13,824.0	88.90	179.60	6,617.5	-7,590.5	430.1	7,602.7	0.85
13,919.0	89.80	179.10	6,618.6	-7,685.5	431.2	7,697.6	1.08
14,013.0	90.70	179.20	6,618.2	-7,779.5	432.6	7,791.5	0.96
14,108.0	88.90	177.90	6,618.5	-7,874.5	435.0	7,886.5	2.34
14,203.0	90.50	178.00	6,619.0	-7,969.4	438.4	7,981.4	1.69
14,297.0	91.20	177.40	6,617.6	-8,063.3	442.1	8,075.4	0.98
14,392.0	89.10	178.00	6,617.3	-8,158.2	446.0	8,170.4	2.30
14,487.0	89.50	178.00	6,618.5	-8,253.2	449.3	8,265.4	0.42
<b>Last MWD @ 14487' MD / 6619' TVD</b>							
14,568.0	89.50	178.00	6,619.2	-8,334.1	452.1	8,346.4	0.00
<b>PTD @ 14568' MD / 6619' TVD / 22' FWL &amp; 536' FSL Sec 27</b>							

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
934.0	934.0	0.3	-2.2	First MWD
6,957.0	6,612.8	-726.8	430.1	Actual 7" Csg 14 FEL & 2402' FNL Sec 21
14,487.0	6,618.5	-8,253.2	449.3	Last MWD @ 14487' MD / 6619' TVD
14,568.0	6,619.2	-8,334.1	452.1	PTD @ 14568' MD / 6619' TVD / 22' FWL & 536' FSL Sec 27

Checked By: _____	Approved By: _____	Date: _____
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# Weld County, CO (NAD 83) Sec 21 - T6N - R63W (Wells Ranch AA21) Wells Ranch State AA27-79HN



## HP 277

## Plan #2

### CASING DETAILS

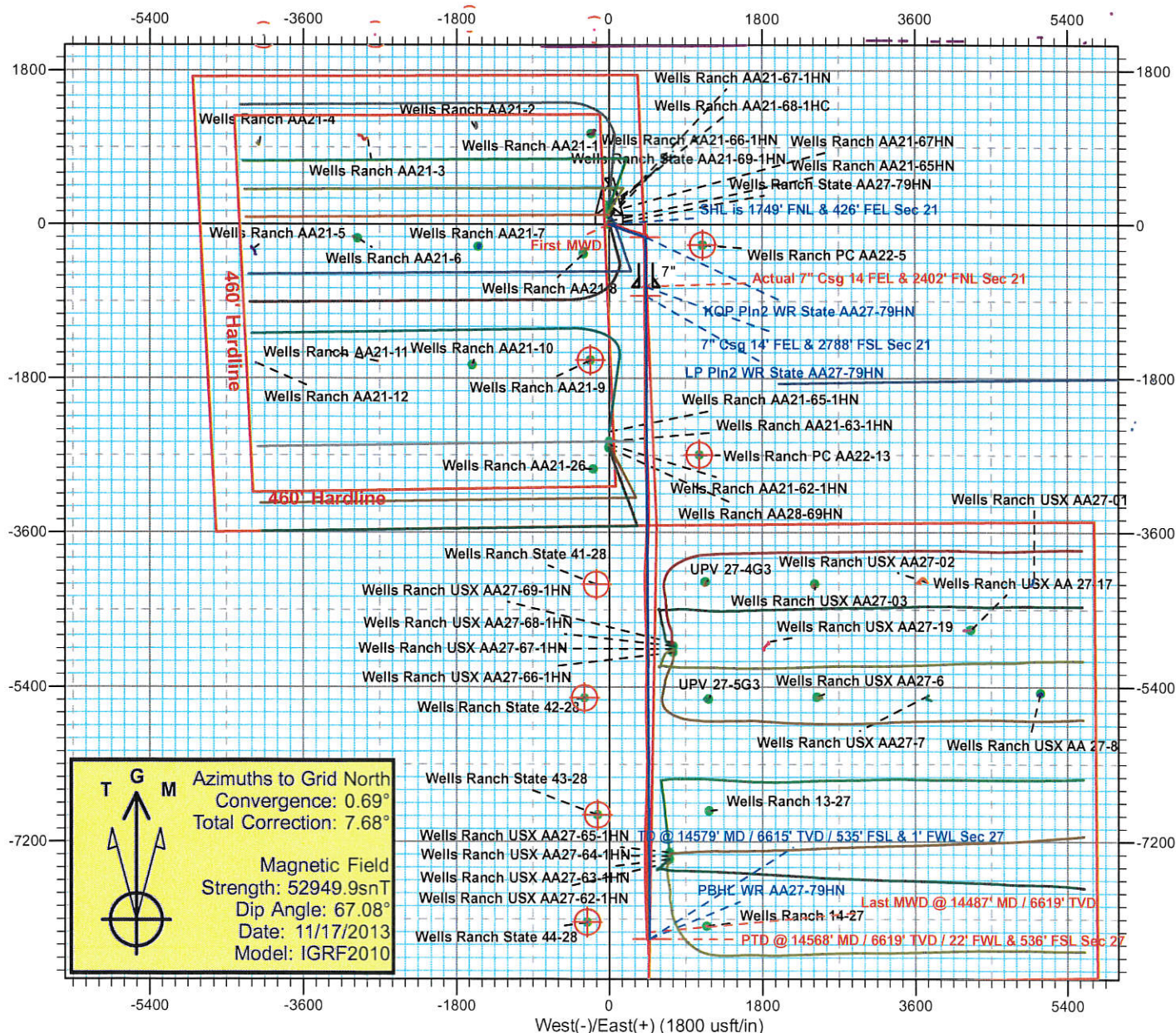
TVD	MD	Name	Size
6622.2	6975.7	7"	7"

### SITE DETAILS: Sec 21 - T6N - R63W (Wells Ranch AA21)

Site Centre Northing: 1417534.22  
Easting: 3296552.45  
Positional Uncertainty: 0.0  
Convergence: 0.69  
Local North: Grid

### SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1500.0	0.00	0.00	1500.0	0.0	0.0	0.00	0.00	0.0	
2100.0	12.00	109.32	2095.7	-20.7	59.1	2.00	109.32	23.9	
3678.2	12.00	109.32	3639.3	-129.3	368.7	0.00	0.00	149.1	
4278.2	0.00	0.00	4235.0	-150.0	427.8	2.00	180.00	173.0	
6031.2	0.00	0.00	5988.0	-150.0	427.8	0.00	0.00	173.0	KOP Pln2 WR State AA27-79HN
6975.7	85.00	179.68	6622.2	-731.1	431.1	9.00	179.68	753.4	
7025.7	85.00	179.68	6626.6	-780.9	431.4	0.00	0.00	803.2	
7082.4	90.10	179.68	6629.0	-837.6	431.7	9.00	0.03	859.8	
14578.7	90.10	179.68	6615.4	-8333.8	473.1	0.00	0.00	8347.2	PBHL WR AA27-79HN





# Weld County, CO (NAD 83) Sec 21 - T6N - R63W (Wells Ranch AA21) Wells Ranch State AA27-79HN



## HP 277

## Plan #2

### CASING DETAILS

TVD	MD	Name	Size
6622.2	6975.7	7"	7"

### SITE DETAILS: Sec 21 - T6N - R63W (Wells Ranch AA21)

Site Centre Northing: 1417534.22  
Easting: 3296552.45  
Positional Uncertainty: 0.0  
Convergence: 0.69  
Local North: Grid

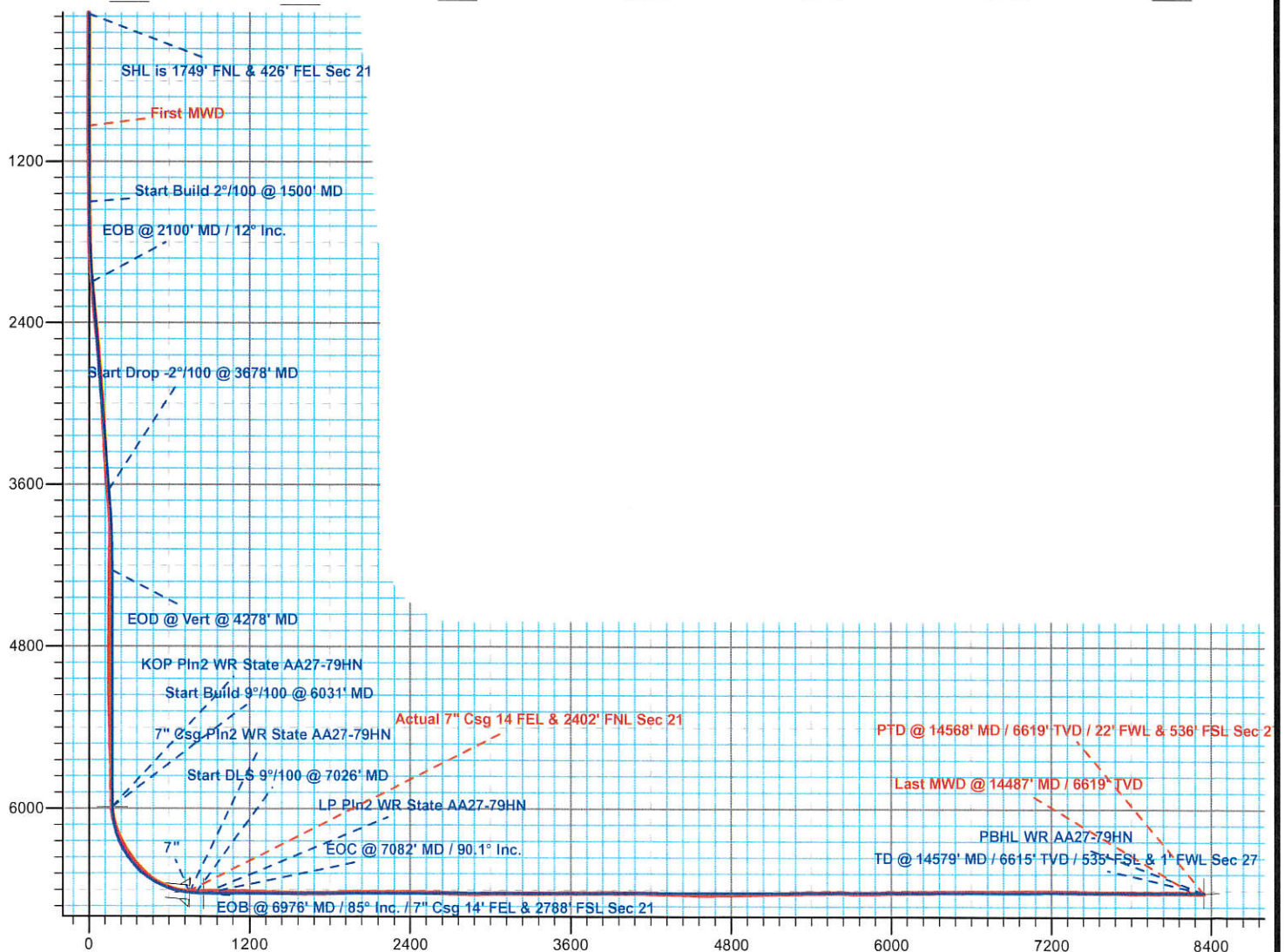
### SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1500.0	0.00	0.00	1500.0	0.0	0.0	0.00	0.00	0.0	
2100.0	12.00	109.32	2095.7	-20.7	59.1	2.00	109.32	23.9	
3678.2	12.00	109.32	3639.3	-129.3	368.7	0.00	0.00	149.1	
4278.2	0.00	0.00	4235.0	-150.0	427.8	2.00	180.00	173.0	
6031.2	0.00	0.00	5988.0	-150.0	427.8	0.00	0.00	173.0	KOP Pln2 WR State AA27-79HN
6975.7	85.00	179.68	6622.2	-731.1	431.1	9.00	179.68	753.4	
7025.7	85.00	179.68	6626.6	-780.9	431.4	0.00	0.00	803.2	
7082.4	90.10	179.68	6629.0	-837.6	431.7	9.00	0.03	859.8	
14578.7	90.10	179.68	6615.4	-8333.8	473.1	0.00	0.00	8347.2	PBHL WR AA27-79HN



Azimuths to Grid North  
Convergence: 0.69°  
Total Correction: 7.68°

Magnetic Field  
Strength: 52949.9snT  
Dip Angle: 67.08°  
Date: 11/17/2013  
Model: IGRF2010



Vertical Section at 176.89° (1200 usft/in)