

Noble Energy

Weld County, CO (NAD 83)

Sec. 29-T6N-R62W (Wells Ranch USX AE29 PAD)

Wells Ranch USX AE29-63-1HN - A1

Design: MWD Survey

Sperry Drilling Services Final Survey Report

13 June, 2012

Well Coordinates: 1,409,559.14 N, 3,318,766.17 E (40° 27' 07.16" N, 104° 21' 16.38" W)

Ground Level: 4,769.00 ft

Local Coordinate Origin:	Centered on Well Wells Ranch USX AE29-63-1HN -
Viewing Datum:	KB @ 4793.00ft (H&P 315)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

HALLIBURTON

Design Report for Wells Ranch USX AE29-63-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
753.00	0.00	0.00	753.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 753.00ft							
836.00	0.65	318.60	836.00	0.35	-0.31	-0.28	0.78
First MWD Survey							
1,082.00	0.47	282.44	1,081.99	1.62	-2.22	-2.09	0.16
1,458.00	0.20	58.83	1,457.98	2.29	-3.16	-2.98	0.17
1,743.00	0.68	39.33	1,742.97	3.85	-1.67	-1.37	0.17
1,933.00	0.55	63.53	1,932.96	5.13	-0.14	0.26	0.15
2,028.00	3.09	11.11	2,027.91	7.85	0.77	1.36	2.94
2,123.00	5.66	9.39	2,122.63	14.99	2.02	3.16	2.71
2,217.00	7.93	10.72	2,215.96	25.93	3.99	5.95	2.42
2,312.00	8.56	3.33	2,309.98	39.43	5.62	8.61	1.30
2,407.00	9.50	352.94	2,403.81	54.27	5.06	9.19	1.98
2,502.00	8.59	351.81	2,497.63	69.07	3.09	8.35	0.98
2,597.00	10.27	356.46	2,591.34	84.55	1.56	8.00	1.94
2,692.00	9.38	357.22	2,684.95	100.73	0.66	8.34	0.95
2,787.00	8.70	356.92	2,778.77	115.64	-0.10	8.71	0.72
2,882.00	10.07	359.46	2,872.49	131.12	-0.57	9.43	1.51
2,976.00	10.13	358.56	2,965.04	147.60	-0.85	10.40	0.18
3,071.00	9.39	359.36	3,058.66	163.70	-1.15	11.34	0.79
3,166.00	8.28	1.12	3,152.53	178.29	-1.10	12.49	1.20
3,261.00	9.58	357.48	3,246.38	193.03	-1.32	13.41	1.49
3,356.00	7.02	359.08	3,340.38	206.73	-1.76	14.01	2.71
3,451.00	8.12	358.76	3,434.55	219.25	-2.00	14.73	1.16
3,546.00	9.31	354.16	3,528.45	233.60	-2.92	14.90	1.45
3,641.00	10.57	353.12	3,622.02	249.90	-4.75	14.32	1.34
3,736.00	11.04	0.66	3,715.34	267.64	-5.69	14.74	1.57
3,831.00	12.43	5.51	3,808.36	286.92	-4.60	17.29	1.79
3,925.00	11.09	1.79	3,900.38	306.02	-3.35	20.00	1.64
4,020.00	10.91	7.53	3,993.64	324.07	-1.88	22.83	1.17
4,115.00	10.34	9.57	4,087.01	341.39	0.71	26.74	0.72
4,210.00	9.43	13.61	4,180.60	357.36	3.96	31.20	1.20
4,305.00	7.59	11.17	4,274.55	371.08	7.01	35.28	1.97
4,400.00	6.08	2.82	4,368.88	382.26	8.47	37.59	1.90
4,495.00	5.23	2.95	4,463.41	391.61	8.94	38.78	0.89
4,590.00	2.24	343.02	4,558.20	397.71	8.62	38.92	3.39
4,685.00	1.88	336.09	4,653.14	400.91	7.45	38.00	0.46
4,969.00	1.40	284.38	4,937.04	406.03	2.20	33.15	0.53
5,254.00	1.25	258.53	5,221.96	406.28	-4.22	26.77	0.21
5,539.00	0.66	308.50	5,506.93	406.68	-8.55	22.48	0.34
5,677.00	0.59	314.12	5,644.92	407.67	-9.68	21.43	0.07
5,739.00	0.70	280.94	5,706.92	407.97	-10.29	20.85	0.62
5,819.00	3.45	83.58	5,786.88	408.33	-8.37	22.79	5.15
5,867.00	10.12	90.13	5,834.51	408.48	-2.71	28.44	13.97
5,914.00	15.75	92.80	5,880.30	408.16	7.80	38.90	12.04
5,962.00	19.10	90.94	5,926.09	407.71	22.16	53.18	7.07
6,009.00	21.65	88.73	5,970.15	407.78	38.52	69.50	5.67
6,057.00	22.98	87.93	6,014.55	408.31	56.73	87.70	2.84
6,104.00	25.71	87.90	6,057.37	409.02	76.10	107.06	5.81

Design Report for Wells Ranch USX AE29-63-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,152.00	30.10	86.72	6,099.78	410.09	98.53	129.51	9.22
6,199.00	35.60	85.66	6,139.25	411.80	123.95	154.99	11.77
6,247.00	40.02	85.27	6,177.16	414.13	153.28	184.41	9.22
6,294.00	41.86	86.52	6,212.66	416.33	184.00	215.21	4.29
6,342.00	44.38	87.94	6,247.70	417.90	216.76	248.00	5.63
6,389.00	47.12	87.69	6,280.49	419.19	250.40	281.64	5.84
6,437.00	52.09	87.41	6,311.59	420.75	286.91	318.16	10.36
6,483.00	56.70	87.60	6,338.36	422.38	324.27	355.53	10.03
6,531.00	60.87	87.27	6,363.23	424.22	365.27	396.55	8.71
6,578.00	62.74	87.61	6,385.44	426.07	406.65	437.95	4.03
6,626.00	65.04	87.82	6,406.56	427.79	449.71	481.02	4.81
6,673.00	68.13	87.90	6,425.24	429.40	492.81	524.11	6.58
6,721.00	71.58	87.48	6,441.77	431.21	537.83	569.14	7.23
6,768.00	75.86	87.14	6,454.94	433.33	582.88	614.23	9.13
6,816.00	81.44	86.09	6,464.38	436.11	629.84	661.26	11.82
6,875.00	86.08	85.22	6,470.79	440.56	688.31	719.90	8.00
6,959.00	90.18	87.00	6,473.53	446.25	772.05	803.83	5.32
7,022.00	90.68	86.55	6,473.06	449.80	834.95	866.81	1.07
7,117.00	90.99	87.33	6,471.68	454.87	929.80	961.78	0.88
7,212.00	89.97	88.75	6,470.88	458.12	1,024.74	1,056.69	1.84
7,307.00	90.12	88.32	6,470.81	460.54	1,119.71	1,151.56	0.48
7,402.00	89.29	89.42	6,471.29	462.42	1,214.68	1,246.41	1.45
7,497.00	88.80	89.63	6,472.88	463.20	1,309.67	1,341.17	0.56
7,591.00	89.01	89.21	6,474.67	464.16	1,403.65	1,434.95	0.50
7,686.00	90.00	88.99	6,475.49	465.65	1,498.63	1,529.77	1.07
7,781.00	89.82	87.44	6,475.64	468.61	1,593.58	1,624.67	1.64
7,876.00	91.91	87.82	6,474.21	472.54	1,688.48	1,719.60	2.24
7,971.00	91.39	87.99	6,471.47	476.01	1,783.38	1,814.48	0.58
8,066.00	89.66	88.65	6,470.60	478.79	1,878.33	1,909.37	1.95
8,161.00	88.77	88.75	6,471.91	480.95	1,973.30	2,004.22	0.94
8,256.00	88.98	89.27	6,473.77	482.59	2,068.26	2,099.04	0.59
8,351.00	89.54	88.80	6,475.00	484.19	2,163.24	2,193.86	0.77
8,445.00	88.40	87.01	6,476.69	487.62	2,257.16	2,287.77	2.26
8,540.00	90.59	87.18	6,477.52	492.44	2,352.03	2,382.73	2.31
8,635.00	90.89	86.88	6,476.30	497.36	2,446.89	2,477.69	0.45
8,730.00	89.20	86.55	6,476.22	502.80	2,541.73	2,572.67	1.81
8,825.00	90.55	88.43	6,476.43	506.96	2,636.63	2,667.61	2.44
8,920.00	90.80	87.83	6,475.31	510.06	2,731.57	2,762.51	0.68
9,015.00	90.46	88.07	6,474.27	513.46	2,826.51	2,857.43	0.44
9,110.00	90.03	89.63	6,473.86	515.37	2,921.48	2,952.28	1.70
9,205.00	88.52	87.62	6,475.06	517.65	3,016.44	3,047.13	2.65
9,300.00	88.95	85.83	6,477.16	523.07	3,111.26	3,142.09	1.94
9,395.00	89.01	86.52	6,478.85	529.41	3,206.03	3,237.07	0.73
9,489.00	89.23	87.73	6,480.30	534.12	3,299.90	3,331.02	1.31
9,584.00	91.30	89.99	6,479.86	536.01	3,394.87	3,425.86	3.23
9,679.00	91.17	89.87	6,477.81	536.13	3,489.85	3,520.57	0.19
9,774.00	90.31	89.78	6,476.58	536.42	3,584.84	3,615.30	0.91
9,869.00	89.01	88.74	6,477.14	537.65	3,679.83	3,710.11	1.75
9,964.00	88.36	89.80	6,479.33	538.86	3,774.79	3,804.89	1.31
10,057.00	89.01	90.24	6,481.46	538.82	3,867.77	3,897.59	0.84
10,150.00	91.05	90.88	6,481.41	537.91	3,960.76	3,990.24	2.30

Design Report for Wells Ranch USX AE29-63-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
10,243.00	90.49	89.88	6,480.16	537.30	4,053.74	4,082.91	1.23
10,336.00	89.63	87.42	6,480.06	539.49	4,146.71	4,175.77	2.80
10,429.00	89.81	86.65	6,480.52	544.30	4,239.58	4,268.74	0.85
10,522.00	89.57	86.14	6,481.02	550.15	4,332.40	4,361.73	0.61
10,614.00	89.91	86.21	6,481.44	556.28	4,424.19	4,453.73	0.38
10,708.00	90.15	86.25	6,481.39	562.46	4,517.99	4,547.72	0.26
10,800.00	89.66	86.21	6,481.54	568.51	4,609.79	4,639.72	0.53
Final MWD Survey							
10,959.00	89.66	86.21	6,482.49	579.02	4,768.44	4,798.71	0.00
Survey Projection to TD - Estimated BHL: 1036' FSL, 104' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
753.00	753.00	0.00	0.00	Surface Casing Assumed Vertical at 753.00ft
836.00	836.00	0.35	-0.31	First MWD Survey
10,800.00	6,481.54	568.51	4,609.79	Final MWD Survey
10,959.00	6,482.49	579.02	4,768.44	Survey Projection to TD
10,959.00	6,482.49	579.02	4,768.44	Estimated BHL: 1036' FSL, 104' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	Wells Ranch USX AE29-63-1HN_PlanA - Rev1_BHL Tgt	85.63	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
753.00	10,959.00	Sperry MWD Surveys	MWD

Design Report for Wells Ranch USX AE29-63-1HN - MWD Survey

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,409,559.14	3,318,766.17	40° 27' 7.164 N	104° 21' 16.380 W
- actual wellpath hits target center									
- Polygon									
Point 1			5,353.00	6.00		1,409,565.14	3,324,118.97		
Point 2			5,242.00	4,401.00		1,413,959.98	3,324,007.97		
Point 3			9,615.00	4,591.00		1,414,149.97	3,328,380.81		
Point 4			9,622.00	224.00		1,409,783.14	3,328,387.81		
Point 5			5,353.00	6.00		1,409,565.14	3,324,118.97		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,409,559.14	3,318,766.17	40° 27' 7.164 N	104° 21' 16.380 W
- actual wellpath hits target center									
- Polygon									
Point 1			-544.00	-583.00		1,408,976.17	3,318,222.19		
Point 2			-515.00	4,719.00		1,414,277.97	3,318,251.19		
Point 3			4,782.00	4,861.00		1,414,419.96	3,323,547.99		
Point 4			4,893.00	-454.00		1,409,105.16	3,323,658.99		
Point 5			-544.00	-583.00		1,408,976.17	3,318,222.19		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,409,559.14	3,318,766.17	40° 27' 7.164 N	104° 21' 16.380 W
- actual wellpath hits target center									
- Polygon									
Point 1			4,893.00	-454.00		1,409,105.16	3,323,658.99		
Point 2			4,782.00	4,861.00		1,414,419.96	3,323,547.99		
Point 3			10,075.00	5,051.00		1,414,609.96	3,328,840.80		
Point 4			10,082.00	-236.00		1,409,323.15	3,328,847.80		
Point 5			4,893.00	-454.00		1,409,105.16	3,323,658.99		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,409,559.14	3,318,766.17	40° 27' 7.164 N	104° 21' 16.380 W
- actual wellpath hits target center									
- Polygon									
Point 1			-84.00	-123.00		1,409,436.15	3,318,682.17		
Point 2			-55.00	4,259.00		1,413,817.99	3,318,711.17		
Point 3			4,322.00	4,401.00		1,413,959.98	3,323,088.01		
Point 4			4,433.00	6.00		1,409,565.14	3,323,199.00		
Point 5			-84.00	-123.00		1,409,436.15	3,318,682.17		
Wells Ranch USX	0.00	0.00	6,476.00	729.97	9,545.41	1,410,289.09	3,328,311.23	40° 27' 13.140 N	104° 19' 12.792 W
- actual wellpath misses target center by 4779.36ft at 10959.00ft MD (6482.49 TVD, 579.02 N, 4768.44 E)									
- Point									

North Reference Sheet for Sec. 29-T6N-R62W (Wells Ranch USX AE29 PAD) - Wells Ranch USX AE29-63-1HN

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

Vertical Depths are relative to KB @ 4793.00ft (H&P 315). Northing and Easting are relative to Wells Ranch USX AE29-63-1HN - Slot A1

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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996300

Grid Coordinates of Well: 1,409,559.14 ft N, 3,318,766.17 ft E

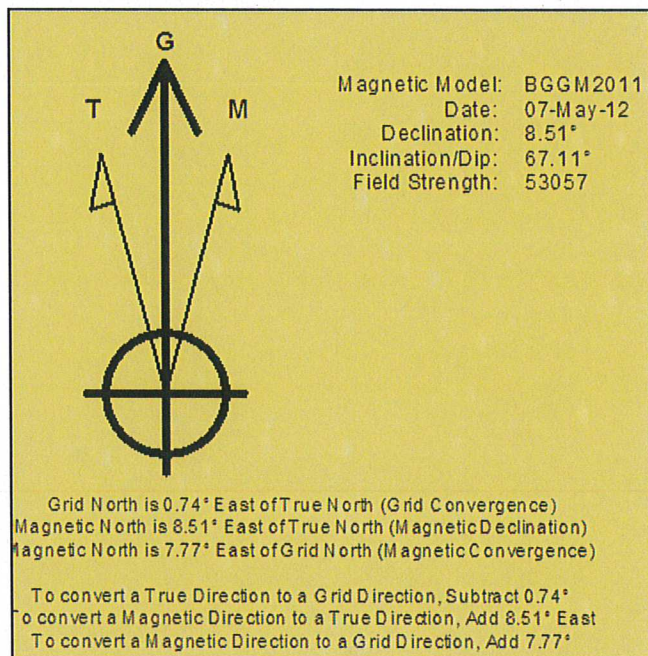
Geographical Coordinates of Well: 40° 27' 07.16" N, 104° 21' 16.38" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,959.00ft

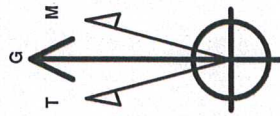
the Bottom Hole Displacement is 4,803.46ft in the Direction of 83.08° (Grid).

Magnetic Convergence at surface is: -7.77° (7 May 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)
 Site: Sec. 29-T6N-R62W (Wells Ranch USX AE29 PAD)
 Well: Wells Ranch USX AE29-63-1HN

Noble Energy

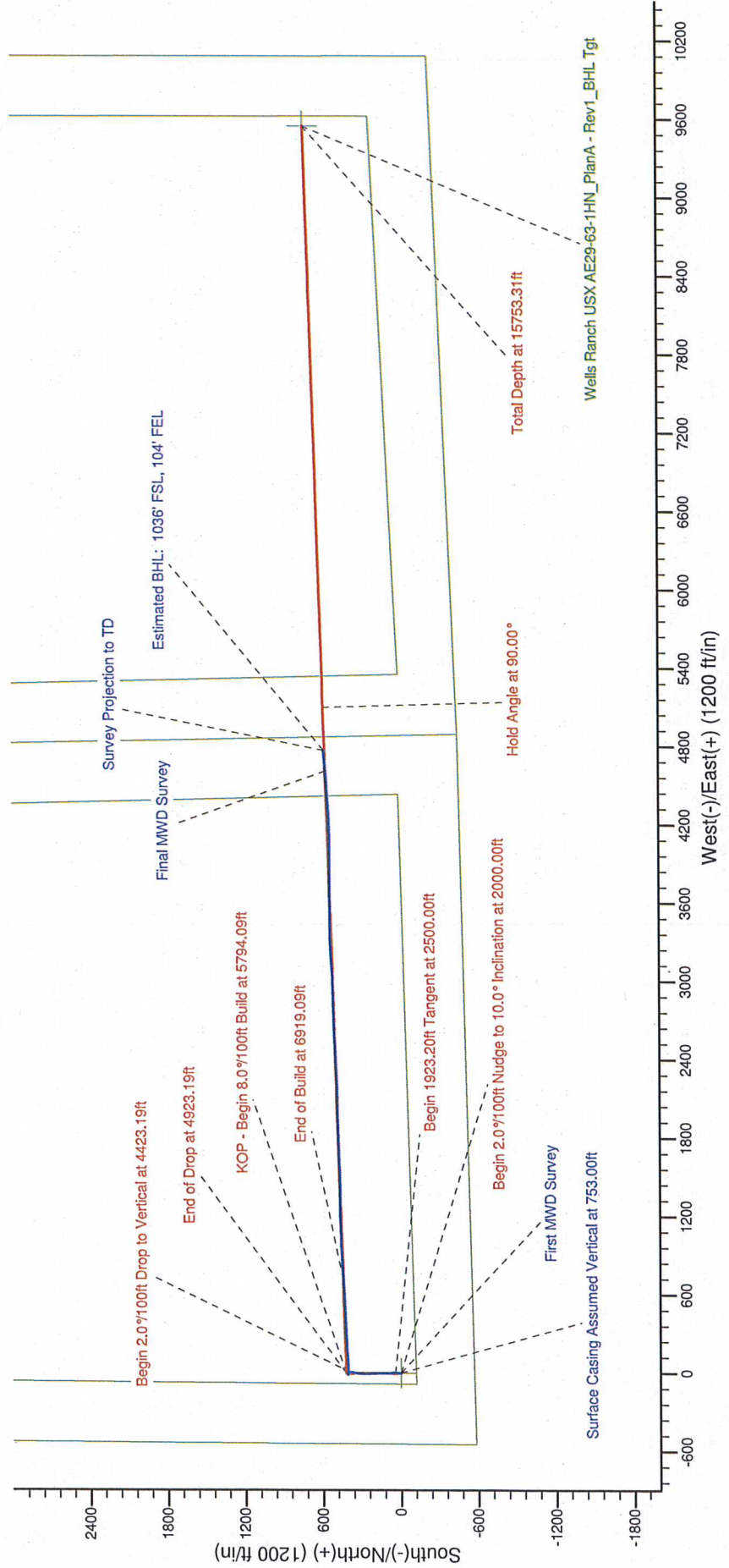


Azimuths to Grid North
 True North: -0.74°
 Magnetic North: 7.77°
 Magnetic Field
 Strength: 53056.8nT
 Dip Angle: 67.11°
 Date: 5/7/2012
 Model: BGGM2011

LEGEND

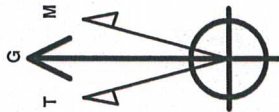
- Wells Ranch USX AE29-63-1HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch USX AE29-63-1HN 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. 29-T6N-R62W (Wells Ranch USX AE29 PAD)
Well: Wells Ranch USX AE29-63-1HN

Noble Energy



Azimuths to Grid North
True North: -0.74°
Magnetic North: 7.77°
Magnetic Field
Strength: 53056.8snT
Dip Angle: 67.11°
Date: 5/7/2012
Model: BGGM2011

LEGEND

- Wells Ranch USX AE29-63-1HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

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