

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 29 T3N-R65W

Wardell 2N-29HZ

Plan D Rev 1

Design: Actual Field Surveys

## Sperry Drilling Services Standard Report

11 June, 2012

Well Coordinates: 1,313,179.41 N, 3,228,349.54 E (40° 11' 24.67" N, 104° 40' 57.44" W)

Ground Level: 4,870.00 ft

Local Coordinate Origin:

Centered on Well Wardell 2N-29HZ

Viewing Datum:

RKB=16' @ 4886.00ft (Extreme 22)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

**Design Report for Wardell 2N-29HZ - Actual Field Surveys**

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
100.00	0.59	52.84	100.00	0.31	0.41	0.23	0.59
<b>First Gyro Survey @ 100.00ft</b>							
200.00	0.40	56.85	199.99	0.81	1.11	0.59	0.19
300.00	0.19	17.04	299.99	1.16	1.45	0.87	0.28
400.00	0.25	282.64	399.99	1.37	1.29	1.11	0.33
500.00	0.20	152.00	499.99	1.26	1.16	1.03	0.41
600.00	0.22	357.21	599.99	1.30	1.23	1.05	0.41
700.00	0.09	283.59	699.99	1.51	1.15	1.27	0.21
800.00	0.10	183.51	799.99	1.44	1.06	1.22	0.15
865.00	0.16	198.00	864.99	1.30	1.03	1.09	0.10
<b>Final Gyro Survey @ 865.00ft - Tie-On to Surface Gyros @ 865.00ft</b>							
1,043.00	0.33	36.67	1,042.99	1.47	1.26	1.22	0.27
<b>First Sperry MWD Survey @ 1043.00ft</b>							
1,131.00	0.73	204.51	1,130.99	1.17	1.18	0.93	1.20
1,224.00	4.43	211.00	1,223.88	-2.45	-0.92	-2.24	3.98
1,316.00	8.48	210.12	1,315.28	-11.37	-6.15	-10.04	4.40
1,408.00	8.98	200.07	1,406.22	-23.98	-12.02	-21.36	1.74
1,499.00	11.00	196.14	1,495.83	-38.99	-16.87	-35.22	2.34
1,591.00	11.25	178.78	1,586.13	-56.40	-19.12	-51.91	3.64
1,683.00	11.84	180.46	1,676.27	-74.81	-19.01	-70.03	0.74
1,775.00	11.27	192.94	1,766.42	-93.02	-21.10	-87.53	2.78
1,867.00	11.05	194.68	1,856.68	-110.31	-25.34	-103.74	0.44
1,959.00	11.56	197.50	1,946.89	-127.63	-30.35	-119.85	0.82
2,045.00	10.92	191.51	2,031.25	-143.83	-34.57	-134.99	1.55
2,131.00	11.87	199.45	2,115.55	-160.15	-39.14	-150.19	2.13
2,216.00	10.98	200.84	2,198.87	-175.96	-44.93	-164.66	1.10
2,302.00	12.50	211.22	2,283.08	-191.57	-52.67	-178.58	3.02
2,387.00	13.18	217.37	2,365.96	-207.14	-63.32	-191.92	1.79
2,473.00	12.17	221.59	2,449.86	-221.72	-75.29	-204.04	1.59
2,559.00	9.81	233.09	2,534.29	-232.90	-87.16	-212.84	3.73
2,644.00	10.06	240.70	2,618.02	-240.88	-99.43	-218.43	1.57
2,730.00	9.76	239.77	2,702.73	-248.23	-112.28	-223.28	0.40
2,816.00	12.21	252.28	2,787.16	-254.67	-127.24	-226.85	3.96
2,901.00	12.88	249.76	2,870.13	-260.68	-144.69	-229.54	1.02
2,987.00	13.99	256.02	2,953.78	-266.51	-163.78	-231.75	2.13
3,073.00	14.00	255.11	3,037.23	-271.69	-183.92	-233.14	0.26
3,158.00	12.11	257.78	3,120.03	-276.22	-202.57	-234.15	2.33
3,244.00	10.95	259.75	3,204.29	-279.59	-219.42	-234.35	1.42
3,330.00	11.44	256.86	3,288.66	-282.98	-235.77	-234.67	0.87
3,415.00	8.54	258.09	3,372.36	-286.20	-250.15	-235.18	3.42
3,501.00	10.27	253.59	3,457.20	-289.68	-263.76	-236.10	2.18
3,587.00	12.21	258.20	3,541.55	-293.71	-280.02	-237.06	2.48
3,672.00	11.90	257.97	3,624.68	-297.37	-297.39	-237.46	0.37
3,758.00	11.88	262.73	3,708.83	-300.34	-314.84	-237.16	1.14
3,844.00	11.11	272.81	3,793.12	-301.05	-331.90	-234.72	2.50
3,930.00	10.58	273.07	3,877.58	-300.23	-348.06	-230.93	0.62
4,015.00	11.57	265.97	3,961.00	-300.41	-364.35	-228.10	1.98
4,101.00	14.54	262.61	4,044.77	-302.40	-383.67	-226.50	3.56
4,186.00	13.62	261.26	4,127.21	-305.29	-404.14	-225.57	1.15

**Design Report for Wardell 2N-29HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,272.00	11.78	259.62	4,211.11	-308.42	-422.79	-225.20	2.18
4,358.00	13.08	265.04	4,295.09	-310.84	-441.12	-224.21	2.03
4,444.00	12.25	263.37	4,379.00	-312.73	-459.87	-222.61	1.05
4,529.00	10.43	262.91	4,462.34	-314.72	-476.47	-221.51	2.14
4,615.00	9.83	271.38	4,547.00	-315.51	-491.53	-219.50	1.87
4,701.00	9.05	269.35	4,631.84	-315.41	-505.64	-216.80	0.99
4,787.00	7.91	272.49	4,716.89	-315.23	-518.31	-214.29	1.43
4,872.00	6.46	275.57	4,801.22	-314.51	-528.91	-211.63	1.76
4,958.00	6.52	258.18	4,886.68	-315.04	-538.51	-210.38	2.28
5,044.00	8.68	256.28	4,971.92	-317.58	-549.59	-210.84	2.53
5,130.00	7.58	261.58	5,057.06	-319.95	-561.51	-210.97	1.55
5,215.00	6.08	264.60	5,141.45	-321.19	-571.54	-210.34	1.81
5,301.00	7.11	251.87	5,226.89	-323.28	-581.13	-210.63	2.07
5,387.00	8.63	247.16	5,312.07	-327.44	-592.14	-212.69	1.92
5,473.00	7.72	244.14	5,397.20	-332.46	-603.28	-215.57	1.17
5,559.00	6.04	254.95	5,482.58	-336.16	-612.85	-217.44	2.46
5,644.00	6.33	259.85	5,567.09	-338.15	-621.78	-217.74	0.71
5,730.00	5.40	261.69	5,652.64	-339.57	-630.45	-217.54	1.10
5,816.00	4.35	253.47	5,738.32	-341.08	-637.58	-217.72	1.46
5,902.00	3.07	245.30	5,824.14	-342.97	-642.80	-218.61	1.61
5,987.00	1.61	218.76	5,909.07	-344.85	-645.62	-219.94	2.10
6,073.00	0.54	154.09	5,995.06	-346.16	-646.20	-221.12	1.70
6,159.00	0.52	119.52	6,081.05	-346.72	-645.68	-221.76	0.37
6,244.00	0.84	111.46	6,166.05	-347.13	-644.76	-222.34	0.39
6,330.00	1.42	99.26	6,252.03	-347.54	-643.13	-223.04	0.73
6,416.00	1.93	107.01	6,337.99	-348.13	-640.69	-224.07	0.65
6,459.00	2.02	116.76	6,380.97	-348.68	-639.32	-224.87	0.81
6,502.00	2.71	105.28	6,423.93	-349.29	-637.66	-225.77	1.94
6,535.00	2.90	103.23	6,456.89	-349.69	-636.10	-226.45	0.65
6,581.00	3.48	79.37	6,502.82	-349.70	-633.59	-226.92	3.12
6,628.00	5.31	40.64	6,549.69	-347.78	-630.77	-225.56	7.20
6,673.00	7.07	36.77	6,594.43	-343.99	-627.76	-222.38	4.02
6,718.00	8.63	28.36	6,639.01	-338.80	-624.50	-217.88	4.30
6,759.00	11.56	28.56	6,679.37	-332.48	-621.07	-212.31	7.15
6,801.00	13.08	28.77	6,720.40	-324.62	-616.77	-205.37	3.62
6,844.00	14.10	26.75	6,762.20	-315.67	-612.07	-197.45	2.62
6,887.00	20.46	20.05	6,803.24	-303.92	-607.13	-186.81	15.47
6,930.00	26.42	14.81	6,842.68	-287.60	-602.11	-171.69	14.67
6,973.00	32.92	12.20	6,880.02	-266.91	-597.19	-152.26	15.41
7,016.00	39.22	10.82	6,914.76	-242.11	-592.16	-128.81	14.77
7,059.00	45.83	7.04	6,946.44	-213.41	-587.71	-101.43	16.47
7,102.00	51.97	4.55	6,974.69	-181.19	-584.48	-70.36	14.93
7,145.00	58.65	1.16	6,999.16	-145.91	-582.76	-35.99	16.83
7,188.00	65.03	359.88	7,019.44	-108.02	-582.43	1.19	15.07
7,231.00	71.27	359.61	7,035.44	-68.13	-582.61	40.43	14.52
7,274.00	78.26	359.69	7,046.73	-26.67	-582.86	81.22	16.26
7,317.00	85.47	356.87	7,052.81	15.85	-584.15	123.25	17.98
7,360.00	88.53	357.60	7,055.06	58.74	-586.22	165.78	7.32
7,379.00	88.46	356.41	7,055.56	77.70	-587.21	184.61	6.27
7,426.00	90.22	356.98	7,056.10	124.62	-589.92	231.22	3.94

**7" Intermediate Casing**

**Design Report for Wardell 2N-29HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,476.00	92.10	357.59	7,055.09	174.55	-592.28	280.73	3.94
7,519.00	92.23	357.32	7,053.46	217.48	-594.19	323.27	0.70
7,562.00	93.15	356.26	7,051.44	260.36	-596.60	365.87	3.26
7,605.00	93.03	356.32	7,049.13	303.21	-599.38	408.49	0.31
7,648.00	92.29	356.05	7,047.13	346.07	-602.23	451.14	1.83
7,691.00	92.54	356.12	7,045.32	388.93	-605.17	493.81	0.60
7,734.00	92.16	355.15	7,043.56	431.77	-608.44	536.52	2.42
7,777.00	91.86	354.88	7,042.05	474.58	-612.17	579.28	0.94
7,820.00	91.85	354.58	7,040.66	517.37	-616.12	622.07	0.70
7,863.00	91.67	354.69	7,039.33	560.17	-620.14	664.87	0.49
7,906.00	92.16	355.74	7,037.90	602.99	-623.72	707.62	2.69
7,947.00	92.16	354.64	7,036.35	643.82	-627.16	748.38	2.68
7,994.00	92.29	353.26	7,034.53	690.52	-632.11	795.20	2.95
8,033.00	92.17	351.71	7,033.01	729.15	-637.20	834.11	3.98
8,080.00	92.29	350.20	7,031.18	775.53	-644.59	881.06	3.22
8,119.00	91.91	350.82	7,029.75	813.97	-651.01	920.02	1.86
8,166.00	92.35	352.96	7,028.00	860.47	-657.64	966.94	4.65
8,205.00	92.29	353.04	7,026.43	899.15	-662.39	1,005.83	0.26
8,250.00	91.73	355.13	7,024.85	943.88	-667.02	1,050.65	4.81
8,291.00	91.92	355.92	7,023.54	984.73	-670.22	1,091.39	1.98
8,337.00	91.18	354.61	7,022.30	1,030.55	-674.01	1,137.13	3.27
8,377.00	91.30	354.05	7,021.43	1,070.35	-677.97	1,176.97	1.43
8,422.00	90.43	352.75	7,020.75	1,115.04	-683.14	1,221.86	3.48
8,462.00	90.68	351.54	7,020.37	1,154.67	-688.60	1,261.81	3.09
8,509.00	91.11	351.84	7,019.63	1,201.17	-695.39	1,308.76	1.12
8,546.00	91.79	353.87	7,018.69	1,237.87	-700.00	1,345.68	5.78
8,592.00	92.23	355.26	7,017.08	1,283.63	-704.35	1,391.46	3.17
8,634.00	92.41	354.96	7,015.38	1,325.44	-707.93	1,433.22	0.83
8,678.00	92.16	354.99	7,013.63	1,369.24	-711.78	1,476.97	0.57
8,719.00	91.92	355.39	7,012.17	1,410.07	-715.21	1,517.74	1.14
8,762.00	92.35	355.43	7,010.57	1,452.90	-718.65	1,560.47	1.00
8,804.00	92.48	355.51	7,008.80	1,494.73	-721.97	1,602.20	0.36
8,848.00	92.84	355.90	7,006.75	1,538.56	-725.26	1,645.88	1.21
8,889.00	92.53	355.89	7,004.83	1,579.41	-728.19	1,686.57	0.76
8,934.00	91.85	356.48	7,003.11	1,624.28	-731.18	1,731.22	2.00
8,973.00	91.42	356.57	7,002.00	1,663.19	-733.54	1,769.90	1.13
9,019.00	90.43	356.07	7,001.26	1,709.09	-736.50	1,815.56	2.41
9,061.00	90.80	356.25	7,000.81	1,750.99	-739.31	1,857.26	0.98
9,148.00	89.88	357.25	7,000.29	1,837.85	-744.24	1,943.54	1.56
9,233.00	90.12	356.94	7,000.29	1,922.74	-748.55	2,027.77	0.46
9,318.00	89.94	356.58	7,000.25	2,007.60	-753.35	2,112.06	0.47
9,405.00	90.43	356.60	6,999.97	2,094.45	-758.53	2,198.37	0.56
9,490.00	89.57	356.88	6,999.97	2,179.31	-763.36	2,282.67	1.06
9,576.00	90.00	356.62	7,000.29	2,265.17	-768.24	2,367.96	0.58
9,660.00	89.14	356.71	7,000.92	2,349.03	-773.12	2,451.28	1.03
9,748.00	89.26	356.71	7,002.15	2,436.87	-778.17	2,538.55	0.14
9,833.00	89.07	356.40	7,003.39	2,521.71	-783.28	2,622.88	0.43
9,919.00	88.70	357.22	7,005.06	2,607.56	-788.07	2,708.14	1.05
10,005.00	88.33	358.63	7,007.29	2,693.47	-791.18	2,793.15	1.69
10,033.00	88.33	358.31	7,008.10	2,721.45	-791.93	2,820.79	1.14
10,062.00	88.83	358.64	7,008.82	2,750.43	-792.70	2,849.41	2.07

**Design Report for Wardell 2N-29HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
10,091.00	89.32	359.22	7,009.29	2,779.42	-793.24	2,878.01	2.62
10,119.00	89.57	359.45	7,009.56	2,807.42	-793.56	2,905.59	1.21
10,147.00	90.50	359.17	7,009.55	2,835.42	-793.90	2,933.17	3.47
10,175.00	90.80	359.11	7,009.23	2,863.41	-794.32	2,960.76	1.09
10,205.00	90.74	358.87	7,008.82	2,893.40	-794.85	2,990.33	0.82
10,235.00	90.86	359.04	7,008.41	2,923.39	-795.40	3,019.91	0.69
10,260.00	90.74	359.08	7,008.06	2,948.39	-795.81	3,044.56	0.51
10,294.00	90.74	359.11	7,007.62	2,982.38	-796.34	3,078.06	0.09
10,325.00	89.20	358.94	7,007.63	3,013.38	-796.87	3,108.63	5.00
10,346.00	89.45	358.97	7,007.88	3,034.37	-797.25	3,129.33	1.20
10,376.00	89.44	358.84	7,008.17	3,064.36	-797.83	3,158.92	0.43
10,405.00	88.58	358.54	7,008.67	3,093.35	-798.49	3,187.53	3.14
10,432.00	88.52	358.58	7,009.36	3,120.34	-799.17	3,214.18	0.27
10,461.00	88.46	358.68	7,010.12	3,149.32	-799.86	3,242.79	0.40
10,490.00	88.27	359.00	7,010.95	3,178.30	-800.45	3,271.38	1.28
10,517.00	88.09	358.86	7,011.80	3,205.28	-800.95	3,297.99	0.84
10,605.00	89.01	359.01	7,014.03	3,293.24	-802.59	3,384.74	1.06
10,689.00	89.94	0.03	7,014.80	3,377.23	-803.29	3,467.43	1.64
10,777.00	90.12	359.93	7,014.76	3,465.23	-803.32	3,553.92	0.23
10,863.00	90.43	359.40	7,014.34	3,551.22	-803.82	3,638.54	0.71
10,948.00	90.12	359.73	7,013.93	3,636.22	-804.47	3,722.20	0.53
11,034.00	90.74	358.25	7,013.29	3,722.20	-805.99	3,806.99	1.87
11,120.00	90.99	358.48	7,011.99	3,808.16	-808.44	3,891.92	0.39
11,205.00	91.73	358.34	7,009.97	3,893.10	-810.80	3,975.84	0.89
11,291.00	91.61	358.07	7,007.47	3,979.02	-813.49	4,060.79	0.34
11,377.00	91.79	357.31	7,004.92	4,064.91	-816.95	4,145.85	0.91
11,462.00	91.79	358.34	7,002.26	4,149.81	-820.18	4,229.88	1.21
11,546.00	91.36	357.97	6,999.95	4,233.73	-822.88	4,312.87	0.68
11,632.00	91.60	358.30	6,997.73	4,319.66	-825.68	4,397.84	0.47
11,693.00	91.98	358.13	6,995.83	4,380.60	-827.58	4,458.08	0.68
<b>Final Sperry MWD Survey @ 11693.00ft</b>							
11,735.00	91.98	358.13	6,994.37	4,422.55	-828.95	4,499.57	0.00
<b>Straight Line Projection to TD @ 11735.00ft</b>							

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
100.00	100.00	0.31	0.41	First Gyro Survey @ 100.00ft
865.00	864.99	1.30	1.03	Final Gyro Survey @ 865.00ft
865.00	864.99	1.30	1.03	Tie-On to Surface Gyros @ 865.00ft
1,043.00	1,042.99	1.47	1.26	First Sperry MWD Survey @ 1043.00ft
11,693.00	6,995.83	4,380.60	-827.58	Final Sperry MWD Survey @ 11693.00ft
11,735.00	6,994.37	4,422.55	-828.95	Straight Line Projection to TD @ 11735.00ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Wardell 2N-29HZ_BHL ReLoc	349.38	Slot	0.00	0.00	0.00

## Design Report for Wardell 2N-29HZ - Actual Field Surveys

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
100.00	865.00	Anadarko Supplied Surveys	NS-GYRO-MS
1,043.00	11,735.00	Sperry MWD Surveys	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,426.00	7,056.10	7" Intermediate Casing	7	8-3/4

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
Wardell 2N-29HZ_Li	0.00	0.00	0.00	0.00	0.00	,179.410492	,8,349.544888	40.190185	-104.682622
- actual wellpath hits target center									
- Rectangle (sides W4,362.52 H389.00 D0.00)									
Wardell 2N-29HZ_S	0.00	0.00	0.00	0.00	0.00	,179.410492	,8,349.544888	40.190185	-104.682622
- actual wellpath hits target center									
- Point									
Wardell 2N-29HZ_S	0.00	0.00	0.00	0.00	0.00	,179.410492	,8,349.544888	40.190185	-104.682622
- actual wellpath hits target center									
- Polygon									
Point 1				1,315.57	-372.37	1,312,819.20	3,229,668.44		
Point 2				1,315.43	2,271.46	1,315,462.80	3,229,643.93		
Point 3				1,316.30	4,927.62	1,318,118.74	3,229,620.31		
Point 4				-1,319.47	4,908.47	1,318,075.30	3,226,984.94		
Point 5				-3,955.25	4,889.17	1,318,031.71	3,224,349.57		
Point 6				-3,946.70	2,251.38	1,315,394.22	3,224,382.43		
Point 7				-3,938.19	-362.79	1,312,780.35	3,224,415.03		
Point 8				-1,311.57	-368.25	1,312,799.10	3,227,041.48		
Wardell 2N-29HZ_4i	0.00	0.00	0.00	0.00	0.00	,179.410492	,8,349.544888	40.190185	-104.682622
- actual wellpath hits target center									
- Polygon									
Point 1				855.53	88.38	1,313,275.67	3,229,204.19		
Point 2				855.41	2,271.53	1,315,458.63	3,229,183.95		
Point 3				856.13	4,464.25	1,317,651.17	3,229,164.45		
Point 4				-1,316.12	4,448.47	1,317,615.37	3,226,992.53		
Point 5				-3,493.75	4,432.52	1,317,579.35	3,224,815.24		
Point 6				-3,486.68	2,252.88	1,315,399.96	3,224,842.40		
Point 7				-3,479.67	96.28	1,313,243.61	3,224,869.28		
Point 8				-1,310.73	91.78	1,313,259.10	3,227,038.08		
Wardell 2N-29HZ_B	0.00	0.00	6,997.00	4,452.52	-835.00	,623.856115	,7,473.576261	40.202407	-104.685611
- actual wellpath misses target center by 30.69ft at 11735.00ft MD (6994.37 TVD, 4422.55 N, -828.95 E)									
- Point									

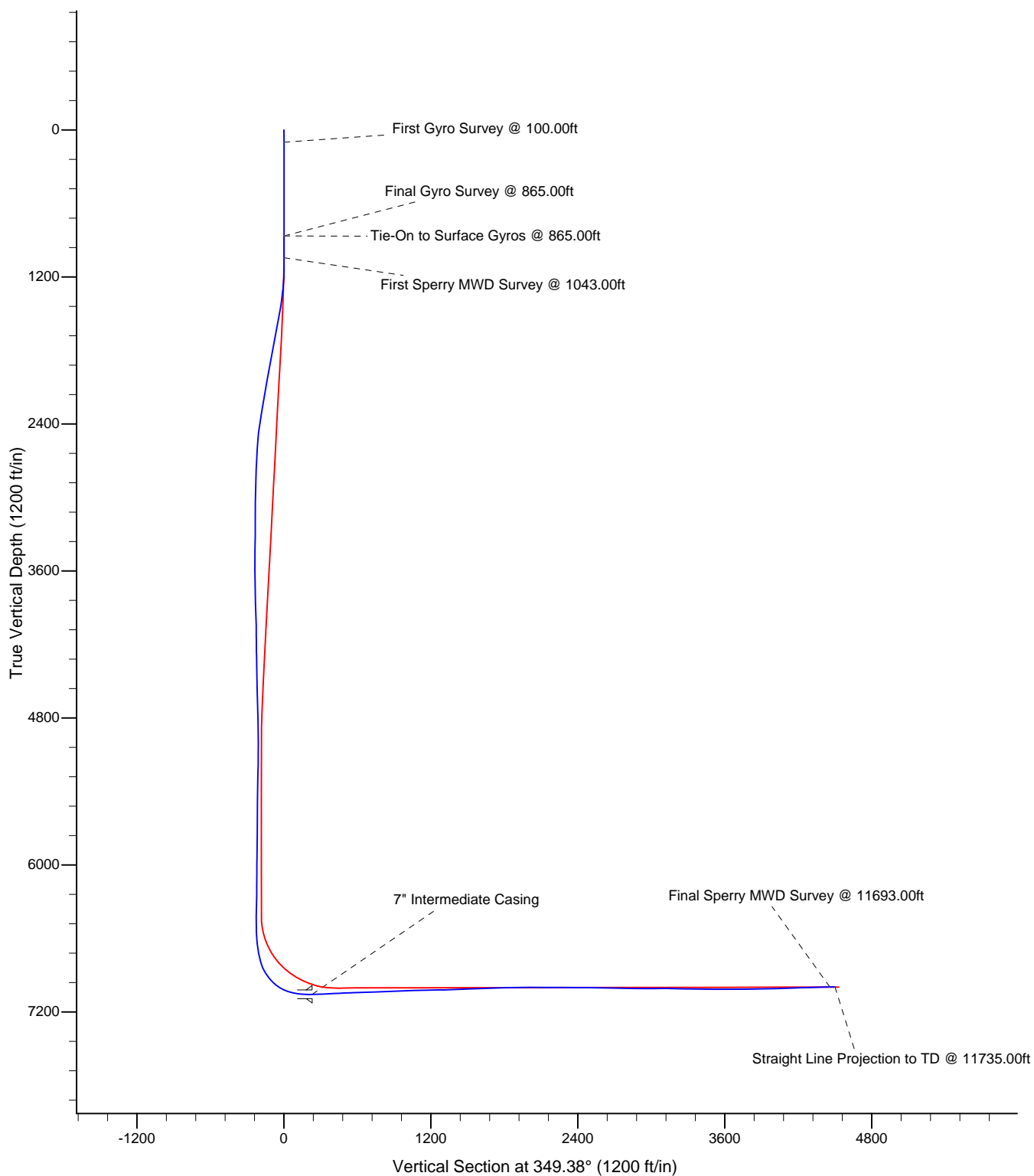
Project: Weld County, CO (NAD 83)  
Site: Sec. 29 T3N-R65W  
Well: Wardell 2N-29HZ

# Anadarko Petroleum Corp.

**HALLIBURTON**  
Sperry Drilling

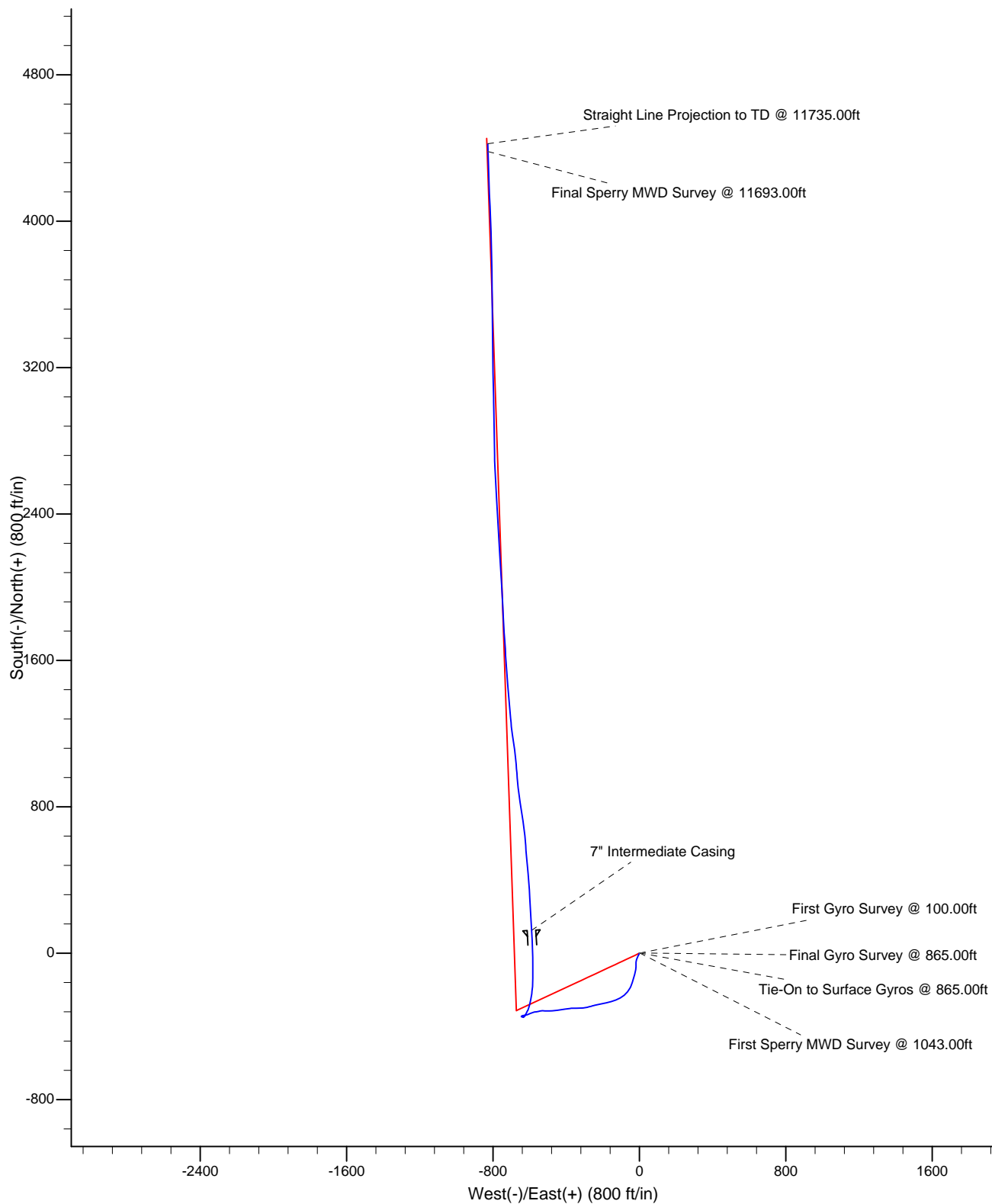
## LEGEND

- Wardell 2N-29HZ, Plan D Rev 1, Plan D Rev 1 Proposal V0
- Actual Field Surveys



## LEGEND

- Wardell 2N-29HZ, Plan D Rev 1, Plan D Rev 1 Proposal V0
- Actual Field Surveys





## North Reference Sheet for Sec. 29 T3N-R65W - Wardell 2N-29HZ - Plan D Rev 1

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

Vertical Depths are relative to RKB=16' @ 4886.00ft (Extreme 22). Northing and Easting are relative to Wardell 2N-29HZ

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: 3,000,000.000644ft, False Northing: 1,000,000.001308ft, Scale Reduction: 0.99995740

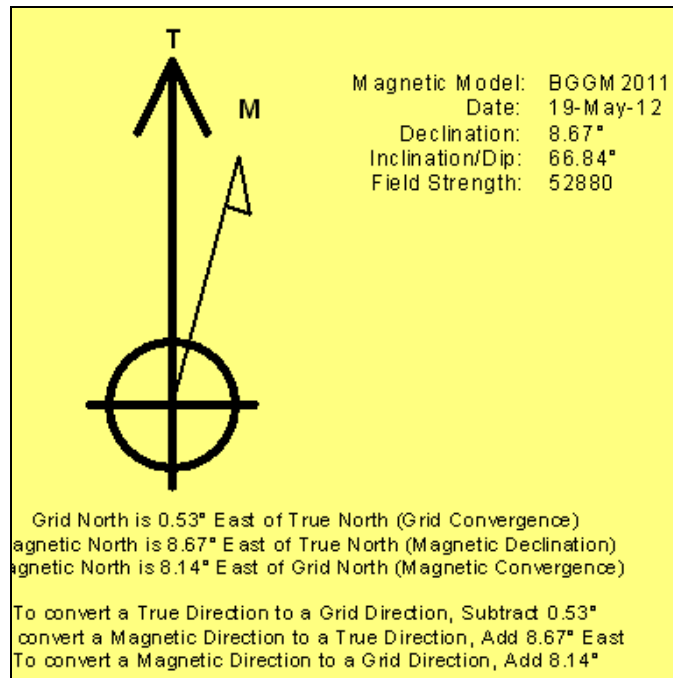
Grid Coordinates of Well: 1,313,179.410492 ft N, 3,228,349.544888 ft E

Geographical Coordinates of Well: 40° 11' 24.67" N, 104° 40' 57.44" W

Grid Convergence at Surface is: 0.53°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,735.00ft  
the Bottom Hole Displacement is 4,499.57ft in the Direction of 349.38° (True).

Magnetic Convergence at surface is: -8.14° (19 May 2012, , BGGM2011)



# **Anadarko Petroleum Corp.**

**Weld County, CO (NAD 83)**

**Sec. 29 T3N-R65W**

**Wardell 2N-29HZ**

**Plan D Rev 1**

**Design: Actual Field Surveys**

## **Survey Report - Geographic**

**11 June, 2012**

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 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		Using geodetic scale factor

Site	Sec. 29 T3N-R65W				
Site Position:		Northing:	1,313,179.460366ft	Latitude:	40.190185
From:	Lat/Long	Easting:	3,228,349.544428ft	Longitude:	-104.682622
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.53 °

Well	Wardell 2N-29HZ					
Well Position	+N/-S	0.00 ft	Northing:	1,313,179.410492 ft	Latitude:	40.190185
	+E/-W	0.00 ft	Easting:	3,228,349.544888 ft	Longitude:	-104.682622
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,870.00 ft

<b>Wellbore</b>	Plan D Rev 1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2011	2012-05-19	8.67	66.84	52,880

Design	Actual Field Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)	
	0.00	0.00	0.00	349.38	

<b>Survey Program</b>	<b>Date</b>	2012-06-11			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
100.00	865.00	Anadarko Supplied Surveys (Plan D Rev 1	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,043.00	11,735.00	Sperry MWD Surveys (Plan D Rev 1)	MWD	MWD - Standard	

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	13,179.410492	28,349.544888	40.190185	-104.682622	
100.00	0.59	52.84	100.00	0.31	0.41	13,179.725250	28,349.952311	40.190186	-104.682621	
First Gyro Survey @ 100.00ft										
200.00	0.40	56.85	199.99	0.81	1.11	13,180.233562	28,350.650197	40.190187	-104.682618	
300.00	0.19	17.04	299.99	1.16	1.45	13,180.586080	28,350.987786	40.190188	-104.682617	
400.00	0.25	282.64	399.99	1.37	1.29	13,180.790816	28,350.821608	40.190189	-104.682617	
500.00	0.20	152.00	499.99	1.26	1.16	13,180.683255	28,350.691659	40.190188	-104.682618	
600.00	0.22	357.21	599.99	1.30	1.23	13,180.721576	28,350.763899	40.190188	-104.682618	
700.00	0.09	283.59	699.99	1.51	1.15	13,180.930981	28,350.676283	40.190189	-104.682618	
800.00	0.10	183.51	799.99	1.44	1.06	13,180.861586	28,350.595239	40.190189	-104.682618	
865.00	0.16	198.00	864.99	1.30	1.03	13,180.718376	28,350.565041	40.190188	-104.682618	
Final Gyro Survey @ 865.00ft - Tie-On to Surface Gyros @ 865.00ft										
1,043.00	0.33	36.67	1,042.99	1.47	1.26	13,180.895256	28,350.792738	40.190189	-104.682617	
First Sperry MWD Survey @ 1043.00ft										
1,131.00	0.73	204.51	1,130.99	1.17	1.18	13,180.587721	28,350.714355	40.190188	-104.682618	
1,224.00	4.43	211.00	1,223.88	-2.45	-0.92	13,176.949698	28,348.651519	40.190178	-104.682625	
1,316.00	8.48	210.12	1,315.28	-11.37	-6.15	13,167.985448	28,343.498022	40.190154	-104.682644	
1,408.00	8.98	200.07	1,406.22	-23.98	-12.02	13,155.320065	28,337.746428	40.190119	-104.682665	
1,499.00	11.00	196.14	1,495.83	-38.99	-16.87	13,140.264479	28,333.034029	40.190078	-104.682682	
1,591.00	11.25	178.78	1,586.13	-56.40	-19.12	13,122.836894	28,330.945172	40.190030	-104.682690	
1,683.00	11.84	180.46	1,676.27	-74.81	-19.01	13,104.429239	28,331.230153	40.189979	-104.682690	
1,775.00	11.27	192.94	1,766.42	-93.02	-21.10	13,086.208954	28,329.308871	40.189930	-104.682698	
1,867.00	11.05	194.68	1,856.68	-110.31	-25.34	13,068.880791	28,325.221161	40.189882	-104.682713	
1,959.00	11.56	197.50	1,946.89	-127.63	-30.35	13,051.515582	28,320.374909	40.189835	-104.682731	
2,045.00	10.92	191.51	2,031.25	-143.83	-34.57	13,035.277213	28,316.307827	40.189790	-104.682746	
2,131.00	11.87	199.45	2,115.55	-160.15	-39.14	13,018.913052	28,311.887709	40.189745	-104.682762	
2,216.00	10.98	200.84	2,198.87	-175.96	-44.93	13,003.052414	28,306.243062	40.189702	-104.682783	
2,302.00	12.50	211.22	2,283.08	-191.57	-52.67	12,987.366391	28,298.648637	40.189659	-104.682811	
2,387.00	13.18	217.37	2,365.96	-207.14	-63.32	12,971.700739	28,288.142777	40.189616	-104.682849	
2,473.00	12.17	221.59	2,449.86	-221.72	-75.29	12,957.019223	28,276.309340	40.189576	-104.682891	
2,559.00	9.81	233.09	2,534.29	-232.90	-87.16	12,945.728011	28,264.534990	40.189546	-104.682934	
2,644.00	10.06	240.70	2,618.02	-240.88	-99.43	12,937.633389	28,252.344992	40.189524	-104.682978	
2,730.00	9.76	239.77	2,702.73	-248.23	-112.28	12,930.169685	28,239.565313	40.189503	-104.683024	
2,816.00	12.21	252.28	2,787.16	-254.67	-127.24	12,923.592382	28,224.660568	40.189486	-104.683077	
2,901.00	12.88	249.76	2,870.13	-260.68	-144.69	12,917.418676	28,207.266367	40.189469	-104.683140	
2,987.00	13.99	256.02	2,953.78	-266.51	-163.78	12,911.415443	28,188.239380	40.189453	-104.683208	
3,073.00	14.00	255.11	3,037.23	-271.69	-183.92	12,906.045787	28,168.148074	40.189439	-104.683280	
3,158.00	12.11	257.78	3,120.03	-276.22	-202.57	12,901.344553	28,149.539095	40.189427	-104.683347	
3,244.00	10.95	259.75	3,204.29	-279.59	-219.42	12,897.826498	28,132.716750	40.189417	-104.683407	
3,330.00	11.44	256.86	3,288.66	-282.98	-235.77	12,894.283830	28,116.406196	40.189408	-104.683466	
3,415.00	8.54	258.09	3,372.36	-286.20	-250.15	12,890.932027	28,102.049811	40.189399	-104.683517	
3,501.00	10.27	253.59	3,457.20	-289.68	-263.76	12,887.323011	28,088.479778	40.189390	-104.683566	
3,587.00	12.21	258.20	3,541.55	-293.71	-280.02	12,883.147476	28,072.260220	40.189379	-104.683624	
3,672.00	11.90	257.97	3,624.68	-297.37	-297.39	12,879.322994	28,054.925615	40.189369	-104.683686	
3,758.00	11.88	262.73	3,708.83	-300.34	-314.84	12,876.194065	28,037.501051	40.189360	-104.683749	
3,844.00	11.11	272.81	3,793.12	-301.05	-331.90	12,875.322822	28,020.450311	40.189358	-104.683810	
3,930.00	10.58	273.07	3,877.58	-300.23	-348.06	12,876.002847	28,004.284259	40.189361	-104.683868	
4,015.00	11.57	265.97	3,961.00	-300.41	-364.35	12,875.671503	27,987.991057	40.189360	-104.683926	
4,101.00	14.54	262.61	4,044.77	-302.40	-383.67	12,873.498546	27,968.697785	40.189355	-104.683995	
4,186.00	13.62	261.26	4,127.21	-305.29	-404.14	12,870.416911	27,948.252706	40.189347	-104.684069	
4,272.00	11.78	259.62	4,211.11	-308.42	-422.79	12,867.124739	27,929.638302	40.189338	-104.684135	
4,358.00	13.08	265.04	4,295.09	-310.84	-441.12	12,864.532718	27,911.330865	40.189332	-104.684201	
4,444.00	12.25	263.37	4,379.00	-312.73	-459.87	12,862.465176	27,892.591964	40.189326	-104.684268	
4,529.00	10.43	262.91	4,462.34	-314.72	-476.47	12,860.321437	27,876.017964	40.189321	-104.684327	
4,615.00	9.83	271.38	4,547.00	-315.51	-491.53	12,859.398572	27,860.961481	40.189319	-104.684381	

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
4,701.00	9.05	269.35	4,631.84	-315.41	-505.64	12,859.368648	27,846.859130	40.189319	-104.684432
4,787.00	7.91	272.49	4,716.89	-315.23	-518.31	12,859.432162	27,834.182790	40.189320	-104.684477
4,872.00	6.46	275.57	4,801.22	-314.51	-528.91	12,860.052628	27,823.574170	40.189322	-104.684515
4,958.00	6.52	258.18	4,886.68	-315.04	-538.51	12,859.433607	27,813.984756	40.189320	-104.684549
5,044.00	8.68	256.28	4,971.92	-317.58	-549.59	12,856.792065	27,802.924445	40.189313	-104.684589
5,130.00	7.58	261.58	5,057.06	-319.95	-561.51	12,854.312634	27,791.031546	40.189307	-104.684632
5,215.00	6.08	264.60	5,141.45	-321.19	-571.54	12,852.975705	27,781.016009	40.189303	-104.684668
5,301.00	7.11	251.87	5,226.89	-323.28	-581.13	12,850.802519	27,771.442978	40.189297	-104.684702
5,387.00	8.63	247.16	5,312.07	-327.44	-592.14	12,846.540472	27,760.477059	40.189286	-104.684741
5,473.00	7.72	244.14	5,397.20	-332.46	-603.28	12,841.414077	27,749.379799	40.189272	-104.684781
5,559.00	6.04	254.95	5,482.58	-336.16	-612.85	12,837.631457	27,739.846341	40.189262	-104.684816
5,644.00	6.33	259.85	5,567.09	-338.15	-621.78	12,835.562325	27,730.934265	40.189257	-104.684848
5,730.00	5.40	261.69	5,652.64	-339.57	-630.45	12,834.062153	27,722.276970	40.189253	-104.684879
5,816.00	4.35	253.47	5,738.32	-341.08	-637.58	12,832.483679	27,715.160357	40.189249	-104.684904
5,902.00	3.07	245.30	5,824.14	-342.97	-642.80	12,830.545379	27,709.959054	40.189243	-104.684923
5,987.00	1.61	218.76	5,909.07	-344.85	-645.62	12,828.637198	27,707.160967	40.189238	-104.684933
6,073.00	0.54	154.09	5,995.06	-346.16	-646.20	12,827.325303	27,706.593748	40.189235	-104.684935
6,159.00	0.52	119.52	6,081.05	-346.72	-645.68	12,826.773301	27,707.115508	40.189233	-104.684933
6,244.00	0.84	111.46	6,166.05	-347.13	-644.76	12,826.363775	27,708.034792	40.189232	-104.684930
6,330.00	1.42	99.26	6,252.03	-347.54	-643.13	12,825.976809	27,709.676765	40.189231	-104.684924
6,416.00	1.93	107.01	6,337.99	-348.13	-640.69	12,825.404197	27,712.118587	40.189229	-104.684915
6,459.00	2.02	116.76	6,380.97	-348.68	-639.32	12,824.863817	27,713.492659	40.189228	-104.684910
6,502.00	2.71	105.28	6,423.93	-349.29	-637.66	12,824.270019	27,715.155439	40.189226	-104.684904
6,535.00	2.90	103.23	6,456.89	-349.69	-636.10	12,823.887836	27,716.724146	40.189225	-104.684899
6,581.00	3.48	79.37	6,502.82	-349.70	-633.59	12,823.902149	27,719.229042	40.189225	-104.684890
6,628.00	5.31	40.64	6,549.69	-347.78	-630.77	12,825.841930	27,722.030406	40.189230	-104.684880
6,673.00	7.07	36.77	6,594.43	-343.99	-627.76	12,829.668116	27,725.009304	40.189241	-104.684869
6,718.00	8.63	28.36	6,639.01	-338.80	-624.50	12,834.887583	27,728.222965	40.189255	-104.684857
6,759.00	11.56	28.56	6,679.37	-332.48	-621.07	12,841.235090	27,731.590357	40.189272	-104.684845
6,801.00	13.08	28.77	6,720.40	-324.62	-616.77	12,849.136588	27,735.817031	40.189294	-104.684830
6,844.00	14.10	26.75	6,762.20	-315.67	-612.07	12,858.121673	27,740.433681	40.189318	-104.684813
6,887.00	20.46	20.05	6,803.24	-303.92	-607.13	12,869.916506	27,745.264580	40.189351	-104.684795
6,930.00	26.42	14.81	6,842.68	-287.60	-602.11	12,886.286437	27,750.140645	40.189395	-104.684777
6,973.00	32.92	12.20	6,880.02	-266.91	-597.19	12,907.022327	27,754.869527	40.189452	-104.684759
7,016.00	39.22	10.82	6,914.76	-242.11	-592.16	12,931.865376	27,759.666914	40.189520	-104.684741
7,059.00	45.83	7.04	6,946.44	-213.41	-587.71	12,960.598415	27,763.849812	40.189599	-104.684726
7,102.00	51.97	4.55	6,974.69	-181.19	-584.48	12,992.846307	27,766.789484	40.189687	-104.684714
7,145.00	58.65	1.16	6,999.16	-145.91	-582.76	13,028.145331	27,768.181554	40.189784	-104.684708
7,188.00	65.03	359.88	7,019.44	-108.02	-582.43	13,066.033217	27,768.163547	40.189888	-104.684707
7,231.00	71.27	359.61	7,035.44	-68.13	-582.61	13,105.918935	27,767.616289	40.189998	-104.684707
7,274.00	78.26	359.69	7,046.73	-26.67	-582.86	13,147.375393	27,766.981345	40.190112	-104.684708
7,317.00	85.47	356.87	7,052.81	15.85	-584.15	13,189.875240	27,765.303471	40.190228	-104.684713
7,360.00	88.53	357.60	7,055.06	58.74	-586.22	13,232.738211	27,762.837544	40.190346	-104.684720
7,379.00	88.46	356.41	7,055.56	77.70	-587.21	13,251.694611	27,761.670441	40.190398	-104.684724
7,426.00	90.22	356.98	7,056.10	124.62	-589.92	13,298.582382	27,758.529648	40.190527	-104.684733
7" Intermediate Casing									
7,476.00	92.10	357.59	7,055.09	174.55	-592.28	13,348.487487	27,755.702470	40.190664	-104.684742
7,519.00	92.23	357.32	7,053.46	217.48	-594.19	13,391.393123	27,753.398964	40.190782	-104.684749
7,562.00	93.15	356.26	7,051.44	260.36	-596.60	13,434.251466	27,750.598943	40.190900	-104.684757
7,605.00	93.03	356.32	7,049.13	303.21	-599.38	13,477.069702	27,747.425915	40.191017	-104.684767
7,648.00	92.29	356.05	7,047.13	346.07	-602.23	13,519.897860	27,744.173192	40.191135	-104.684778
7,691.00	92.54	356.12	7,045.32	388.93	-605.17	13,562.728695	27,740.845098	40.191252	-104.684788
7,734.00	92.16	355.15	7,043.56	431.77	-608.44	13,605.533532	27,737.180546	40.191370	-104.684800
7,777.00	91.86	354.88	7,042.05	474.58	-612.17	13,648.306376	27,733.052083	40.191488	-104.684813
7,820.00	91.85	354.58	7,040.66	517.37	-616.12	13,691.062099	27,728.710521	40.191605	-104.684827

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
7,863.00	91.67	354.69	7,039.33	560.17	-620.14	13,733.812826	27,724.297841	40.191722	-104.684842
7,906.00	92.16	355.74	7,037.90	602.99	-623.72	13,776.601605	27,720.318496	40.191840	-104.684855
7,947.00	92.16	354.64	7,036.35	643.82	-627.16	13,817.392417	27,716.507061	40.191952	-104.684867
7,994.00	92.29	353.26	7,034.53	690.52	-632.11	13,864.044668	27,711.127277	40.192080	-104.684885
8,033.00	92.17	351.71	7,033.01	729.15	-637.20	13,902.628947	27,705.674964	40.192186	-104.684903
8,080.00	92.29	350.20	7,031.18	775.53	-644.59	13,948.936011	27,697.865068	40.192314	-104.684929
8,119.00	91.91	350.82	7,029.75	813.97	-651.01	13,987.313686	27,691.085548	40.192419	-104.684952
8,166.00	92.35	352.96	7,028.00	860.47	-657.64	14,033.743625	27,684.031940	40.192547	-104.684976
8,205.00	92.29	353.04	7,026.43	899.15	-662.39	14,072.374128	27,678.926839	40.192653	-104.684993
8,250.00	91.73	355.13	7,024.85	943.88	-667.02	14,117.057833	27,673.880834	40.192776	-104.685010
8,291.00	91.92	355.92	7,023.54	984.73	-670.22	14,157.878820	27,670.307194	40.192888	-104.685021
8,337.00	91.18	354.61	7,022.30	1,030.55	-674.01	14,203.664844	27,666.089372	40.193014	-104.685035
8,377.00	91.30	354.05	7,021.43	1,070.35	-677.97	14,243.419852	27,661.771910	40.193123	-104.685049
8,422.00	90.43	352.75	7,020.75	1,115.04	-683.14	14,288.063668	27,656.188905	40.193246	-104.685067
8,462.00	90.68	351.54	7,020.37	1,154.67	-688.60	14,327.631971	27,650.357876	40.193354	-104.685087
8,509.00	91.11	351.84	7,019.63	1,201.17	-695.39	14,374.066102	27,643.137836	40.193482	-104.685111
8,546.00	91.79	353.87	7,018.69	1,237.87	-700.00	14,410.719350	27,638.199522	40.193583	-104.685128
8,592.00	92.23	355.26	7,017.08	1,283.63	-704.35	14,456.439100	27,633.423846	40.193708	-104.685143
8,634.00	92.41	354.96	7,015.38	1,325.44	-707.93	14,498.215332	27,629.461495	40.193823	-104.685156
8,678.00	92.16	354.99	7,013.63	1,369.24	-711.78	14,541.972115	27,625.207238	40.193943	-104.685170
8,719.00	91.92	355.39	7,012.17	1,410.07	-715.21	14,582.766575	27,621.395473	40.194055	-104.685182
8,762.00	92.35	355.43	7,010.57	1,452.90	-718.65	14,625.563474	27,617.562295	40.194173	-104.685194
8,804.00	92.48	355.51	7,008.80	1,494.73	-721.97	14,667.360965	27,613.862749	40.194288	-104.685206
8,848.00	92.84	355.90	7,006.75	1,538.56	-725.26	14,711.155894	27,610.167355	40.194408	-104.685218
8,889.00	92.53	355.89	7,004.83	1,579.41	-728.19	14,751.975267	27,606.859345	40.194520	-104.685229
8,934.00	91.85	356.48	7,003.11	1,624.28	-731.18	14,796.810904	27,603.454242	40.194643	-104.685239
8,973.00	91.42	356.57	7,002.00	1,663.19	-733.54	14,835.698162	27,600.732845	40.194750	-104.685248
9,019.00	90.43	356.07	7,001.26	1,709.09	-736.50	14,881.565499	27,597.357983	40.194876	-104.685258
9,061.00	90.80	356.25	7,000.81	1,750.99	-739.31	14,923.439213	27,594.159398	40.194991	-104.685268
9,148.00	89.88	357.25	7,000.29	1,837.85	-744.24	15,010.242877	27,588.427212	40.195230	-104.685286
9,233.00	90.12	356.94	7,000.29	1,922.74	-748.55	15,095.086553	27,583.337327	40.195463	-104.685301
9,318.00	89.94	356.58	7,000.25	2,007.60	-753.35	15,179.898998	27,577.751465	40.195696	-104.685319
9,405.00	90.43	356.60	6,999.97	2,094.45	-758.53	15,266.689158	27,571.776668	40.195934	-104.685337
9,490.00	89.57	356.88	6,999.97	2,179.31	-763.36	15,351.498954	27,566.161247	40.196167	-104.685355
9,576.00	90.00	356.62	7,000.29	2,265.17	-768.24	15,437.307514	27,560.494735	40.196403	-104.685372
9,660.00	89.14	356.71	7,000.92	2,349.03	-773.12	15,521.109927	27,554.835824	40.196633	-104.685390
9,748.00	89.26	356.71	7,002.15	2,436.87	-778.17	15,608.902291	27,548.976750	40.196874	-104.685408
9,833.00	89.07	356.40	7,003.39	2,521.71	-783.28	15,693.685247	27,543.088100	40.197107	-104.685426
9,919.00	88.70	357.22	7,005.06	2,607.56	-788.07	15,779.483440	27,537.512470	40.197343	-104.685443
10,005.00	88.33	358.63	7,007.29	2,693.47	-791.18	15,865.359860	27,533.608047	40.197578	-104.685454
10,033.00	88.33	358.31	7,008.10	2,721.45	-791.93	15,893.328685	27,532.602940	40.197655	-104.685457
10,062.00	88.83	358.64	7,008.82	2,750.43	-792.70	15,922.299801	27,531.564354	40.197735	-104.685460
10,091.00	89.32	359.22	7,009.29	2,779.42	-793.24	15,951.283297	27,530.755726	40.197814	-104.685462
10,119.00	89.57	359.45	7,009.56	2,807.42	-793.56	15,979.274679	27,530.172746	40.197891	-104.685463
10,147.00	90.50	359.17	7,009.55	2,835.42	-793.90	16,007.266819	27,529.577531	40.197968	-104.685464
10,175.00	90.80	359.11	7,009.23	2,863.41	-794.32	16,035.255575	27,528.899300	40.198045	-104.685465
10,205.00	90.74	358.87	7,008.82	2,893.40	-794.85	16,065.240756	27,528.094138	40.198127	-104.685467
10,235.00	90.86	359.04	7,008.41	2,923.39	-795.40	16,095.225232	27,527.270665	40.198210	-104.685469
10,260.00	90.74	359.08	7,008.06	2,948.39	-795.81	16,120.213520	27,526.630230	40.198278	-104.685471
10,294.00	90.74	359.11	7,007.62	2,982.38	-796.34	16,154.198601	27,525.779987	40.198371	-104.685473
10,325.00	89.20	358.94	7,007.63	3,013.38	-796.87	16,185.185665	27,524.966865	40.198457	-104.685475
10,346.00	89.45	358.97	7,007.88	3,034.37	-797.25	16,206.175383	27,524.390419	40.198514	-104.685476
10,376.00	89.44	358.84	7,008.17	3,064.36	-797.83	16,236.160655	27,523.540737	40.198597	-104.685478
10,405.00	88.58	358.54	7,008.67	3,093.35	-798.49	16,265.139866	27,522.610731	40.198676	-104.685480
10,432.00	88.52	358.58	7,009.36	3,120.34	-799.17	16,292.114147	27,521.683788	40.198750	-104.685483

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
10,461.00	88.46	358.68	7,010.12	3,149.32	-799.86	16,321.086930	27,520.723605	40.198830	-104.685485
10,490.00	88.27	359.00	7,010.95	3,178.30	-800.45	16,350.061256	27,519.869669	40.198909	-104.685487
10,517.00	88.09	358.86	7,011.80	3,205.28	-800.95	16,377.035972	27,519.117077	40.198983	-104.685489
10,605.00	89.01	359.01	7,014.03	3,293.24	-802.59	16,464.969073	27,516.671450	40.199225	-104.685495
10,689.00	89.94	0.03	7,014.80	3,377.23	-803.29	16,548.946937	27,515.193739	40.199455	-104.685498
10,777.00	90.12	359.93	7,014.76	3,465.23	-803.32	16,636.939102	27,514.351913	40.199697	-104.685498
10,863.00	90.43	359.40	7,014.34	3,551.22	-803.82	16,722.924279	27,513.056492	40.199933	-104.685500
10,948.00	90.12	359.73	7,013.93	3,636.22	-804.47	16,807.907450	27,511.627803	40.200166	-104.685502
11,034.00	90.74	358.25	7,013.29	3,722.20	-805.99	16,893.867571	27,509.319649	40.200402	-104.685507
11,120.00	90.99	358.48	7,011.99	3,808.16	-808.44	16,979.792708	27,506.074098	40.200638	-104.685516
11,205.00	91.73	358.34	7,009.97	3,893.10	-810.80	17,064.706475	27,502.933554	40.200871	-104.685525
11,291.00	91.61	358.07	7,007.47	3,979.02	-813.49	17,150.595540	27,499.449150	40.201107	-104.685534
11,377.00	91.79	357.31	7,004.92	4,064.91	-816.95	17,236.447925	27,495.193013	40.201343	-104.685547
11,462.00	91.79	358.34	7,002.26	4,149.81	-820.18	17,321.307154	27,491.186500	40.201576	-104.685558
11,546.00	91.36	357.97	6,999.95	4,233.73	-822.88	17,405.199486	27,487.709745	40.201806	-104.685568
11,632.00	91.60	358.30	6,997.73	4,319.66	-825.68	17,491.091975	27,484.120079	40.202042	-104.685578
11,693.00	91.98	358.13	6,995.83	4,380.60	-827.58	17,552.009799	27,481.659387	40.202210	-104.685585
<b>Final Sperry MWD Survey @ 11693.00ft</b>									
11,735.00	91.98	358.13	6,994.37	4,422.55	-828.95	17,593.946174	27,479.903100	40.202325	-104.685590
<b>Straight Line Projection to TD @ 11735.00ft</b>									



# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

### Targets

Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Wardell 2N-29HZ_Lar	- actual wellpath hits target center - Rectangle (sides W4,362.52 H389.00 D0.00)	0.00	0.00	0.00	0.00	0.00	313,179.410492	228,349.544888	40.190185	-104.682622
Wardell 2N-29HZ_SH	- actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	313,179.410492	228,349.544888	40.190185	-104.682622
Wardell 2N-29HZ_Ser	- actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	313,179.410492	228,349.544888	40.190185	-104.682622
	Point 1			0.00	-372.37	1,315.57	1,312,819.20	3,229,668.44		
	Point 2			0.00	2,271.46	1,315.43	1,315,462.80	3,229,643.93		
	Point 3			0.00	4,927.62	1,316.30	1,318,118.74	3,229,620.31		
	Point 4			0.00	4,908.47	-1,319.47	1,318,075.30	3,226,984.94		
	Point 5			0.00	4,889.17	-3,955.25	1,318,031.71	3,224,349.57		
	Point 6			0.00	2,251.38	-3,946.70	1,315,394.22	3,224,382.43		
	Point 7			0.00	-362.79	-3,938.19	1,312,780.35	3,224,415.03		
	Point 8			0.00	-368.25	-1,311.57	1,312,799.10	3,227,041.48		
Wardell 2N-29HZ_46C	- actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	313,179.410492	228,349.544888	40.190185	-104.682622
	Point 1			0.00	88.38	855.53	1,313,275.67	3,229,204.19		
	Point 2			0.00	2,271.53	855.41	1,315,458.63	3,229,183.95		
	Point 3			0.00	4,464.25	856.13	1,317,651.17	3,229,164.45		
	Point 4			0.00	4,448.47	-1,316.12	1,317,615.37	3,226,992.53		
	Point 5			0.00	4,432.52	-3,493.75	1,317,579.35	3,224,815.24		
	Point 6			0.00	2,252.88	-3,486.68	1,315,399.96	3,224,842.40		
	Point 7			0.00	96.28	-3,479.67	1,313,243.61	3,224,869.28		
	Point 8			0.00	91.78	-1,310.73	1,313,259.10	3,227,038.08		
Wardell 2N-29HZ_BH	- actual wellpath misses target center by 30.69ft at 11735.00ft MD (6994.37 TVD, 4422.55 N, -828.95 E) - Point	0.00	0.00	6,997.00	4,452.52	-835.00	317,623.856115	227,473.576261	40.202407	-104.685611

### Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,426.00	7,056.10	7" Intermediate Casing	7	8-3/4

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
100.00	100.00	0.31	0.41	First Gyro Survey @ 100.00ft
865.00	864.99	1.30	1.03	Final Gyro Survey @ 865.00ft
865.00	864.99	1.30	1.03	Tie-On to Surface Gyros @ 865.00ft
1,043.00	1,042.99	1.47	1.26	First Sperry MWD Survey @ 1043.00ft
11,693.00	6,995.83	4,380.60	-827.58	Final Sperry MWD Survey @ 11693.00ft
11,735.00	6,994.37	4,422.55	-828.95	Straight Line Projection to TD @ 11735.00ft

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



**Halliburton Company**  
Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Wardell 2N-29HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Site:</b>	Sec. 29 T3N-R65W	<b>MD Reference:</b>	RKB=16' @ 4886.00ft (Extreme 22)
<b>Well:</b>	Wardell 2N-29HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan D Rev 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db