

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 29 T3N-R65W

Wardell 3C-20HZ

Plan E Rev 2

Design: Actual Surveys

Sperry Drilling Services

Standard Report

06 July, 2012

Well Coordinates: 1,313,356.46 N, 3,226,520.20 E (40° 11' 26.58" N, 104° 41' 20.99" W)

Ground Level: 4,879.00 ft

Local Coordinate Origin:

Centered on Well Wardell 3C-20HZ

Viewing Datum:

RKB=25ft @ 4904.00ft (HP 308)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

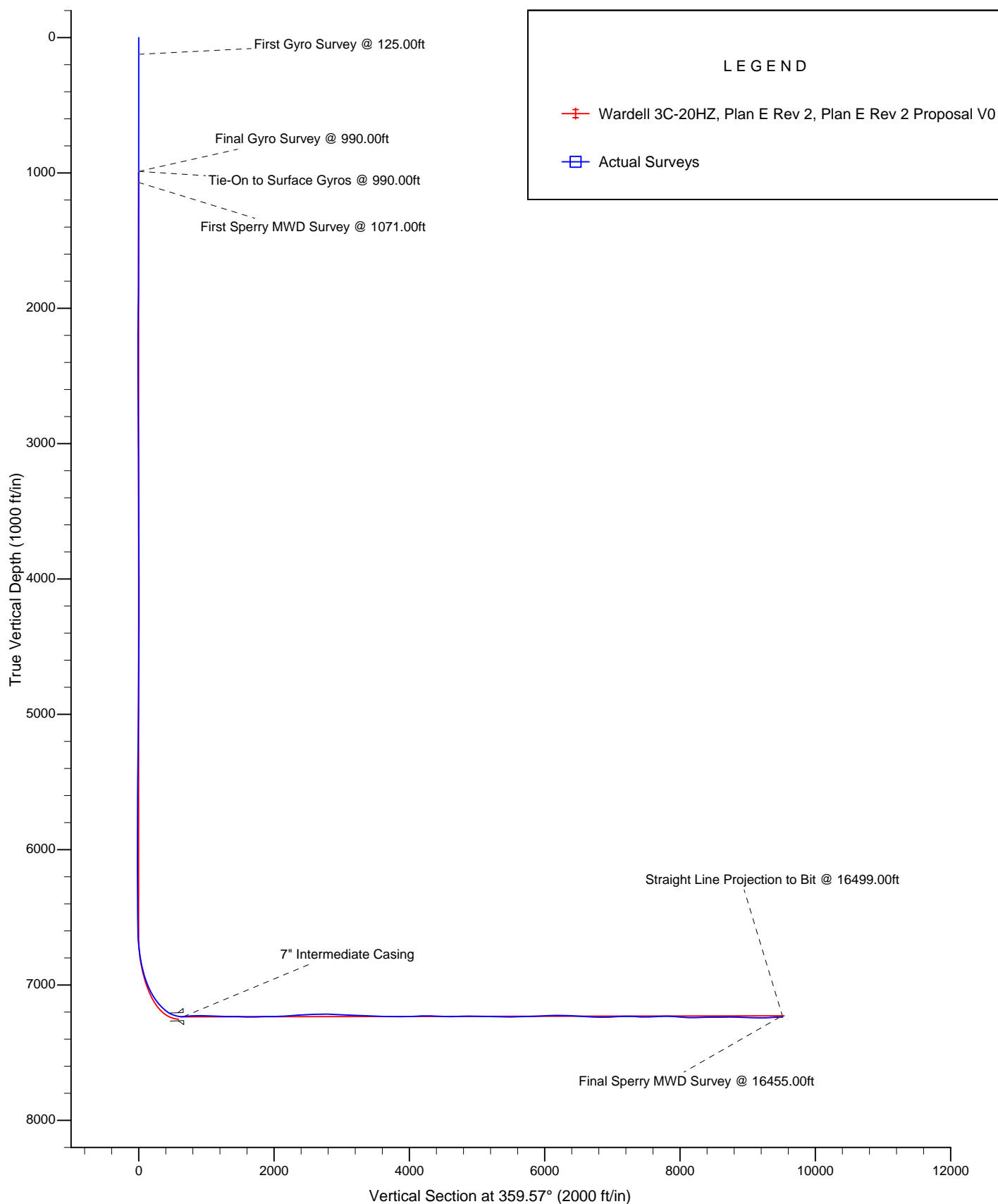
Version: 2003.16 Build: 43I

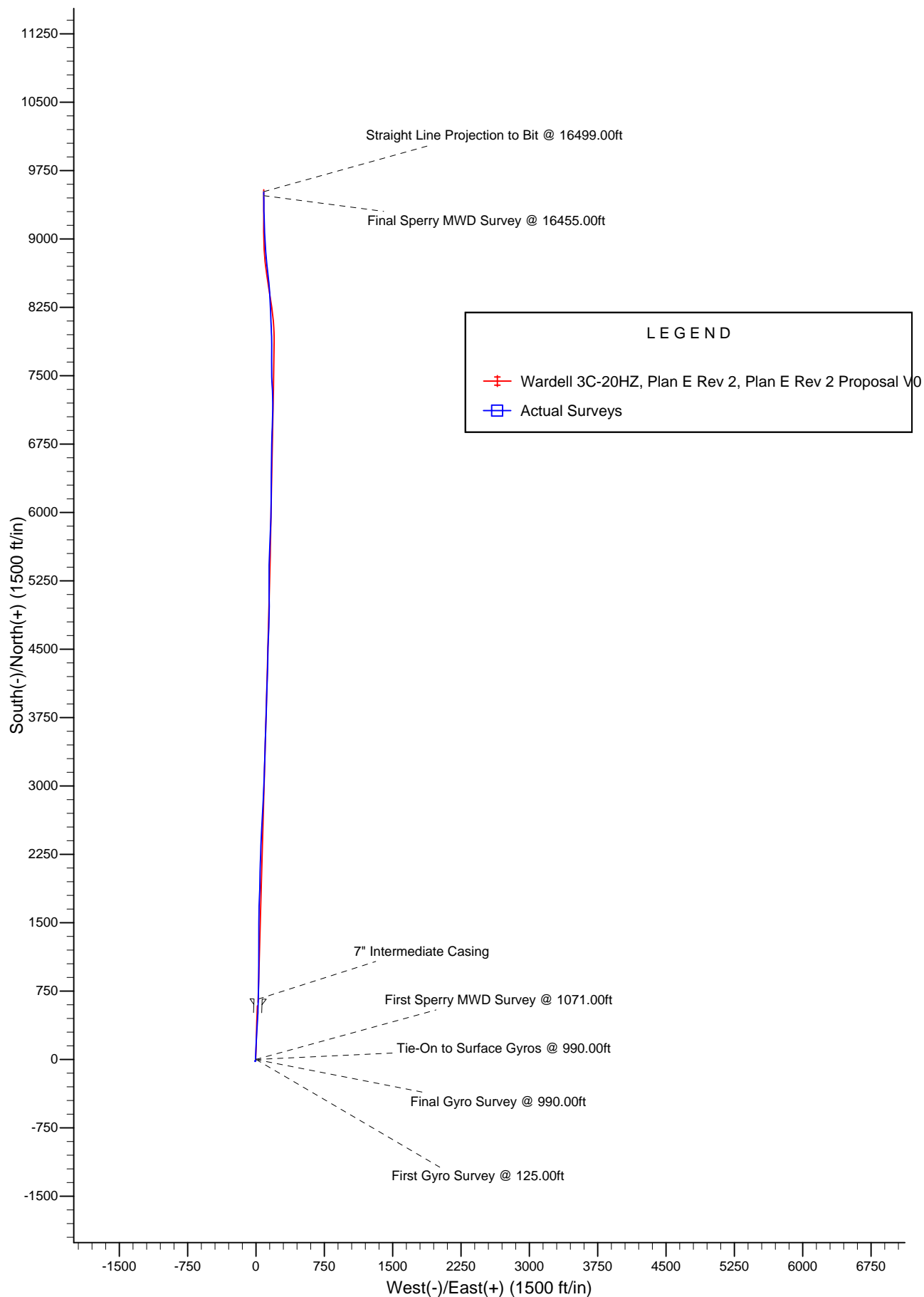
HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 29 T3N-R65W
Well: Wardell 3C-20HZ

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling





Design Report for Wardell 3C-20HZ - Actual 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
125.00	0.36	311.66	125.00	0.26	-0.29	0.26	0.29
First Gyro Survey @ 125.00ft							
225.00	0.42	240.09	225.00	0.29	-0.85	0.29	0.46
325.00	0.37	300.59	325.00	0.27	-1.44	0.28	0.40
425.00	0.04	32.01	424.99	0.46	-1.70	0.48	0.37
525.00	0.12	232.44	524.99	0.43	-1.77	0.44	0.16
625.00	0.08	65.76	624.99	0.39	-1.78	0.41	0.20
725.00	0.27	267.26	724.99	0.41	-1.96	0.43	0.35
825.00	0.25	151.48	824.99	0.21	-2.09	0.22	0.44
925.00	0.17	296.85	924.99	0.08	-2.12	0.10	0.40
990.00	0.30	218.40	989.99	-0.01	-2.31	0.01	0.48
Final Gyro Survey @ 990.00ft - Tie-On to Surface Gyros @ 990.00ft							
1,071.00	0.03	70.94	1,070.99	-0.17	-2.42	-0.15	0.40
First Sperry MWD Survey @ 1071.00ft							
1,102.00	0.14	212.59	1,101.99	-0.20	-2.43	-0.18	0.53
1,194.00	0.22	231.11	1,193.99	-0.40	-2.63	-0.38	0.11
1,286.00	0.25	193.76	1,285.99	-0.71	-2.82	-0.69	0.17
1,377.00	0.10	255.71	1,376.99	-0.92	-2.94	-0.90	0.24
1,470.00	0.29	289.13	1,469.99	-0.86	-3.24	-0.84	0.23
1,562.00	0.25	276.10	1,561.99	-0.76	-3.66	-0.74	0.08
1,654.00	0.38	307.23	1,653.99	-0.56	-4.10	-0.53	0.23
1,745.00	1.01	168.94	1,744.98	-1.16	-4.19	-1.13	1.45
1,837.00	1.28	146.74	1,836.97	-2.82	-3.47	-2.79	0.56
1,929.00	1.20	165.76	1,928.94	-4.61	-2.67	-4.59	0.45
2,021.00	0.94	161.69	2,020.93	-6.26	-2.20	-6.24	0.29
2,112.00	0.93	206.35	2,111.92	-7.63	-2.29	-7.61	0.78
2,207.00	0.41	195.49	2,206.91	-8.65	-2.72	-8.63	0.56
2,302.00	0.79	189.84	2,301.91	-9.62	-2.92	-9.60	0.40
2,397.00	0.59	117.42	2,396.90	-10.49	-2.60	-10.47	0.87
2,491.00	0.45	72.95	2,490.90	-10.61	-1.82	-10.59	0.44
2,585.00	0.79	35.92	2,584.89	-9.98	-1.09	-9.97	0.54
2,680.00	0.89	54.96	2,679.88	-9.02	-0.10	-9.02	0.31
2,774.00	0.98	50.60	2,773.87	-8.09	1.12	-8.10	0.12
2,869.00	1.29	48.39	2,868.85	-6.87	2.55	-6.89	0.33
2,963.00	1.54	37.44	2,962.82	-5.16	4.11	-5.19	0.39
3,058.00	0.75	28.32	3,057.80	-3.60	5.18	-3.64	0.85
3,152.00	0.46	335.64	3,151.80	-2.71	5.31	-2.75	0.63
3,247.00	1.11	11.57	3,246.79	-1.47	5.34	-1.51	0.83
3,342.00	0.66	332.44	3,341.78	-0.08	5.27	-0.12	0.77
3,437.00	0.40	338.23	3,436.77	0.71	4.90	0.68	0.28
3,532.00	0.41	291.14	3,531.77	1.14	4.46	1.11	0.34
3,627.00	0.53	336.39	3,626.77	1.67	3.96	1.64	0.40
3,722.00	0.50	352.33	3,721.76	2.48	3.73	2.46	0.15
3,817.00	0.70	5.67	3,816.76	3.47	3.73	3.44	0.26
3,912.00	0.31	340.72	3,911.76	4.29	3.71	4.26	0.46
4,007.00	0.50	34.16	4,006.75	4.88	3.86	4.85	0.42
4,102.00	0.49	58.70	4,101.75	5.43	4.43	5.40	0.22
4,197.00	0.06	302.97	4,196.75	5.67	4.74	5.63	0.55
4,292.00	0.90	212.29	4,291.75	5.07	4.30	5.03	0.95

Design Report for Wardell 3C-20HZ - Actual Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,386.00	1.03	223.94	4,385.73	3.83	3.32	3.81	0.25
4,481.00	0.98	202.98	4,480.72	2.47	2.41	2.45	0.39
4,576.00	0.94	207.89	4,575.70	1.03	1.73	1.02	0.10
4,670.00	0.57	193.67	4,669.70	-0.10	1.26	-0.11	0.44
4,765.00	0.72	263.06	4,764.69	-0.63	0.55	-0.64	0.78
4,860.00	0.89	245.98	4,859.68	-1.01	-0.71	-1.00	0.31
4,954.00	1.46	217.19	4,953.66	-2.26	-2.10	-2.24	0.86
5,049.00	1.93	202.61	5,048.62	-4.70	-3.45	-4.67	0.67
5,144.00	1.38	196.46	5,143.58	-7.27	-4.39	-7.24	0.61
5,238.00	0.90	205.01	5,237.56	-9.03	-5.02	-8.99	0.54
5,333.00	1.21	218.07	5,332.55	-10.49	-5.96	-10.45	0.41
5,428.00	1.06	213.13	5,427.53	-12.02	-7.06	-11.96	0.19
5,523.00	1.01	221.91	5,522.51	-13.38	-8.10	-13.32	0.17
5,617.00	1.21	233.36	5,616.49	-14.59	-9.45	-14.51	0.32
5,712.00	1.42	229.39	5,711.47	-15.95	-11.14	-15.87	0.24
5,807.00	1.05	177.39	5,806.45	-17.59	-12.00	-17.50	1.19
5,901.00	2.04	149.08	5,900.42	-19.88	-11.10	-19.80	1.30
5,996.00	1.70	80.16	5,995.38	-21.09	-8.84	-21.02	2.25
6,091.00	1.40	58.37	6,090.34	-20.24	-6.46	-20.19	0.69
6,186.00	1.26	42.28	6,185.32	-18.86	-4.77	-18.82	0.42
6,281.00	1.24	32.27	6,280.29	-17.22	-3.52	-17.19	0.23
6,376.00	1.32	356.13	6,375.27	-15.26	-3.05	-15.23	0.84
6,471.00	1.24	337.79	6,470.25	-13.21	-3.51	-13.19	0.44
6,566.00	1.24	318.53	6,565.23	-11.49	-4.58	-11.46	0.44
6,597.00	1.37	314.61	6,596.22	-10.98	-5.06	-10.94	0.51
6,629.00	2.50	351.30	6,628.20	-10.02	-5.44	-9.98	5.07
6,661.00	6.23	2.28	6,660.10	-7.60	-5.48	-7.56	11.89
6,692.00	9.25	2.30	6,690.82	-3.43	-5.31	-3.39	9.74
6,724.00	11.78	2.96	6,722.28	2.41	-5.04	2.44	7.92
6,756.00	14.65	3.30	6,753.43	9.71	-4.64	9.75	8.97
6,787.00	17.37	2.69	6,783.22	18.25	-4.20	18.28	8.79
6,819.00	19.74	2.08	6,813.56	28.42	-3.78	28.45	7.43
6,851.00	21.63	2.06	6,843.49	39.72	-3.37	39.74	5.91
6,882.00	25.59	3.24	6,871.89	52.12	-2.78	52.14	12.86
6,914.00	28.39	3.64	6,900.40	66.61	-1.91	66.62	8.77
6,946.00	31.02	4.12	6,928.20	82.43	-0.83	82.43	8.25
6,977.00	33.59	2.73	6,954.40	98.97	0.15	98.96	8.63
7,009.00	36.22	1.35	6,980.64	117.26	0.79	117.25	8.58
7,041.00	39.22	0.90	7,005.95	136.83	1.17	136.82	9.41
7,072.00	42.98	0.93	7,029.30	157.21	1.50	157.19	12.13
7,104.00	46.67	1.25	7,052.00	179.76	1.93	179.74	11.55
7,136.00	49.82	2.27	7,073.30	203.61	2.67	203.59	10.13
7,167.00	52.80	3.72	7,092.68	227.77	3.94	227.74	10.28
7,199.00	55.31	4.66	7,111.46	253.61	5.84	253.56	8.20
7,231.00	57.29	4.22	7,129.22	280.15	7.90	280.08	6.29
7,262.00	58.87	4.23	7,145.61	306.39	9.83	306.31	5.10
7,294.00	61.84	3.98	7,161.43	334.13	11.82	334.03	9.31
7,326.00	65.75	3.44	7,175.56	362.77	13.68	362.66	12.31
7,357.00	68.67	4.29	7,187.57	391.28	15.61	391.15	9.75
7,389.00	70.78	2.90	7,198.66	421.24	17.49	421.10	7.75
7,421.00	73.87	1.71	7,208.37	451.70	18.71	451.55	10.29

Design Report for Wardell 3C-20HZ - Actual Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,452.00	77.69	1.74	7,215.99	481.73	19.62	481.57	12.32
7,484.00	80.16	1.57	7,222.13	513.12	20.52	512.95	7.74
7,516.00	81.70	1.35	7,227.18	544.71	21.33	544.53	4.86
7,547.00	83.26	0.65	7,231.23	575.43	21.86	575.25	5.51
7,579.00	86.30	1.76	7,234.14	607.29	22.53	607.10	10.11
7,598.00	88.43	1.69	7,235.02	626.26	23.10	626.07	11.22
7,634.80	92.02	1.76	7,234.87	663.04	24.21	662.84	9.75
7" Intermediate Casing							
7,642.00	92.72	1.77	7,234.58	670.23	24.43	670.03	9.75
7,705.00	93.03	1.79	7,231.42	733.12	26.39	732.90	0.49
7,800.00	91.30	1.75	7,227.83	828.00	29.32	827.76	1.82
7,895.00	89.32	0.48	7,227.31	922.98	31.17	922.72	2.48
7,989.00	88.70	359.62	7,228.94	1,016.96	31.25	1,016.70	1.13
8,084.00	89.07	359.98	7,230.79	1,111.94	30.92	1,111.68	0.54
8,179.00	88.95	359.44	7,232.43	1,206.93	30.44	1,206.66	0.58
8,274.00	90.00	0.37	7,233.30	1,301.92	30.28	1,301.66	1.48
8,369.00	89.94	0.46	7,233.35	1,396.92	30.97	1,396.65	0.11
8,463.00	88.64	0.56	7,234.51	1,490.90	31.80	1,490.62	1.39
8,558.00	89.51	1.08	7,236.05	1,585.88	33.16	1,585.59	1.07
8,653.00	90.43	1.48	7,236.10	1,680.86	35.29	1,680.54	1.06
8,748.00	90.68	1.98	7,235.18	1,775.81	38.15	1,775.47	0.59
8,843.00	90.80	2.22	7,233.95	1,870.74	41.64	1,870.37	0.28
8,938.00	89.88	359.79	7,233.39	1,965.71	43.30	1,965.33	2.74
9,032.00	91.17	1.94	7,232.52	2,059.69	44.72	2,059.30	2.67
9,127.00	91.61	2.19	7,230.22	2,154.60	48.14	2,154.18	0.53
9,222.00	91.67	1.87	7,227.50	2,249.50	51.51	2,249.05	0.34
9,317.00	92.35	1.75	7,224.17	2,344.39	54.50	2,343.92	0.73
9,411.00	92.04	3.04	7,220.57	2,438.24	58.43	2,437.73	1.41
9,506.00	90.49	2.82	7,218.47	2,533.09	63.28	2,532.55	1.65
9,601.00	90.37	2.86	7,217.76	2,627.97	67.99	2,627.39	0.13
9,696.00	91.30	3.43	7,216.37	2,722.82	73.20	2,722.19	1.15
9,791.00	88.89	2.58	7,216.22	2,817.68	78.18	2,817.01	2.69
9,886.00	89.32	2.92	7,217.70	2,912.56	82.74	2,911.86	0.58
9,981.00	88.39	2.13	7,219.60	3,007.44	86.92	3,006.71	1.28
10,075.00	88.45	2.08	7,222.19	3,101.34	90.38	3,100.58	0.08
10,170.00	88.02	1.96	7,225.12	3,196.24	93.72	3,195.45	0.47
10,265.00	89.57	1.91	7,227.11	3,291.16	96.93	3,290.34	1.63
10,359.00	88.77	1.61	7,228.48	3,385.11	99.82	3,384.26	0.91
10,453.00	87.96	1.33	7,231.16	3,479.04	102.23	3,478.17	0.91
10,548.00	89.20	2.22	7,233.51	3,573.96	105.17	3,573.07	1.61
10,643.00	90.06	1.75	7,234.13	3,668.90	108.46	3,667.98	1.03
10,737.00	90.06	1.75	7,234.03	3,762.86	111.33	3,761.92	0.00
10,831.00	90.25	1.61	7,233.77	3,856.81	114.09	3,855.85	0.25
10,926.00	90.19	1.36	7,233.41	3,951.78	116.55	3,950.80	0.27
11,021.00	91.05	1.84	7,232.38	4,046.74	119.20	4,045.73	1.04
11,115.00	91.73	2.21	7,230.10	4,140.65	122.52	4,139.62	0.82
11,210.00	89.38	1.52	7,229.18	4,235.59	125.61	4,234.53	2.58
11,305.00	89.69	1.76	7,229.95	4,330.55	128.33	4,329.46	0.41
11,400.00	88.33	1.42	7,231.59	4,425.49	130.97	4,424.39	1.48
11,495.00	89.01	0.70	7,233.80	4,520.45	132.72	4,519.33	1.04
11,591.00	90.37	2.16	7,234.32	4,616.41	135.12	4,615.27	2.08

Design Report for Wardell 3C-20HZ - Actual Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
11,686.00	90.99	2.65	7,233.19	4,711.32	139.10	4,710.15	0.83
11,781.00	90.93	2.09	7,231.60	4,806.23	143.03	4,805.02	0.59
11,876.00	89.94	0.62	7,230.88	4,901.20	145.28	4,899.97	1.87
11,970.00	88.76	358.88	7,231.94	4,995.18	144.87	4,993.96	2.24
12,065.00	89.57	359.84	7,233.33	5,090.17	143.81	5,088.95	1.32
12,160.00	89.81	0.38	7,233.84	5,185.16	143.99	5,183.94	0.62
12,255.00	89.51	359.79	7,234.40	5,280.16	144.13	5,278.93	0.70
12,350.00	89.51	0.02	7,235.22	5,375.16	143.97	5,373.93	0.24
12,444.00	89.38	1.52	7,236.13	5,469.14	145.24	5,467.90	1.60
12,539.00	90.80	2.58	7,235.98	5,564.08	148.63	5,562.81	1.87
12,634.00	90.49	2.66	7,234.91	5,658.97	152.98	5,657.67	0.34
12,729.00	90.86	2.59	7,233.79	5,753.87	157.33	5,752.53	0.40
12,824.00	91.17	2.16	7,232.11	5,848.77	161.26	5,847.40	0.56
12,919.00	91.42	0.70	7,229.96	5,943.71	163.63	5,942.32	1.56
13,014.00	91.17	0.94	7,227.81	6,038.68	164.99	6,037.27	0.36
13,108.00	91.17	0.94	7,225.89	6,132.65	166.53	6,131.23	0.00
13,203.00	89.63	0.23	7,225.23	6,227.63	167.50	6,226.21	1.79
13,298.00	88.70	0.55	7,226.61	6,322.62	168.15	6,321.18	1.04
13,392.00	88.89	0.68	7,228.59	6,416.60	169.16	6,415.15	0.24
13,486.00	87.84	0.08	7,231.27	6,510.55	169.78	6,509.10	1.29
13,581.00	88.64	1.15	7,234.19	6,605.50	170.80	6,604.04	1.41
13,676.00	88.21	0.46	7,236.80	6,700.45	172.14	6,698.98	0.86
13,767.00	89.20	1.74	7,238.86	6,791.41	173.88	6,789.92	1.78
13,862.00	90.80	2.62	7,238.86	6,886.34	177.50	6,884.82	1.92
13,957.00	91.11	1.24	7,237.28	6,981.27	180.70	6,979.72	1.49
14,052.00	92.10	1.55	7,234.61	7,076.20	183.01	7,074.63	1.09
14,147.00	90.68	0.38	7,232.31	7,171.16	184.61	7,169.57	1.94
14,241.00	88.95	358.42	7,232.61	7,265.14	183.62	7,263.56	2.78
14,336.00	88.21	356.53	7,234.97	7,360.02	179.44	7,358.47	2.14
14,431.00	89.63	357.60	7,236.76	7,454.87	174.58	7,453.35	1.87
14,526.00	90.86	359.40	7,236.35	7,549.83	172.09	7,548.33	2.29
14,621.00	91.30	359.86	7,234.56	7,644.81	171.48	7,643.31	0.67
14,716.00	91.79	0.68	7,232.00	7,739.78	171.92	7,738.27	1.01
14,811.00	88.70	359.64	7,231.59	7,834.76	172.19	7,833.25	3.43
14,906.00	88.02	358.68	7,234.31	7,929.71	170.80	7,928.21	1.24
15,001.00	87.53	357.38	7,238.00	8,024.58	167.53	8,023.10	1.46
15,075.00	89.20	357.79	7,240.11	8,098.48	164.42	8,097.02	2.32
15,142.00	88.95	357.59	7,241.19	8,165.42	161.72	8,163.98	0.48
15,237.00	90.93	358.11	7,241.29	8,260.35	158.15	8,258.93	2.15
15,337.00	91.24	356.71	7,239.40	8,360.22	153.64	8,358.84	1.43
15,431.00	90.37	355.54	7,238.08	8,454.00	147.28	8,452.66	1.55
15,527.00	89.44	353.75	7,238.24	8,549.57	138.32	8,548.30	2.10
15,622.00	90.31	354.02	7,238.45	8,644.03	128.20	8,642.83	0.96
15,716.00	90.37	353.65	7,237.89	8,737.49	118.11	8,736.36	0.40
15,811.00	89.44	355.31	7,238.05	8,832.04	108.97	8,830.98	2.00
15,906.00	88.95	356.64	7,239.38	8,926.80	102.30	8,925.78	1.49
16,002.00	88.52	357.42	7,241.50	9,022.64	97.33	9,021.66	0.93
16,097.00	89.13	358.04	7,243.45	9,117.55	93.57	9,116.59	0.92
16,192.00	90.25	357.94	7,243.96	9,212.49	90.24	9,211.55	1.18
16,286.00	91.73	359.09	7,242.34	9,306.44	87.80	9,305.52	1.99
16,381.00	91.30	359.51	7,239.83	9,401.40	86.64	9,400.48	0.63

Design Report for Wardell 3C-20HZ - Actual Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
16,455.00	91.30	359.57	7,238.15	9,475.37	86.05	9,474.46	0.08
Final Sperry MWD Survey @ 16455.00ft							
16,499.00	91.30	359.57	7,237.15	9,519.36	85.72	9,518.45	0.00
Straight Line Projection to Bit @ 16499.00ft							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
125.00	125.00	0.26	-0.29	First Gyro Survey @ 125.00ft
990.00	989.99	-0.01	-2.31	Final Gyro Survey @ 990.00ft
990.00	989.99	-0.01	-2.31	Tie-On to Surface Gyros @ 990.00ft
1,071.00	1,070.99	-0.17	-2.42	First Sperry MWD Survey @ 1071.00ft
16,455.00	7,238.15	9,475.37	86.05	Final Sperry MWD Survey @ 16455.00ft
16,499.00	7,237.15	9,519.36	85.72	Straight Line Projection to Bit @ 16499.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Wardell 3C-20HZ_BHL	359.57	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
125.00	990.00	Surface Gyros	NS-GYRO-MS
1,071.00	7,598.00	Sperry MWD Surveys - Build	MWD
7,642.00	16,499.00	Sperry MWD Surveys - Lateral	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,634.80	7,234.87	7" Intermediate Casing	7	8-3/4

Design Report for Wardell 3C-20HZ - Actual Surveys

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 3C-20HZ_H	0.00	0.00	0.00	0.00	0.00	,356.459041	,6,520.195882	40.190717	-104.689164
- actual wellpath hits target center									
- Polygon									
Point 1				516.19	-562.07	1,312,799.16	3,227,041.48		
Point 2				507.90	4,714.64	1,318,075.35	3,226,984.95		
Point 3				522.35	10,004.54	1,323,364.93	3,226,951.03		
Wardell 3C-20HZ_W	0.00	0.00	7,228.94	8,620.56	117.35	,977.364343	,6,558.714685	40.214380	-104.688744
- actual wellpath misses target center by 16.36ft at 15599.80ft MD (7238.53 TVD, 8621.95 N, 130.53 E)									
- Point									
Wardell 3C-20HZ_B	0.00	0.00	7,228.00	9,545.37	-71.49	,900.372167	,6,361.430447	40.216919	-104.689420
- actual wellpath misses target center by 159.61ft at 16499.00ft MD (7237.15 TVD, 9519.36 N, 85.72 E)									
- Point									
Wardell 3C-20HZ_V	0.00	0.00	7,229.77	7,800.00	200.00	,157.629310	,6,648.860423	40.212128	-104.688448
- actual wellpath misses target center by 27.74ft at 14776.32ft MD (7231.15 TVD, 7800.08 N, 172.29 E)									
- Point									
Wardell 3C-20HZ_S	0.00	0.00	0.00	0.00	0.00	,356.459041	,6,520.195882	40.190717	-104.689164
- actual wellpath hits target center									
- Polygon									
Point 1				-2,127.88	4,695.14	1,318,031.75	3,224,349.57		
Point 2				507.90	4,714.64	1,318,075.35	3,226,984.95		
Point 3				3,143.67	4,733.98	1,318,118.78	3,229,620.32		
Wardell 3C-20HZ_W	0.00	0.00	7,232.40	5,200.00	150.00	,557.391611	,6,622.637502	40.204991	-104.688627
- actual wellpath misses target center by 6.11ft at 12174.84ft MD (7233.90 TVD, 5200.00 N, 144.08 E)									
- Point									
Wardell 3C-20HZ_Si	0.00	0.00	0.00	0.00	0.00	,356.459041	,6,520.195882	40.190717	-104.689164
- actual wellpath hits target center									
- Polygon									
Point 1				-1,651.94	-97.72	1,313,243.64	3,224,869.29		
Point 2				516.99	-102.06	1,313,259.13	3,227,038.08		
Point 3				2,683.25	-105.30	1,313,275.70	3,229,204.18		
Point 4				2,682.97	2,077.85	1,315,458.67	3,229,183.94		
Point 5				2,683.53	4,270.57	1,317,651.21	3,229,164.45		
Point 6				2,685.26	5,190.65	1,318,571.22	3,229,157.77		
Point 7				2,692.97	7,371.33	1,320,751.79	3,229,145.54		
Point 8				2,720.01	9,541.75	1,322,922.27	3,229,152.73		
Point 9				521.75	9,544.51	1,322,904.93	3,226,954.63		
Point 10				-1,681.59	9,547.53	1,322,887.81	3,224,751.45		
Point 11				-1,684.58	7,352.95	1,320,693.39	3,224,768.53		
Point 12				-1,670.77	5,158.55	1,318,499.30	3,224,802.40		
Point 13				-1,666.34	4,238.52	1,317,579.39	3,224,815.24		
Point 14				-1,659.12	2,058.88	1,315,400.00	3,224,842.39		
Wardell 3C-20HZ_Si	0.00	0.00	0.00	0.00	0.00	,356.459041	,6,520.195882	40.190717	-104.689164
- actual wellpath hits target center									
- Polygon									
Point 1				-2,110.43	-556.82	1,312,780.39	3,224,415.04		
Point 2				516.19	-562.08	1,312,799.15	3,227,041.48		
Point 3				3,143.33	-566.00	1,312,819.25	3,229,668.44		
Point 4				3,142.99	2,077.82	1,315,462.84	3,229,643.92		
Point 5				3,143.67	4,733.98	1,318,118.78	3,229,620.32		
Point 6				3,143.67	4,733.98	1,318,118.78	3,229,620.32		
Point 7				3,152.98	7,367.65	1,320,752.32	3,229,605.54		
Point 8				3,185.80	10,001.19	1,323,385.93	3,229,614.28		
Point 9				522.35	10,004.53	1,323,364.92	3,226,951.03		
Point 10				-2,140.99	10,008.18	1,323,344.22	3,224,287.88		
Point 11				-2,144.60	7,351.82	1,320,688.05	3,224,308.56		
Point 12				-2,127.88	4,695.14	1,318,031.75	3,224,349.57		
Point 13				-2,127.88	4,695.14	1,318,031.75	3,224,349.57		
Point 14				-2,119.14	2,057.35	1,315,394.26	3,224,382.42		
Wardell 3C-20HZ_S	0.00	0.00	0.00	0.00	0.00	,356.459041	,6,520.195882	40.190717	-104.689164
- actual wellpath hits target center									

Design Report for Wardell 3C-20HZ - Actual Surveys

- Point

North Reference Sheet for Sec. 29 T3N-R65W - Wardell 3C-20HZ - Plan E Rev 2

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

Vertical Depths are relative to RKB=25ft @ 4904.00ft (HP 308). Northing and Easting are relative to Wardell 3C-20HZ

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: 0.99995739

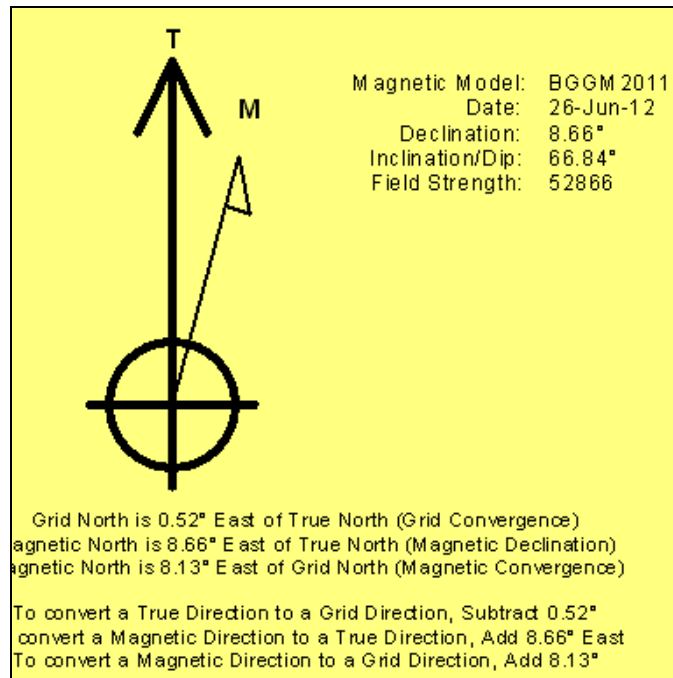
Grid Coordinates of Well: 1,313,356.459041 ft N, 3,226,520.195882 ft E

Geographical Coordinates of Well: 40° 11' 26.58" N, 104° 41' 20.99" W

Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,499.00ft
the Bottom Hole Displacement is 9,519.75ft in the Direction of 0.52° (True).

Magnetic Convergence at surface is: -8.13° (26 June 2012, , BGGM2011)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 29 T3N-R65W

Wardell 3C-20HZ

Plan E Rev 2

Design: Actual Surveys

Survey Report - Geographic

06 July, 2012

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	EDM 2003.16 Single User Db

Project	Weld County, CO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 3C-20HZ					
Well Position	+N/-S	0.00 ft	Northing:	1,313,356.459041 ft	Latitude:	40.190717
	+E/-W	0.00 ft	Easting:	3,226,520.195882 ft	Longitude:	-104.689164
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,879.00 ft

Wellbore	Plan E Rev 2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2011	2012-06-26	8.66	66.84	52,866

Design	Actual 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	359.57	

Survey Program	Date	2012-07-06			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	990.00	Surface Gyros (Plan E Rev 2)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,071.00	7,598.00	Sperry MWD Surveys - Build (Plan E Rev	MWD	MWD - Standard	
7,642.00	16,499.00	Sperry MWD Surveys - Lateral (Plan E Re	MWD	MWD - Standard	

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	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	13,356.459041	26,520.195882	40.190717	-104.689164	
125.00	0.36	311.66	125.00	0.26	-0.29	13,356.717366	26,519.900134	40.190718	-104.689165	
First Gyro Survey @ 125.00ft										
225.00	0.42	240.09	225.00	0.29	-0.85	13,356.738377	26,519.347533	40.190718	-104.689167	
325.00	0.37	300.59	325.00	0.27	-1.44	13,356.714486	26,518.752101	40.190718	-104.689169	
425.00	0.04	32.01	424.99	0.46	-1.70	13,356.906010	26,518.490904	40.190718	-104.689170	
525.00	0.12	232.44	524.99	0.43	-1.77	13,356.871186	26,518.426712	40.190718	-104.689170	
625.00	0.08	65.76	624.99	0.39	-1.78	13,356.835838	26,518.407681	40.190718	-104.689170	
725.00	0.27	267.26	724.99	0.41	-1.96	13,356.851666	26,518.235844	40.190718	-104.689171	
825.00	0.25	151.48	824.99	0.21	-2.09	13,356.647528	26,518.106528	40.190718	-104.689171	
925.00	0.17	296.85	924.99	0.08	-2.12	13,356.522593	26,518.079477	40.190717	-104.689172	
990.00	0.30	218.40	989.99	-0.01	-2.31	13,356.431040	26,517.888581	40.190717	-104.689172	
Final Gyro Survey @ 990.00ft - Tie-On to Surface Gyros @ 990.00ft										
1,071.00	0.03	70.94	1,070.99	-0.17	-2.42	13,356.270770	26,517.778371	40.190716	-104.689173	
First Sperry MWD Survey @ 1071.00ft										
1,102.00	0.14	212.59	1,101.99	-0.20	-2.43	13,356.241396	26,517.765911	40.190716	-104.689173	
1,194.00	0.22	231.11	1,193.99	-0.40	-2.63	13,356.034010	26,517.569788	40.190716	-104.689173	
1,286.00	0.25	193.76	1,285.99	-0.71	-2.82	13,355.726499	26,517.387382	40.190715	-104.689174	
1,377.00	0.10	255.71	1,376.99	-0.92	-2.94	13,355.512947	26,517.265158	40.190714	-104.689175	
1,470.00	0.29	289.13	1,469.99	-0.86	-3.24	13,355.567287	26,516.963654	40.190715	-104.689176	
1,562.00	0.25	276.10	1,561.99	-0.76	-3.66	13,355.661072	26,516.543252	40.190715	-104.689177	
1,654.00	0.38	307.23	1,653.99	-0.56	-4.10	13,355.862916	26,516.098921	40.190715	-104.689179	
1,745.00	1.01	168.94	1,744.98	-1.16	-4.19	13,355.257595	26,516.018041	40.190714	-104.689179	
1,837.00	1.28	146.74	1,836.97	-2.82	-3.47	13,353.609281	26,516.752223	40.190709	-104.689176	
1,929.00	1.20	165.76	1,928.94	-4.61	-2.67	13,351.823753	26,517.569079	40.190704	-104.689174	
2,021.00	0.94	161.69	2,020.93	-6.26	-2.20	13,350.178033	26,518.058175	40.190700	-104.689172	
2,112.00	0.93	206.35	2,111.92	-7.63	-2.29	13,348.806854	26,517.977427	40.190696	-104.689172	
2,207.00	0.41	195.49	2,206.91	-8.65	-2.72	13,347.784558	26,517.553799	40.190693	-104.689174	
2,302.00	0.79	189.84	2,301.91	-9.62	-2.92	13,346.809950	26,517.360010	40.190691	-104.689174	
2,397.00	0.59	117.42	2,396.90	-10.49	-2.60	13,345.942431	26,517.690195	40.190688	-104.689173	
2,491.00	0.45	72.95	2,490.90	-10.61	-1.82	13,345.834953	26,518.473689	40.190688	-104.689171	
2,585.00	0.79	35.92	2,584.89	-9.98	-1.09	13,346.474630	26,519.200918	40.190690	-104.689168	
2,680.00	0.89	54.96	2,679.88	-9.02	-0.10	13,347.437573	26,520.180405	40.190692	-104.689164	
2,774.00	0.98	50.60	2,773.87	-8.09	1.12	13,348.378026	26,521.390696	40.190695	-104.689160	
2,869.00	1.29	48.39	2,868.85	-6.87	2.55	13,349.616754	26,522.806691	40.190698	-104.689155	
2,963.00	1.54	37.44	2,962.82	-5.16	4.11	13,351.336414	26,524.349982	40.190703	-104.689149	
3,058.00	0.75	28.32	3,057.80	-3.60	5.18	13,352.907012	26,525.406652	40.190707	-104.689145	
3,152.00	0.46	335.64	3,151.80	-2.71	5.31	13,353.793511	26,525.534761	40.190710	-104.689145	
3,247.00	1.11	11.57	3,246.79	-1.47	5.34	13,355.042544	26,525.550598	40.190713	-104.689145	
3,342.00	0.66	332.44	3,341.78	-0.08	5.27	13,356.428350	26,525.469325	40.190717	-104.689145	
3,437.00	0.40	338.23	3,436.77	0.71	4.90	13,357.217867	26,525.085964	40.190719	-104.689146	
3,532.00	0.41	291.14	3,531.77	1.14	4.46	13,357.644352	26,524.642050	40.190720	-104.689148	
3,627.00	0.53	336.39	3,626.77	1.67	3.96	13,358.164987	26,524.144287	40.190722	-104.689150	
3,722.00	0.50	352.33	3,721.76	2.48	3.73	13,358.976207	26,523.905570	40.190724	-104.689151	
3,817.00	0.70	5.67	3,816.76	3.47	3.73	13,359.964414	26,523.898543	40.190726	-104.689151	
3,912.00	0.31	340.72	3,911.76	4.29	3.71	13,360.784150	26,523.863524	40.190729	-104.689151	
4,007.00	0.50	34.16	4,006.75	4.88	3.86	13,361.371037	26,524.006051	40.190730	-104.689150	
4,102.00	0.49	58.70	4,101.75	5.43	4.43	13,361.930328	26,524.580785	40.190732	-104.689148	
4,197.00	0.06	302.97	4,196.75	5.67	4.74	13,362.171210	26,524.883952	40.190733	-104.689147	
4,292.00	0.90	212.29	4,291.75	5.07	4.30	13,361.563575	26,524.449199	40.190731	-104.689149	
4,386.00	1.03	223.94	4,385.73	3.83	3.32	13,360.322271	26,523.479918	40.190727	-104.689152	
4,481.00	0.98	202.98	4,480.72	2.47	2.41	13,358.951291	26,522.582784	40.190724	-104.689155	
4,576.00	0.94	207.89	4,575.70	1.03	1.73	13,357.508498	26,521.914288	40.190720	-104.689158	
4,670.00	0.57	193.67	4,669.70	-0.10	1.26	13,356.368467	26,521.453532	40.190717	-104.689160	
4,765.00	0.72	263.06	4,764.69	-0.63	0.55	13,355.830789	26,520.754251	40.190715	-104.689162	

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	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
4,860.00	0.89	245.98	4,859.68	-1.01	-0.71	13,355.446790	26,519.491330	40.190714	-104.689167
4,954.00	1.46	217.19	4,953.66	-2.26	-2.10	13,354.183009	26,518.112192	40.190711	-104.689172
5,049.00	1.93	202.61	5,048.62	-4.70	-3.45	13,351.729967	26,516.788033	40.190704	-104.689176
5,144.00	1.38	196.46	5,143.58	-7.27	-4.39	13,349.147727	26,515.872479	40.190697	-104.689180
5,238.00	0.90	205.01	5,237.56	-9.03	-5.02	13,347.387533	26,515.255736	40.190692	-104.689182
5,333.00	1.21	218.07	5,332.55	-10.49	-5.96	13,345.913310	26,514.335275	40.190688	-104.689185
5,428.00	1.06	213.13	5,427.53	-12.02	-7.06	13,344.377858	26,513.250551	40.190684	-104.689189
5,523.00	1.01	221.91	5,522.51	-13.38	-8.10	13,343.009497	26,512.223535	40.190680	-104.689193
5,617.00	1.21	233.36	5,616.49	-14.59	-9.45	13,341.788409	26,510.884937	40.190677	-104.689198
5,712.00	1.42	229.39	5,711.47	-15.95	-11.14	13,340.408201	26,509.199098	40.190673	-104.689204
5,807.00	1.05	177.39	5,806.45	-17.59	-12.00	13,338.764761	26,508.360128	40.190669	-104.689207
5,901.00	2.04	149.08	5,900.42	-19.88	-11.10	13,336.477408	26,509.279988	40.190662	-104.689204
5,996.00	1.70	80.16	5,995.38	-21.09	-8.84	13,335.288260	26,511.548374	40.190659	-104.689196
6,091.00	1.40	58.37	6,090.34	-20.24	-6.46	13,336.159366	26,513.916984	40.190661	-104.689187
6,186.00	1.26	42.28	6,185.32	-18.86	-4.77	13,337.556119	26,515.595040	40.190665	-104.689181
6,281.00	1.24	32.27	6,280.29	-17.22	-3.52	13,339.209360	26,516.831428	40.190670	-104.689177
6,376.00	1.32	356.13	6,375.27	-15.26	-3.05	13,341.174446	26,517.288429	40.190675	-104.689175
6,471.00	1.24	337.79	6,470.25	-13.21	-3.51	13,343.213436	26,516.807375	40.190681	-104.689177
6,566.00	1.24	318.53	6,565.23	-11.49	-4.58	13,344.925396	26,515.722444	40.190685	-104.689180
6,597.00	1.37	314.61	6,596.22	-10.98	-5.06	13,345.432499	26,515.231858	40.190687	-104.689182
6,629.00	2.50	351.30	6,628.20	-10.02	-5.44	13,346.387555	26,514.845202	40.190689	-104.689183
6,661.00	6.23	2.28	6,660.10	-7.60	-5.48	13,348.812732	26,514.786522	40.190696	-104.689184
6,692.00	9.25	2.30	6,690.82	-3.43	-5.31	13,352.985101	26,514.915314	40.190708	-104.689183
6,724.00	11.78	2.96	6,722.28	2.41	-5.04	13,358.819966	26,515.133893	40.190724	-104.689182
6,756.00	14.65	3.30	6,753.43	9.71	-4.64	13,366.126572	26,515.468780	40.190744	-104.689181
6,787.00	17.37	2.69	6,783.22	18.25	-4.20	13,374.667462	26,515.833597	40.190767	-104.689179
6,819.00	19.74	2.08	6,813.56	28.42	-3.78	13,384.843780	26,516.160921	40.190795	-104.689178
6,851.00	21.63	2.06	6,843.49	39.72	-3.37	13,396.142031	26,516.465785	40.190826	-104.689176
6,882.00	25.59	3.24	6,871.89	52.12	-2.78	13,408.545301	26,516.936365	40.190860	-104.689174
6,914.00	28.39	3.64	6,900.40	66.61	-1.91	13,423.046954	26,517.677506	40.190900	-104.689171
6,946.00	31.02	4.12	6,928.20	82.43	-0.83	13,438.874525	26,518.608342	40.190943	-104.689167
6,977.00	33.59	2.73	6,954.40	98.97	0.15	13,455.417785	26,519.439566	40.190989	-104.689163
7,009.00	36.22	1.35	6,980.64	117.26	0.79	13,473.719101	26,519.916690	40.191039	-104.689161
7,041.00	39.22	0.90	7,005.95	136.83	1.17	13,493.292569	26,520.119441	40.191093	-104.689160
7,072.00	42.98	0.93	7,029.30	157.21	1.50	13,513.666201	26,520.258711	40.191148	-104.689159
7,104.00	46.67	1.25	7,052.00	179.76	1.93	13,536.218362	26,520.483578	40.191210	-104.689157
7,136.00	49.82	2.27	7,073.30	203.61	2.67	13,560.080053	26,521.003663	40.191276	-104.689154
7,167.00	52.80	3.72	7,092.68	227.77	3.94	13,584.249099	26,522.053072	40.191342	-104.689150
7,199.00	55.31	4.66	7,111.46	253.61	5.84	13,610.098798	26,523.712718	40.191413	-104.689143
7,231.00	57.29	4.22	7,129.22	280.15	7.90	13,636.656691	26,525.529566	40.191486	-104.689136
7,262.00	58.87	4.23	7,145.61	306.39	9.83	13,662.912264	26,527.227960	40.191558	-104.689129
7,294.00	61.84	3.98	7,161.43	334.13	11.82	13,690.665108	26,528.963930	40.191634	-104.689122
7,326.00	65.75	3.44	7,175.56	362.77	13.68	13,719.324959	26,530.557009	40.191713	-104.689115
7,357.00	68.67	4.29	7,187.57	391.28	15.61	13,747.851459	26,532.224638	40.191791	-104.689108
7,389.00	70.78	2.90	7,198.66	421.24	17.49	13,777.821887	26,533.830133	40.191873	-104.689101
7,421.00	73.87	1.71	7,208.37	451.70	18.71	13,808.291011	26,534.774877	40.191957	-104.689097
7,452.00	77.69	1.74	7,215.99	481.73	19.62	13,838.327712	26,535.404695	40.192039	-104.689094
7,484.00	80.16	1.57	7,222.13	513.12	20.52	13,869.721866	26,536.024339	40.192125	-104.689091
7,516.00	81.70	1.35	7,227.18	544.71	21.33	13,901.315221	26,536.540424	40.192212	-104.689088
7,547.00	83.26	0.65	7,231.23	575.43	21.86	13,932.045082	26,536.795438	40.192297	-104.689086
7,579.00	86.30	1.76	7,234.14	607.29	22.53	13,963.904507	26,537.174926	40.192384	-104.689083
7,598.00	88.43	1.69	7,235.02	626.26	23.10	13,982.878345	26,537.572723	40.192436	-104.689081
7,634.80	92.02	1.76	7,234.87	663.04	24.21	14,019.662419	26,538.342941	40.192537	-104.689077
7" Intermediate Casing									
7,642.00	92.72	1.77	7,234.58	670.23	24.43	14,026.854230	26,538.498553	40.192557	-104.689077

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	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	
7,705.00	93.03	1.79	7,231.42	733.12	26.39	14,089.757058	26,539.877787	40.192729	-104.689070	
7,800.00	91.30	1.75	7,227.83	828.00	29.32	14,184.659144	26,541.942062	40.192990	-104.689059	
7,895.00	89.32	0.48	7,227.31	922.98	31.17	14,279.641981	26,542.921889	40.193251	-104.689052	
7,989.00	88.70	359.62	7,228.94	1,016.96	31.25	14,373.619389	26,542.144626	40.193509	-104.689052	
8,084.00	89.07	359.98	7,230.79	1,111.94	30.92	14,468.589452	26,540.944673	40.193769	-104.689053	
8,179.00	88.95	359.44	7,232.43	1,206.93	30.44	14,563.561272	26,539.595480	40.194030	-104.689055	
8,274.00	90.00	0.37	7,233.30	1,301.92	30.28	14,658.545323	26,538.569488	40.194291	-104.689056	
8,369.00	89.94	0.46	7,233.35	1,396.92	30.97	14,753.541076	26,538.388919	40.194551	-104.689053	
8,463.00	88.64	0.56	7,234.51	1,490.90	31.80	14,847.527823	26,538.366093	40.194809	-104.689050	
8,558.00	89.51	1.08	7,236.05	1,585.88	33.16	14,942.508889	26,538.856991	40.195070	-104.689045	
8,653.00	90.43	1.48	7,236.10	1,680.86	35.29	15,037.495343	26,540.110534	40.195331	-104.689038	
8,748.00	90.68	1.98	7,235.18	1,775.81	38.15	15,132.465417	26,542.109967	40.195592	-104.689027	
8,843.00	90.80	2.22	7,233.95	1,870.74	41.64	15,227.417424	26,544.722562	40.195852	-104.689015	
8,938.00	89.88	359.79	7,233.39	1,965.71	43.30	15,322.400215	26,545.520020	40.196113	-104.689009	
9,032.00	91.17	1.94	7,232.52	2,059.69	44.72	15,416.383100	26,546.079341	40.196371	-104.689004	
9,127.00	91.61	2.19	7,230.22	2,154.60	48.14	15,511.316440	26,548.633372	40.196631	-104.688992	
9,222.00	91.67	1.87	7,227.50	2,249.50	51.51	15,606.240547	26,551.129151	40.196892	-104.688980	
9,317.00	92.35	1.75	7,224.17	2,344.39	54.50	15,701.153560	26,553.259997	40.197152	-104.688969	
9,411.00	92.04	3.04	7,220.57	2,438.24	58.43	15,795.028399	26,556.326841	40.197410	-104.688955	
9,506.00	90.49	2.82	7,218.47	2,533.09	63.28	15,889.914519	26,560.313799	40.197670	-104.688937	
9,601.00	90.37	2.86	7,217.76	2,627.97	67.99	15,984.830175	26,564.152707	40.197931	-104.688921	
9,696.00	91.30	3.43	7,216.37	2,722.82	73.20	16,079.715235	26,568.496358	40.198191	-104.688902	
9,791.00	88.89	2.58	7,216.22	2,817.68	78.18	16,174.614139	26,572.608332	40.198451	-104.688884	
9,886.00	89.32	2.92	7,217.70	2,912.56	82.74	16,269.526457	26,576.297798	40.198712	-104.688868	
9,981.00	88.39	2.13	7,219.60	3,007.44	86.92	16,364.443722	26,579.614299	40.198972	-104.688853	
10,075.00	88.45	2.08	7,222.19	3,101.34	90.38	16,458.368199	26,582.206827	40.199230	-104.688840	
10,170.00	88.02	1.96	7,225.12	3,196.24	93.72	16,553.286474	26,584.685882	40.199491	-104.688828	
10,265.00	89.57	1.91	7,227.11	3,291.16	96.93	16,648.229718	26,587.024624	40.199751	-104.688817	
10,359.00	88.77	1.61	7,228.48	3,385.11	99.82	16,742.193108	26,589.052117	40.200009	-104.688807	
10,453.00	87.96	1.33	7,231.16	3,479.04	102.23	16,836.137148	26,590.603548	40.200267	-104.688798	
10,548.00	89.20	2.22	7,233.51	3,573.96	105.17	16,931.078476	26,592.677183	40.200527	-104.688788	
10,643.00	90.06	1.75	7,234.13	3,668.90	108.46	17,026.040404	26,595.099300	40.200788	-104.688776	
10,737.00	90.06	1.75	7,234.03	3,762.86	111.33	17,120.014827	26,597.110597	40.201046	-104.688765	
10,831.00	90.25	1.61	7,233.77	3,856.81	114.09	17,213.991277	26,599.007075	40.201304	-104.688756	
10,926.00	90.19	1.36	7,233.41	3,951.78	116.55	17,308.973085	26,600.600469	40.201565	-104.688747	
11,021.00	91.05	1.84	7,232.38	4,046.74	119.20	17,403.945554	26,602.384357	40.201825	-104.688737	
11,115.00	91.73	2.21	7,230.10	4,140.65	122.52	17,497.880929	26,604.845889	40.202083	-104.688725	
11,210.00	89.38	1.52	7,229.18	4,235.59	125.61	17,592.839177	26,607.068818	40.202344	-104.688714	
11,305.00	89.69	1.76	7,229.95	4,330.55	128.33	17,687.813793	26,608.919112	40.202604	-104.688705	
11,400.00	88.33	1.42	7,231.59	4,425.49	130.97	17,782.776753	26,610.686332	40.202865	-104.688695	
11,495.00	89.01	0.70	7,233.80	4,520.45	132.72	17,877.741774	26,611.574822	40.203126	-104.688689	
11,591.00	90.37	2.16	7,234.32	4,616.41	135.12	17,973.719424	26,613.092845	40.203389	-104.688680	
11,686.00	90.99	2.65	7,233.19	4,711.32	139.10	18,068.656744	26,616.210850	40.203650	-104.688666	
11,781.00	90.93	2.09	7,231.60	4,806.23	143.03	18,163.589681	26,619.270680	40.203910	-104.688652	
11,876.00	89.94	0.62	7,230.88	4,901.20	145.28	18,258.569117	26,620.648401	40.204171	-104.688644	
11,970.00	88.76	358.88	7,231.94	4,995.18	144.87	18,352.545218	26,619.379132	40.204429	-104.688645	
12,065.00	89.57	359.84	7,233.33	5,090.17	143.81	18,447.509584	26,617.449839	40.204689	-104.688649	
12,160.00	89.81	0.38	7,233.84	5,185.16	143.99	18,542.501247	26,616.763607	40.204950	-104.688649	
12,255.00	89.51	359.79	7,234.40	5,280.16	144.13	18,637.492211	26,616.035932	40.205211	-104.688648	
12,350.00	89.51	0.02	7,235.22	5,375.16	143.97	18,732.479083	26,615.009845	40.205472	-104.688649	
12,444.00	89.38	1.52	7,236.13	5,469.14	145.24	18,826.467097	26,615.413523	40.205730	-104.688644	
12,539.00	90.80	2.58	7,235.98	5,564.08	148.63	18,921.425453	26,617.943351	40.205990	-104.688632	
12,634.00	90.49	2.66	7,234.91	5,658.97	152.98	19,016.351703	26,621.417656	40.206251	-104.688616	
12,729.00	90.86	2.59	7,233.79	5,753.87	157.33	19,111.277031	26,624.900224	40.206511	-104.688601	
12,824.00	91.17	2.16	7,232.11	5,848.77	161.26	19,206.208172	26,627.968310	40.206772	-104.688587	

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	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
12,919.00	91.42	0.70	7,229.96	5,943.71	163.63	19,301.165338	26,629.470174	40.207032	-104.688578
13,014.00	91.17	0.94	7,227.81	6,038.68	164.99	19,396.135614	26,629.960974	40.207293	-104.688573
13,108.00	91.17	0.94	7,225.89	6,132.65	166.53	19,490.109533	26,630.643440	40.207551	-104.688568
13,203.00	89.63	0.23	7,225.23	6,227.63	167.50	19,585.099649	26,630.744668	40.207812	-104.688564
13,298.00	88.70	0.55	7,226.61	6,322.62	168.15	19,680.084088	26,630.522645	40.208073	-104.688562
13,392.00	88.89	0.68	7,228.59	6,416.60	169.16	19,774.059114	26,630.672055	40.208331	-104.688558
13,486.00	87.84	0.08	7,231.27	6,510.55	169.78	19,868.014800	26,630.436197	40.208588	-104.688556
13,581.00	88.64	1.15	7,234.19	6,605.50	170.80	19,962.963663	26,630.587342	40.208849	-104.688552
13,676.00	88.21	0.46	7,236.80	6,700.45	172.14	20,057.921785	26,631.053267	40.209110	-104.688548
13,767.00	89.20	1.74	7,238.86	6,791.41	173.88	20,148.887041	26,631.968124	40.209359	-104.688541
13,862.00	90.80	2.62	7,238.86	6,886.34	177.50	20,243.839295	26,634.713413	40.209620	-104.688529
13,957.00	91.11	1.24	7,237.28	6,981.27	180.70	20,338.791037	26,637.044137	40.209881	-104.688517
14,052.00	92.10	1.55	7,234.61	7,076.20	183.01	20,433.737450	26,638.487696	40.210141	-104.688509
14,147.00	90.68	0.38	7,232.31	7,171.16	184.61	20,528.698554	26,639.218477	40.210402	-104.688503
14,241.00	88.95	358.42	7,232.61	7,265.14	183.62	20,622.667825	26,637.375027	40.210660	-104.688507
14,336.00	88.21	356.53	7,234.97	7,360.02	179.44	20,717.495228	26,632.324413	40.210920	-104.688522
14,431.00	89.63	357.60	7,236.76	7,454.87	174.58	20,812.297491	26,626.594508	40.211181	-104.688539
14,526.00	90.86	359.40	7,236.35	7,549.83	172.09	20,907.227585	26,623.239746	40.211441	-104.688548
14,621.00	91.30	359.86	7,234.56	7,644.81	171.48	21,002.194613	26,621.757957	40.211702	-104.688550
14,716.00	91.79	0.68	7,232.00	7,739.78	171.92	21,097.153997	26,621.337060	40.211963	-104.688548
14,811.00	88.70	359.64	7,231.59	7,834.76	172.19	21,192.134348	26,620.733694	40.212223	-104.688547
14,906.00	88.02	358.68	7,234.31	7,929.71	170.80	21,287.062819	26,618.473660	40.212484	-104.688552
15,001.00	87.53	357.38	7,238.00	8,024.58	167.53	21,381.894922	26,614.343482	40.212744	-104.688564
15,075.00	89.20	357.79	7,240.11	8,098.48	164.42	21,455.761593	26,610.551376	40.212947	-104.688575
15,142.00	88.95	357.59	7,241.19	8,165.42	161.72	21,522.667997	26,607.239419	40.213131	-104.688585
15,237.00	90.93	358.11	7,241.29	8,260.35	158.15	21,617.555421	26,602.807955	40.213392	-104.688598
15,337.00	91.24	356.71	7,239.40	8,360.22	153.64	21,717.383012	26,597.377245	40.213666	-104.688614
15,431.00	90.37	355.54	7,238.08	8,454.00	147.28	21,811.090328	26,590.168553	40.213923	-104.688637
15,527.00	89.44	353.75	7,238.24	8,549.57	138.32	21,906.576295	26,580.336583	40.214186	-104.688669
15,622.00	90.31	354.02	7,238.45	8,644.03	128.20	22,000.934032	26,569.354085	40.214445	-104.688705
15,716.00	90.37	353.65	7,237.89	8,737.49	118.11	22,094.288407	26,558.405789	40.214701	-104.688741
15,811.00	89.44	355.31	7,238.05	8,832.04	108.97	22,188.751851	26,548.404065	40.214961	-104.688774
15,906.00	88.95	356.64	7,239.38	8,926.80	102.30	22,283.436799	26,540.870801	40.215221	-104.688798
16,002.00	88.52	357.42	7,241.50	9,022.64	97.33	22,379.229958	26,535.022009	40.215484	-104.688815
16,097.00	89.13	358.04	7,243.45	9,117.55	93.57	22,474.092131	26,530.392641	40.215745	-104.688829
16,192.00	90.25	357.94	7,243.96	9,212.49	90.24	22,568.992287	26,526.192935	40.216005	-104.688841
16,286.00	91.73	359.09	7,242.34	9,306.44	87.80	22,662.912293	26,522.898345	40.216263	-104.688850
16,381.00	91.30	359.51	7,239.83	9,401.40	86.64	22,757.852938	26,520.870022	40.216524	-104.688854
16,455.00	91.30	359.57	7,238.15	9,475.37	86.05	22,831.819828	26,519.599705	40.216727	-104.688856
Final Sperry MWD Survey @ 16455.00ft									
16,499.00	91.30	359.57	7,237.15	9,519.36	85.72	22,875.800532	26,518.867410	40.216848	-104.688857
Straight Line Projection to Bit @ 16499.00ft									

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	EDM 2003.16 Single User Db

Targets

Target Name	- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape		(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
Wardell 3C-20HZ_Hoi		0.00	0.00	0.00	0.00	0.00	313,356.459041	226,520.195882	40.190717	-104.689164
- actual wellpath hits target center										
- Polygon										
Point 1				0.00	-562.07	516.19	1,312,799.16	3,227,041.48		
Point 2				0.00	4,714.64	507.90	1,318,075.35	3,226,984.95		
Point 3				0.00	10,004.54	522.35	1,323,364.93	3,226,951.03		
Wardell 3C-20HZ_WF		0.00	0.00	7,228.94	8,620.56	117.35	321,977.364343	226,558.714685	40.214380	-104.688744
- actual wellpath misses target center by 16.36ft at 15599.80ft MD (7238.53 TVD, 8621.95 N, 130.53 E)										
- Point										
Wardell 3C-20HZ_BH		0.00	0.00	7,228.00	9,545.37	-71.49	322,900.372167	226,361.430447	40.216919	-104.689420
- actual wellpath misses target center by 159.61ft at 16499.00ft MD (7237.15 TVD, 9519.36 N, 85.72 E)										
- Point										
Wardell 3C-20HZ_WF		0.00	0.00	7,229.77	7,800.00	200.00	321,157.629310	226,648.860423	40.212128	-104.688448
- actual wellpath misses target center by 27.74ft at 14776.32ft MD (7231.15 TVD, 7800.08 N, 172.29 E)										
- Point										
Wardell 3C-20HZ_Ser		0.00	0.00	0.00	0.00	0.00	313,356.459041	226,520.195882	40.190717	-104.689164
- actual wellpath hits target center										
- Polygon										
Point 1				0.00	4,695.14	-2,127.88	1,318,031.75	3,224,349.57		
Point 2				0.00	4,714.64	507.90	1,318,075.35	3,226,984.95		
Point 3				0.00	4,733.98	3,143.67	1,318,118.78	3,229,620.32		
Wardell 3C-20HZ_WF		0.00	0.00	7,232.40	5,200.00	150.00	318,557.391611	226,622.637502	40.204991	-104.688627
- actual wellpath misses target center by 6.11ft at 12174.84ft MD (7233.90 TVD, 5200.00 N, 144.08 E)										
- Point										
Wardell 3C-20HZ_Set		0.00	0.00	0.00	0.00	0.00	313,356.459041	226,520.195882	40.190717	-104.689164
- actual wellpath hits target center										
- Polygon										
Point 1				0.00	-97.72	-1,651.94	1,313,243.64	3,224,869.29		
Point 2				0.00	-102.06	516.99	1,313,259.13	3,227,038.08		
Point 3				0.00	-105.30	2,683.25	1,313,275.70	3,229,204.18		
Point 4				0.00	2,077.85	2,682.97	1,315,458.67	3,229,183.94		
Point 5				0.00	4,270.57	2,683.53	1,317,651.21	3,229,164.45		
Point 6				0.00	5,190.65	2,685.26	1,318,571.22	3,229,157.77		
Point 7				0.00	7,371.33	2,692.97	1,320,751.79	3,229,145.54		
Point 8				0.00	9,541.75	2,720.01	1,322,922.27	3,229,152.73		
Point 9				0.00	9,544.51	521.75	1,322,904.93	3,226,954.63		
Point 10				0.00	9,547.53	-1,681.59	1,322,887.81	3,224,751.45		
Point 11				0.00	7,352.95	-1,684.58	1,320,693.39	3,224,768.53		
Point 12				0.00	5,158.55	-1,670.77	1,318,499.30	3,224,802.40		
Point 13				0.00	4,238.52	-1,666.34	1,317,579.39	3,224,815.24		
Point 14				0.00	2,058.88	-1,659.12	1,315,400.00	3,224,842.39		
Wardell 3C-20HZ_Ser		0.00	0.00	0.00	0.00	0.00	313,356.459041	226,520.195882	40.190717	-104.689164
- actual wellpath hits target center										
- Polygon										
Point 1				0.00	-556.82	-2,110.43	1,312,780.39	3,224,415.04		
Point 2				0.00	-562.08	516.19	1,312,799.15	3,227,041.48		
Point 3				0.00	-566.00	3,143.33	1,312,819.25	3,229,668.44		
Point 4				0.00	2,077.82	3,142.99	1,315,462.84	3,229,643.92		
Point 5				0.00	4,733.98	3,143.67	1,318,118.78	3,229,620.32		
Point 6				0.00	4,733.98	3,143.67	1,318,118.78	3,229,620.32		
Point 7				0.00	7,367.65	3,152.98	1,320,752.32	3,229,605.54		
Point 8				0.00	10,001.19	3,185.80	1,323,385.93	3,229,614.28		
Point 9				0.00	10,004.53	522.35	1,323,364.92	3,226,951.03		
Point 10				0.00	10,008.18	-2,140.99	1,323,344.22	3,224,287.88		
Point 11				0.00	7,351.82	-2,144.60	1,320,688.05	3,224,308.56		

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 3C-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4904.00ft (HP 308)
Well:	Wardell 3C-20HZ	North Reference:	True
Wellbore:	Plan E Rev 2	Survey Calculation Method:	Minimum Curvature
Design:	Actual Surveys	Database:	EDM 2003.16 Single User Db

Point 12	0.00	4,695.14	-2,127.88	1,318,031.75	3,224,349.57		
Point 13	0.00	4,695.14	-2,127.88	1,318,031.75	3,224,349.57		
Point 14	0.00	2,057.35	-2,119.14	1,315,394.26	3,224,382.42		
Wardell 3C-20HZ_SH	0.00	0.00	0.00	0.00	313,356.459041	226,520.195882	40.190717 -104.689164
- actual wellpath hits target center							
- Point							

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name		Casing Diameter (")	Hole Diameter (")
7,634.80	7,234.87	7" Intermediate Casing		7	8-3/4

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
125.00	125.00	0.26	-0.29	First Gyro Survey @ 125.00ft	
990.00	989.99	-0.01	-2.31	Final Gyro Survey @ 990.00ft	
990.00	989.99	-0.01	-2.31	Tie-On to Surface Gyros @ 990.00ft	
1,071.00	1,070.99	-0.17	-2.42	First Sperry MWD Survey @ 1071.00ft	
16,455.00	7,238.15	9,475.37	86.05	Final Sperry MWD Survey @ 16455.00ft	
16,499.00	7,237.15	9,519.36	85.72	Straight Line Projection to Bit @ 16499.00ft	

Checked By: _____	Approved By: _____	Date: _____
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