

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 29 T3N-R65W

Wardell 28N-20HZ

Plan H Rev 1

Design: Actual Field Surveys

Sperry Drilling Services Standard Report

16 July, 2012

Well Coordinates: 1,313,356.22 N, 3,226,536.12 E (40° 11' 26.58" N, 104° 41' 20.79" W)

Ground Level: 4,878.00 ft

Local Coordinate Origin:

Centered on Well Wardell 28N-20HZ

Viewing Datum:

RKB=25ft @ 4903.00ft (HP 308)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

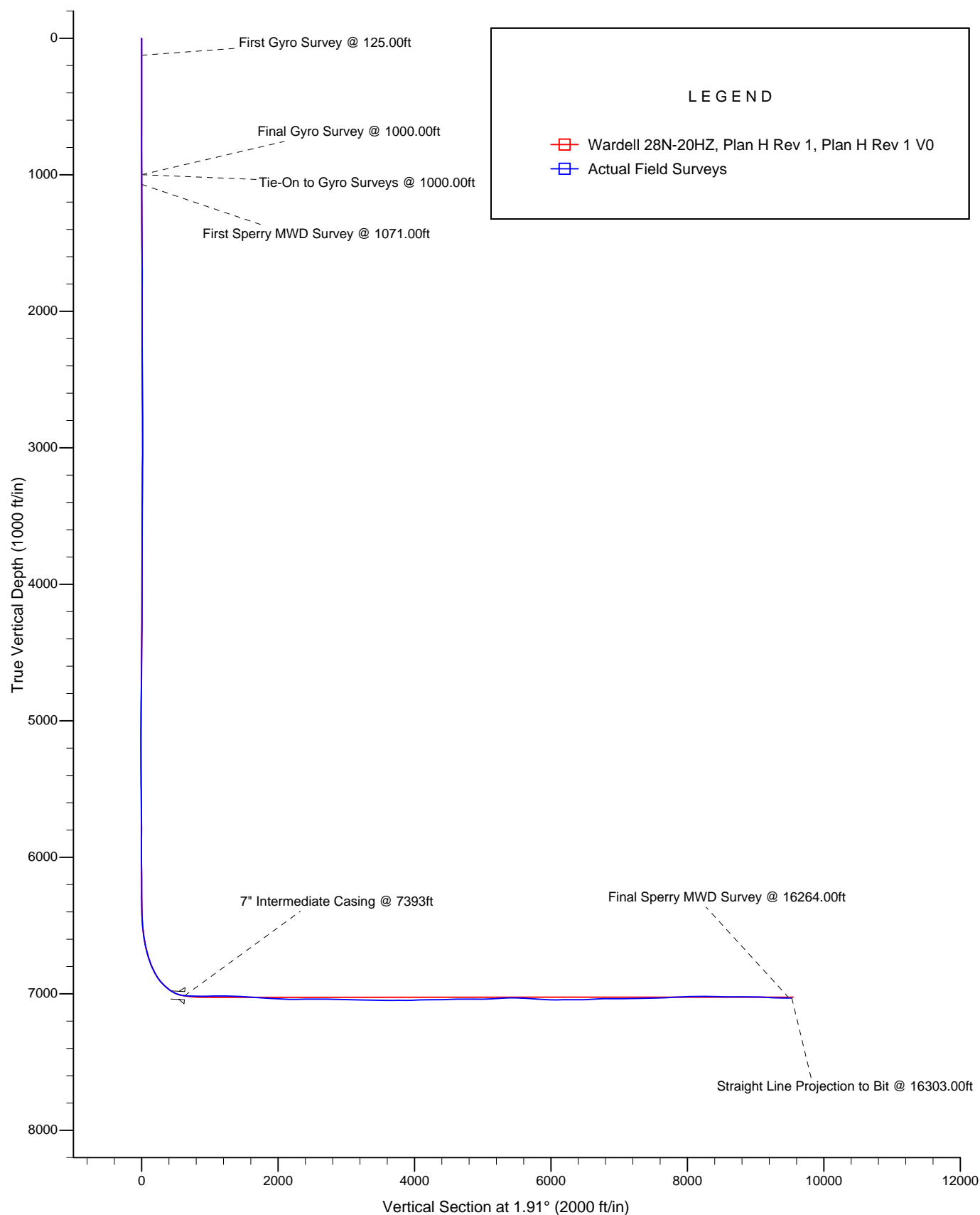
Version: 2003.16 Build: 43I

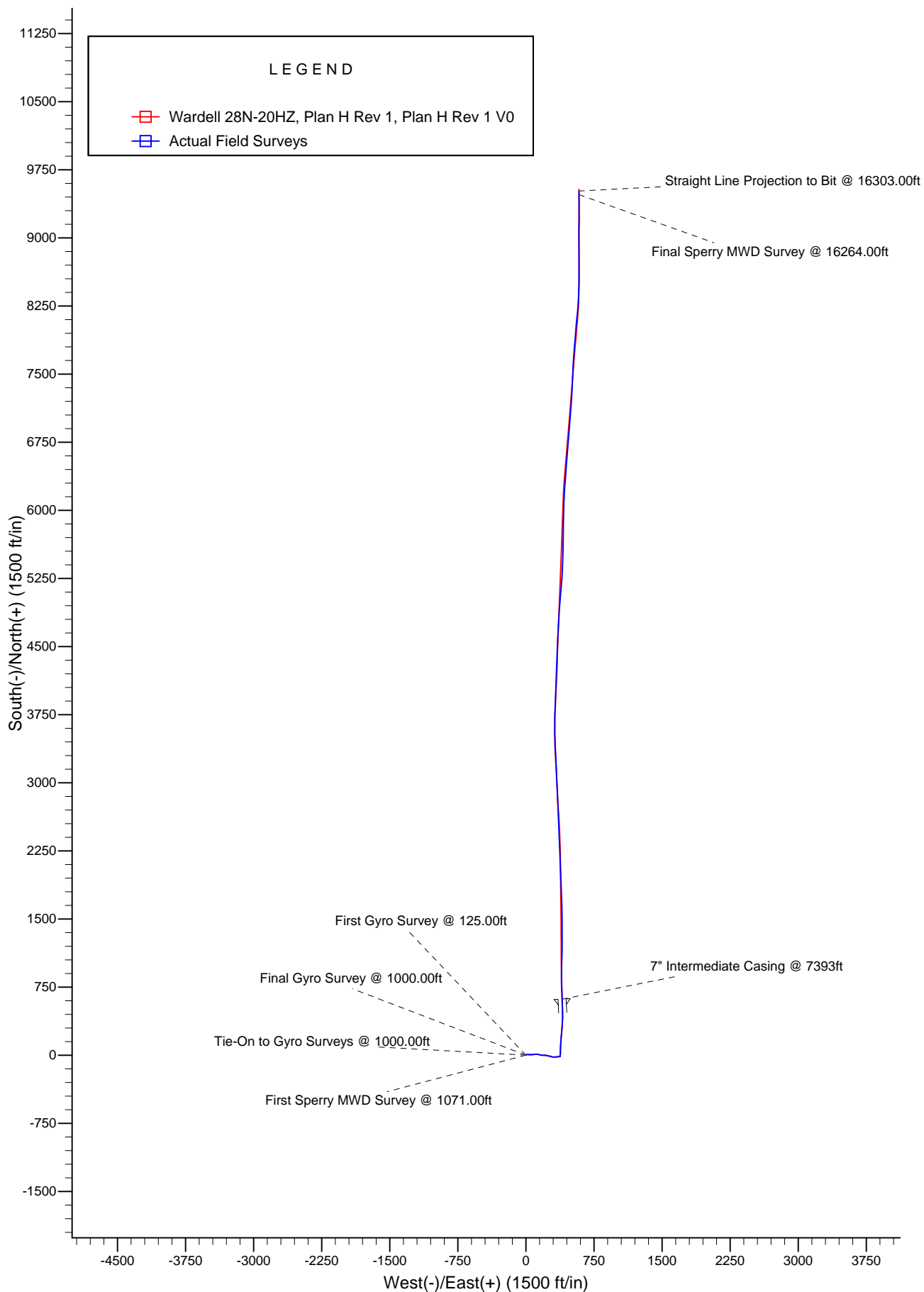
HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 29 T3N-R65W
Well: Wardell 28N-20HZ

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling





Design Report for Wardell 28N-20HZ - 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
125.00	0.50	308.28	125.00	0.34	-0.43	0.32	0.40
First Gyro Survey @ 125.00ft							
225.00	0.23	13.47	225.00	0.80	-0.72	0.78	0.45
325.00	0.25	244.91	325.00	0.91	-0.87	0.88	0.43
425.00	0.20	342.30	425.00	0.98	-1.13	0.94	0.34
525.00	0.08	86.87	525.00	1.15	-1.11	1.11	0.23
625.00	0.21	265.86	625.00	1.14	-1.22	1.10	0.29
725.00	0.13	62.41	725.00	1.18	-1.30	1.14	0.33
825.00	0.13	220.84	825.00	1.15	-1.28	1.10	0.26
925.00	0.19	345.93	924.99	1.22	-1.39	1.17	0.29
1,000.00	0.15	258.83	999.99	1.32	-1.52	1.27	0.31
Final Gyro Survey @ 1000.00ft - Tie-On to Gyro Surveys @ 1000.00ft							
1,071.00	0.50	306.71	1,070.99	1.49	-1.86	1.43	0.58
First Sperry MWD Survey @ 1071.00ft							
1,102.00	0.35	333.73	1,101.99	1.66	-2.01	1.59	0.79
1,194.00	0.44	340.14	1,193.99	2.24	-2.25	2.16	0.11
1,286.00	1.21	340.50	1,285.98	3.49	-2.70	3.40	0.84
1,377.00	1.42	56.80	1,376.96	5.01	-2.07	4.94	1.79
1,470.00	2.38	94.36	1,469.91	5.50	0.82	5.52	1.64
1,562.00	4.45	78.68	1,561.75	6.05	6.22	6.25	2.45
1,654.00	3.96	80.07	1,653.50	7.30	12.85	7.72	0.54
1,746.00	5.09	81.04	1,745.21	8.48	20.01	9.14	1.23
1,837.00	4.69	102.54	1,835.89	8.30	27.63	9.22	2.05
1,929.00	4.50	102.43	1,927.59	6.71	34.83	7.86	0.21
2,021.00	4.30	93.54	2,019.32	5.72	41.79	7.11	0.77
2,112.00	4.15	90.04	2,110.07	5.51	48.49	7.12	0.33
2,207.00	4.09	82.78	2,204.83	5.93	55.29	7.77	0.55
2,302.00	4.75	90.45	2,299.55	6.33	62.58	8.40	0.93
2,397.00	4.10	82.70	2,394.26	6.73	69.89	9.05	0.93
2,491.00	4.56	79.42	2,488.00	7.84	76.89	10.39	0.56
2,585.00	3.78	79.03	2,581.75	9.12	83.61	11.89	0.83
2,680.00	4.54	81.03	2,676.50	10.30	90.40	13.30	0.81
2,775.00	6.34	87.43	2,771.06	11.12	99.35	14.42	2.00
2,869.00	5.78	85.44	2,864.54	11.73	109.25	15.35	0.64
2,963.00	6.22	98.91	2,958.03	11.32	119.00	15.27	1.57
3,058.00	5.38	96.63	3,052.54	10.00	128.51	14.27	0.92
3,152.00	4.63	93.41	3,146.18	9.27	136.68	13.81	0.85
3,247.00	4.64	110.30	3,240.88	7.71	144.11	12.50	1.43
3,342.00	3.69	110.40	3,335.62	5.31	150.58	10.31	1.00
3,437.00	4.11	101.66	3,430.40	3.56	156.78	8.77	0.76
3,532.00	3.44	95.70	3,525.20	2.59	162.95	8.00	0.82
3,627.00	4.26	92.79	3,619.98	2.13	169.31	7.76	0.89
3,722.00	4.39	96.76	3,714.71	1.53	176.44	7.40	0.34
3,817.00	5.66	95.51	3,809.35	0.65	184.72	6.79	1.34
3,912.00	5.78	91.83	3,903.87	0.05	194.16	6.51	0.41
4,007.00	5.65	94.74	3,998.40	-0.49	203.60	6.28	0.33
4,102.00	5.61	94.39	4,092.94	-1.23	212.89	5.85	0.06
4,197.00	4.77	92.19	4,187.55	-1.74	221.47	5.63	0.91
4,292.00	5.82	107.29	4,282.15	-3.32	230.02	4.33	1.83

Design Report for Wardell 28N-20HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,386.00	5.60	102.43	4,375.68	-5.72	239.05	2.23	0.56
4,481.00	5.26	99.37	4,470.26	-7.43	247.87	0.82	0.47
4,576.00	4.57	98.21	4,564.91	-8.68	255.91	-0.17	0.73
4,670.00	5.78	98.78	4,658.52	-9.94	264.30	-1.14	1.29
4,765.00	4.97	107.82	4,753.11	-11.93	272.94	-2.85	1.23
4,860.00	5.88	109.90	4,847.68	-14.84	281.43	-5.48	0.98
4,954.00	5.18	107.14	4,941.24	-17.73	290.02	-8.08	0.80
5,049.00	5.94	98.51	5,035.80	-19.72	298.98	-9.77	1.19
5,144.00	5.53	85.26	5,130.32	-20.07	308.40	-9.81	1.46
5,238.00	5.03	89.82	5,223.93	-19.69	317.04	-9.13	0.69
5,333.00	4.36	89.47	5,318.61	-19.64	324.81	-8.83	0.71
5,428.00	6.46	77.51	5,413.18	-18.45	333.64	-7.35	2.50
5,523.00	4.85	81.33	5,507.72	-16.69	342.83	-5.28	1.74
5,617.00	4.06	79.16	5,601.43	-15.46	350.03	-3.82	0.86
5,712.00	4.61	84.07	5,696.16	-14.44	357.13	-2.55	0.70
5,807.00	3.55	91.15	5,790.92	-14.10	363.86	-2.00	1.23
5,901.00	3.20	93.89	5,884.76	-14.34	369.39	-2.05	0.41
5,996.00	2.10	92.20	5,979.65	-14.58	373.78	-2.15	1.16
6,091.00	1.05	52.44	6,074.62	-14.12	376.21	-1.60	1.53
6,186.00	1.13	26.21	6,169.60	-12.75	377.31	-0.20	0.53
6,281.00	1.29	7.97	6,264.58	-10.85	377.87	1.72	0.44
6,376.00	1.32	0.40	6,359.56	-8.70	378.03	3.88	0.18
6,407.00	1.36	345.90	6,390.55	-7.98	377.94	4.59	1.10
6,439.00	3.18	3.84	6,422.52	-6.73	377.91	5.84	6.04
6,471.00	5.91	2.36	6,454.42	-4.20	378.03	8.37	8.54
6,502.00	8.23	0.79	6,485.18	-0.38	378.13	12.19	7.51
6,534.00	10.58	3.45	6,516.75	4.84	378.34	17.42	7.47
6,566.00	13.46	4.50	6,548.04	11.49	378.81	24.08	9.03
6,597.00	16.44	2.20	6,577.99	19.47	379.26	32.07	9.80
6,629.00	19.16	0.27	6,608.46	29.25	379.46	41.85	8.70
6,661.00	21.53	0.17	6,638.46	40.37	379.50	52.97	7.41
6,692.00	24.39	1.85	6,667.00	52.46	379.72	65.06	9.46
6,724.00	27.57	1.45	6,695.76	66.47	380.13	79.07	9.95
6,756.00	30.63	2.74	6,723.72	82.02	380.70	94.63	9.76
6,787.00	33.91	3.24	6,749.93	98.55	381.57	111.18	10.62
6,819.00	36.83	3.14	6,776.02	117.04	382.60	129.69	9.13
6,851.00	40.70	3.45	6,800.96	137.04	383.75	149.72	12.11
6,882.00	44.73	4.34	6,823.74	158.01	385.19	170.73	13.14
6,914.00	46.58	5.08	6,846.10	180.82	387.07	193.59	6.01
6,946.00	50.08	4.04	6,867.37	204.64	388.96	217.46	11.20
6,977.00	53.77	5.60	6,886.49	228.95	391.02	241.83	12.54
7,009.00	57.64	5.00	6,904.52	255.27	393.46	268.21	12.19
7,041.00	61.64	4.50	6,920.69	282.78	395.74	295.78	12.57
7,072.00	64.07	4.05	6,934.83	310.29	397.80	323.34	7.94
7,104.00	66.11	3.64	6,948.31	339.25	399.74	352.35	6.48
7,136.00	67.75	3.52	6,960.85	368.63	401.58	381.78	5.14
7,167.00	70.10	2.46	6,971.99	397.51	403.09	410.70	8.22
7,199.00	72.85	0.52	6,982.16	427.84	403.87	441.03	10.34
7,231.00	75.13	359.45	6,990.99	458.60	403.86	471.77	7.82
7,262.00	77.72	358.45	6,998.26	488.72	403.31	501.86	8.92
7,294.00	80.83	357.90	7,004.22	520.14	402.31	533.23	9.86

Design Report for Wardell 28N-20HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,326.00	83.02	358.60	7,008.71	551.81	401.34	564.85	7.18
7,353.00	84.38	357.29	7,011.67	578.63	400.38	591.62	6.97
7,393.00	86.85	357.56	7,014.73	618.47	398.59	631.38	6.21
7" Intermediate Casing @ 7393ft							
7,432.00	89.26	357.83	7,016.05	657.41	397.02	670.25	6.21
7,463.00	88.83	357.57	7,016.57	688.38	395.78	701.16	1.62
7,558.00	89.81	358.38	7,017.70	783.31	392.42	795.93	1.34
7,653.00	89.81	0.47	7,018.01	878.30	391.47	890.83	2.20
7,748.00	90.25	1.40	7,017.96	973.29	393.02	985.82	1.08
7,843.00	90.62	2.01	7,017.24	1,068.24	395.84	1,080.81	0.75
7,937.00	90.56	1.54	7,016.28	1,162.19	398.76	1,174.81	0.50
8,032.00	88.64	359.56	7,016.94	1,257.18	399.67	1,269.77	2.90
8,127.00	88.83	359.93	7,019.04	1,352.15	399.25	1,364.68	0.44
8,222.00	88.83	359.86	7,020.98	1,447.13	399.07	1,459.60	0.07
8,316.00	88.83	358.72	7,022.89	1,541.10	397.91	1,553.48	1.21
8,412.00	88.27	358.46	7,025.32	1,637.04	395.55	1,649.29	0.64
8,506.00	88.02	358.06	7,028.37	1,730.95	392.69	1,743.05	0.50
8,601.00	87.59	357.83	7,032.01	1,825.82	389.29	1,837.75	0.51
8,696.00	88.08	357.79	7,035.59	1,920.68	385.66	1,932.44	0.52
8,791.00	89.01	358.06	7,038.01	2,015.59	382.22	2,027.18	1.02
8,886.00	88.33	357.11	7,040.21	2,110.48	378.22	2,121.89	1.23
8,980.00	89.63	357.18	7,041.88	2,204.34	373.54	2,215.54	1.38
9,074.00	90.74	358.57	7,041.58	2,298.27	370.05	2,309.31	1.89
9,169.00	90.56	357.69	7,040.50	2,393.22	366.95	2,404.09	0.95
9,261.00	90.62	357.92	7,039.56	2,485.14	363.43	2,495.85	0.26
9,353.00	90.31	357.54	7,038.81	2,577.07	359.79	2,587.61	0.53
9,445.00	90.00	357.83	7,038.56	2,668.99	356.07	2,679.36	0.46
9,537.00	89.69	357.96	7,038.81	2,760.93	352.69	2,771.13	0.37
9,628.00	88.70	357.29	7,040.09	2,851.84	348.92	2,861.87	1.31
9,720.00	88.33	357.18	7,042.47	2,943.70	344.48	2,953.53	0.42
9,812.00	89.75	357.32	7,044.01	3,035.58	340.07	3,045.21	1.55
9,904.00	89.38	356.93	7,044.71	3,127.46	335.46	3,136.89	0.58
9,996.00	90.19	357.63	7,045.06	3,219.36	331.09	3,228.59	1.16
10,089.00	89.63	357.37	7,045.20	3,312.27	327.03	3,321.31	0.66
10,180.00	89.14	357.44	7,046.18	3,403.17	322.91	3,412.03	0.54
10,272.00	89.51	358.32	7,047.26	3,495.10	319.51	3,503.79	1.04
10,364.00	89.32	0.01	7,048.20	3,587.08	318.17	3,595.68	1.85
10,455.00	90.62	0.21	7,048.25	3,678.08	318.35	3,686.63	1.45
10,547.00	89.75	1.74	7,047.95	3,770.06	319.91	3,778.61	1.91
10,639.00	90.12	2.07	7,048.06	3,862.01	322.97	3,870.61	0.54
10,734.00	90.99	2.45	7,047.14	3,956.93	326.72	3,965.61	1.00
10,828.00	91.05	2.09	7,045.46	4,050.84	330.44	4,059.59	0.39
10,923.00	90.62	2.16	7,044.08	4,145.77	333.96	4,154.58	0.46
11,017.00	90.25	1.94	7,043.37	4,239.70	337.32	4,248.58	0.46
11,112.00	89.94	0.86	7,043.21	4,334.67	339.64	4,343.57	1.18
11,206.00	90.93	2.42	7,042.50	4,428.63	342.33	4,437.56	1.97
11,301.00	90.74	2.86	7,041.11	4,523.52	346.71	4,532.54	0.50
11,396.00	90.74	3.15	7,039.88	4,618.38	351.69	4,627.52	0.31
11,491.00	90.19	3.15	7,039.11	4,713.23	356.91	4,722.49	0.58
11,586.00	89.81	3.76	7,039.11	4,808.06	362.63	4,817.46	0.76
11,680.00	89.57	4.15	7,039.62	4,901.83	369.12	4,911.40	0.49

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
11,775.00	90.56	3.50	7,039.51	4,996.62	375.45	5,006.34	1.25
11,870.00	91.67	5.56	7,037.67	5,091.30	382.96	5,101.22	2.46
11,964.00	91.42	4.61	7,035.13	5,184.89	391.28	5,195.04	1.04
12,044.00	91.85	3.92	7,032.85	5,264.64	397.23	5,274.94	1.02
12,108.00	91.18	3.07	7,031.16	5,328.50	401.13	5,338.89	1.69
12,202.00	89.51	1.46	7,030.59	5,422.42	404.85	5,432.88	2.47
12,297.00	89.13	1.92	7,031.72	5,517.37	407.65	5,527.87	0.63
12,391.00	89.13	0.83	7,033.14	5,611.33	409.90	5,621.85	1.16
12,486.00	88.09	0.22	7,035.45	5,706.29	410.77	5,716.80	1.27
12,581.00	87.78	0.83	7,038.87	5,801.23	411.64	5,811.71	0.72
12,676.00	87.84	1.20	7,042.50	5,896.14	413.32	5,906.63	0.39
12,770.00	89.13	2.40	7,044.99	5,990.06	416.28	6,000.59	1.87
12,865.00	91.11	1.59	7,044.79	6,085.00	419.58	6,095.58	2.25
12,960.00	90.00	3.36	7,043.87	6,179.90	423.69	6,190.57	2.20
13,055.00	90.12	4.05	7,043.77	6,274.70	429.82	6,285.52	0.74
13,149.00	90.12	4.14	7,043.57	6,368.46	436.54	6,379.45	0.10
13,244.00	90.56	3.71	7,043.01	6,463.23	443.04	6,474.39	0.65
13,339.00	91.85	4.68	7,041.01	6,557.96	449.99	6,569.29	1.70
13,434.00	91.24	4.20	7,038.45	6,652.64	457.34	6,664.16	0.82
13,528.00	90.56	4.81	7,036.97	6,746.33	464.72	6,758.05	0.97
13,623.00	90.37	4.78	7,036.20	6,841.00	472.66	6,852.93	0.20
13,717.00	89.57	5.20	7,036.25	6,934.64	480.84	6,946.79	0.96
13,812.00	90.06	4.32	7,036.56	7,029.31	488.72	7,041.67	1.06
13,907.00	90.93	3.46	7,035.74	7,124.09	495.17	7,136.61	1.29
14,001.00	90.49	4.31	7,034.57	7,217.86	501.53	7,230.55	1.02
14,096.00	90.87	2.75	7,033.44	7,312.67	507.38	7,325.50	1.69
14,191.00	90.31	2.76	7,032.47	7,407.56	511.95	7,420.48	0.59
14,286.00	90.93	2.36	7,031.44	7,502.46	516.19	7,515.47	0.78
14,381.00	90.80	3.54	7,030.00	7,597.32	521.08	7,610.44	1.25
14,476.00	91.05	3.04	7,028.47	7,692.15	526.53	7,705.40	0.59
14,571.00	92.04	4.95	7,025.91	7,786.88	533.15	7,800.30	2.26
14,666.00	90.99	4.87	7,023.40	7,881.49	541.27	7,895.13	1.11
14,761.00	90.93	4.75	7,021.81	7,976.15	549.24	7,990.00	0.14
14,856.00	90.68	4.53	7,020.47	8,070.82	556.92	8,084.88	0.35
14,951.00	90.68	5.93	7,019.34	8,165.42	565.58	8,179.71	1.47
15,046.00	89.38	4.56	7,019.29	8,260.02	574.27	8,274.55	1.99
15,140.00	89.57	2.83	7,020.16	8,353.82	580.32	8,368.49	1.85
15,235.00	89.20	0.48	7,021.18	8,448.76	583.07	8,463.48	2.50
15,330.00	89.32	0.04	7,022.40	8,543.75	583.50	8,558.43	0.48
15,425.00	90.37	0.10	7,022.66	8,638.75	583.61	8,653.38	1.11
15,520.00	90.00	0.38	7,022.35	8,733.75	584.01	8,748.34	0.49
15,615.00	90.00	0.30	7,022.35	8,828.75	584.58	8,843.30	0.08
15,710.00	89.63	0.04	7,022.66	8,923.75	584.86	8,938.26	0.48
15,805.00	89.01	0.44	7,023.79	9,018.74	585.26	9,033.21	0.78
15,900.00	88.33	1.46	7,025.99	9,113.70	586.83	9,128.17	1.29
15,995.00	88.46	359.98	7,028.65	9,208.65	588.02	9,223.11	1.56
16,090.00	89.20	359.35	7,030.59	9,303.63	587.47	9,318.02	1.02
16,185.00	90.00	359.01	7,031.26	9,398.62	586.11	9,412.91	0.91
16,264.00	90.00	359.06	7,031.26	9,477.61	584.78	9,491.81	0.06
Final Sperry MWD Survey @ 16264.00ft							
16,303.00	90.00	359.06	7,031.26	9,516.60	584.14	9,530.76	0.00

Design Report for Wardell 28N-20HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
Straight Line Projection to Bit @ 16303.00ft							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
125.00	125.00	0.34	-0.43	First Gyro Survey @ 125.00ft
1,000.00	999.99	1.32	-1.52	Final Gyro Survey @ 1000.00ft
1,000.00	999.99	1.32	-1.52	Tie-On to Gyro Surveys @ 1000.00ft
1,071.00	1,070.99	1.49	-1.86	First Sperry MWD Survey @ 1071.00ft
16,264.00	7,031.26	9,477.61	584.78	Final Sperry MWD Survey @ 16264.00ft
16,303.00	7,031.26	9,516.60	584.14	Straight Line Projection to Bit @ 16303.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Wardell 28N-20HZ_BHL	1.91	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
125.00	1,000.00	Surface Gyros	NS-GYRO-MS
1,071.00	7,353.00	MWD Surveys - Vert/Build	MWD
7,432.00	16,303.00	Sperry MWD Surveys - Lateral	MWD+SCC

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,393.00	7,014.73	7" Intermediate Casing @ 7393ft	7	8-3/4

Design Report for Wardell 28N-20HZ - Actual Field 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 28N-20HZ_! - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
Wardell 28N-20HZ_! - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
Point 1				-2,143.80	4,695.51	1,318,031.73	3,224,349.57		
Point 2				491.98	4,715.00	1,318,075.32	3,226,984.95		
Point 3				3,127.75	4,734.34	1,318,118.76	3,229,620.32		
Wardell 28N-20HZ_I - actual wellpath misses target center by 268.18ft at 16303.00ft MD (7031.26 TVD, 9516.60 N, 584.14 E) - Point	0.00	0.00	7,025.00	9,545.00	317.53	,903.321550	,6,766.351014	40.216917	-104.687970
Wardell 28N-20HZ_(- actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
Point 1				500.27	-561.69	1,312,799.16	3,227,041.49		
Point 2				491.98	4,715.03	1,318,075.35	3,226,984.95		
Point 3				491.98	4,715.03	1,318,075.35	3,226,984.95		
Point 4				506.44	10,004.92	1,323,364.93	3,226,951.03		
Wardell 28N-20HZ_V - actual wellpath misses target center by 20.79ft at 12979.52ft MD (7043.86 TVD, 6199.38 N, 424.85 E) - Point	0.00	0.00	7,025.57	6,200.00	415.00	,559.495153	,6,894.394653	40.207735	-104.687621
Wardell 28N-20HZ_\) - actual wellpath misses target center by 16.80ft at 8975.06ft MD (7041.85 TVD, 2199.41 N, 373.78 E) - Point	0.00	0.00	7,026.25	2,200.00	380.00	,559.512782	,6,895.973807	40.196755	-104.687747
Wardell 28N-20HZ_I - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
Point 1				924.41	-545.48	1,312,819.24	3,227,465.44		
Point 2				924.07	2,098.35	1,315,462.85	3,227,440.93		
Point 3				924.75	4,754.50	1,318,118.78	3,227,417.32		
Point 4				924.75	4,754.50	1,318,118.78	3,227,417.32		
Point 5				934.05	7,388.18	1,320,752.32	3,227,402.54		
Point 6				966.88	10,021.71	1,323,385.93	3,227,411.28		
Point 7				46.10	9,988.42	1,323,344.22	3,226,490.88		
Point 8				42.48	7,332.05	1,320,688.04	3,226,511.55		
Point 9				59.20	4,675.38	1,318,031.75	3,226,552.57		
Point 10				59.20	4,675.38	1,318,031.75	3,226,552.57		
Point 11				67.94	2,037.59	1,315,394.26	3,226,585.43		
Point 12				76.64	-576.58	1,312,780.39	3,226,618.03		
Wardell 28N-20HZ_!< - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
Point 1				-1,667.87	-97.35	1,313,243.63	3,224,869.28		
Point 2				501.07	-101.70	1,313,259.11	3,227,038.08		
Point 3				2,667.33	-104.93	1,313,275.69	3,229,204.19		
Point 4				2,667.05	2,078.21	1,315,458.65	3,229,183.94		
Point 5				2,667.61	4,270.93	1,317,651.19	3,229,164.45		
Point 6				2,669.34	5,191.01	1,318,571.20	3,229,157.77		
Point 7				2,677.05	7,371.69	1,320,751.77	3,229,145.54		
Point 8				2,704.10	9,542.12	1,322,922.26	3,229,152.74		
Point 9				505.83	9,544.88	1,322,904.92	3,226,954.63		
Point 10				-1,697.51	9,547.90	1,322,887.80	3,224,751.45		
Point 11				-1,700.50	7,353.32	1,320,693.37	3,224,768.53		
Point 12				-1,686.69	5,158.92	1,318,499.29	3,224,802.40		
Point 13				-1,682.26	4,238.89	1,317,579.37	3,224,815.24		
Point 14				-1,675.04	2,059.25	1,315,399.98	3,224,842.39		
Wardell 28N-20HZ_\) - actual wellpath misses target center by 8.56ft at 14986.29ft MD (7019.07 TVD, 8200.54 N, 569.07 E) - Point	0.00	0.00	7,025.23	8,200.00	575.00	,560.789365	,7,036.093046	40.213225	-104.687048

Design Report for Wardell 28N-20HZ - Actual Field Surveys

Wardell 28N-20HZ_1	0.00	0.00	7,026.04	3,400.00	320.00	,758.862837	,6,825.006012	40.200049	-104.687961
- actual wellpath misses target center by 20.32ft at 10176.75ft MD (7046.13 TVD, 3399.92 N, 323.06 E)									
- Point									
Wardell 28N-20HZ_1	0.00	0.00	0.00	0.00	0.00	,356.223761	,6,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Polygon									
Point 1			-2,126.36	-556.45	1,312,780.38	3,224,415.03			
Point 2			500.27	-561.71	1,312,799.14	3,227,041.49			
Point 3			3,127.41	-565.64	1,312,819.23	3,229,668.44			
Point 4			3,127.07	2,078.18	1,315,462.82	3,229,643.93			
Point 5			3,127.75	4,734.34	1,318,118.76	3,229,620.32			
Point 6			3,127.75	4,734.34	1,318,118.76	3,229,620.32			
Point 7			3,137.06	7,368.02	1,320,752.31	3,229,605.54			
Point 8			3,169.88	10,001.55	1,323,385.91	3,229,614.28			
Point 9			506.44	10,004.90	1,323,364.91	3,226,951.03			
Point 10			-2,156.90	10,008.55	1,323,344.21	3,224,287.89			
Point 11			-2,160.52	7,352.18	1,320,688.03	3,224,308.56			
Point 12			-2,143.80	4,695.51	1,318,031.73	3,224,349.57			
Point 13			-2,143.80	4,695.51	1,318,031.73	3,224,349.57			
Point 14			-2,135.06	2,057.72	1,315,394.25	3,224,382.43			

North Reference Sheet for Sec. 29 T3N-R65W - Wardell 28N-20HZ - Plan H 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=25ft @ 4903.00ft (HP 308). Northing and Easting are relative to Wardell 28N-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

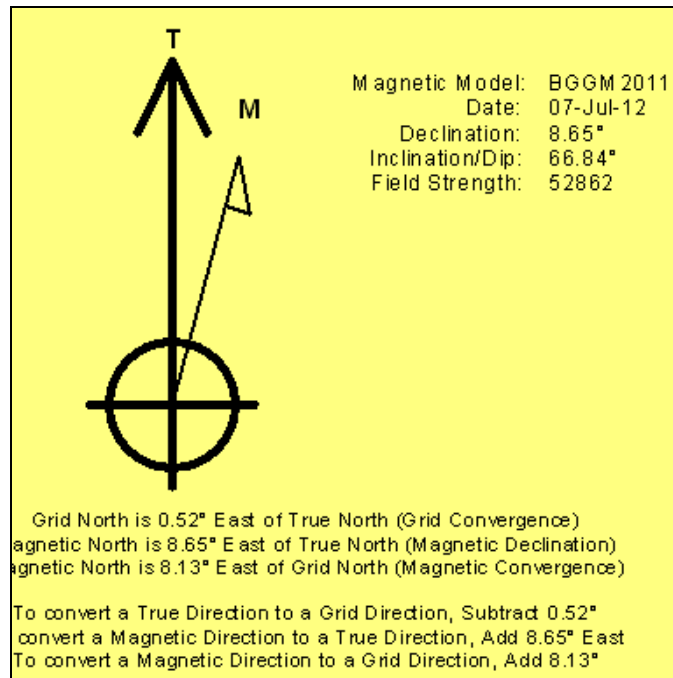
Grid Coordinates of Well: 1,313,356.223761 ft N, 3,226,536.122796 ft E

Geographical Coordinates of Well: 40° 11' 26.58" N, 104° 41' 20.79" W

Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,303.00ft
the Bottom Hole Displacement is 9,534.51ft in the Direction of 3.51° (True).

Magnetic Convergence at surface is: -8.13° (7 July 2012, , BGGM2011)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 29 T3N-R65W

Wardell 28N-20HZ

Plan H Rev 1

Design: Actual Field Surveys

Survey Report - Geographic

16 July, 2012

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field 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 28N-20HZ					
Well Position	+N/-S	0.00 ft	Northing:	1,313,356.223761 ft	Latitude:	40.190716
	+E/-W	0.00 ft	Easting:	3,226,536.122796 ft	Longitude:	-104.689107
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,878.00 ft

Wellbore	Plan H Rev 1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2011	2012-07-07	8.65	66.84	52,862

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	1.91	

Survey Program	Date	2012-07-16			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	1,000.00	Surface Gyros (Plan H Rev 1)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,071.00	7,353.00	MWD Surveys - Vert/Build (Plan H Rev 1)	MWD	MWD - Standard	
7,432.00	16,303.00	Sperry MWD Surveys - Lateral (Plan H Re	MWD+SCC	MWD + Short Collar correction	

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field 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	13,356.223761	26,536.122796	40.190716	-104.689107
125.00	0.50	308.28	125.00	0.34	-0.43	13,356.557703	26,535.691598	40.190717	-104.689109
First Gyro Survey @ 125.00ft									
225.00	0.23	13.47	225.00	0.80	-0.72	13,357.020460	26,535.391605	40.190718	-104.689110
325.00	0.25	244.91	325.00	0.91	-0.87	13,357.121752	26,535.239851	40.190718	-104.689110
425.00	0.20	342.30	425.00	0.98	-1.13	13,357.193214	26,534.988553	40.190719	-104.689111
525.00	0.08	86.87	525.00	1.15	-1.11	13,357.363434	26,535.003642	40.190719	-104.689111
625.00	0.21	265.86	625.00	1.14	-1.22	13,357.352983	26,534.890666	40.190719	-104.689111
725.00	0.13	62.41	725.00	1.18	-1.30	13,357.391539	26,534.808078	40.190719	-104.689112
825.00	0.13	220.84	825.00	1.15	-1.28	13,357.358498	26,534.834737	40.190719	-104.689112
925.00	0.19	345.93	924.99	1.22	-1.39	13,357.432450	26,534.719564	40.190719	-104.689112
1,000.00	0.15	258.83	999.99	1.32	-1.52	13,357.532890	26,534.592099	40.190720	-104.689112
Final Gyro Survey @ 1000.00ft - Tie-On to Gyro Surveys @ 1000.00ft									
1,071.00	0.50	306.71	1,070.99	1.49	-1.86	13,357.696950	26,534.251068	40.190720	-104.689114
First Sperry MWD Survey @ 1071.00ft									
1,102.00	0.35	333.73	1,101.99	1.66	-2.01	13,357.861321	26,534.099223	40.190720	-104.689114
1,194.00	0.44	340.14	1,193.99	2.24	-2.25	13,358.443253	26,533.849524	40.190722	-104.689115
1,286.00	1.21	340.50	1,285.98	3.49	-2.70	13,359.687007	26,533.393884	40.190725	-104.689117
1,377.00	1.42	56.80	1,376.96	5.01	-2.07	13,361.215786	26,534.002704	40.190730	-104.689114
1,470.00	2.38	94.36	1,469.91	5.50	0.82	13,361.726367	26,536.887838	40.190731	-104.689104
1,562.00	4.45	78.68	1,561.75	6.05	6.22	13,362.331167	26,542.287373	40.190733	-104.689085
1,654.00	3.96	80.07	1,653.50	7.30	12.85	13,363.640073	26,548.904277	40.190736	-104.689061
1,746.00	5.09	81.04	1,745.21	8.48	20.01	13,364.888923	26,556.053594	40.190739	-104.689035
1,837.00	4.69	102.54	1,835.89	8.30	27.63	13,364.779552	26,563.674320	40.190739	-104.689008
1,929.00	4.50	102.43	1,927.59	6.71	34.83	13,363.252006	26,570.884256	40.190734	-104.688982
2,021.00	4.30	93.54	2,019.32	5.72	41.79	13,362.325972	26,577.859768	40.190732	-104.688957
2,112.00	4.15	90.04	2,110.07	5.51	48.49	13,362.174289	26,584.558924	40.190731	-104.688933
2,207.00	4.09	82.78	2,204.83	5.93	55.29	13,362.659807	26,591.352994	40.190732	-104.688909
2,302.00	4.75	90.45	2,299.55	6.33	62.58	13,363.121374	26,598.643178	40.190733	-104.688883
2,397.00	4.10	82.70	2,394.26	6.73	69.89	13,363.588753	26,605.940912	40.190734	-104.688857
2,491.00	4.56	79.42	2,488.00	7.84	76.89	13,364.765797	26,612.936450	40.190737	-104.688832
2,585.00	3.78	79.03	2,581.75	9.12	83.61	13,366.102820	26,619.639323	40.190741	-104.688808
2,680.00	4.54	81.03	2,676.50	10.30	90.40	13,367.346940	26,626.416170	40.190744	-104.688783
2,775.00	6.34	87.43	2,771.06	11.12	99.35	13,368.250257	26,635.362667	40.190746	-104.688751
2,869.00	5.78	85.44	2,864.54	11.73	109.25	13,368.949806	26,645.259597	40.190748	-104.688716
2,963.00	6.22	98.91	2,958.03	11.32	119.00	13,368.626577	26,655.012252	40.190747	-104.688681
3,058.00	5.38	96.63	3,052.54	10.00	128.51	13,367.402306	26,664.531827	40.190743	-104.688647
3,152.00	4.63	93.41	3,146.18	9.27	136.68	13,366.742559	26,672.702435	40.190741	-104.688618
3,247.00	4.64	110.30	3,240.88	7.71	144.11	13,365.249409	26,680.147723	40.190737	-104.688591
3,342.00	3.69	110.40	3,335.62	5.31	150.58	13,362.910022	26,686.638382	40.190730	-104.688568
3,437.00	4.11	101.66	3,430.40	3.56	156.78	13,361.213205	26,692.853404	40.190726	-104.688546
3,532.00	3.44	95.70	3,525.20	2.59	162.95	13,360.298576	26,699.032065	40.190723	-104.688524
3,627.00	4.26	92.79	3,619.98	2.13	169.31	13,359.901942	26,705.396103	40.190722	-104.688501
3,722.00	4.39	96.76	3,714.71	1.53	176.44	13,359.367502	26,712.535853	40.190720	-104.688475
3,817.00	5.66	95.51	3,809.35	0.65	184.72	13,358.565394	26,720.817177	40.190718	-104.688446
3,912.00	5.78	91.83	3,903.87	0.05	194.16	13,358.049218	26,730.266208	40.190716	-104.688412
4,007.00	5.65	94.74	3,998.40	-0.49	203.60	13,357.596401	26,739.712050	40.190715	-104.688378
4,102.00	5.61	94.39	4,092.94	-1.23	212.89	13,356.939548	26,749.008311	40.190713	-104.688345
4,197.00	4.77	92.19	4,187.55	-1.74	221.47	13,356.511638	26,757.589223	40.190711	-104.688314
4,292.00	5.82	107.29	4,282.15	-3.32	230.02	13,355.007308	26,766.149673	40.190707	-104.688284
4,386.00	5.60	102.43	4,375.68	-5.72	239.05	13,352.686369	26,775.200451	40.190700	-104.688251
4,481.00	5.26	99.37	4,470.26	-7.43	247.87	13,351.060508	26,784.038376	40.190696	-104.688220
4,576.00	4.57	98.21	4,564.91	-8.68	255.91	13,349.884716	26,792.091572	40.190692	-104.688191
4,670.00	5.78	98.78	4,658.52	-9.94	264.30	13,348.704180	26,800.486971	40.190689	-104.688161
4,765.00	4.97	107.82	4,753.11	-11.93	272.94	13,346.793809	26,809.150044	40.190683	-104.688130

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field 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	5.88	109.90	4,847.68	-14.84	281.43	13,343.955976	26,817.669449	40.190675	-104.688100
4,954.00	5.18	107.14	4,941.24	-17.73	290.02	13,341.145194	26,826.277622	40.190667	-104.688069
5,049.00	5.94	98.51	5,035.80	-19.72	298.98	13,339.235939	26,835.254944	40.190662	-104.688037
5,144.00	5.53	85.26	5,130.32	-20.07	308.40	13,338.972950	26,844.681081	40.190661	-104.688003
5,238.00	5.03	89.82	5,223.93	-19.69	317.04	13,339.439094	26,853.311475	40.190662	-104.687972
5,333.00	4.36	89.47	5,318.61	-19.64	324.81	13,339.556679	26,861.086070	40.190662	-104.687944
5,428.00	6.46	77.51	5,413.18	-18.45	333.64	13,340.826679	26,869.904372	40.190665	-104.687913
5,523.00	4.85	81.33	5,507.72	-16.69	342.83	13,342.671844	26,879.075965	40.190670	-104.687880
5,617.00	4.06	79.16	5,601.43	-15.46	350.03	13,343.962402	26,886.260870	40.190673	-104.687854
5,712.00	4.61	84.07	5,696.16	-14.44	357.13	13,345.054153	26,893.351285	40.190676	-104.687829
5,807.00	3.55	91.15	5,790.92	-14.10	363.86	13,345.451142	26,900.085754	40.190677	-104.687805
5,901.00	3.20	93.89	5,884.76	-14.34	369.39	13,345.265305	26,905.614669	40.190677	-104.687785
5,996.00	2.10	92.20	5,979.65	-14.58	373.78	13,345.058714	26,910.001396	40.190676	-104.687769
6,091.00	1.05	52.44	6,074.62	-14.12	376.21	13,345.544708	26,912.426380	40.190677	-104.687760
6,186.00	1.13	26.21	6,169.60	-12.75	377.31	13,346.925733	26,913.517489	40.190681	-104.687756
6,281.00	1.29	7.97	6,264.58	-10.85	377.87	13,348.830181	26,914.062071	40.190686	-104.687754
6,376.00	1.32	0.40	6,359.56	-8.70	378.03	13,350.984655	26,914.198280	40.190692	-104.687754
6,407.00	1.36	345.90	6,390.55	-7.98	377.94	13,351.697652	26,914.104631	40.190694	-104.687754
6,439.00	3.18	3.84	6,422.52	-6.73	377.91	13,352.951244	26,914.060092	40.190697	-104.687754
6,471.00	5.91	2.36	6,454.42	-4.20	378.03	13,355.484311	26,914.164232	40.190704	-104.687754
6,502.00	8.23	0.79	6,485.18	-0.38	378.13	13,359.298586	26,914.225675	40.190715	-104.687754
6,534.00	10.58	3.45	6,516.75	4.84	378.34	13,364.523352	26,914.386290	40.190729	-104.687753
6,566.00	13.46	4.50	6,548.04	11.49	378.81	13,371.173678	26,914.794560	40.190747	-104.687751
6,597.00	16.44	2.20	6,577.99	19.47	379.26	13,379.159201	26,915.173105	40.190769	-104.687750
6,629.00	19.16	0.27	6,608.46	29.25	379.46	13,388.938212	26,915.282290	40.190796	-104.687749
6,661.00	21.53	0.17	6,638.46	40.37	379.50	13,400.062290	26,915.222736	40.190827	-104.687749
6,692.00	24.39	1.85	6,667.00	52.46	379.72	13,412.151569	26,915.335741	40.190860	-104.687748
6,724.00	27.57	1.45	6,695.76	66.47	380.13	13,426.164282	26,915.608386	40.190898	-104.687746
6,756.00	30.63	2.74	6,723.72	82.02	380.70	13,441.717592	26,916.043375	40.190941	-104.687744
6,787.00	33.91	3.24	6,749.93	98.55	381.57	13,458.250233	26,916.758669	40.190986	-104.687741
6,819.00	36.83	3.14	6,776.02	117.04	382.60	13,476.750752	26,917.619566	40.191037	-104.687738
6,851.00	40.70	3.45	6,800.96	137.04	383.75	13,496.758587	26,918.590263	40.191092	-104.687733
6,882.00	44.73	4.34	6,823.74	158.01	385.19	13,517.745087	26,919.832685	40.191150	-104.687728
6,914.00	46.58	5.08	6,846.10	180.82	387.07	13,540.566196	26,921.505316	40.191212	-104.687722
6,946.00	50.08	4.04	6,867.37	204.64	388.96	13,564.405554	26,923.181489	40.191278	-104.687715
6,977.00	53.77	5.60	6,886.49	228.95	391.02	13,588.733124	26,925.017409	40.191344	-104.687707
7,009.00	57.64	5.00	6,904.52	255.27	393.46	13,615.071987	26,927.214861	40.191417	-104.687699
7,041.00	61.64	4.50	6,920.69	282.78	395.74	13,642.601933	26,929.246650	40.191492	-104.687690
7,072.00	64.07	4.05	6,934.83	310.29	397.80	13,670.125075	26,931.049941	40.191568	-104.687683
7,104.00	66.11	3.64	6,948.31	339.25	399.74	13,699.096591	26,932.730250	40.191647	-104.687676
7,136.00	67.75	3.52	6,960.85	368.63	401.58	13,728.493326	26,934.299520	40.191728	-104.687670
7,167.00	70.10	2.46	6,971.99	397.51	403.09	13,757.389279	26,935.541876	40.191807	-104.687664
7,199.00	72.85	0.52	6,982.16	427.84	403.87	13,787.721014	26,936.049211	40.191890	-104.687661
7,231.00	75.13	359.45	6,990.99	458.60	403.86	13,818.474617	26,935.758283	40.191975	-104.687661
7,262.00	77.72	358.45	6,998.26	488.72	403.31	13,848.592905	26,934.929274	40.192057	-104.687663
7,294.00	80.83	357.90	7,004.22	520.14	402.31	13,880.002145	26,933.640097	40.192144	-104.687667
7,326.00	83.02	358.60	7,008.71	551.81	401.34	13,911.656458	26,932.383671	40.192231	-104.687670
7,353.00	84.38	357.29	7,011.67	578.63	400.38	13,938.463835	26,931.175824	40.192304	-104.687674
7,393.00	86.85	357.56	7,014.73	618.47	398.59	13,978.283711	26,929.021563	40.192414	-104.687680
7" Intermediate Casing @ 7393ft									
7,432.00	89.26	357.83	7,016.05	657.41	397.02	14,017.209261	26,927.099519	40.192520	-104.687686
7,463.00	88.83	357.57	7,016.57	688.38	395.78	14,048.165897	26,925.572523	40.192606	-104.687690
7,558.00	89.81	358.38	7,017.70	783.31	392.42	14,143.059232	26,921.348238	40.192866	-104.687702
7,653.00	89.81	0.47	7,018.01	878.30	391.47	14,238.031923	26,919.526418	40.193127	-104.687706
7,748.00	90.25	1.40	7,017.96	973.29	393.02	14,333.024141	26,920.207927	40.193388	-104.687700

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field 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
7,843.00	90.62	2.01	7,017.24	1,068.24	395.84	14,427.996561	26,922.165887	40.193648	-104.687690
7,937.00	90.56	1.54	7,016.28	1,162.19	398.76	14,521.964900	26,924.218012	40.193906	-104.687680
8,032.00	88.64	359.56	7,016.94	1,257.18	399.67	14,616.949356	26,924.261398	40.194167	-104.687676
8,127.00	88.83	359.93	7,019.04	1,352.15	399.25	14,711.913170	26,922.970282	40.194428	-104.687678
8,222.00	88.83	359.86	7,020.98	1,447.13	399.07	14,806.883589	26,921.927734	40.194688	-104.687679
8,316.00	88.83	358.72	7,022.89	1,541.10	397.91	14,900.836643	26,919.904010	40.194946	-104.687683
8,412.00	88.27	358.46	7,025.32	1,637.04	395.55	14,996.746688	26,916.665487	40.195210	-104.687691
8,506.00	88.02	358.06	7,028.37	1,730.95	392.69	15,090.619830	26,912.954342	40.195467	-104.687701
8,601.00	87.59	357.83	7,032.01	1,825.82	389.29	15,185.449651	26,908.683091	40.195728	-104.687714
8,696.00	88.08	357.79	7,035.59	1,920.68	385.66	15,280.271028	26,904.188293	40.195988	-104.687726
8,791.00	89.01	358.06	7,038.01	2,015.59	382.22	15,375.137543	26,899.882226	40.196249	-104.687739
8,886.00	88.33	357.11	7,040.21	2,110.48	378.22	15,469.981353	26,895.013120	40.196509	-104.687753
8,980.00	89.63	357.18	7,041.88	2,204.34	373.54	15,563.797055	26,889.474048	40.196767	-104.687770
9,074.00	90.74	358.57	7,041.58	2,298.27	370.05	15,657.688349	26,885.130058	40.197025	-104.687782
9,169.00	90.56	357.69	7,040.50	2,393.22	366.95	15,752.594313	26,881.162354	40.197285	-104.687793
9,261.00	90.62	357.92	7,039.56	2,485.14	363.43	15,844.481890	26,876.798593	40.197538	-104.687806
9,353.00	90.31	357.54	7,038.81	2,577.07	359.79	15,936.365307	26,872.314471	40.197790	-104.687819
9,445.00	90.00	357.83	7,038.56	2,668.99	356.07	16,028.247934	26,867.758057	40.198042	-104.687832
9,537.00	89.69	357.96	7,038.81	2,760.93	352.69	16,120.146723	26,863.538434	40.198295	-104.687844
9,628.00	88.70	357.29	7,040.09	2,851.84	348.92	16,211.015782	26,858.936948	40.198544	-104.687858
9,720.00	88.33	357.18	7,042.47	2,943.70	344.48	16,302.829316	26,853.660794	40.198796	-104.687874
9,812.00	89.75	357.32	7,044.01	3,035.58	340.07	16,394.659984	26,848.407791	40.199049	-104.687890
9,904.00	89.38	356.93	7,044.71	3,127.46	335.46	16,486.491253	26,842.953713	40.199301	-104.687906
9,996.00	90.19	357.63	7,045.06	3,219.36	331.09	16,578.337942	26,837.748032	40.199553	-104.687922
10,089.00	89.63	357.37	7,045.20	3,312.27	327.03	16,671.203925	26,832.842216	40.199808	-104.687936
10,180.00	89.14	357.44	7,046.18	3,403.17	322.91	16,762.059742	26,827.891508	40.200058	-104.687951
10,272.00	89.51	358.32	7,047.26	3,495.10	319.51	16,853.950451	26,823.648175	40.200310	-104.687963
10,364.00	89.32	0.01	7,048.20	3,587.08	318.17	16,945.912486	26,821.466581	40.200562	-104.687968
10,455.00	90.62	0.21	7,048.25	3,678.08	318.35	17,036.904223	26,820.809182	40.200812	-104.687967
10,547.00	89.75	1.74	7,047.95	3,770.06	319.91	17,128.893355	26,821.533402	40.201065	-104.687962
10,639.00	90.12	2.07	7,048.06	3,862.01	322.97	17,220.862366	26,823.750649	40.201317	-104.687951
10,734.00	90.99	2.45	7,047.14	3,956.93	326.72	17,315.809174	26,826.628383	40.201578	-104.687937
10,828.00	91.05	2.09	7,045.46	4,050.84	330.44	17,409.746479	26,829.491956	40.201835	-104.687924
10,923.00	90.62	2.16	7,044.08	4,145.77	333.96	17,504.695033	26,832.145862	40.202096	-104.687911
11,017.00	90.25	1.94	7,043.37	4,239.70	337.32	17,598.654760	26,834.649037	40.202354	-104.687899
11,112.00	89.94	0.86	7,043.21	4,334.67	339.64	17,693.637955	26,836.101443	40.202615	-104.687891
11,206.00	90.93	2.42	7,042.50	4,428.63	342.33	17,787.609340	26,837.932044	40.202872	-104.687881
11,301.00	90.74	2.86	7,041.11	4,523.52	346.71	17,882.530155	26,841.439275	40.203133	-104.687866
11,396.00	90.74	3.15	7,039.88	4,618.38	351.69	17,977.429040	26,845.551212	40.203393	-104.687848
11,491.00	90.19	3.15	7,039.11	4,713.23	356.91	18,072.321742	26,849.903506	40.203654	-104.687829
11,586.00	89.81	3.76	7,039.11	4,808.06	362.63	18,167.192797	26,854.761021	40.203914	-104.687809
11,680.00	89.57	4.15	7,039.62	4,901.83	369.12	18,261.018685	26,860.386337	40.204171	-104.687786
11,775.00	90.56	3.50	7,039.51	4,996.62	375.45	18,355.855266	26,865.856337	40.204432	-104.687763
11,870.00	91.67	5.56	7,037.67	5,091.30	382.96	18,450.594603	26,872.490895	40.204692	-104.687736
11,964.00	91.42	4.61	7,035.13	5,184.89	391.28	18,544.257719	26,879.962732	40.204948	-104.687706
12,044.00	91.85	3.92	7,032.85	5,264.64	397.23	18,624.050674	26,885.180179	40.205167	-104.687685
12,108.00	91.18	3.07	7,031.16	5,328.50	401.13	18,687.938637	26,888.495969	40.205343	-104.687671
12,202.00	89.51	1.46	7,030.59	5,422.42	404.85	18,781.883122	26,891.351436	40.205600	-104.687658
12,297.00	89.13	1.92	7,031.72	5,517.37	407.65	18,876.852284	26,893.284452	40.205861	-104.687648
12,391.00	89.13	0.83	7,033.14	5,611.33	409.90	18,970.825658	26,894.680408	40.206119	-104.687639
12,486.00	88.09	0.22	7,035.45	5,706.29	410.77	19,065.791904	26,894.682268	40.206380	-104.687636
12,581.00	87.78	0.83	7,038.87	5,801.23	411.64	19,160.725599	26,894.683967	40.206640	-104.687633
12,676.00	87.84	1.20	7,042.50	5,896.14	413.32	19,255.648510	26,895.497532	40.206901	-104.687627
12,770.00	89.13	2.40	7,044.99	5,990.06	416.28	19,349.584635	26,897.590256	40.207159	-104.687617
12,865.00	91.11	1.59	7,044.79	6,085.00	419.58	19,444.543554	26,900.028863	40.207419	-104.687605

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field 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
12,960.00	90.00	3.36	7,043.87	6,179.90	423.69	19,539.474716	26,903.262878	40.207680	-104.687590
13,055.00	90.12	4.05	7,043.77	6,274.70	429.82	19,634.323653	26,908.534297	40.207940	-104.687568
13,149.00	90.12	4.14	7,043.57	6,368.46	436.54	19,728.136922	26,914.388948	40.208197	-104.687544
13,244.00	90.56	3.71	7,043.01	6,463.23	443.04	19,822.963436	26,920.024441	40.208457	-104.687521
13,339.00	91.85	4.68	7,041.01	6,557.96	449.99	19,917.740377	26,926.105122	40.208717	-104.687496
13,434.00	91.24	4.20	7,038.45	6,652.64	457.34	20,012.479356	26,932.590391	40.208977	-104.687470
13,528.00	90.56	4.81	7,036.97	6,746.33	464.72	20,106.235980	26,939.115387	40.209235	-104.687443
13,623.00	90.37	4.78	7,036.20	6,841.00	472.66	20,200.964953	26,946.189970	40.209494	-104.687415
13,717.00	89.57	5.20	7,036.25	6,934.64	480.84	20,294.674558	26,953.509215	40.209751	-104.687385
13,812.00	90.06	4.32	7,036.56	7,029.31	488.72	20,389.409287	26,960.526027	40.210011	-104.687357
13,907.00	90.93	3.46	7,035.74	7,124.09	495.17	20,484.236008	26,966.103442	40.210272	-104.687334
14,001.00	90.49	4.31	7,034.57	7,217.86	501.53	20,578.062024	26,971.613770	40.210529	-104.687311
14,096.00	90.87	2.75	7,033.44	7,312.67	507.38	20,672.917473	26,976.595036	40.210789	-104.687290
14,191.00	90.31	2.76	7,032.47	7,407.56	511.95	20,767.836004	26,980.292962	40.211050	-104.687274
14,286.00	90.93	2.36	7,031.44	7,502.46	516.19	20,862.765767	26,983.667813	40.211310	-104.687259
14,381.00	90.80	3.54	7,030.00	7,597.32	521.08	20,957.664058	26,987.688478	40.211571	-104.687241
14,476.00	91.05	3.04	7,028.47	7,692.15	526.53	21,052.536589	26,992.272193	40.211831	-104.687222
14,571.00	92.04	4.95	7,025.91	7,786.88	533.15	21,147.318248	26,998.020858	40.212091	-104.687198
14,666.00	90.99	4.87	7,023.40	7,881.49	541.27	21,242.001554	27,005.283144	40.212351	-104.687169
14,761.00	90.93	4.75	7,021.81	7,976.15	549.24	21,336.718518	27,012.381765	40.212610	-104.687140
14,856.00	90.68	4.53	7,020.47	8,070.82	556.92	21,431.459963	27,019.199595	40.212870	-104.687113
14,951.00	90.68	5.93	7,019.34	8,165.42	565.58	21,526.126634	27,026.992684	40.213130	-104.687082
15,046.00	89.38	4.56	7,019.29	8,260.02	574.27	21,620.795986	27,034.810940	40.213390	-104.687051
15,140.00	89.57	2.83	7,020.16	8,353.82	580.32	21,714.640511	27,040.010086	40.213647	-104.687029
15,235.00	89.20	0.48	7,021.18	8,448.76	583.07	21,809.605658	27,041.885069	40.213908	-104.687019
15,330.00	89.32	0.04	7,022.40	8,543.75	583.50	21,904.592428	27,041.447484	40.214168	-104.687018
15,425.00	90.37	0.10	7,022.66	8,638.75	583.61	21,999.583718	27,040.694870	40.214429	-104.687017
15,520.00	90.00	0.38	7,022.35	8,733.75	584.01	22,094.577749	27,040.224099	40.214690	-104.687016
15,615.00	90.00	0.30	7,022.35	8,828.75	584.58	22,189.573204	27,039.919120	40.214951	-104.687014
15,710.00	89.63	0.04	7,022.66	8,923.75	584.86	22,284.566602	27,039.332292	40.215212	-104.687013
15,805.00	89.01	0.44	7,023.79	9,018.74	585.26	22,379.554041	27,038.861531	40.215472	-104.687011
15,900.00	88.33	1.46	7,025.99	9,113.70	586.83	22,474.519963	27,039.567599	40.215733	-104.687006
15,995.00	88.46	359.98	7,028.65	9,208.65	588.02	22,569.475425	27,039.892481	40.215994	-104.687001
16,090.00	89.20	359.35	7,030.59	9,303.63	587.47	22,664.439760	27,038.468655	40.216254	-104.687003
16,185.00	90.00	359.01	7,031.26	9,398.62	586.11	22,759.406355	27,036.240671	40.216515	-104.687008
16,264.00	90.00	359.06	7,031.26	9,477.61	584.78	22,838.376313	27,034.188017	40.216732	-104.687013
Final Sperry MWD Survey @ 16264.00ft									
16,303.00	90.00	359.06	7,031.26	9,516.60	584.14	22,877.361923	27,033.191692	40.216839	-104.687015
Straight Line Projection to Bit @ 16303.00ft									

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field Surveys	Database:	EDM 2003.16 Single User Db

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N-S (ft)	+E-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Wardell 28N-20HZ_SI	0.00	0.00	0.00	0.00	0.00	313,356.223761	226,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Point									
Wardell 28N-20HZ_Si	0.00	0.00	0.00	0.00	0.00	313,356.223761	226,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	4,695.51	-2,143.80	1,318,031.73	3,224,349.57		
Point 2			0.00	4,715.00	491.98	1,318,075.32	3,226,984.95		
Point 3			0.00	4,734.34	3,127.75	1,318,118.76	3,229,620.32		
Wardell 28N-20HZ_BI	0.00	0.00	7,025.00	9,545.00	317.53	322,903.321550	226,766.351014	40.216917	-104.687970
- actual wellpath misses target center by 268.18ft at 16303.00ft MD (7031.26 TVD, 9516.60 N, 584.14 E)									
- Point									
Wardell 28N-20HZ_Ci	0.00	0.00	0.00	0.00	0.00	313,356.223761	226,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-561.69	500.27	1,312,799.16	3,227,041.49		
Point 2			0.00	4,715.03	491.98	1,318,075.35	3,226,984.95		
Point 3			0.00	4,715.03	491.98	1,318,075.35	3,226,984.95		
Point 4			0.00	10,004.92	506.44	1,323,364.93	3,226,951.03		
Wardell 28N-20HZ_WI	0.00	0.00	7,025.57	6,200.00	415.00	319,559.495153	226,894.394653	40.207735	-104.687621
- actual wellpath misses target center by 20.79ft at 12979.52ft MD (7043.86 TVD, 6199.38 N, 424.85 E)									
- Point									
Wardell 28N-20HZ_W	0.00	0.00	7,026.25	2,200.00	380.00	315,559.512782	226,895.973807	40.196755	-104.687747
- actual wellpath misses target center by 16.80ft at 8975.06ft MD (7041.85 TVD, 2199.41 N, 373.78 E)									
- Point									
Wardell 28N-20HZ_Li	0.00	0.00	0.00	0.00	0.00	313,356.223761	226,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-545.48	924.41	1,312,819.24	3,227,465.44		
Point 2			0.00	2,098.35	924.07	1,315,462.85	3,227,440.93		
Point 3			0.00	4,754.50	924.75	1,318,118.78	3,227,417.32		
Point 4			0.00	4,754.50	924.75	1,318,118.78	3,227,417.32		
Point 5			0.00	7,388.18	934.05	1,320,752.32	3,227,402.54		
Point 6			0.00	10,021.71	966.88	1,323,385.93	3,227,411.28		
Point 7			0.00	9,988.42	46.10	1,323,344.22	3,226,490.88		
Point 8			0.00	7,332.05	42.48	1,320,688.04	3,226,511.55		
Point 9			0.00	4,675.38	59.20	1,318,031.75	3,226,552.57		
Point 10			0.00	4,675.38	59.20	1,318,031.75	3,226,552.57		
Point 11			0.00	2,037.59	67.94	1,315,394.26	3,226,585.43		
Point 12			0.00	-576.58	76.64	1,312,780.39	3,226,618.03		
Wardell 28N-20HZ_Si	0.00	0.00	0.00	0.00	0.00	313,356.223761	226,536.122796	40.190716	-104.689107
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-97.35	-1,667.87	1,313,243.63	3,224,869.28		
Point 2			0.00	-101.70	501.07	1,313,259.11	3,227,038.08		
Point 3			0.00	-104.93	2,667.33	1,313,275.69	3,229,204.19		
Point 4			0.00	2,078.21	2,667.05	1,315,458.65	3,229,183.94		
Point 5			0.00	4,270.93	2,667.61	1,317,651.19	3,229,164.45		
Point 6			0.00	5,191.01	2,669.34	1,318,571.20	3,229,157.77		
Point 7			0.00	7,371.69	2,677.05	1,320,751.77	3,229,145.54		
Point 8			0.00	9,542.12	2,704.10	1,322,922.26	3,229,152.74		
Point 9			0.00	9,544.88	505.83	1,322,904.92	3,226,954.63		
Point 10			0.00	9,547.90	-1,697.51	1,322,887.80	3,224,751.45		
Point 11			0.00	7,353.32	-1,700.50	1,320,693.37	3,224,768.53		
Point 12			0.00	5,158.92	-1,686.69	1,318,499.29	3,224,802.40		

Halliburton Company

Survey Report - Geographic

Company:	Anadarko Petroleum Corp.	Local Co-ordinate Reference:	Well Wardell 28N-20HZ
Project:	Weld County, CO (NAD 83)	TVD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Site:	Sec. 29 T3N-R65W	MD Reference:	RKB=25ft @ 4903.00ft (HP 308)
Well:	Wardell 28N-20HZ	North Reference:	True
Wellbore:	Plan H Rev 1	Survey Calculation Method:	Minimum Curvature
Design:	Actual Field Surveys	Database:	EDM 2003.16 Single User Db

Point 13	0.00	4,238.89	-1,682.26	1,317,579.37	3,224,815.24		
Point 14	0.00	2,059.25	-1,675.04	1,315,399.98	3,224,842.39		
Wardell 28N-20HZ_W	0.00	0.00	7,025.23	8,200.00	575.00	321,560.789365	27,036.093046
- actual wellpath misses target center by 8.56ft at 14986.29ft MD (7019.07 TVD, 8200.54 N, 569.07 E)							
- Point							
Wardell 28N-20HZ_W	0.00	0.00	7,026.04	3,400.00	320.00	316,758.862837	26,825.006012
- actual wellpath misses target center by 20.32ft at 10176.75ft MD (7046.13 TVD, 3399.92 N, 323.06 E)							
- Point							
Wardell 28N-20HZ_S	0.00	0.00	0.00	0.00	0.00	313,356.223761	26,536.122796
- actual wellpath hits target center							
- Polygon							
Point 1	0.00	-556.45	-2,126.36	1,312,780.38	3,224,415.03		
Point 2	0.00	-561.71	500.27	1,312,799.14	3,227,041.49		
Point 3	0.00	-565.64	3,127.41	1,312,819.23	3,229,668.44		
Point 4	0.00	2,078.18	3,127.07	1,315,462.82	3,229,643.93		
Point 5	0.00	4,734.34	3,127.75	1,318,118.76	3,229,620.32		
Point 6	0.00	4,734.34	3,127.75	1,318,118.76	3,229,620.32		
Point 7	0.00	7,368.02	3,137.06	1,320,752.31	3,229,605.54		
Point 8	0.00	10,001.55	3,169.88	1,323,385.91	3,229,614.28		
Point 9	0.00	10,004.90	506.44	1,323,364.91	3,226,951.03		
Point 10	0.00	10,008.55	-2,156.90	1,323,344.21	3,224,287.89		
Point 11	0.00	7,352.18	-2,160.52	1,320,688.03	3,224,308.56		
Point 12	0.00	4,695.51	-2,143.80	1,318,031.73	3,224,349.57		
Point 13	0.00	4,695.51	-2,143.80	1,318,031.73	3,224,349.57		
Point 14	0.00	2,057.72	-2,135.06	1,315,394.25	3,224,382.43		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name		Casing Diameter (")	Hole Diameter (")
7,393.00	7,014.73	7" Intermediate Casing @ 7393ft		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	0.34	-0.43	First Gyro Survey @ 125.00ft	
1,000.00	999.99	1.32	-1.52	Final Gyro Survey @ 1000.00ft	
1,000.00	999.99	1.32	-1.52	Tie-On to Gyro Surveys @ 1000.00ft	
1,071.00	1,070.99	1.49	-1.86	First Sperry MWD Survey @ 1071.00ft	
16,264.00	7,031.26	9,477.61	584.78	Final Sperry MWD Survey @ 16264.00ft	
16,303.00	7,031.26	9,516.60	584.14	Straight Line Projection to Bit @ 16303.00ft	

Checked By: _____ Approved By: _____ Date: _____