

Project: Weld County, CO (NAD 83)
 Site: Sec. 31-T3N-R66W
 Well: Vonderlage 30N-31HZ
 Wellbore: Plan A 0
 Design: Actual Field Surveys



Straight Line Proj @ 11538' MD :: 7100.62' TVD

Final Sperry MWD Survey @ 11488.00ft

7" @ 7518.7 MD :: 7107.03' TVD

LEGEND

- Vonderlage 30N-31HZ, Plan A 0, Plan A 0 - PROPOSAL V0
- Actual Field Surveys

- H&P 308: RKB = 25ft
- First MS Energy Services Gyro @ 125.00ft
- Final MS Energy Services Gyro @ 750.00ft
- Tie-On to Surface Gyros @ 750.00ft
- First Sperry MWD Survey @ 920.00ft

Straight Line Proj @ 11538' MD :: 7100.62' TVD

Final Sperry MWD Survey @ 11488.00ft

7" @ 7518.7 MD :: 7107.03' TVD

South(-)/North(+) (1000 ft/in)

West(-)/East(+) (1000 ft/in)

True Vertical Depth (2000 ft/in)

Vertical Section at 359.88° (2000 ft/in)

7" Casing: ~718.39' FSL, ~209.48' FWL
 Lat/Long: 40.175963 N, -104.828768 E
 State Planes - CO Northern: 1,307,656.03' N, 3,187,561.01' E
 Location: Sec. 31-T3N-R66W

BHL: ~485.34' FNL, ~275.17' FWL
 Lat/Long: 40.186991 N, -104.828830 E
 State Planes - CO Northern: 1,311,673.07' N, 3,187,513.32' E
 Location: Sec. 31-T3N-R66W

WELL DETAILS: Vonderlage 30N-31HZ

Ground Level: 4825.00
 RKB = 25ft @ 4850.00ft (H&P 308)

Design: Actual Field Surveys (Vonderlage 30N-31HZ/Plan A 0)

Created By: Fred Hartmann Date: 07/31/2013
 Reviewed: _____ Date: _____

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T3N-R66W

Vonderlage 30N-31HZ

05-123-35894

Plan A 0

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

31 July, 2013

Surface UWI : 05-123-35894

Well Coordinates: 1,307,325.21 N, 3,187,836.58 E (40° 10' 30.18" N, 104° 49' 40.05" W)

Ground Level: 4,825.00 ft

Local Coordinate Origin: Centered on Well Vonderlage 30N-31HZ

Viewing Datum: RKB = 25ft @ 4850.00ft (H&P 308)

TVDs to System: N

North Reference: True

Unit System: API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

Design Report for Vonderlage 30N-31HZ - 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
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
H&P 308: RKB = 25ft							
125.00	0.29	68.95	125.00	0.09	0.24	0.09	0.29
First MS Energy Services Gyro @ 125.00ft							
225.00	0.18	181.65	225.00	0.02	0.47	0.02	0.40
325.00	0.38	217.25	325.00	-0.40	0.26	-0.40	0.26
425.00	0.52	162.74	425.00	-1.09	0.20	-1.09	0.43
525.00	0.46	158.38	524.99	-1.90	0.48	-1.90	0.07
625.00	0.38	211.67	624.99	-2.56	0.45	-2.56	0.38
725.00	1.02	213.17	724.98	-3.58	-0.21	-3.58	0.64
750.00	1.13	212.15	749.98	-3.98	-0.46	-3.98	0.45
Final MS Energy Services Gyro @ 750.00ft - Tie-On to Surface Gyros @ 750.00ft							
920.00	1.14	226.02	919.94	-6.57	-2.57	-6.57	0.16
First Sperry MWD Survey @ 920.00ft							
1,012.00	0.65	216.80	1,011.93	-7.62	-3.54	-7.62	0.55
1,103.00	0.46	220.60	1,102.93	-8.32	-4.09	-8.31	0.21
1,194.00	0.28	228.99	1,193.93	-8.74	-4.49	-8.73	0.21
1,286.00	0.31	225.35	1,285.92	-9.06	-4.84	-9.05	0.04
1,377.00	0.28	276.20	1,376.92	-9.21	-5.24	-9.20	0.28
1,469.00	1.85	257.67	1,468.91	-9.50	-6.91	-9.49	1.73
1,561.00	3.22	227.85	1,560.82	-11.55	-10.28	-11.53	2.02
1,653.00	5.08	217.18	1,652.57	-16.53	-14.66	-16.50	2.18
1,745.00	7.62	213.32	1,744.00	-24.88	-20.47	-24.83	2.80
1,929.00	9.07	211.94	1,926.05	-47.38	-34.84	-47.31	0.80
2,112.00	10.31	214.55	2,106.43	-73.11	-51.76	-73.00	0.72
2,203.00	12.43	221.45	2,195.65	-87.16	-62.86	-87.03	2.76
2,294.00	10.76	220.10	2,284.79	-101.00	-74.82	-100.84	1.86
2,386.00	9.55	217.18	2,375.35	-113.65	-84.96	-113.47	1.43
2,480.00	11.09	221.11	2,467.82	-126.67	-95.62	-126.47	1.80
2,575.00	9.72	220.31	2,561.26	-139.67	-106.82	-139.45	1.45
2,669.00	9.36	219.21	2,653.96	-151.65	-116.78	-151.40	0.43
2,763.00	11.76	222.61	2,746.36	-164.62	-128.10	-164.35	2.64
2,857.00	11.35	223.21	2,838.46	-178.41	-140.92	-178.12	0.45
2,952.00	10.27	222.40	2,931.77	-191.48	-153.03	-191.16	1.15
3,046.00	10.20	217.73	3,024.27	-204.25	-163.78	-203.91	0.89
3,140.00	9.43	214.36	3,116.90	-217.19	-173.22	-216.83	1.02
3,235.00	10.48	219.67	3,210.47	-230.27	-183.12	-229.88	1.47
3,329.00	8.38	214.86	3,303.19	-242.47	-192.50	-242.07	2.38
3,423.00	9.40	218.93	3,396.07	-254.06	-201.24	-253.64	1.27
3,517.00	9.66	221.63	3,488.77	-265.93	-211.30	-265.49	0.55
3,611.00	7.70	220.61	3,581.69	-276.61	-220.64	-276.14	2.09
3,705.00	5.91	218.59	3,675.02	-285.17	-227.76	-284.69	1.92
3,799.00	7.18	225.64	3,768.41	-293.06	-234.98	-292.57	1.60
3,894.00	7.69	229.90	3,862.61	-301.31	-244.08	-300.79	0.79
3,988.00	7.23	231.28	3,955.81	-309.06	-253.51	-308.53	0.53
4,082.00	6.90	231.06	4,049.10	-316.31	-262.51	-315.76	0.35
4,176.00	4.54	218.24	4,142.63	-322.78	-269.21	-322.21	2.84
4,270.00	3.28	205.84	4,236.41	-328.12	-272.69	-327.55	1.61
4,364.00	1.49	192.61	4,330.33	-331.73	-274.12	-331.16	1.98

Design Report for Vonderlage 30N-31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,459.00	1.39	163.13	4,425.30	-334.04	-274.06	-333.47	0.78
4,553.00	1.20	155.29	4,519.27	-336.03	-273.32	-335.45	0.28
4,647.00	0.96	151.46	4,613.26	-337.61	-272.53	-337.04	0.27
4,741.00	1.01	161.46	4,707.24	-339.09	-271.89	-338.52	0.19
4,835.00	0.88	169.98	4,801.23	-340.59	-271.50	-340.02	0.20
4,929.00	0.86	165.82	4,895.22	-341.98	-271.20	-341.41	0.07
5,024.00	0.91	165.85	4,990.21	-343.40	-270.84	-342.84	0.05
5,118.00	0.89	56.40	5,084.20	-343.72	-270.05	-343.16	1.56
5,213.00	1.06	39.80	5,179.19	-342.64	-268.88	-342.08	0.35
5,307.00	1.20	30.57	5,273.17	-341.12	-267.82	-340.56	0.24
5,402.00	0.91	17.76	5,368.15	-339.55	-267.08	-338.99	0.39
5,497.00	0.93	8.68	5,463.14	-338.07	-266.74	-337.51	0.15
5,591.00	1.17	351.28	5,557.13	-336.37	-266.77	-335.81	0.42
5,686.00	0.77	57.13	5,652.11	-335.06	-266.38	-334.50	1.16
5,881.00	0.94	18.37	5,847.09	-332.83	-264.77	-332.28	0.30
5,969.00	1.14	26.65	5,935.08	-331.36	-264.15	-330.81	0.28
6,064.00	1.03	36.08	6,030.06	-329.83	-263.23	-329.28	0.22
6,159.00	1.16	21.69	6,125.05	-328.25	-262.37	-327.70	0.32
6,253.00	1.02	36.54	6,219.03	-326.69	-261.52	-326.14	0.33
6,348.00	0.88	28.88	6,314.02	-325.37	-260.66	-324.83	0.20
6,442.00	0.96	36.41	6,408.00	-324.11	-259.85	-323.56	0.15
6,489.00	1.86	19.25	6,454.99	-323.07	-259.36	-322.53	2.09
6,537.00	6.58	359.32	6,502.85	-319.58	-259.14	-319.04	10.15
6,584.00	10.88	358.27	6,549.29	-312.45	-259.30	-311.91	9.15
6,631.00	14.23	358.93	6,595.16	-302.24	-259.54	-301.70	7.13
6,678.00	16.80	359.01	6,640.44	-289.67	-259.77	-289.13	5.47
6,726.00	19.14	1.40	6,686.10	-274.87	-259.70	-274.32	5.11
6,773.00	23.14	359.71	6,729.93	-257.92	-259.56	-257.38	8.61
6,820.00	27.06	0.93	6,772.48	-237.99	-259.43	-237.45	8.41
6,867.00	31.07	359.47	6,813.56	-215.16	-259.37	-214.62	8.66
6,914.00	35.81	358.85	6,852.77	-189.27	-259.76	-188.73	10.11
6,961.00	39.92	357.67	6,889.86	-160.45	-260.65	-159.90	8.88
7,009.00	44.95	356.67	6,925.28	-128.11	-262.26	-127.56	10.57
7,040.00	48.47	356.65	6,946.53	-105.59	-263.57	-105.03	11.35
7,072.00	50.11	358.07	6,967.40	-81.36	-264.69	-80.80	6.13
7,104.00	52.35	358.37	6,987.44	-56.42	-265.46	-55.87	7.04
7,135.00	55.48	358.35	7,005.69	-31.38	-266.18	-30.82	10.10
7,167.00	58.82	358.52	7,023.05	-4.51	-266.91	-3.95	10.45
7,198.00	62.61	359.21	7,038.21	22.51	-267.44	23.07	12.38
7,230.00	66.28	359.53	7,052.01	51.38	-267.76	51.94	11.50
7,261.00	69.83	359.74	7,063.60	80.13	-267.94	80.69	11.47
7,293.00	73.05	359.21	7,073.78	110.46	-268.22	111.02	10.18
7,324.00	75.77	359.04	7,082.11	140.31	-268.68	140.87	8.79
7,356.00	77.98	359.06	7,089.38	171.47	-269.19	172.03	6.91
7,387.00	80.33	358.58	7,095.21	201.91	-269.82	202.47	7.73
7,419.00	82.70	358.70	7,099.93	233.54	-270.57	234.11	7.42
7,450.00	84.88	358.57	7,103.28	264.35	-271.31	264.92	7.04
7,482.00	86.85	358.43	7,105.59	296.26	-272.14	296.82	6.17
7,518.70	88.67	358.68	7,107.03	332.91	-273.07	333.49	5.01
7" @ 7518.7' MD :: 7107.03' TVD							
7,533.00	89.38	358.78	7,107.27	347.21	-273.38	347.78	5.01

Design Report for Vonderlage 30N-31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,627.00	88.89	359.20	7,108.69	441.18	-275.04	441.76	0.69
7,721.00	88.83	359.50	7,110.56	535.16	-276.10	535.73	0.33
7,815.00	88.95	359.40	7,112.38	629.14	-277.01	629.71	0.17
7,909.00	89.44	359.49	7,113.70	723.12	-277.92	723.70	0.53
8,003.00	89.44	359.43	7,114.62	817.11	-278.80	817.70	0.06
8,097.00	89.88	359.11	7,115.18	911.10	-280.00	911.69	0.58
8,192.00	90.43	358.64	7,114.92	1,006.08	-281.87	1,006.67	0.76
8,286.00	90.62	358.51	7,114.06	1,100.05	-284.20	1,100.64	0.24
8,380.00	90.93	358.40	7,112.79	1,194.01	-286.74	1,194.61	0.35
8,474.00	91.17	358.26	7,111.06	1,287.95	-289.48	1,288.56	0.30
8,568.00	91.36	357.86	7,108.99	1,381.88	-292.66	1,382.49	0.47
8,662.00	90.68	358.74	7,107.32	1,475.82	-295.45	1,476.43	1.18
8,756.00	90.80	0.60	7,106.10	1,569.80	-295.99	1,570.42	1.98
8,851.00	90.74	0.17	7,104.82	1,664.79	-295.35	1,665.41	0.46
8,945.00	91.30	0.10	7,103.15	1,758.78	-295.13	1,759.39	0.60
9,039.00	90.86	2.71	7,101.38	1,852.72	-292.82	1,853.33	2.82
9,134.00	90.87	2.62	7,099.95	1,947.61	-288.41	1,948.21	0.10
9,228.00	89.20	2.11	7,099.89	2,041.53	-284.53	2,042.12	1.86
9,323.00	89.01	1.57	7,101.37	2,136.47	-281.48	2,137.05	0.60
9,418.00	89.14	0.81	7,102.91	2,231.43	-279.51	2,232.01	0.81
9,512.00	89.26	0.29	7,104.22	2,325.42	-278.60	2,326.00	0.57
9,607.00	89.13	0.06	7,105.55	2,420.41	-278.31	2,420.99	0.28
9,701.00	88.83	2.24	7,107.23	2,514.37	-276.43	2,514.94	2.34
9,796.00	89.01	1.81	7,109.02	2,609.29	-273.07	2,609.86	0.49
9,890.00	89.07	1.82	7,110.59	2,703.23	-270.09	2,703.79	0.06
9,985.00	89.13	1.32	7,112.08	2,798.18	-267.49	2,798.74	0.53
10,079.00	89.07	1.08	7,113.56	2,892.15	-265.52	2,892.70	0.26
10,174.00	89.07	0.90	7,115.10	2,987.13	-263.88	2,987.67	0.19
10,269.00	89.63	0.56	7,116.18	3,082.11	-262.67	3,082.65	0.69
10,363.00	89.57	0.93	7,116.84	3,176.10	-261.45	3,176.64	0.40
10,458.00	90.43	359.87	7,116.84	3,271.10	-260.79	3,271.64	1.44
10,552.00	90.87	359.69	7,115.77	3,365.09	-261.15	3,365.63	0.51
10,647.00	91.11	359.20	7,114.13	3,460.07	-262.07	3,460.61	0.57
10,741.00	90.43	359.05	7,112.87	3,554.05	-263.50	3,554.59	0.74
10,836.00	91.11	358.71	7,111.59	3,649.02	-265.36	3,649.57	0.80
10,930.00	92.10	358.63	7,108.96	3,742.96	-267.54	3,743.51	1.06
11,024.00	89.38	358.64	7,107.74	3,836.92	-269.78	3,837.47	2.89
11,119.00	89.69	358.34	7,108.51	3,931.88	-272.28	3,932.44	0.45
11,214.00	90.37	358.12	7,108.46	4,026.83	-275.22	4,027.40	0.75
11,308.00	91.17	357.56	7,107.20	4,120.76	-278.76	4,121.33	1.04
11,403.00	91.73	357.08	7,104.80	4,215.62	-283.20	4,216.21	0.78
11,488.00	91.79	356.94	7,102.19	4,300.47	-287.63	4,301.06	0.18
Final Sperry MWD Survey @ 11488.00ft							
11,538.00	91.79	356.94	7,100.62	4,350.37	-290.30	4,350.97	0.00
Straight Line Proj @ 11538' MD :: 7100.62' TVD							