

HALLIBURTON

Sperry Drilling

END OF WELL REPORT

For

Anadarko Petroleum Corp.

Vonderlage 29N-W31HZ

Sec. 31-T3N-R66W

Weld County, CO

Job #900512979

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Section 1

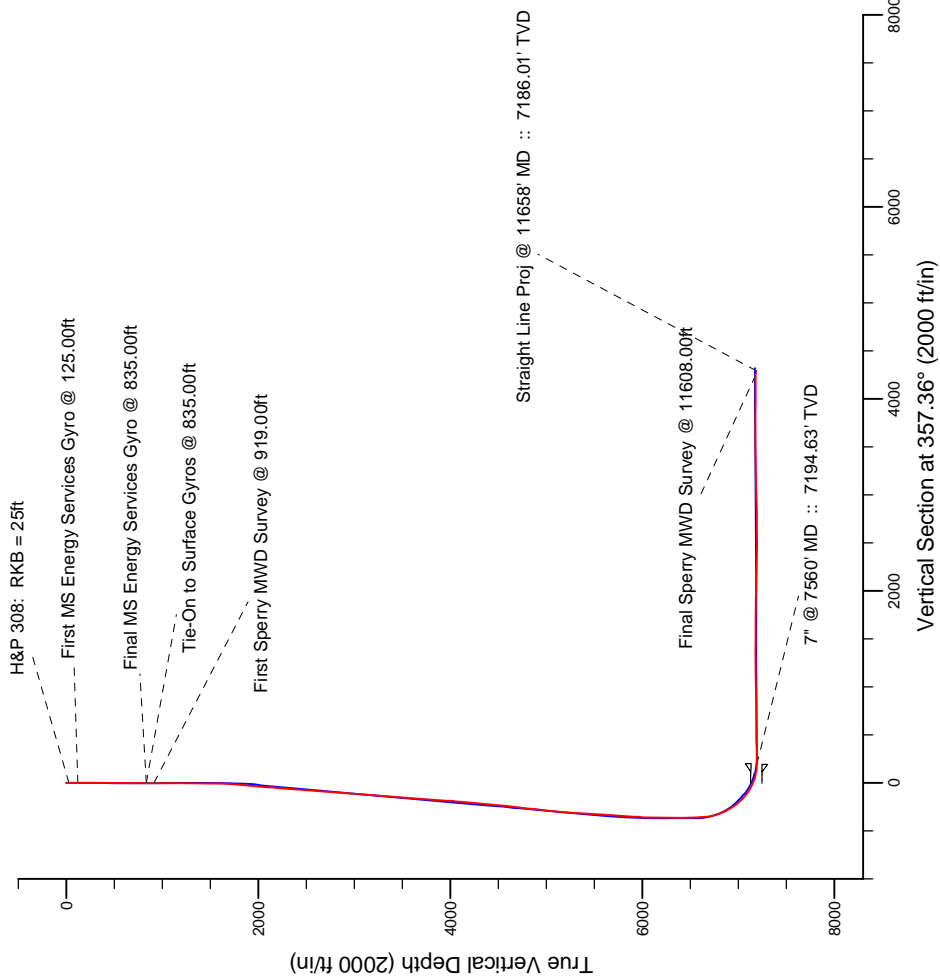
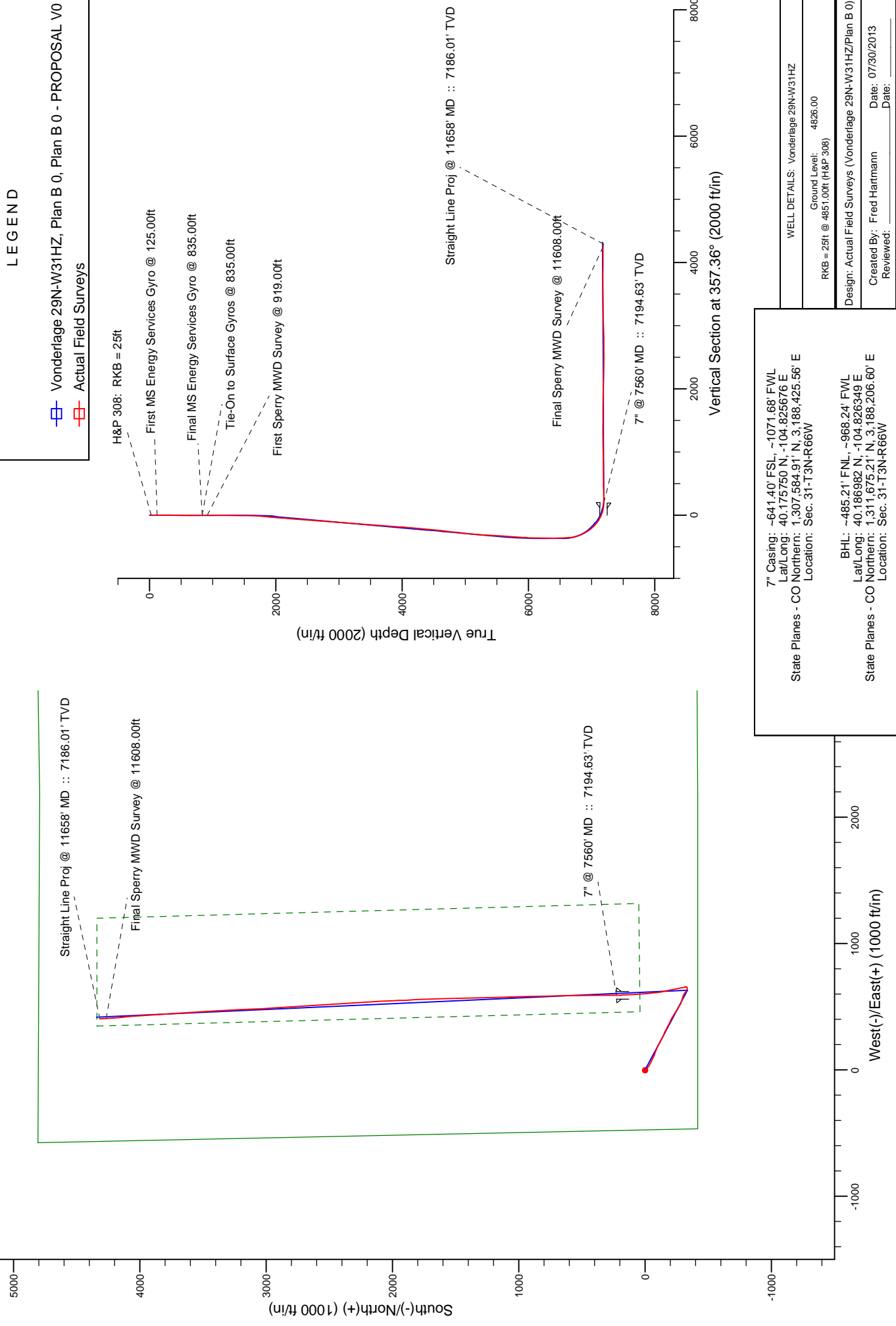
Contents: Surveys

Project: Weld County, CO (NAD 83)
 Site: Sec. 31-T3N-R66W
 Well: Vonderlage 29N-W31HZ
 Wellbore: Plan B 0
 Design: Actual Field Surveys



LEGEND

- Vonderlage 29N-W31HZ, Plan B 0, Plan B 0 - PROPOSAL V0
- Actual Field Surveys



7" Casing: ~641.40' FSL, ~1071.68' FWL
 Lat/Long: 40.175750 N, -104.825676 E
 State Planes - CO Northern: 1,307,584.91' N, 3,188,425.56' E
 Location: Sec. 31-T3N-R66W

BHL: ~485.21' FNL, ~968.24' FWL
 Lat/Long: 40.186982 N, -104.826349 E
 State Planes - CO Northern: 1,311,675.21' N, 3,188,206.60' E
 Location: Sec. 31-T3N-R66W

WELL DETAILS: Vonderlage 29N-W31HZ	
Ground Level:	4826.00
RKB = 25ft @ 4851.00ft (H&P 308)	
Design: Actual Field Surveys (Vonderlage 29N-W31HZ/Plan B 0)	
Created By: Fred Hartmann	Date: 07/30/2013
Reviewed:	Date:

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T3N-R66W

Vonderlage 29N-W31HZ

05-123-35892

Plan B 0

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

30 July, 2013

Surface UWI : 05-123-35892

Well Coordinates: 1,307,355.07 N, 3,187,835.51 E (40° 10' 30.47" N, 104° 49' 40.06" W)

Ground Level: 4,826.00 ft

Local Coordinate Origin: Centered on Site Sec. 31-T3N-R66W

Viewing Datum: RKB = 25ft @ 4851.00ft (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

HALLIBURTON

Design Report for Vonderlage 29N-W31HZ - 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	0.16	170.59	125.00	-0.14	0.02	-0.14	0.16
First MS Energy Services Gyro @ 125.00ft							
225.00	0.05	164.05	225.00	-0.32	0.06	-0.32	0.11
325.00	0.15	20.28	325.00	-0.24	0.12	-0.24	0.19
425.00	0.06	357.78	425.00	-0.07	0.16	-0.07	0.10
525.00	0.18	239.19	525.00	-0.09	0.02	-0.09	0.22
625.00	0.19	196.94	625.00	-0.33	-0.16	-0.32	0.13
725.00	0.10	8.96	725.00	-0.41	-0.20	-0.39	0.29
825.00	0.06	72.00	825.00	-0.30	-0.13	-0.29	0.09
835.00	0.04	60.09	835.00	-0.30	-0.13	-0.29	0.22
Final MS Energy Services Gyro @ 835.00ft - Tie-On to Surface Gyros @ 835.00ft							
919.00	0.11	296.40	919.00	-0.25	-0.17	-0.24	0.16
First Sperry MWD Survey @ 919.00ft							
1,011.00	0.29	195.74	1,011.00	-0.43	-0.31	-0.41	0.36
1,102.00	0.44	169.28	1,102.00	-1.00	-0.31	-0.98	0.24
1,194.00	0.22	160.61	1,193.99	-1.51	-0.19	-1.50	0.24
1,286.00	0.54	134.44	1,285.99	-1.98	0.18	-1.98	0.39
1,377.00	0.59	141.24	1,376.99	-2.65	0.78	-2.68	0.09
1,469.00	0.59	171.94	1,468.98	-3.49	1.14	-3.53	0.34
1,561.00	1.92	136.16	1,560.96	-5.07	2.28	-5.16	1.61
1,653.00	3.63	133.36	1,652.85	-8.18	5.46	-8.42	1.86
1,744.00	5.75	136.93	1,743.54	-13.49	10.67	-13.96	2.35
1,836.00	7.21	129.42	1,834.95	-20.52	18.28	-21.34	1.83
1,928.00	9.49	124.59	1,925.97	-28.49	28.98	-29.79	2.59
2,019.00	10.21	117.22	2,015.63	-36.44	42.33	-38.35	1.59
2,111.00	9.77	116.48	2,106.24	-43.65	56.57	-46.21	0.50
2,202.00	8.65	120.40	2,196.06	-50.56	69.38	-53.70	1.41
2,293.00	9.46	118.27	2,285.93	-57.56	81.87	-61.27	0.96
2,385.00	10.67	111.49	2,376.51	-64.26	96.46	-68.63	1.84
2,479.00	9.83	109.92	2,469.01	-70.19	112.10	-75.27	0.94
2,574.00	8.96	106.32	2,562.74	-75.03	126.82	-80.79	1.10
2,668.00	9.56	112.06	2,655.52	-80.02	141.08	-86.43	1.17
2,763.00	9.47	112.60	2,749.21	-85.98	155.61	-93.06	0.13
2,857.00	9.15	113.15	2,841.97	-91.89	169.62	-99.60	0.35
3,046.00	7.76	113.92	3,028.91	-102.98	195.10	-111.85	0.74
3,141.00	9.41	123.26	3,122.85	-109.84	207.46	-119.27	2.27
3,236.00	8.56	119.98	3,216.68	-117.63	220.08	-127.64	1.04
3,330.00	7.44	115.52	3,309.77	-123.75	231.63	-134.28	1.36
3,425.00	9.59	116.11	3,403.72	-129.88	244.29	-140.99	2.26
3,519.00	8.72	115.50	3,496.52	-136.39	257.75	-148.12	0.93
3,614.00	10.56	116.81	3,590.17	-143.42	272.02	-155.79	1.95
3,708.00	9.70	114.14	3,682.71	-150.54	286.94	-163.60	1.04
3,803.00	7.59	112.19	3,776.62	-156.19	300.05	-169.84	2.24
3,897.00	9.61	116.52	3,869.56	-162.04	312.82	-176.27	2.26
3,992.00	9.41	115.34	3,963.25	-168.90	326.94	-183.78	0.29
4,086.00	11.89	116.50	4,055.63	-176.51	342.55	-192.10	2.65
4,181.00	11.00	117.54	4,148.74	-185.07	359.34	-201.42	0.96

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,275.00	9.02	117.61	4,241.30	-192.63	373.83	-209.64	2.11
4,370.00	8.20	115.13	4,335.23	-198.96	386.56	-216.55	0.95
4,465.00	10.37	115.54	4,428.98	-205.52	400.41	-223.74	2.29
4,559.00	11.99	120.85	4,521.20	-214.18	416.43	-233.13	2.04
4,654.00	12.26	122.58	4,614.08	-224.67	433.40	-244.39	0.48
4,748.00	11.18	121.40	4,706.12	-234.79	449.59	-255.25	1.18
4,843.00	9.74	122.17	4,799.54	-243.87	464.25	-264.99	1.52
5,032.00	10.86	123.88	4,985.49	-262.31	492.57	-284.71	0.61
5,126.00	10.17	122.47	5,077.91	-271.70	506.92	-294.76	0.78
5,221.00	9.42	115.28	5,171.53	-279.52	521.03	-303.22	1.51
5,315.00	10.78	110.08	5,264.07	-285.83	536.24	-310.22	1.74
5,410.00	9.96	108.66	5,357.52	-291.51	552.37	-316.63	0.90
5,504.00	8.09	105.26	5,450.35	-295.85	566.45	-321.62	2.07
5,599.00	7.73	106.76	5,544.45	-299.45	579.02	-325.80	0.44
5,694.00	8.33	112.55	5,638.52	-303.93	591.49	-330.85	1.06
5,788.00	7.96	123.28	5,731.57	-310.11	603.22	-337.57	1.66
5,883.00	6.98	128.23	5,825.77	-317.30	613.26	-345.20	1.23
5,977.00	5.82	124.80	5,919.18	-323.55	621.66	-351.84	1.30
6,072.00	4.36	115.90	6,013.80	-327.88	628.86	-356.49	1.74
6,166.00	3.76	111.31	6,107.57	-330.56	634.95	-359.45	0.73
6,261.00	3.16	100.34	6,202.40	-332.16	640.42	-361.30	0.94
6,355.00	2.79	91.27	6,296.27	-332.68	645.26	-362.04	0.64
6,450.00	2.40	85.55	6,391.17	-332.57	649.56	-362.13	0.49
6,544.00	2.18	78.23	6,485.10	-332.06	653.27	-361.79	0.39
6,591.00	1.99	66.16	6,532.07	-331.54	654.89	-361.35	1.02
6,639.00	2.07	4.35	6,580.04	-330.34	655.72	-360.19	4.35
6,686.00	5.05	8.09	6,626.95	-327.45	656.07	-357.31	6.36
6,734.00	8.58	358.89	6,674.60	-321.77	656.30	-351.66	7.67
6,781.00	12.54	354.25	6,720.80	-313.19	655.72	-343.05	8.61
6,828.00	16.58	349.55	6,766.28	-301.51	653.99	-331.31	8.95
6,875.00	21.03	348.01	6,810.76	-286.66	651.02	-316.34	9.53
6,923.00	24.33	348.88	6,855.04	-268.53	647.33	-298.06	6.91
6,970.00	28.87	348.99	6,897.06	-247.88	643.29	-277.24	9.66
7,017.00	32.26	347.70	6,937.52	-224.48	638.45	-253.64	7.35
7,064.00	37.61	347.05	6,976.04	-198.23	632.56	-227.15	11.41
7,112.00	41.82	348.37	7,012.95	-168.27	626.05	-196.92	8.94
7,159.00	47.09	350.55	7,046.49	-135.91	620.06	-164.33	11.67
7,206.00	51.68	351.68	7,077.08	-100.67	614.56	-128.87	9.93
7,253.00	57.06	353.34	7,104.45	-62.81	609.60	-90.82	11.80
7,300.00	60.55	356.11	7,128.79	-22.79	605.93	-50.67	8.97
7,347.00	65.94	356.12	7,149.94	19.07	603.08	-8.73	11.47
7,395.00	70.68	356.06	7,167.68	63.55	600.04	35.85	9.88
7,442.00	76.56	356.12	7,180.93	108.52	596.97	80.91	12.51
7,489.00	82.27	356.86	7,189.56	154.62	594.14	127.09	12.25
7,520.00	86.36	358.14	7,192.63	185.43	592.80	157.93	13.82
7,560.00	87.89	358.97	7,194.63	225.36	591.79	197.87	4.34
7" @ 7560' MD :: 7194.63' TVD							
7,634.00	90.71	0.50	7,195.54	299.35	591.45	271.79	4.34
7,728.00	90.74	359.98	7,194.35	393.34	591.84	365.66	0.55
7,822.00	90.09	359.36	7,193.67	487.33	591.30	459.58	0.96
7,917.00	89.91	358.87	7,193.67	582.32	589.84	554.54	0.55

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,011.00	90.25	358.73	7,193.54	676.30	587.87	648.51	0.39
8,105.00	90.55	358.41	7,192.88	770.27	585.52	742.48	0.47
8,199.00	91.45	358.51	7,191.24	864.22	583.00	836.45	0.96
8,293.00	91.94	358.31	7,188.46	958.14	580.39	930.39	0.56
8,387.00	91.51	358.29	7,185.63	1,052.06	577.60	1,024.34	0.46
8,481.00	90.40	358.35	7,184.07	1,146.00	574.85	1,118.31	1.18
8,576.00	90.62	358.64	7,183.22	1,240.96	572.35	1,213.29	0.38
8,670.00	89.38	358.87	7,183.22	1,334.94	570.31	1,307.26	1.34
8,764.00	89.60	358.52	7,184.06	1,428.91	568.17	1,401.23	0.44
8,858.00	89.51	358.30	7,184.79	1,522.87	565.56	1,495.21	0.25
8,953.00	90.52	358.63	7,184.76	1,617.84	563.01	1,590.19	1.12
9,047.00	89.45	357.64	7,184.79	1,711.79	559.96	1,684.18	1.55
9,142.00	89.60	357.83	7,185.58	1,806.71	556.20	1,779.18	0.25
9,236.00	89.75	357.99	7,186.11	1,900.64	552.77	1,873.17	0.23
9,331.00	88.27	356.77	7,187.75	1,995.53	548.43	1,968.15	2.02
9,425.00	88.21	356.81	7,190.64	2,089.33	543.17	2,062.10	0.08
9,520.00	88.55	356.90	7,193.32	2,184.15	537.96	2,157.06	0.37
9,614.00	88.40	356.79	7,195.82	2,277.98	532.79	2,251.02	0.20
9,709.00	88.49	356.69	7,198.40	2,372.79	527.39	2,345.98	0.14
9,804.00	89.94	356.21	7,199.70	2,467.59	521.51	2,440.96	1.61
9,898.00	90.03	356.09	7,199.73	2,561.38	515.20	2,534.94	0.16
9,993.00	90.28	356.28	7,199.47	2,656.17	508.87	2,629.92	0.33
10,087.00	90.86	356.24	7,198.54	2,749.97	502.74	2,723.90	0.62
10,182.00	91.11	356.43	7,196.90	2,844.76	496.67	2,818.87	0.33
10,277.00	91.42	356.72	7,194.81	2,939.56	491.00	2,913.83	0.45
10,371.00	91.88	357.11	7,192.10	3,033.39	485.94	3,007.79	0.64
10,466.00	92.28	357.43	7,188.65	3,128.22	481.42	3,102.73	0.54
10,560.00	92.34	357.33	7,184.86	3,222.04	477.13	3,196.65	0.12
10,654.00	92.40	357.14	7,180.98	3,315.85	472.59	3,290.57	0.21
10,749.00	90.55	356.86	7,178.53	3,410.69	467.62	3,385.53	1.97
10,843.00	89.78	356.40	7,178.26	3,504.52	462.10	3,479.52	0.95
10,938.00	89.69	356.40	7,178.70	3,599.34	456.13	3,574.51	0.09
11,032.00	89.51	356.11	7,179.35	3,693.13	449.99	3,668.49	0.36
11,127.00	89.66	356.07	7,180.04	3,787.91	443.52	3,763.46	0.16
11,221.00	89.45	355.83	7,180.77	3,881.67	436.88	3,857.43	0.34
11,316.00	89.63	355.82	7,181.54	3,976.42	429.96	3,952.40	0.19
11,410.00	89.38	355.75	7,182.35	4,070.16	423.05	4,046.36	0.28
11,505.00	89.32	355.46	7,183.43	4,164.87	415.77	4,141.31	0.31
11,599.00	88.95	355.48	7,184.84	4,258.57	408.35	4,235.24	0.39
11,608.00	88.86	355.63	7,185.02	4,267.54	407.65	4,244.24	1.94
Final Sperry MWD Survey @ 11608.00ft							
11,658.00	88.86	355.63	7,186.01	4,317.38	403.84	4,294.21	0.00
Straight Line Proj @ 11658' MD :: 7186.01' TVD							

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
25.00	25.00	0.00	0.00	H&P 308: RKB = 25ft
125.00	125.00	-0.14	0.02	First MS Energy Services Gyro @ 125.00ft
835.00	835.00	-0.30	-0.13	Final MS Energy Services Gyro @ 835.00ft
835.00	835.00	-0.30	-0.13	Tie-On to Surface Gyros @ 835.00ft
919.00	919.00	-0.25	-0.17	First Sperry MWD Survey @ 919.00ft
11,608.00	7,185.02	4,267.54	407.65	Final Sperry MWD Survey @ 11608.00ft
11,658.00	7,186.01	4,317.38	403.84	Straight Line Proj @ 11658' MD :: 7186.01' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
User	No Target (Freehand)	357.36	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
25.00	835.00	MS Energy Services - Surface Gyros	NS-GYRO-MS
919.00	7,520.00	Sperry MWD Survey - Vert/Build	MWD+SC
7,634.00	11,608.00	Sperry MWD Surveys - Lateral	MWD+SC

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,560.00	7,194.63	7" @ 7560' MD :: 7194.63' TVD	7	8-3/4

Design Report for Vonderlage 29N-W31HZ - 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
Vonderlage 29N-W3	0.00	0.00	0.00	0.00	0.00	1,307,355.07	3,187,835.51	40.175131	-104.827794
- actual wellpath hits target center									
- Polygon									
Point 1				-574.78	4,807.20	1,312,157.58	3,187,224.34		
Point 2				2,193.97	4,794.22	1,312,165.58	3,189,992.99		
Point 3				4,788.20	4,832.81	1,312,223.84	3,192,586.74		
Point 4				4,796.27	2,216.02	1,309,607.29	3,192,614.65		
Point 5				4,804.89	-400.54	1,306,990.98	3,192,643.10		
Point 6				2,176.80	-417.31	1,306,954.29	3,190,015.32		
Point 7				-466.96	-415.23	1,306,936.33	3,187,371.73		
Point 8				-520.73	2,195.83	1,309,546.80	3,187,298.18		
Point 9				-574.78	4,807.20	1,312,157.58	3,187,224.34		
Vonderlage 29N-W3	0.00	0.00	7,176.00	4,342.43	417.14	1,311,700.36	3,188,219.71	40.187051	-104.826301
- actual wellpath misses target center by 30.07ft at 11658.00ft MD (7186.01 TVD, 4317.38 N, 403.84 E)									
- Point									
Vonderlage 29N-W3	0.00	0.00	0.00	0.00	0.00	1,307,355.07	3,187,835.51	40.175131	-104.827794
- actual wellpath hits target center									
- Polygon									
Point 1				346.75	4,341.44	1,311,698.83	3,188,149.33		
Point 2				461.56	40.85	1,307,399.42	3,188,296.73		
Point 3				1,317.68	49.30	1,307,414.36	3,189,152.73		
Point 4				1,202.82	4,341.69	1,311,705.57	3,189,005.34		
Point 5				346.75	4,341.44	1,311,698.83	3,188,149.33		
Vonderlage 29N-W3	0.00	0.00	0.00	0.00	0.00	1,307,355.07	3,187,835.51	40.175131	-104.827794
- actual wellpath hits target center									
- Point									

North Reference Sheet for Sec. 31-T3N-R66W - Vonderlage 29N-W31HZ - Plan B 0

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 @ 4851.00ft (H&P 308). Northing and Easting are relative to Sec. 31-T3N-R66W

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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995771

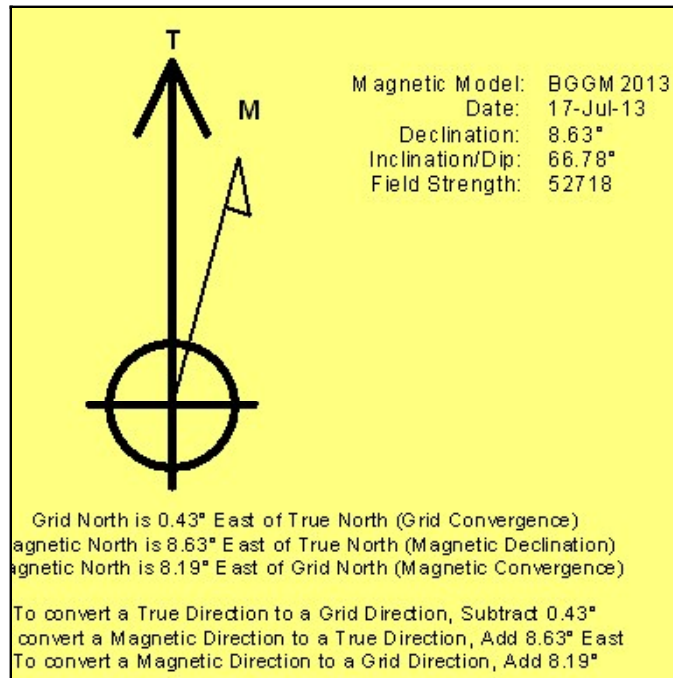
Grid Coordinates of Well: 1,307,355.07 ft N, 3,187,835.51 ft E

Geographical Coordinates of Well: 40° 10' 30.47" N, 104° 49' 40.06" W

Grid Convergence at Surface is: 0.43°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,658.00ft the Bottom Hole Displacement is 4,336.23ft in the Direction of 5.34° (True).

Magnetic Convergence at surface is: -8.19° (17 July 2013, , BGGM2013)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T3N-R66W

Vonderlage 29N-W31HZ

05-123-35892

Plan B 0

Design: Actual Field Surveys

Sperry Drilling Services Geodetic Report

30 July, 2013

Well Coordinates: 1,307,355.07 N, 3,187,835.51 E (40° 10' 30.47" N, 104° 49' 40.06" W)
Ground Level: 4,826.00 ft

Local Coordinate Origin: Centered on Site Sec. 31-T3N-R66W
Viewing Datum: RKB = 25ft @ 4851.00ft (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: 431

HALLIBURTON

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (ft)	+E/-W (ft)	Latitude (ft)	Longitude (ft)	Northing (ft)	Easting (ft)
0.00	0.00	0.00	0.00	0.00	0.00	40.175131	-104.827794	1,307,355.07	3,187,835.51
25.00	0.00	0.00	25.00	0.00	0.00	40.175131	-104.827794	1,307,355.07	3,187,835.51
125.00	0.16	170.59	125.00	-0.14	0.02	40.175131	-104.827794	1,307,354.93	3,187,835.54
225.00	0.05	164.05	225.00	-0.32	0.06	40.175130	-104.827794	1,307,354.75	3,187,835.57
325.00	0.15	20.28	325.00	-0.24	0.12	40.175130	-104.827794	1,307,354.83	3,187,835.63
425.00	0.06	357.78	425.00	-0.07	0.16	40.175131	-104.827793	1,307,355.01	3,187,835.67
525.00	0.18	239.19	525.00	-0.09	0.02	40.175131	-104.827794	1,307,354.98	3,187,835.54
625.00	0.19	196.94	625.00	-0.33	-0.16	40.175130	-104.827795	1,307,354.74	3,187,835.35
725.00	0.10	8.96	725.00	-0.41	-0.20	40.175130	-104.827795	1,307,354.67	3,187,835.32
825.00	0.06	72.00	825.00	-0.30	-0.13	40.175130	-104.827794	1,307,354.77	3,187,835.38
835.00	0.04	60.09	835.00	-0.30	-0.13	40.175130	-104.827794	1,307,354.77	3,187,835.39
919.00	0.11	296.40	919.00	-0.25	-0.17	40.175130	-104.827795	1,307,354.82	3,187,835.34
1,011.00	0.29	195.74	1,011.00	-0.43	-0.31	40.175130	-104.827795	1,307,354.64	3,187,835.20
1,102.00	0.44	169.28	1,102.00	-1.00	-0.31	40.175128	-104.827795	1,307,354.07	3,187,835.21
1,194.00	0.22	160.61	1,193.99	-1.51	-0.19	40.175127	-104.827795	1,307,353.56	3,187,835.34
1,286.00	0.54	134.44	1,285.99	-1.98	0.18	40.175126	-104.827793	1,307,353.09	3,187,835.71
1,377.00	0.59	141.24	1,376.99	-2.65	0.78	40.175124	-104.827791	1,307,352.43	3,187,836.31
1,469.00	0.59	171.94	1,468.98	-3.49	1.14	40.175121	-104.827790	1,307,351.60	3,187,836.68
1,561.00	1.92	136.16	1,560.96	-5.07	2.28	40.175117	-104.827786	1,307,350.02	3,187,837.83
1,653.00	3.63	133.36	1,652.85	-8.18	5.46	40.175109	-104.827774	1,307,346.94	3,187,841.04
1,744.00	5.75	136.93	1,743.54	-13.49	10.67	40.175094	-104.827756	1,307,341.67	3,187,846.29
1,836.00	7.21	129.42	1,834.95	-20.52	18.28	40.175075	-104.827729	1,307,334.69	3,187,853.95
1,928.00	9.49	124.59	1,925.97	-28.49	28.98	40.175053	-104.827690	1,307,326.80	3,187,864.71
2,019.00	10.21	117.22	2,015.63	-36.44	42.33	40.175031	-104.827643	1,307,318.96	3,187,878.12
2,111.00	9.77	116.48	2,106.24	-43.65	56.57	40.175011	-104.827592	1,307,311.85	3,187,892.41
2,202.00	8.65	120.40	2,196.06	-50.56	69.38	40.174992	-104.827546	1,307,305.05	3,187,905.28
2,293.00	9.46	118.27	2,285.93	-57.56	81.87	40.174973	-104.827501	1,307,298.14	3,187,917.82
2,385.00	10.67	111.49	2,376.51	-64.26	96.46	40.174955	-104.827449	1,307,291.55	3,187,932.45
2,479.00	9.83	109.92	2,469.01	-70.19	112.10	40.174938	-104.827393	1,307,285.74	3,187,948.14
2,574.00	8.96	106.32	2,562.74	-75.03	126.82	40.174925	-104.827340	1,307,281.01	3,187,962.90
2,668.00	9.56	112.06	2,655.52	-80.02	141.08	40.174911	-104.827289	1,307,276.13	3,187,977.19
2,763.00	9.47	112.60	2,749.21	-85.98	155.61	40.174895	-104.827237	1,307,270.28	3,187,991.76
2,857.00	9.15	113.15	2,841.97	-91.89	169.62	40.174879	-104.827187	1,307,264.47	3,188,006.82
3,046.00	7.76	113.92	3,028.91	-102.98	195.10	40.174848	-104.827096	1,307,253.59	3,188,031.38
3,141.00	9.41	123.26	3,122.85	-109.84	207.46	40.174829	-104.827052	1,307,246.82	3,188,043.79
3,236.00	8.56	119.98	3,216.68	-117.63	220.08	40.174808	-104.827006	1,307,239.12	3,188,056.47
3,330.00	7.44	115.52	3,309.77	-123.75	231.63	40.174791	-104.826965	1,307,233.09	3,188,068.07
3,425.00	9.59	116.11	3,403.72	-129.88	244.29	40.174774	-104.826920	1,307,227.06	3,188,080.77
3,519.00	8.72	115.50	3,496.52	-136.39	257.75	40.174757	-104.826872	1,307,220.64	3,188,094.28
3,614.00	10.56	116.81	3,590.17	-143.42	272.02	40.174737	-104.826821	1,307,213.73	3,188,108.60
3,708.00	9.70	114.14	3,682.71	-150.54	286.94	40.174718	-104.826767	1,307,206.72	3,188,123.57
3,803.00	7.59	112.19	3,776.62	-156.19	300.05	40.174702	-104.826720	1,307,201.17	3,188,136.73

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (ft)	+E/-W (ft)	Latitude (ft)	Longitude (ft)	Northing (ft)	Easting (ft)
3,897.00	9.61	116.52	3,869.56	-162.04	312.82	40.174686	-104.826675	1,307,195.42	3,188,149.54
3,932.00	9.41	115.34	3,963.25	-168.90	326.94	40.174667	-104.826624	1,307,188.66	3,188,163.71
4,086.00	11.89	116.50	4,055.63	-176.51	342.55	40.174646	-104.826568	1,307,181.17	3,188,179.38
4,181.00	11.00	117.54	4,148.74	-185.07	359.34	40.174623	-104.826508	1,307,172.74	3,188,196.24
4,275.00	9.02	117.61	4,241.30	-192.63	373.83	40.174602	-104.826456	1,307,165.29	3,188,210.77
4,370.00	8.20	115.13	4,335.23	-198.96	386.56	40.174585	-104.826411	1,307,159.06	3,188,223.55
4,465.00	10.37	115.54	4,428.98	-205.52	400.41	40.174567	-104.826361	1,307,152.60	3,188,237.45
4,559.00	11.99	120.85	4,521.20	-214.18	416.43	40.174543	-104.826304	1,307,144.07	3,188,253.54
4,654.00	12.26	122.58	4,614.08	-224.67	433.40	40.174514	-104.826243	1,307,133.70	3,188,270.58
4,748.00	11.18	121.40	4,706.12	-234.79	449.59	40.174486	-104.826185	1,307,123.71	3,188,286.85
4,843.00	9.74	122.17	4,799.54	-243.87	464.25	40.174462	-104.826133	1,307,114.74	3,188,301.58
5,032.00	10.86	123.88	4,985.49	-262.31	492.57	40.174411	-104.826031	1,307,096.52	3,188,330.03
5,126.00	10.17	122.47	5,077.91	-271.70	506.92	40.174385	-104.825980	1,307,087.24	3,188,344.46
5,221.00	9.42	115.28	5,171.53	-279.52	521.03	40.174364	-104.825930	1,307,079.52	3,188,358.62
5,315.00	10.78	110.08	5,264.07	-285.83	536.24	40.174346	-104.825875	1,307,073.33	3,188,373.88
5,410.00	9.96	108.66	5,357.52	-291.51	552.37	40.174331	-104.825817	1,307,067.78	3,188,390.05
5,504.00	8.09	105.26	5,450.35	-295.85	566.45	40.174319	-104.825767	1,307,063.54	3,188,404.17
5,599.00	7.73	106.76	5,544.45	-299.45	579.02	40.174309	-104.825722	1,307,060.03	3,188,416.76
5,694.00	8.33	112.55	5,638.52	-303.93	591.49	40.174297	-104.825677	1,307,055.65	3,188,429.27
5,788.00	7.96	123.28	5,731.57	-310.11	603.22	40.174280	-104.825635	1,307,049.55	3,188,441.04
5,883.00	6.98	128.23	5,825.77	-317.30	613.26	40.174260	-104.825599	1,307,042.45	3,188,451.13
5,977.00	5.82	124.80	5,919.18	-323.55	621.66	40.174243	-104.825569	1,307,036.26	3,188,459.58
6,072.00	4.36	115.90	6,013.80	-327.88	628.86	40.174231	-104.825544	1,307,031.99	3,188,466.82
6,166.00	3.76	111.31	6,107.57	-330.56	634.95	40.174224	-104.825522	1,307,029.35	3,188,472.92
6,261.00	3.16	100.34	6,202.40	-332.16	640.42	40.174219	-104.825502	1,307,027.79	3,188,478.41
6,355.00	2.79	91.27	6,296.27	-332.68	645.26	40.174218	-104.825485	1,307,027.31	3,188,483.25
6,450.00	2.40	85.55	6,391.17	-332.57	649.56	40.174218	-104.825470	1,307,027.45	3,188,487.54
6,544.00	2.18	78.23	6,485.10	-332.06	653.27	40.174219	-104.825456	1,307,027.99	3,188,491.25
6,591.00	1.99	66.16	6,532.07	-331.54	654.89	40.174221	-104.825451	1,307,028.52	3,188,492.87
6,639.00	2.07	4.35	6,580.04	-330.34	655.72	40.174224	-104.825448	1,307,029.73	3,188,493.69
6,686.00	5.05	8.09	6,626.95	-327.45	656.07	40.174232	-104.825446	1,307,032.62	3,188,494.02
6,734.00	8.58	358.89	6,674.60	-321.77	656.30	40.174248	-104.825445	1,307,038.30	3,188,494.21
6,781.00	12.54	354.25	6,720.80	-313.19	655.72	40.174271	-104.825448	1,307,046.88	3,188,493.56
6,828.00	16.58	349.55	6,766.28	-301.51	653.99	40.174303	-104.825454	1,307,058.54	3,188,491.75
6,875.00	21.03	348.01	6,810.76	-286.66	651.02	40.174344	-104.825464	1,307,073.37	3,188,488.66
6,923.00	24.33	348.88	6,855.04	-268.53	647.33	40.174394	-104.825478	1,307,091.47	3,188,484.83
6,970.00	28.87	348.99	6,897.06	-247.88	643.29	40.174451	-104.825492	1,307,112.09	3,188,480.64
7,017.00	32.26	347.70	6,937.52	-224.48	638.45	40.174515	-104.825509	1,307,135.45	3,188,475.62
7,064.00	37.61	347.05	6,976.04	-198.23	632.56	40.174587	-104.825530	1,307,161.65	3,188,469.53
7,112.00	41.82	348.37	7,012.95	-168.27	626.05	40.174669	-104.825554	1,307,191.57	3,188,462.79
7,159.00	47.09	350.55	7,046.49	-135.91	620.06	40.174758	-104.825575	1,307,223.87	3,188,456.56
7,206.00	51.68	351.68	7,077.08	-100.67	614.56	40.174855	-104.825595	1,307,259.07	3,188,450.79

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (ft)	+E/-W (ft)	Latitude (ft)	Longitude (ft)	Northing (ft)	Easting (ft)
7,253.00	57.06	353.34	7,104.45	-62.81	609.60	40.174959	-104.825613	1,307,296.89	3,188,445.55
7,300.00	60.55	356.11	7,128.79	-22.79	605.93	40.175068	-104.825626	1,307,336.88	3,188,441.57
7,347.00	65.94	356.12	7,149.94	19.07	603.08	40.175183	-104.825636	1,307,378.71	3,188,438.41
7,395.00	70.68	356.06	7,167.68	63.55	600.04	40.175305	-104.825647	1,307,423.17	3,188,435.03
7,442.00	76.56	356.12	7,180.93	108.52	596.97	40.175429	-104.825658	1,307,468.11	3,188,431.62
7,489.00	82.27	356.86	7,189.56	154.62	594.14	40.175555	-104.825668	1,307,514.18	3,188,428.44
7,520.00	86.36	358.14	7,192.63	185.43	592.80	40.175640	-104.825673	1,307,544.98	3,188,426.87
7,560.00	87.89	358.97	7,194.63	225.36	591.79	40.175750	-104.825676	1,307,584.91	3,188,425.56
7,634.00	90.71	0.50	7,195.54	299.35	591.45	40.175953	-104.825677	1,307,658.88	3,188,424.65
7,728.00	90.74	359.98	7,194.35	393.34	591.84	40.176211	-104.825676	1,307,752.87	3,188,424.33
7,822.00	90.09	359.36	7,193.67	487.33	591.30	40.176469	-104.825678	1,307,846.85	3,188,423.08
7,917.00	89.91	358.87	7,193.67	582.32	589.84	40.176729	-104.825683	1,307,941.82	3,188,420.89
8,011.00	90.25	358.73	7,193.54	676.30	587.87	40.176987	-104.825690	1,308,035.78	3,188,418.21
8,105.00	90.55	358.41	7,192.88	770.27	585.52	40.177245	-104.825699	1,308,129.72	3,188,415.15
8,199.00	91.45	358.51	7,191.24	864.22	583.00	40.177503	-104.825708	1,308,223.65	3,188,411.92
8,293.00	91.94	358.31	7,188.46	958.14	580.39	40.177761	-104.825717	1,308,317.55	3,188,408.60
8,387.00	91.51	358.29	7,185.63	1,052.06	577.60	40.178019	-104.825727	1,308,411.43	3,188,405.10
8,481.00	90.40	358.35	7,184.07	1,146.00	574.85	40.178277	-104.825737	1,308,505.35	3,188,401.63
8,576.00	90.62	358.64	7,183.22	1,240.96	572.35	40.178537	-104.825746	1,308,600.29	3,188,398.42
8,670.00	89.38	358.87	7,183.22	1,334.94	570.31	40.178795	-104.825753	1,308,694.24	3,188,395.66
8,764.00	89.60	358.52	7,184.06	1,428.91	568.17	40.179053	-104.825761	1,308,788.19	3,188,392.81
8,858.00	89.51	358.30	7,184.79	1,522.87	565.56	40.179311	-104.825770	1,308,882.13	3,188,389.49
8,953.00	90.52	358.63	7,184.76	1,617.84	563.01	40.179572	-104.825779	1,308,977.06	3,188,386.22
9,047.00	89.45	357.64	7,184.79	1,711.79	559.96	40.179830	-104.825790	1,309,070.98	3,188,382.45
9,142.00	89.60	357.83	7,185.58	1,806.71	556.20	40.180090	-104.825803	1,309,165.87	3,188,377.98
9,236.00	89.75	357.99	7,186.11	1,900.64	552.77	40.180348	-104.825816	1,309,259.77	3,188,373.84
9,331.00	88.27	356.77	7,187.75	1,995.53	548.43	40.180609	-104.825831	1,309,354.62	3,188,368.78
9,425.00	88.21	356.81	7,190.64	2,089.33	543.17	40.180866	-104.825850	1,309,448.38	3,188,362.81
9,520.00	88.55	356.90	7,193.32	2,184.15	537.96	40.181126	-104.825869	1,309,543.15	3,188,356.88
9,614.00	88.40	356.79	7,195.82	2,277.98	532.79	40.181384	-104.825887	1,309,636.93	3,188,351.00
9,709.00	88.49	356.69	7,198.40	2,372.79	527.39	40.181644	-104.825907	1,309,731.69	3,188,344.88
9,804.00	89.94	356.21	7,199.70	2,467.59	521.51	40.181905	-104.825928	1,309,826.45	3,188,338.28
9,898.00	90.03	356.09	7,199.73	2,561.38	515.20	40.182162	-104.825950	1,309,920.18	3,188,331.26
9,993.00	90.28	356.28	7,199.47	2,656.17	508.87	40.182422	-104.825973	1,310,014.91	3,188,324.22
10,087.00	90.86	356.24	7,198.54	2,749.97	502.74	40.182680	-104.825995	1,310,108.66	3,188,317.38
10,182.00	91.11	356.43	7,196.90	2,844.76	496.67	40.182940	-104.826016	1,310,203.39	3,188,310.59
10,277.00	91.42	356.72	7,194.81	2,939.56	491.00	40.183200	-104.826037	1,310,298.15	3,188,304.19
10,371.00	91.88	357.11	7,192.10	3,033.39	485.94	40.183458	-104.826055	1,310,391.93	3,188,298.43
10,466.00	92.28	357.43	7,188.65	3,128.22	481.42	40.183718	-104.826071	1,310,486.72	3,188,293.19
10,560.00	92.34	357.33	7,184.86	3,222.04	477.13	40.183976	-104.826086	1,310,580.51	3,188,288.18
10,654.00	92.40	357.14	7,180.98	3,315.85	472.59	40.184233	-104.826103	1,310,674.27	3,188,282.94
10,749.00	90.55	356.86	7,178.53	3,410.69	467.62	40.184493	-104.826120	1,310,769.06	3,188,277.25

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (ft)	+E/-W (ft)	Latitude (ft)	Longitude (ft)	Northing (ft)	Easting (ft)
10,843.00	89.78	356.40	7,178.26	3,504.52	462.10	40.184751	-104.826140	1,310,862.85	3,188,271.01
10,938.00	89.69	356.40	7,178.70	3,599.34	456.13	40.185011	-104.826161	1,310,957.61	3,188,264.33
11,032.00	89.51	356.11	7,179.35	3,693.13	449.99	40.185269	-104.826183	1,311,051.36	3,188,257.48
11,127.00	89.66	356.07	7,180.04	3,787.91	443.52	40.185529	-104.826207	1,311,146.08	3,188,250.29
11,221.00	89.45	355.83	7,180.77	3,881.67	436.88	40.185786	-104.826230	1,311,239.78	3,188,242.94
11,316.00	89.63	355.82	7,181.54	3,976.42	429.96	40.186046	-104.826255	1,311,334.47	3,188,235.30
11,410.00	89.38	355.75	7,182.35	4,070.16	423.05	40.186304	-104.826280	1,311,428.15	3,188,227.68
11,505.00	89.32	355.46	7,183.43	4,164.87	415.77	40.186564	-104.826306	1,311,522.80	3,188,219.69
11,599.00	88.95	355.48	7,184.84	4,258.57	408.35	40.186821	-104.826332	1,311,616.44	3,188,211.55
11,608.00	88.86	355.63	7,185.02	4,267.54	407.65	40.186845	-104.826335	1,311,625.40	3,188,210.79
11,658.00	88.86	355.63	7,186.01	4,317.38	403.84	40.186982	-104.826349	1,311,675.21	3,188,206.60

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
25.00	25.00	0.00	0.00	H&P 308: RKB = 25ft
125.00	125.00	-0.14	0.02	First MS Energy Services Gyro @ 125.00ft
835.00	835.00	-0.30	-0.13	Final MS Energy Services Gyro @ 835.00ft
835.00	835.00	-0.30	-0.13	Tie-On to Surface Gyros @ 835.00ft
919.00	919.00	-0.25	-0.17	First Sperry MWD Survey @ 919.00ft
11,608.00	7,185.02	4,267.54	407.65	Final Sperry MWD Survey @ 11608.00ft
11,658.00	7,186.01	4,317.38	403.84	Straight Line Proj @ 11658' MD :: 7'186.01' TVD

Vertical Section Information

Angle Type	Origin Type	Azimuth (°)	Origin		Start TVD (ft)
			+N/S (ft)	+E/W (ft)	
User	No Target (Freehand)	357.36	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
25.00	835.00	MS Energy Services - Surface Gyros	NS-GYRO-MS
919.00	7,520.00	Sperry MWD Survey - Vert/Build	MWD+SC
7,634.00	11,608.00	Sperry MWD Surveys - Lateral	MWD+SC

Design Report for Vonderlage 29N-W31HZ - Actual Field Surveys

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,560.00	7,194.63	7" @ 7560' MD :: 7194.63' TVD	7	8-3/4

Targets for Plan B 0

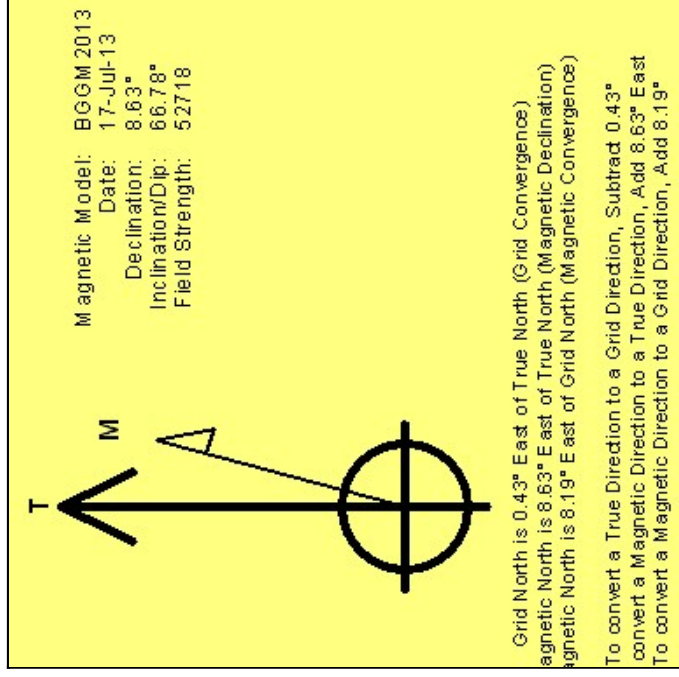
Shape	Target Name	TVD (ft)	Northing (ft)	Easting (ft)	+N/-S ft	+E/-W ft	Created	Updated
Polygon	Vonderlage 29N-W31HZ_Sec	0.00	1,307,355.07	3,187,835.51	0.00	0.00	06-28-2013	07-01-2013
Point	Vonderlage 29N-W31HZ_BHL	7,176.00	1,311,700.36	3,188,219.71	4,342.43	417.14	06-28-2013	06-28-2013
Polygon	Vonderlage 29N-W31HZ_LD	0.00	1,307,355.07	3,187,835.51	0.00	0.00	06-28-2013	07-01-2013
Point	Vonderlage 29N-W31HZ_SHL	0.00	1,307,355.07	3,187,835.51	0.00	0.00	06-28-2013	06-28-2013

North Reference Sheet for Sec. 31-T3N-R66W - Vonderlage 29N-W31HZ - Plan B 0

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 @ 4851.00ft (H&P 308). Northing and Easting are relative to Sec. 31-T3N-R66W
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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995771

Grid Coordinates of Well: 1,307,355.07 ft N, 3,187,835.51 ft E
Geographical Coordinates of Well: 40° 10' 30.47" N, 104° 49' 40.06" W
Grid Convergence at Surface is: 0.43°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,658.00ft
the Bottom Hole Displacement is 4,336.23ft in the Direction of 5.34° (True).
Magnetic Convergence at surface is: -8.19° (17 July 2013, BGGM2013)



Section 2

Contents: Proposal Data

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T3N-R66W

Vonderlage 29N-W31HZ

05-123-35892

Plan B 0

Plan: Plan B 0 - PROPOSAL

Sperry Drilling Services

Proposal Report

01 July, 2013

Well Coordinates: 1,307,355.07 N, 3,187,835.51 E (40° 10' 30.47" N, 104° 49' 40.06" W)

Ground Level: 4,826.00 ft

Local Coordinate Origin: Centered on Well Vonderlage 29N-W31HZ

Viewing Datum: RKB = 25ft @ 4851.00ft (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: 431

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 31-T3N-R66W
 Well: Vonderlage 29N-W31HZ
 Wellbore: Plan B 0
 Design: Plan B 0 - PROPOSAL

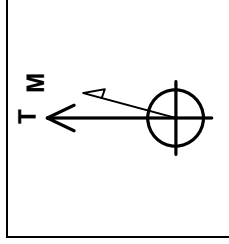
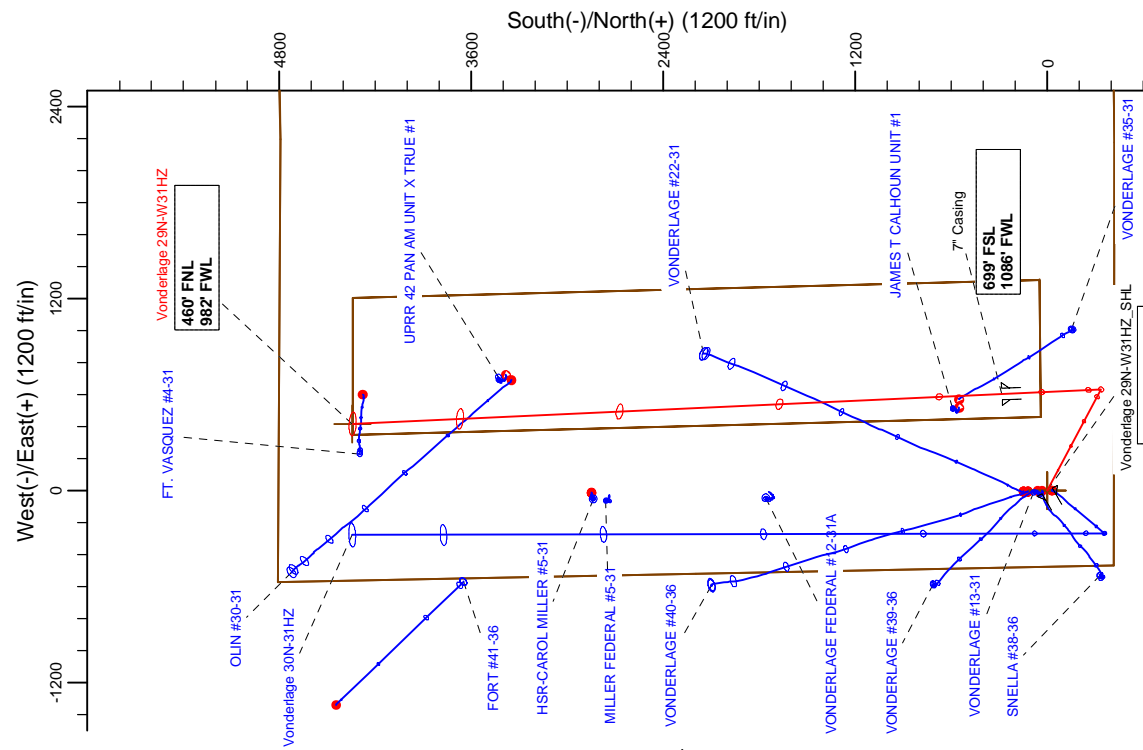
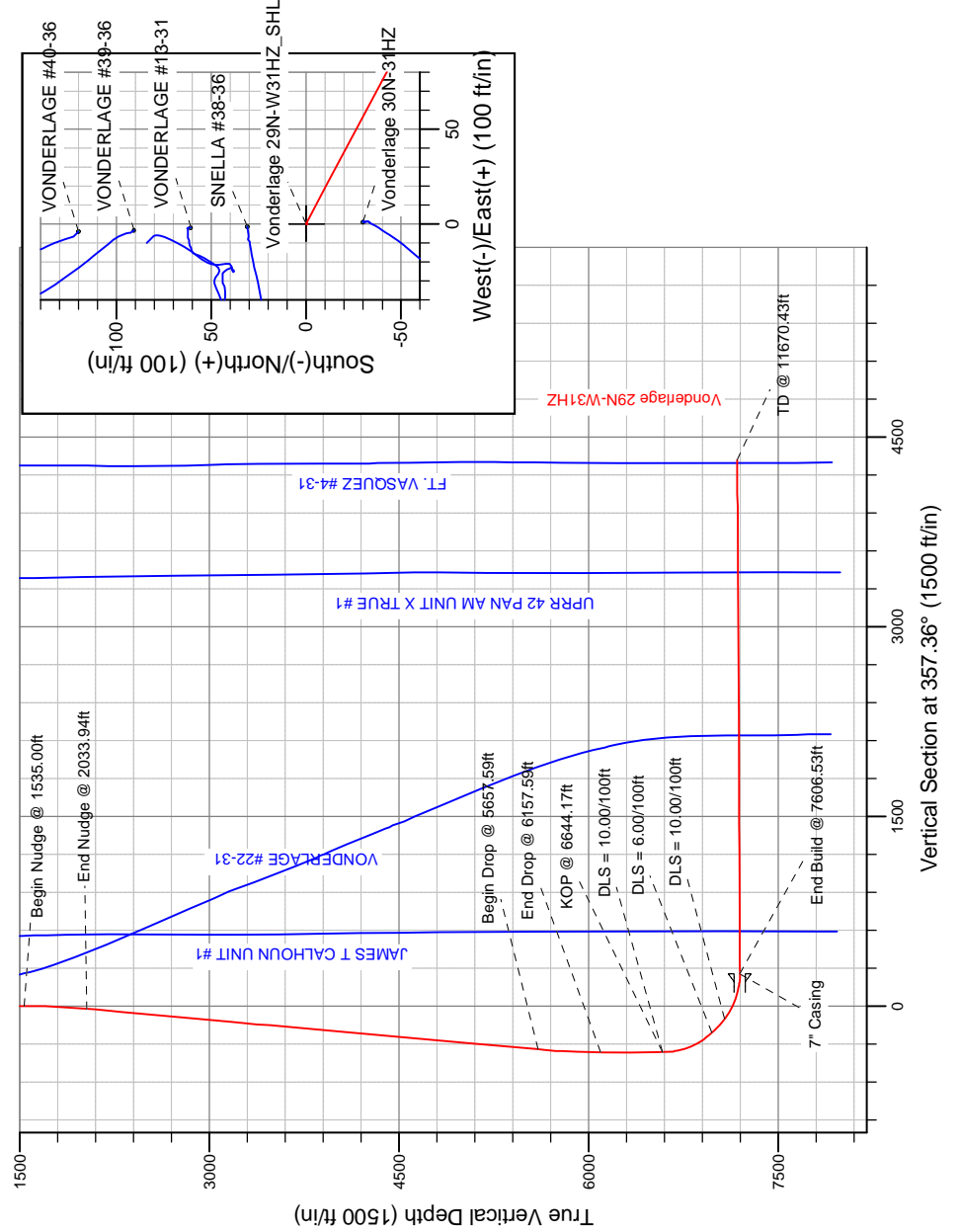


SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	835.00	0.04	60.09	835.00	-0.30	-0.13	0.00	0.00	-0.29	
2	1535.00	0.04	60.09	1535.00	-0.05	0.30	0.00	0.00	-0.07	
3	2033.94	10.00	118.00	2031.40	-20.35	38.80	2.00	58.10	-22.12	
4	5657.59	10.00	118.00	5600.00	-315.76	594.38	0.00	0.00	-342.81	
5	6157.59	0.00	0.00	6097.47	-336.20	632.81	2.00	180.00	-364.99	
6	6644.17	0.00	0.00	6584.05	-336.20	632.81	0.00	0.00	-364.99	
7	7075.81	43.16	357.36	6976.00	-181.32	625.67	10.00	357.36	-209.95	
8	7224.31	52.07	357.36	7076.00	-71.85	620.62	6.00	0.00	-100.36	
9	7606.53	90.30	357.36	7197.00	282.90	604.27	10.00	0.00	254.77	
10	11670.43	90.30	357.36	7176.00	4342.43	417.14	0.00	0.00	4318.61	Vonderlage 29N-W31HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Vonderlage 29N-W31HZ_LD	0.00	0.00	0.00	40.175131	-104.827794	Polygon
Vonderlage 29N-W31HZ_Sec	0.00	0.00	0.00	40.175131	-104.827794	Polygon
Vonderlage 29N-W31HZ_SHL	0.00	0.00	0.00	40.175131	-104.827794	Point
Vonderlage 29N-W31HZ_BHL	7176.00	4342.43	417.14	40.187051	-104.826301	Point



WELL DETAILS: Vonderlage 29N-W31HZ
Ground Level: 4826.00
RKB = 25ft @ 4851.00ft (H&P 308)
Plan: Plan B 0 - PROPOSAL (Vonderlage 29N-W31HZ/Plan B 0)
Created By: Fred Hartmann Date: 07/01/2013

Plan Report for Vonderlage 29N-W31HZ - Plan B 0 - PROPOSAL

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
835.00	0.04	60.09	835.00	-0.30	-0.13	-0.29	0.00	0.00	0.00	0.00
Tie-On to Surface Gyros @ 835.00ft										
875.40	0.04	60.09	875.40	-0.28	-0.10	-0.28	0.00	0.00	0.00	0.00
9 5/8" Casing										
900.00	0.04	60.09	900.00	-0.27	-0.09	-0.27	0.00	0.00	0.00	0.00
1,000.00	0.04	60.09	1,000.00	-0.24	-0.03	-0.24	0.00	0.00	0.00	0.00
1,100.00	0.04	60.09	1,100.00	-0.20	0.04	-0.20	0.00	0.00	0.00	0.00
1,200.00	0.04	60.09	1,200.00	-0.17	0.10	-0.17	0.00	0.00	0.00	0.00
1,300.00	0.04	60.09	1,300.00	-0.13	0.16	-0.14	0.00	0.00	0.00	0.00
1,400.00	0.04	60.09	1,400.00	-0.10	0.22	-0.11	0.00	0.00	0.00	0.00
1,500.00	0.04	60.09	1,500.00	-0.06	0.28	-0.08	0.00	0.00	0.00	0.00
1,535.00	0.04	60.09	1,535.00	-0.05	0.30	-0.07	0.00	0.00	0.00	0.00
Begin Nudge @ 1535.00ft										
1,600.00	1.32	116.72	1,599.99	-0.38	0.99	-0.42	2.00	1.97	87.12	58.10
1,700.00	3.32	117.61	1,699.91	-2.24	4.59	-2.45	2.00	2.00	0.89	1.47
1,800.00	5.32	117.83	1,799.62	-5.75	11.25	-6.26	2.00	2.00	0.22	0.59
1,900.00	7.32	117.93	1,899.00	-10.90	20.98	-11.85	2.00	2.00	0.10	0.37
2,000.00	9.32	117.99	1,997.95	-17.68	33.77	-19.22	2.00	2.00	0.06	0.27
2,033.94	10.00	118.00	2,031.40	-20.35	38.80	-22.12	2.00	2.00	0.04	0.21
End Nudge @ 2033.94ft										
2,100.00	10.00	118.00	2,096.46	-25.74	48.92	-27.97	0.00	0.00	0.00	0.20
2,200.00	10.00	118.00	2,194.94	-33.89	64.26	-36.82	0.00	0.00	0.00	0.00
2,300.00	10.00	118.00	2,293.42	-42.04	79.59	-45.66	0.00	0.00	0.00	0.00
2,400.00	10.00	118.00	2,391.90	-50.20	94.92	-54.51	0.00	0.00	0.00	0.00
2,500.00	10.00	118.00	2,490.38	-58.35	110.25	-63.36	0.00	0.00	0.00	0.00
2,600.00	10.00	118.00	2,588.86	-66.50	125.59	-72.21	0.00	0.00	0.00	0.00
2,700.00	10.00	118.00	2,687.34	-74.65	140.92	-81.06	0.00	0.00	0.00	0.00
2,800.00	10.00	118.00	2,785.83	-82.81	156.25	-89.91	0.00	0.00	0.00	0.00
2,900.00	10.00	118.00	2,884.31	-90.96	171.58	-98.76	0.00	0.00	0.00	0.00
3,000.00	10.00	118.00	2,982.79	-99.11	186.91	-107.61	0.00	0.00	0.00	0.00
3,100.00	10.00	118.00	3,081.27	-107.26	202.25	-116.46	0.00	0.00	0.00	0.00
3,200.00	10.00	118.00	3,179.75	-115.41	217.58	-125.31	0.00	0.00	0.00	0.00
3,300.00	10.00	118.00	3,278.23	-123.57	232.91	-134.16	0.00	0.00	0.00	0.00
3,400.00	10.00	118.00	3,376.71	-131.72	248.24	-143.01	0.00	0.00	0.00	0.00
3,500.00	10.00	118.00	3,475.19	-139.87	263.58	-151.86	0.00	0.00	0.00	0.00
3,600.00	10.00	118.00	3,573.67	-148.02	278.91	-160.71	0.00	0.00	0.00	0.00
3,700.00	10.00	118.00	3,672.15	-156.18	294.24	-169.56	0.00	0.00	0.00	0.00
3,800.00	10.00	118.00	3,770.63	-164.33	309.57	-178.41	0.00	0.00	0.00	0.00
3,900.00	10.00	118.00	3,869.11	-172.48	324.90	-187.26	0.00	0.00	0.00	0.00
3,930.35	10.00	118.00	3,899.00	-174.95	329.56	-189.95	0.00	0.00	0.00	0.00
Parkman										
4,000.00	10.00	118.00	3,967.59	-180.63	340.24	-196.11	0.00	0.00	0.00	0.00
4,100.00	10.00	118.00	4,066.08	-188.78	355.57	-204.96	0.00	0.00	0.00	0.00
4,200.00	10.00	118.00	4,164.56	-196.94	370.90	-213.81	0.00	0.00	0.00	0.00
4,290.82	10.00	118.00	4,254.00	-204.34	384.83	-221.85	0.00	0.00	0.00	0.00
Sussex										
4,300.00	10.00	118.00	4,263.04	-205.09	386.23	-222.66	0.00	0.00	0.00	0.00
4,400.00	10.00	118.00	4,361.52	-213.24	401.57	-231.51	0.00	0.00	0.00	0.00
4,500.00	10.00	118.00	4,460.00	-221.39	416.90	-240.36	0.00	0.00	0.00	0.00
4,600.00	10.00	118.00	4,558.48	-229.55	432.23	-249.21	0.00	0.00	0.00	0.00
4,700.00	10.00	118.00	4,656.96	-237.70	447.56	-258.06	0.00	0.00	0.00	0.00
4,800.00	10.00	118.00	4,755.44	-245.85	462.89	-266.91	0.00	0.00	0.00	0.00
4,900.00	10.00	118.00	4,853.92	-254.00	478.23	-275.76	0.00	0.00	0.00	0.00
5,000.00	10.00	118.00	4,952.40	-262.16	493.56	-284.61	0.00	0.00	0.00	0.00
5,100.00	10.00	118.00	5,050.88	-270.31	508.89	-293.46	0.00	0.00	0.00	0.00
5,200.00	10.00	118.00	5,149.36	-278.46	524.22	-302.31	0.00	0.00	0.00	0.00
5,300.00	10.00	118.00	5,247.84	-286.61	539.56	-311.16	0.00	0.00	0.00	0.00
5,400.00	10.00	118.00	5,346.33	-294.76	554.89	-320.01	0.00	0.00	0.00	0.00

Plan Report for Vonderlage 29N-W31HZ - Plan B 0 - PROPOSAL

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/S (ft)	+E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
5,500.00	10.00	118.00	5,444.81	-302.92	570.22	-328.86	0.00	0.00	0.00	0.00
5,600.00	10.00	118.00	5,543.29	-311.07	585.55	-337.71	0.00	0.00	0.00	0.00
5,657.59	10.00	118.00	5,600.00	-315.76	594.38	-342.81	0.00	0.00	0.00	0.00
Begin Drop @ 5657.59ft										
5,700.00	9.15	118.00	5,641.82	-319.08	600.61	-346.40	2.00	-2.00	0.00	180.00
5,800.00	7.15	118.00	5,740.81	-325.73	613.13	-353.63	2.00	-2.00	0.00	180.00
5,900.00	5.15	118.00	5,840.22	-330.76	622.59	-359.09	2.00	-2.00	0.00	180.00
6,000.00	3.15	118.00	5,939.96	-334.16	628.98	-362.78	2.00	-2.00	0.00	180.00
6,100.00	1.15	118.00	6,039.88	-335.92	632.30	-364.69	2.00	-2.00	0.00	180.00
6,157.59	0.00	0.00	6,097.47	-336.20	632.81	-364.99	2.00	-2.00	0.00	-180.00
End Drop @ 6157.59ft										
6,200.00	0.00	0.00	6,139.88	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,239.88	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,339.88	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,439.88	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,539.88	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
6,644.17	0.00	0.00	6,584.05	-336.20	632.81	-364.99	0.00	0.00	0.00	0.00
KOP @ 6644.17ft - DLS = 10.00/100ft										
6,700.00	5.58	357.36	6,639.79	-333.48	632.68	-362.27	10.00	10.00	0.00	357.36
6,800.00	15.58	357.36	6,737.96	-315.16	631.84	-343.93	10.00	10.00	0.00	0.00
6,900.00	25.58	357.36	6,831.46	-280.08	630.22	-308.82	10.00	10.00	0.00	0.00
7,000.00	35.58	357.36	6,917.44	-229.32	627.88	-258.00	10.00	10.00	0.00	0.00
7,075.81	43.16	357.36	6,976.00	-181.32	625.67	-209.95	10.00	10.00	0.00	0.00
DLS = 6.00/100ft										
7,100.00	44.62	357.36	6,993.44	-164.57	624.90	-193.18	6.00	6.00	0.00	0.00
7,110.69	45.26	357.36	7,001.00	-157.03	624.55	-185.63	6.00	6.00	0.00	0.00
Sharon Springs										
7,200.00	50.62	357.36	7,060.82	-90.82	621.50	-119.35	6.00	6.00	0.00	0.00
7,224.31	52.07	357.36	7,076.00	-71.85	620.62	-100.36	6.00	6.00	0.00	0.00
DLS = 10.00/100ft - Niobrara										
7,300.00	59.64	357.36	7,118.45	-9.32	617.74	-37.76	10.00	10.00	0.00	0.00
7,400.00	69.64	357.36	7,161.22	80.83	613.58	52.49	10.00	10.00	0.00	0.00
7,500.00	79.64	357.36	7,187.67	177.04	609.15	148.79	10.00	10.00	0.00	0.00
7,600.00	89.64	357.36	7,197.00	276.37	604.57	248.23	10.00	10.00	0.00	0.00
7,606.53	90.30	357.36	7,197.00	282.89	604.27	254.76	10.00	10.00	0.00	0.00
End Build @ 7606.53ft - Niobrara C TL (Heel) - 7" Casing										
7,700.00	90.30	357.36	7,196.52	376.26	599.96	348.23	0.00	0.00	0.00	0.00
7,800.00	90.30	357.36	7,196.00	476.16	595.36	448.23	0.00	0.00	0.00	0.00
7,900.00	90.30	357.36	7,195.48	576.05	590.75	548.23	0.00	0.00	0.00	0.00
8,000.00	90.30	357.36	7,194.97	675.94	586.15	648.23	0.00	0.00	0.00	0.00
8,100.00	90.30	357.36	7,194.45	775.83	581.54	748.22	0.00	0.00	0.00	0.00
8,200.00	90.30	357.36	7,193.93	875.73	576.94	848.22	0.00	0.00	0.00	0.00
8,300.00	90.30	357.36	7,193.42	975.62	572.34	948.22	0.00	0.00	0.00	0.00
8,400.00	90.30	357.36	7,192.90	1,075.51	567.73	1,048.22	0.00	0.00	0.00	0.00
8,500.00	90.30	357.36	7,192.38	1,175.40	563.13	1,148.22	0.00	0.00	0.00	0.00
8,600.00	90.30	357.36	7,191.87	1,275.30	558.52	1,248.22	0.00	0.00	0.00	0.00
8,700.00	90.30	357.36	7,191.35	1,375.19	553.92	1,348.22	0.00	0.00	0.00	0.00
8,800.00	90.30	357.36	7,190.83	1,475.08	549.31	1,448.22	0.00	0.00	0.00	0.00
8,900.00	90.30	357.36	7,190.32	1,574.97	544.71	1,548.21	0.00	0.00	0.00	0.00
9,000.00	90.30	357.36	7,189.80	1,674.87	540.10	1,648.21	0.00	0.00	0.00	0.00
9,100.00	90.30	357.36	7,189.28	1,774.76	535.50	1,748.21	0.00	0.00	0.00	0.00
9,200.00	90.30	357.36	7,188.77	1,874.65	530.89	1,848.21	0.00	0.00	0.00	0.00
9,300.00	90.30	357.36	7,188.25	1,974.55	526.29	1,948.21	0.00	0.00	0.00	0.00
9,400.00	90.30	357.36	7,187.73	2,074.44	521.68	2,048.21	0.00	0.00	0.00	0.00
9,500.00	90.30	357.36	7,187.22	2,174.33	517.08	2,148.21	0.00	0.00	0.00	0.00
9,600.00	90.30	357.36	7,186.70	2,274.22	512.48	2,248.20	0.00	0.00	0.00	0.00
9,700.00	90.30	357.36	7,186.18	2,374.12	507.87	2,348.20	0.00	0.00	0.00	0.00
9,800.00	90.30	357.36	7,185.67	2,474.01	503.27	2,448.20	0.00	0.00	0.00	0.00
9,900.00	90.30	357.36	7,185.15	2,573.90	498.66	2,548.20	0.00	0.00	0.00	0.00

Plan Report for Vonderlage 29N-W31HZ - Plan B 0 - PROPOSAL

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
10,000.00	90.30	357.36	7,184.63	2,673.79	494.06	2,648.20	0.00	0.00	0.00	0.00
10,100.00	90.30	357.36	7,184.12	2,773.69	489.45	2,748.20	0.00	0.00	0.00	0.00
10,200.00	90.30	357.36	7,183.60	2,873.58	484.85	2,848.20	0.00	0.00	0.00	0.00
10,300.00	90.30	357.36	7,183.08	2,973.47	480.24	2,948.20	0.00	0.00	0.00	0.00
10,400.00	90.30	357.36	7,182.56	3,073.36	475.64	3,048.19	0.00	0.00	0.00	0.00
10,500.00	90.30	357.36	7,182.05	3,173.26	471.03	3,148.19	0.00	0.00	0.00	0.00
10,600.00	90.30	357.36	7,181.53	3,273.15	466.43	3,248.19	0.00	0.00	0.00	0.00
10,700.00	90.30	357.36	7,181.01	3,373.04	461.82	3,348.19	0.00	0.00	0.00	0.00
10,800.00	90.30	357.36	7,180.50	3,472.93	457.22	3,448.19	0.00	0.00	0.00	0.00
10,900.00	90.30	357.36	7,179.98	3,572.83	452.62	3,548.19	0.00	0.00	0.00	0.00
11,000.00	90.30	357.36	7,179.46	3,672.72	448.01	3,648.19	0.00	0.00	0.00	0.00
11,100.00	90.30	357.36	7,178.95	3,772.61	443.41	3,748.18	0.00	0.00	0.00	0.00
11,200.00	90.30	357.36	7,178.43	3,872.50	438.80	3,848.18	0.00	0.00	0.00	0.00
11,300.00	90.30	357.36	7,177.91	3,972.40	434.20	3,948.18	0.00	0.00	0.00	0.00
11,400.00	90.30	357.36	7,177.40	4,072.29	429.59	4,048.18	0.00	0.00	0.00	0.00
11,500.00	90.30	357.36	7,176.88	4,172.18	424.99	4,148.18	0.00	0.00	0.00	0.00
11,600.00	90.30	357.36	7,176.36	4,272.07	420.38	4,248.18	0.00	0.00	0.00	0.00
11,670.42	90.30	357.36	7,176.00	4,342.42	417.14	4,318.60	0.00	0.00	0.00	0.00
Niobrara C TL (Toe)										
11,670.43	90.30	357.36	7,176.00	4,342.43	417.14	4,318.61	0.00	0.00	0.00	0.00
TD @ 11670.43ft - Vonderlage 29N-W31HZ_BHL										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
835.00	835.00	-0.30	-0.13	Tie-On to Surface Gyros @ 835.00ft
1,535.00	1,535.00	-0.05	0.30	Begin Nudge @ 1535.00ft
2,033.94	2,031.40	-20.35	38.80	End Nudge @ 2033.94ft
5,657.59	5,600.00	-315.76	594.38	Begin Drop @ 5657.59ft
6,157.59	6,097.47	-336.20	632.81	End Drop @ 6157.59ft
6,644.17	6,584.05	-336.20	632.81	KOP @ 6644.17ft
6,644.17	6,584.05	-336.20	632.81	DLS = 10.00/100ft
7,075.81	6,976.00	-181.32	625.67	DLS = 6.00/100ft
7,224.31	7,076.00	-71.85	620.62	DLS = 10.00/100ft
7,606.53	7,197.00	282.89	604.27	End Build @ 7606.53ft
11,670.43	7,176.00	4,342.43	417.14	TD @ 11670.43ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	357.36	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
25.00	835.00	MS Energy Services - Surface Gyros	NS-GYRO-MS
835.00	7,606.53	Plan B 0 - PROPOSAL	MWD+SC
7,606.53	11,670.43	Plan B 0 - PROPOSAL	MWD+SC

Plan Report for Vonderlage 29N-W31HZ - Plan B 0 - PROPOSAL**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
875.40	875.40	9 5/8" Casing	9-5/8	13-1/2
7,606.53	7,197.00	7" Casing	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,930.35	3,899.00	Parkman		0.00	
4,290.82	4,254.00	Sussex		0.00	
7,110.69	7,001.00	Sharon Springs		0.00	
7,224.31	7,076.00	Niobrara		0.00	
7,606.53	7,197.00	Niobrara C TL (Heel)		0.00	
11,670.42	7,176.00	Niobrara C TL (Toe)		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N-S (ft)	+E-W (ft)	Shape
Vonderlage 29N-W31HZ_Sec	0.00	0.00	0.00	Polygon
Vonderlage 29N-W31HZ_BHL	7,176.00	4,342.43	417.14	Point
Vonderlage 29N-W31HZ_LD	0.00	0.00	0.00	Polygon
Vonderlage 29N-W31HZ_SHL	0.00	0.00	0.00	Point