

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 34-T2N-R65W

Sparboe 8N-3HZ

Plan C Rev 0

Design: Actual Field Surveys

## Sperry Drilling Services Standard Report

19 February, 2013

Well Coordinates: 1,281,026.25 N, 3,239,692.34 E (40° 06' 05.87" N, 104° 38' 35.29" W)

Ground Level: 4,970.00 ft

Local Coordinate Origin:

Centered on Well Sparboe 8N-3HZ

Viewing Datum:

RKB=25 @ 4995.00ft (HP 308)

TVDs to System:

N

North Reference:

True

Unit System:

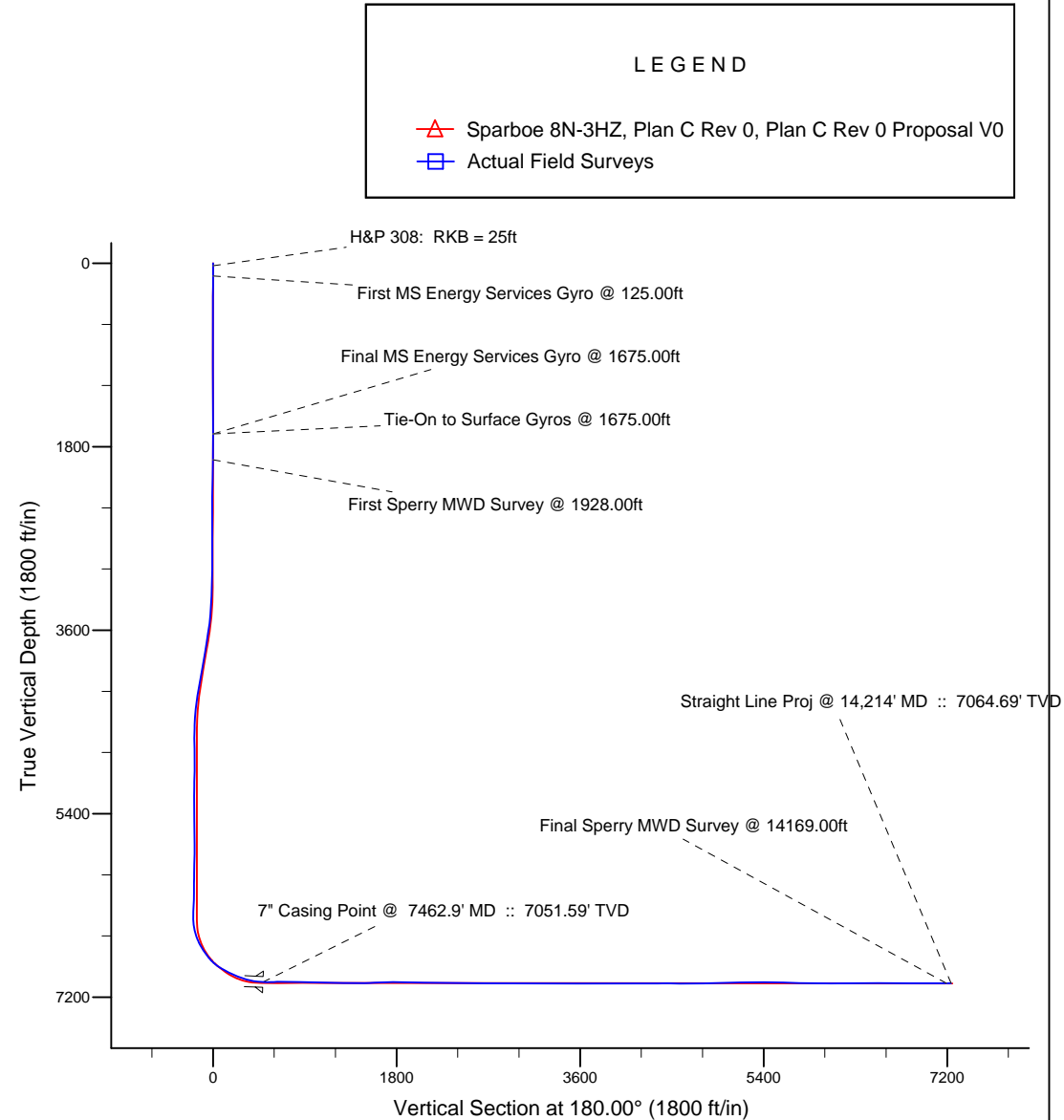
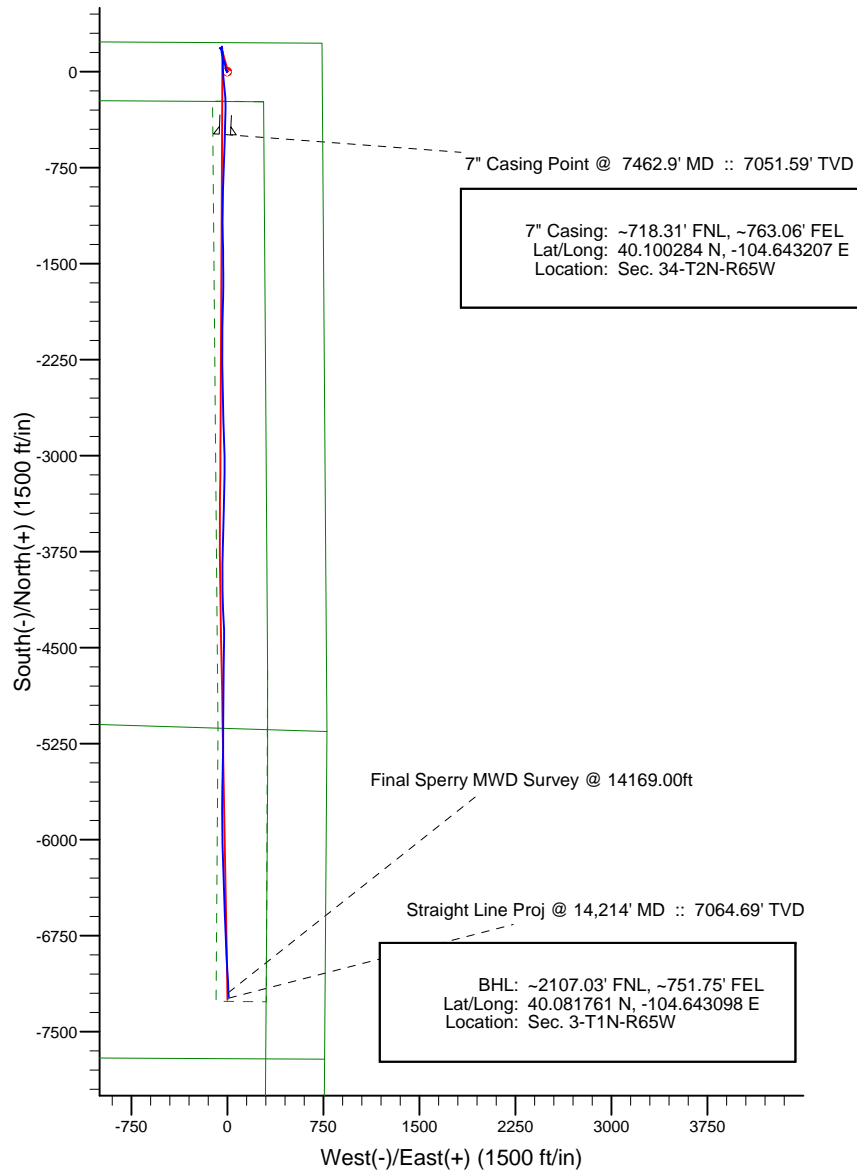
API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 34-T2N-R65W  
 Well: Sparboe 8N-3HZ  
 Wellbore: Plan C Rev 0  
 Design: Actual Field Surveys



WELL DETAILS: Sparboe 8N-3HZ	
Ground Level: 4970.00	
RKB=25 @ 4995.00ft (HP 308)	
Design: Actual Field Surveys (Sparboe 8N-3HZ/Plan C Rev 0)	
Created By: Fred Hartmann	Date: 02/06/2013
Reviewed: _____	Date: _____

**Design Report for Sparboe 8N-3HZ - 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
<b>H&amp;P 308: RKB = 25ft</b>							
125.00	0.87	280.05	125.00	0.13	-0.75	-0.13	0.87
<b>First MS Energy Services Gyro @ 125.00ft</b>							
225.00	0.34	325.64	224.99	0.51	-1.66	-0.51	0.68
325.00	0.97	304.47	324.98	1.23	-2.53	-1.23	0.66
425.00	0.35	329.60	424.98	1.98	-3.38	-1.98	0.67
525.00	0.12	310.52	524.98	2.31	-3.61	-2.31	0.24
625.00	0.08	0.40	624.98	2.45	-3.69	-2.45	0.09
725.00	0.37	31.69	724.97	2.79	-3.52	-2.79	0.30
825.00	0.25	192.59	824.97	2.85	-3.40	-2.85	0.61
925.00	0.27	174.34	924.97	2.40	-3.43	-2.40	0.08
1,025.00	0.33	235.64	1,024.97	2.01	-3.64	-2.01	0.31
1,125.00	0.28	117.30	1,124.97	1.73	-3.66	-1.73	0.52
1,225.00	0.29	192.49	1,224.97	1.37	-3.50	-1.37	0.35
1,325.00	0.30	158.06	1,324.97	0.88	-3.46	-0.88	0.17
1,425.00	0.28	199.16	1,424.97	0.41	-3.44	-0.41	0.20
1,525.00	0.28	188.25	1,524.97	-0.06	-3.55	0.06	0.05
1,625.00	0.38	333.17	1,624.97	-0.01	-3.74	0.01	0.63
1,675.00	0.25	52.98	1,674.97	0.21	-3.73	-0.21	0.83
<b>Final MS Energy Services Gyro @ 1675.00ft - Tie-On to Surface Gyros @ 1675.00ft</b>							
1,928.00	0.65	352.14	1,927.96	1.96	-3.48	-1.96	0.23
<b>First Sperry MWD Survey @ 1928.00ft</b>							
2,111.00	0.79	331.08	2,110.94	4.09	-4.23	-4.09	0.16
2,301.00	0.63	346.04	2,300.93	6.25	-5.12	-6.25	0.13
2,490.00	0.77	318.64	2,489.92	8.21	-6.21	-8.21	0.19
2,680.00	0.91	241.31	2,679.90	8.45	-8.38	-8.45	0.56
2,869.00	0.67	338.53	2,868.89	8.76	-10.10	-8.76	0.63
3,059.00	0.46	350.48	3,058.88	10.54	-10.63	-10.54	0.13
3,153.00	0.59	336.35	3,152.88	11.36	-10.89	-11.36	0.19
3,248.00	2.47	344.52	3,247.84	13.78	-11.63	-13.78	1.99
3,343.00	3.26	347.66	3,342.72	18.39	-12.75	-18.39	0.85
3,438.00	4.67	351.77	3,437.49	24.86	-13.88	-24.86	1.51
3,533.00	7.53	351.54	3,531.94	34.84	-15.35	-34.84	3.01
3,627.00	8.55	349.65	3,625.02	47.81	-17.51	-47.81	1.12
3,722.00	9.43	345.51	3,718.85	62.29	-20.73	-62.29	1.15
3,817.00	10.00	341.73	3,812.49	77.66	-25.26	-77.66	0.90
3,912.00	10.11	344.69	3,906.03	93.53	-30.05	-93.53	0.56
4,007.00	10.89	343.33	3,999.44	110.17	-34.83	-110.17	0.86
4,102.00	10.94	347.24	4,092.72	127.56	-39.39	-127.56	0.78
4,196.00	9.87	345.25	4,185.17	144.05	-43.41	-144.05	1.20
4,291.00	8.22	351.43	4,278.99	158.64	-46.50	-158.64	2.01
4,387.00	5.73	351.74	4,374.27	170.17	-48.21	-170.17	2.59
4,481.00	3.82	358.40	4,467.94	177.95	-48.97	-177.95	2.11
4,577.00	1.86	347.08	4,563.82	182.66	-49.41	-182.66	2.11
4,672.00	1.27	217.50	4,658.80	183.33	-50.40	-183.33	2.99
4,767.00	1.17	220.64	4,753.78	181.76	-51.67	-181.76	0.13
4,861.00	1.04	275.61	4,847.77	181.12	-53.14	-181.12	1.09
4,956.00	1.70	284.51	4,942.74	181.55	-55.36	-181.55	0.73

**Design Report for Sparboe 8N-3HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,051.00	2.00	297.23	5,037.69	182.67	-58.20	-182.67	0.53
5,146.00	0.94	0.94	5,132.66	184.20	-59.66	-184.20	1.89
5,241.00	1.11	40.73	5,227.65	185.68	-59.05	-185.68	0.75
5,335.00	1.59	128.28	5,321.63	185.56	-57.43	-185.56	2.02
5,430.00	1.84	105.49	5,416.59	184.34	-54.93	-184.34	0.76
5,525.00	1.48	123.76	5,511.55	183.25	-52.44	-183.25	0.67
5,620.00	1.16	105.15	5,606.53	182.32	-50.49	-182.32	0.56
5,714.00	1.10	82.67	5,700.51	182.18	-48.68	-182.18	0.47
5,809.00	1.01	63.30	5,795.49	182.67	-47.02	-182.67	0.39
5,904.00	1.25	53.12	5,890.47	183.67	-45.45	-183.67	0.33
5,999.00	1.61	35.46	5,985.44	185.38	-43.84	-185.38	0.59
6,093.00	0.31	354.17	6,079.43	186.71	-43.10	-186.71	1.48
6,188.00	0.92	335.54	6,174.42	187.66	-43.45	-187.66	0.67
6,378.00	2.25	356.27	6,364.35	192.77	-44.32	-192.77	0.75
6,410.00	2.16	5.95	6,396.32	194.00	-44.30	-194.00	1.20
6,441.00	0.47	88.38	6,427.32	194.58	-44.11	-194.58	6.93
6,473.00	3.93	172.21	6,459.29	193.50	-43.83	-193.50	12.21
6,504.00	7.42	173.37	6,490.13	190.46	-43.46	-190.46	11.26
6,536.00	10.31	175.18	6,521.75	185.55	-42.98	-185.55	9.07
6,568.00	13.59	176.30	6,553.05	178.94	-42.49	-178.94	10.28
6,599.00	17.48	174.15	6,582.91	170.67	-41.78	-170.67	12.68
6,631.00	20.87	174.42	6,613.13	160.22	-40.74	-160.22	10.60
6,663.00	23.35	174.92	6,642.78	148.23	-39.62	-148.23	7.77
6,694.00	26.13	175.12	6,670.93	135.30	-38.50	-135.30	8.97
6,726.00	29.17	176.61	6,699.27	120.49	-37.44	-120.49	9.74
6,757.00	32.30	179.11	6,725.92	104.66	-36.86	-104.66	10.90
6,789.00	34.36	180.61	6,752.65	87.08	-36.83	-87.08	6.93
6,820.00	36.29	179.98	6,777.94	69.16	-36.92	-69.16	6.34
6,852.00	38.29	178.99	6,803.40	49.78	-36.74	-49.78	6.52
6,884.00	41.40	177.71	6,827.97	29.29	-36.14	-29.29	10.05
6,915.00	45.54	177.52	6,850.46	7.98	-35.25	-7.98	13.36
6,947.00	49.63	176.55	6,872.04	-15.61	-34.02	15.61	12.98
6,978.00	53.60	174.73	6,891.28	-39.83	-32.17	39.83	13.61
7,010.00	57.32	174.67	6,909.43	-66.07	-29.73	66.07	11.63
7,042.00	60.94	174.84	6,925.84	-93.42	-27.22	93.42	11.32
7,073.00	62.55	174.86	6,940.52	-120.61	-24.77	120.61	5.19
7,105.00	63.49	174.49	6,955.03	-149.01	-22.12	149.01	3.11
7,137.00	64.72	174.70	6,969.01	-177.66	-19.41	177.66	3.89
7,168.00	65.32	176.10	6,982.10	-205.67	-17.16	205.67	4.53
7,200.00	68.15	177.19	6,994.74	-235.02	-15.44	235.02	9.38
7,231.00	70.33	179.82	7,005.73	-263.99	-14.69	263.99	10.60
7,263.00	72.25	180.45	7,015.99	-294.30	-14.76	294.30	6.28
7,294.00	73.17	181.06	7,025.21	-323.89	-15.15	323.89	3.51
7,326.00	75.91	181.60	7,033.74	-354.72	-15.87	354.72	8.72
7,358.00	79.71	181.00	7,040.49	-385.99	-16.58	385.99	12.02
7,389.00	82.02	181.76	7,045.41	-416.58	-17.32	416.58	7.83
7,421.00	85.18	182.10	7,048.98	-448.36	-18.39	448.36	9.93
7,462.90	87.68	182.38	7,051.59	-490.15	-20.02	490.15	6.00
<b>7" Casing Point @ 7462.9' MD :: 7051.59' TVD</b>							
7,537.00	92.10	182.86	7,051.73	-564.15	-23.40	564.15	6.00
7,632.00	89.88	182.64	7,050.09	-659.02	-27.96	659.02	2.35

**Design Report for Sparboe 8N-3HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,727.00	90.06	181.43	7,050.14	-753.96	-31.33	753.96	1.29
7,819.00	88.45	180.96	7,051.34	-845.93	-33.25	845.93	1.82
7,911.00	88.08	181.17	7,054.12	-937.87	-34.96	937.87	0.46
8,003.00	89.69	180.75	7,055.91	-1,029.84	-36.50	1,029.84	1.81
8,094.00	89.01	180.46	7,056.94	-1,120.82	-37.46	1,120.82	0.81
8,186.00	88.58	179.31	7,058.88	-1,212.80	-37.28	1,212.80	1.33
8,278.00	88.45	179.41	7,061.26	-1,304.77	-36.25	1,304.77	0.18
8,370.00	89.88	179.25	7,062.60	-1,396.75	-35.18	1,396.75	1.56
8,462.00	91.05	179.32	7,061.86	-1,488.74	-34.03	1,488.74	1.27
8,553.00	92.41	179.78	7,059.11	-1,579.69	-33.31	1,579.69	1.58
8,645.00	92.54	180.76	7,055.14	-1,671.60	-33.75	1,671.60	1.07
8,737.00	91.42	180.70	7,051.96	-1,763.54	-34.92	1,763.54	1.22
8,829.00	88.27	181.53	7,052.21	-1,855.51	-36.71	1,855.51	3.54
8,921.00	88.33	180.66	7,054.94	-1,947.45	-38.46	1,947.45	0.95
9,012.00	88.45	180.42	7,057.49	-2,038.41	-39.32	2,038.41	0.29
9,104.00	88.95	180.60	7,059.58	-2,130.38	-40.14	2,130.38	0.58
9,196.00	90.06	180.18	7,060.37	-2,222.37	-40.77	2,222.37	1.29
9,288.00	89.51	180.01	7,060.72	-2,314.37	-40.92	2,314.37	0.63
9,380.00	89.20	178.88	7,061.76	-2,406.36	-40.03	2,406.36	1.27
9,472.00	89.57	178.49	7,062.74	-2,498.33	-37.92	2,498.33	0.58
9,563.00	89.88	178.69	7,063.18	-2,589.30	-35.68	2,589.30	0.41
9,655.00	90.74	177.39	7,062.68	-2,681.24	-32.53	2,681.24	1.69
9,747.00	89.01	177.75	7,062.88	-2,773.16	-28.63	2,773.16	1.92
9,839.00	89.26	178.42	7,064.27	-2,865.09	-25.56	2,865.09	0.78
9,931.00	89.44	179.33	7,065.32	-2,957.07	-23.75	2,957.07	1.01
10,023.00	89.88	180.34	7,065.86	-3,049.07	-23.49	3,049.07	1.20
10,115.00	89.51	179.50	7,066.35	-3,141.06	-23.36	3,141.06	1.00
10,208.00	89.57	181.50	7,067.10	-3,234.05	-24.17	3,234.05	2.15
10,299.00	89.63	180.57	7,067.73	-3,325.04	-25.81	3,325.04	1.02
10,391.00	90.19	182.30	7,067.88	-3,417.00	-28.12	3,417.00	1.98
10,483.00	90.43	182.14	7,067.38	-3,508.93	-31.68	3,508.93	0.31
10,575.00	90.49	182.06	7,066.64	-3,600.87	-35.05	3,600.87	0.11
10,670.00	90.31	181.00	7,065.98	-3,695.83	-37.59	3,695.83	1.13
10,764.00	90.31	180.42	7,065.47	-3,789.82	-38.75	3,789.82	0.62
10,860.00	90.00	180.35	7,065.21	-3,885.82	-39.40	3,885.82	0.33
10,955.00	90.06	179.44	7,065.16	-3,980.82	-39.22	3,980.82	0.96
11,050.00	89.88	178.80	7,065.21	-4,075.80	-37.76	4,075.80	0.70
11,145.00	89.88	177.90	7,065.41	-4,170.76	-35.03	4,170.76	0.95
11,240.00	89.94	177.37	7,065.56	-4,265.68	-31.11	4,265.68	0.56
11,335.00	90.49	178.27	7,065.20	-4,360.61	-27.50	4,360.61	1.11
11,430.00	90.00	181.48	7,064.79	-4,455.60	-27.29	4,455.60	3.42
11,525.00	89.63	180.84	7,065.10	-4,550.58	-29.21	4,550.58	0.78
11,620.00	89.57	180.52	7,065.76	-4,645.57	-30.34	4,645.57	0.34
11,715.00	89.69	179.86	7,066.38	-4,740.57	-30.65	4,740.57	0.71
11,810.00	91.36	181.15	7,065.51	-4,835.55	-31.49	4,835.55	2.22
11,905.00	91.79	181.19	7,062.90	-4,930.50	-33.43	4,930.50	0.45
12,000.00	91.36	180.12	7,060.29	-5,025.45	-34.52	5,025.45	1.21
12,095.00	91.48	178.73	7,057.93	-5,120.42	-33.56	5,120.42	1.47
12,190.00	92.17	180.52	7,054.91	-5,215.36	-32.94	5,215.36	2.02
12,285.00	91.18	180.82	7,052.13	-5,310.31	-34.05	5,310.31	1.09
12,380.00	88.51	181.61	7,052.39	-5,405.28	-36.07	5,405.28	2.93

## Design Report for Sparboe 8N-3HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
12,475.00	88.45	181.32	7,054.91	-5,500.22	-38.49	5,500.22	0.31
12,570.00	88.58	181.30	7,057.37	-5,595.16	-40.66	5,595.16	0.14
12,664.00	88.58	180.32	7,059.70	-5,689.12	-41.99	5,689.12	1.04
12,759.00	89.01	180.20	7,061.70	-5,784.10	-42.42	5,784.10	0.47
12,854.00	89.38	179.18	7,063.03	-5,879.09	-41.91	5,879.09	1.14
12,949.00	89.51	178.59	7,063.95	-5,974.06	-40.06	5,974.06	0.64
13,044.00	89.69	177.75	7,064.61	-6,069.01	-37.03	6,069.01	0.90
13,139.00	89.69	178.74	7,065.13	-6,163.97	-34.12	6,163.97	1.04
13,234.00	90.19	178.57	7,065.23	-6,258.94	-31.89	6,258.94	0.56
13,329.00	90.68	178.43	7,064.51	-6,353.90	-29.40	6,353.90	0.54
13,424.00	91.30	178.04	7,062.86	-6,448.84	-26.48	6,448.84	0.77
13,519.00	90.19	178.05	7,061.63	-6,543.78	-23.24	6,543.78	1.17
13,613.00	89.63	177.58	7,061.78	-6,637.71	-19.65	6,637.71	0.78
13,709.00	89.69	177.70	7,062.35	-6,733.63	-15.70	6,733.63	0.14
13,804.00	89.51	177.18	7,063.01	-6,828.53	-11.46	6,828.53	0.58
13,899.00	89.63	176.78	7,063.72	-6,923.39	-6.45	6,923.39	0.44
13,994.00	89.88	177.21	7,064.13	-7,018.26	-1.47	7,018.26	0.52
14,090.00	89.94	176.71	7,064.28	-7,114.13	3.62	7,114.13	0.52
14,169.00	89.75	177.06	7,064.49	-7,193.01	7.91	7,193.01	0.50
<b>Final Sperry MWD Survey @ 14169.00ft</b>							
14,214.00	89.75	177.06	7,064.69	-7,237.95	10.22	7,237.95	0.00
<b>Straight Line Proj @ 14,214' MD :: 7064.69' TVD</b>							

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	0.13	-0.75	First MS Energy Services Gyro @ 125.00ft
1,675.00	1,674.97	0.21	-3.73	Final MS Energy Services Gyro @ 1675.00ft
1,675.00	1,674.97	0.21	-3.73	Tie-On to Surface Gyros @ 1675.00ft
1,928.00	1,927.96	1.96	-3.48	First Sperry MWD Survey @ 1928.00ft
14,169.00	7,064.49	-7,193.01	7.91	Final Sperry MWD Survey @ 14169.00ft
14,214.00	7,064.69	-7,237.95	10.22	Straight Line Proj @ 14,214' MD :: 7064.69' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	180.00	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
25.00	1,675.00	MS Energy Services - Surface Gyros	NS-GYRO-MS
1,928.00	7,421.00	Sperry MWD Surveys - Vert/Build	MWD+IFR1+SC
7,537.00	13,899.00	Sperry MWD Surveys - Lateral	MWD+IFR1+SC
13,994.00	14,169.00	Sperry MWD Surveys - Lateral 2	MWD+SC

**Design Report for Sparboe 8N-3HZ - Actual Field Surveys**

**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,462.90	7,051.59	7" Casing Point @ 7462.9' MD :: 7051.59' TVD	7	8-3/4

## Design Report for Sparboe 8N-3HZ - 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
Sparboe 8N-3HZ_St	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			-4,048.99	-209.55		1,280,777.59	3,235,645.72		
Point 2			-4,047.93	-2,376.40		1,278,610.94	3,235,667.72		
Point 3			-4,045.06	-4,548.26		1,276,439.30	3,235,691.58		
Point 4			-4,050.29	-5,468.54		1,275,519.05	3,235,695.24		
Point 5			-4,077.77	-7,691.93		1,273,295.58	3,235,689.25		
Point 6			-4,097.37	-9,862.18		1,271,125.33	3,235,690.62		
Point 7			-1,915.02	-9,877.93		1,271,130.67	3,237,872.93		
Point 8			282.86	-9,892.73		1,271,137.11	3,240,070.76		
Point 9			298.55	-7,711.63		1,273,318.17	3,240,065.38		
Point 10			313.42	-5,599.89		1,275,429.87	3,240,059.84		
Point 11			313.20	-4,679.40		1,276,350.28	3,240,050.73		
Point 12			297.54	-2,457.13		1,278,572.21	3,240,013.60		
Point 13			281.09	-233.58		1,280,795.40	3,239,975.66		
Point 14			-1,883.95	-220.73		1,280,787.33	3,237,810.69		
Sparboe 8N-3HZ_34	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			-4,504.48	-4,995.05		1,275,988.11	3,235,236.51		
Point 2			-1,864.88	-5,072.18		1,275,936.49	3,237,876.63		
Point 3			776.58	-5,153.68		1,275,880.52	3,240,518.65		
Sparboe 8N-3HZ_Sc	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			-4,509.24	252.84		1,281,235.50	3,235,181.05		
Point 2			-4,507.96	-2,367.86		1,278,615.04	3,235,207.65		
Point 3			-4,504.48	-4,995.05		1,275,988.11	3,235,236.51		
Point 4			-4,537.76	-7,687.02		1,273,296.05	3,235,229.25		
Point 5			-4,561.53	-10,319.04		1,270,664.03	3,235,230.91		
Point 6			-1,918.30	-10,337.94		1,270,670.67	3,237,874.10		
Point 7			739.55	-10,355.82		1,270,678.47	3,240,531.89		
Point 8			758.57	-7,713.93		1,273,320.32	3,240,525.38		
Point 9			776.58	-5,154.00		1,275,880.20	3,240,518.65		
Point 10			757.63	-2,465.67		1,278,568.11	3,240,473.73		
Point 11			737.74	223.73		1,281,257.09	3,240,427.85		
Point 12			-1,885.76	239.30		1,281,247.31	3,237,804.43		
Sparboe 8N-3HZ_Bf	0.00	0.00	7,065.00	-7,250.48	0.00	1,273,776.40	3,239,762.40	40.081727	-104.643135
- actual wellpath misses target center by 16.17ft at 14214.00ft MD (7064.69 TVD, -7237.95 N, 10.22 E)									
- Point									
Sparboe 8N-3HZ_1/	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			-4,537.76	-7,687.02		1,273,296.05	3,235,229.25		
Point 2			758.57	-7,713.93		1,273,320.32	3,240,525.38		
Sparboe 8N-3HZ_LL	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			281.09	-233.58		1,280,795.40	3,239,975.66		
Point 2			-117.72	-229.73		1,280,795.40	3,239,576.85		
Point 3			-74.42	-5,145.77		1,275,880.20	3,239,667.65		
Point 4			-88.13	-7,261.82		1,273,764.20	3,239,674.38		
Point 5			302.86	-7,265.60		1,273,764.20	3,240,065.38		
Point 6			313.20	-4,679.40		1,276,350.28	3,240,050.73		
Sparboe 8N-3HZ_St	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Point									
Sparboe 8N-3HZ_W	0.00	0.00	7,062.47	-3,800.00	-60.00	1,277,226.00	3,239,669.06	40.091199	-104.643349
- actual wellpath misses target center by 21.38ft at 10774.33ft MD (7065.42 TVD, -3800.15 N, -38.83 E)									
- Point									



Design Report for Sparboe 8N-3HZ - Actual Field Surveys

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Sparboe 8N-3HZ_BI	0.00	0.00	7,065.00	-7,250.48	101.86	1,273,777.38	3,239,864.25	40.081727	-104.642771
- actual wellpath misses target center by 92.49ft at 14214.00ft MD (7064.69 TVD, -7237.95 N, 10.22 E)									
- Point									

## North Reference Sheet for Sec. 34-T2N-R65W - Sparboe 8N-3HZ - Plan C Rev 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=25 @ 4995.00ft (HP 308). Northing and Easting are relative to Sparboe 8N-3HZ

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: 0.99996022

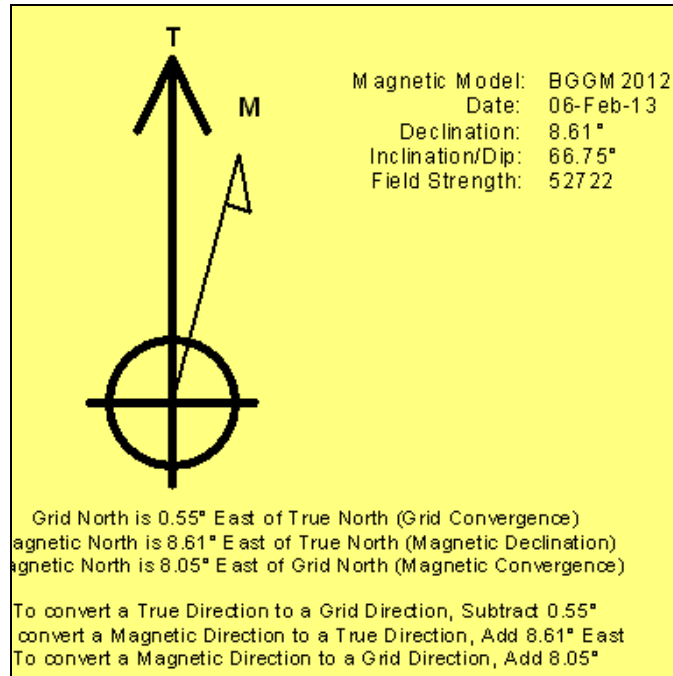
Grid Coordinates of Well: 1,281,026.25 ft N, 3,239,692.34 ft E

Geographical Coordinates of Well: 40° 06' 05.87" N, 104° 38' 35.29" W

Grid Convergence at Surface is: 0.55°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,214.00ft  
the Bottom Hole Displacement is 7,237.96ft in the Direction of 179.92° (True).

Magnetic Convergence at surface is: -8.05° ( 6 February 2013, , BGGM2012)



# **Anadarko Petroleum Corp.**

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

**Sec. 34-T2N-R65W**

**Sparboe 8N-3HZ**

**Plan C Rev 0**

**Design: Actual Field Surveys**

## **Survey Report - Geographic**

**19 February, 2013**

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

<b>Project</b>	Weld County, CO (NAD 83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site	Sec. 34-T2N-R65W				
Site Position:		Northing:	1,281,025.39ft	Latitude:	40.101626
From:	Lat/Long	Easting:	3,239,752.49ft	Longitude:	-104.642920
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.55 °

Well	Sparboe 8N-3HZ					
Well Position	+N/-S	0.00 ft	Northing:	1,281,026.25 ft	Latitude:	40.101630
	+E/-W	0.00 ft	Easting:	3,239,692.34 ft	Longitude:	-104.643135
Position Uncertainty		3.28 ft	Wellhead Elevation:	ft	Ground Level:	4,970.00 ft

<b>Wellbore</b>	Plan C Rev 0				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2012	02-06-2013	8.61	66.75	52,722

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	180.00	

<b>Survey Program</b>	<b>Date</b>	02-19-2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
25.00	1,675.00	MS Energy Services - Surface Gyros (Plar	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,928.00	7,421.00	Sperry MWD Surveys - Vert/Build (Plan C	MWD+IFR1+SC	Fixed:v2:crustal field dec & axial correction	
7,537.00	13,899.00	Sperry MWD Surveys - Lateral (Plan C Re	MWD+IFR1+SC	Fixed:v2:crustal field dec & axial correction	
13,994.00	14,169.00	Sperry MWD Surveys - Lateral 2 (Plan C F	MWD+SC	Fixed:v2:standard dec & axial correction	

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
25.00	0.00	0.00	25.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
<b>H&amp;P 308: RKB = 25ft</b>									
125.00	0.87	280.05	125.00	0.13	-0.75	1,281,026.37	3,239,691.59	40.101630	-104.643138
<b>First MS Energy Services Gyro @ 125.00ft</b>									
225.00	0.34	325.64	224.99	0.51	-1.66	1,281,026.74	3,239,690.67	40.101631	-104.643141
325.00	0.97	304.47	324.98	1.23	-2.53	1,281,027.46	3,239,689.80	40.101633	-104.643144
425.00	0.35	329.60	424.98	1.98	-3.38	1,281,028.19	3,239,688.94	40.101635	-104.643147
525.00	0.12	310.52	524.98	2.31	-3.61	1,281,028.52	3,239,688.70	40.101636	-104.643148
625.00	0.08	0.40	624.98	2.45	-3.69	1,281,028.66	3,239,688.62	40.101637	-104.643148
725.00	0.37	31.69	724.97	2.79	-3.52	1,281,029.00	3,239,688.79	40.101638	-104.643148
825.00	0.25	192.59	824.97	2.85	-3.40	1,281,029.07	3,239,688.91	40.101638	-104.643147
925.00	0.27	174.34	924.97	2.40	-3.43	1,281,028.62	3,239,688.89	40.101637	-104.643147
1,025.00	0.33	235.64	1,024.97	2.01	-3.64	1,281,028.22	3,239,688.68	40.101635	-104.643148
1,125.00	0.28	117.30	1,124.97	1.73	-3.66	1,281,027.95	3,239,688.66	40.101635	-104.643148
1,225.00	0.29	192.49	1,224.97	1.37	-3.50	1,281,027.59	3,239,688.83	40.101634	-104.643148
1,325.00	0.30	158.06	1,324.97	0.88	-3.46	1,281,027.10	3,239,688.88	40.101632	-104.643147
1,425.00	0.28	199.16	1,424.97	0.41	-3.44	1,281,026.63	3,239,688.90	40.101631	-104.643147
1,525.00	0.28	188.25	1,524.97	-0.06	-3.55	1,281,026.15	3,239,688.79	40.101630	-104.643148
1,625.00	0.38	333.17	1,624.97	-0.01	-3.74	1,281,026.20	3,239,688.60	40.101630	-104.643148
1,675.00	0.25	52.98	1,674.97	0.21	-3.73	1,281,026.42	3,239,688.61	40.101630	-104.643148
<b>Final MS Energy Services Gyro @ 1675.00ft - Tie-On to Surface Gyros @ 1675.00ft</b>									
1,928.00	0.65	352.14	1,927.96	1.96	-3.48	1,281,028.17	3,239,688.84	40.101635	-104.643147
<b>First Sperry MWD Survey @ 1928.00ft</b>									
2,111.00	0.79	331.08	2,110.94	4.09	-4.23	1,281,030.30	3,239,688.07	40.101641	-104.643150
2,301.00	0.63	346.04	2,300.93	6.25	-5.12	1,281,032.45	3,239,687.16	40.101647	-104.643153
2,490.00	0.77	318.64	2,489.92	8.21	-6.21	1,281,034.40	3,239,686.05	40.101652	-104.643157
2,680.00	0.91	241.31	2,679.90	8.45	-8.38	1,281,034.61	3,239,683.88	40.101653	-104.643165
2,869.00	0.67	338.53	2,868.89	8.76	-10.10	1,281,034.91	3,239,682.16	40.101654	-104.643171
3,059.00	0.46	350.48	3,058.88	10.54	-10.63	1,281,036.69	3,239,681.61	40.101659	-104.643173
3,153.00	0.59	336.35	3,152.88	11.36	-10.89	1,281,037.50	3,239,681.34	40.101661	-104.643174
3,248.00	2.47	344.52	3,247.84	13.78	-11.63	1,281,039.91	3,239,680.58	40.101668	-104.643177
3,343.00	3.26	347.66	3,342.72	18.39	-12.75	1,281,044.51	3,239,679.41	40.101680	-104.643181
3,438.00	4.67	351.77	3,437.49	24.86	-13.88	1,281,050.97	3,239,678.22	40.101698	-104.643185
3,533.00	7.53	351.54	3,531.94	34.84	-15.35	1,281,060.94	3,239,676.65	40.101726	-104.643190
3,627.00	8.55	349.65	3,625.02	47.81	-17.51	1,281,073.88	3,239,674.36	40.101761	-104.643198
3,722.00	9.43	345.51	3,718.85	62.29	-20.73	1,281,088.33	3,239,671.01	40.101801	-104.643209
3,817.00	10.00	341.73	3,812.49	77.66	-25.26	1,281,103.66	3,239,666.33	40.101843	-104.643225
3,912.00	10.11	344.69	3,906.03	93.53	-30.05	1,281,119.48	3,239,661.39	40.101887	-104.643242
4,007.00	10.89	343.33	3,999.44	110.17	-34.83	1,281,136.08	3,239,656.45	40.101932	-104.643259
4,102.00	10.94	347.24	4,092.72	127.56	-39.39	1,281,153.42	3,239,651.72	40.101980	-104.643276
4,196.00	9.87	345.25	4,185.17	144.05	-43.41	1,281,169.87	3,239,647.54	40.102025	-104.643290
4,291.00	8.22	351.43	4,278.99	158.64	-46.50	1,281,184.43	3,239,644.31	40.102065	-104.643301
4,387.00	5.73	351.74	4,374.27	170.17	-48.21	1,281,195.94	3,239,642.49	40.102097	-104.643307
4,481.00	3.82	358.40	4,467.94	177.95	-48.97	1,281,203.71	3,239,641.65	40.102118	-104.643310
4,577.00	1.86	347.08	4,563.82	182.66	-49.41	1,281,208.42	3,239,641.17	40.102131	-104.643312
4,672.00	1.27	217.50	4,658.80	183.33	-50.40	1,281,209.08	3,239,640.18	40.102133	-104.643315
4,767.00	1.17	220.64	4,753.78	181.76	-51.67	1,281,207.49	3,239,638.92	40.102129	-104.643320
4,861.00	1.04	275.61	4,847.77	181.12	-53.14	1,281,206.84	3,239,637.45	40.102127	-104.643325
4,956.00	1.70	284.51	4,942.74	181.55	-55.36	1,281,207.25	3,239,635.23	40.102128	-104.643333
5,051.00	2.00	297.23	5,037.69	182.67	-58.20	1,281,208.34	3,239,632.38	40.102131	-104.643343
5,146.00	0.94	0.94	5,132.66	184.20	-59.66	1,281,209.86	3,239,630.90	40.102136	-104.643348
5,241.00	1.11	40.73	5,227.65	185.68	-59.05	1,281,211.34	3,239,631.50	40.102140	-104.643346
5,335.00	1.59	128.28	5,321.63	185.56	-57.43	1,281,211.24	3,239,633.12	40.102139	-104.643340
5,430.00	1.84	105.49	5,416.59	184.34	-54.93	1,281,210.04	3,239,635.63	40.102136	-104.643331

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
5,525.00	1.48	123.76	5,511.55	183.25	-52.44	1,281,208.97	3,239,638.13	40.102133	-104.643322
5,620.00	1.16	105.15	5,606.53	182.32	-50.49	1,281,208.06	3,239,640.09	40.102130	-104.643315
5,714.00	1.10	82.67	5,700.51	182.18	-48.68	1,281,207.94	3,239,641.91	40.102130	-104.643309
5,809.00	1.01	63.30	5,795.49	182.67	-47.02	1,281,208.45	3,239,643.55	40.102131	-104.643303
5,904.00	1.25	53.12	5,890.47	183.67	-45.45	1,281,209.47	3,239,645.12	40.102134	-104.643297
5,999.00	1.61	35.46	5,985.44	185.38	-43.84	1,281,211.19	3,239,646.71	40.102139	-104.643292
6,093.00	0.31	354.17	6,079.43	186.71	-43.10	1,281,212.53	3,239,647.43	40.102142	-104.643289
6,188.00	0.92	335.54	6,174.42	187.66	-43.45	1,281,213.47	3,239,647.08	40.102145	-104.643290
6,378.00	2.25	356.27	6,364.35	192.77	-44.32	1,281,218.57	3,239,646.16	40.102159	-104.643293
6,410.00	2.16	5.95	6,396.32	194.00	-44.30	1,281,219.80	3,239,646.17	40.102162	-104.643293
6,441.00	0.47	88.38	6,427.32	194.58	-44.11	1,281,220.39	3,239,646.35	40.102164	-104.643293
6,473.00	3.93	172.21	6,459.29	193.50	-43.83	1,281,219.31	3,239,646.64	40.102161	-104.643292
6,504.00	7.42	173.37	6,490.13	190.46	-43.46	1,281,216.27	3,239,647.05	40.102153	-104.643290
6,536.00	10.31	175.18	6,521.75	185.55	-42.98	1,281,211.37	3,239,647.57	40.102139	-104.643289
6,568.00	13.59	176.30	6,553.05	178.94	-42.49	1,281,204.77	3,239,648.12	40.102121	-104.643287
6,599.00	17.48	174.15	6,582.91	170.67	-41.78	1,281,196.50	3,239,648.91	40.102098	-104.643284
6,631.00	20.87	174.42	6,613.13	160.22	-40.74	1,281,186.06	3,239,650.06	40.102070	-104.643281
6,663.00	23.35	174.92	6,642.78	148.23	-39.62	1,281,174.08	3,239,651.29	40.102037	-104.643277
6,694.00	26.13	175.12	6,670.93	135.30	-38.50	1,281,161.17	3,239,652.54	40.102001	-104.643273
6,726.00	29.17	176.61	6,699.27	120.49	-37.44	1,281,146.37	3,239,653.74	40.101961	-104.643269
6,757.00	32.30	179.11	6,725.92	104.66	-36.86	1,281,130.55	3,239,654.47	40.101917	-104.643267
6,789.00	34.36	180.61	6,752.65	87.08	-36.83	1,281,112.97	3,239,654.68	40.101869	-104.643267
6,820.00	36.29	179.98	6,777.94	69.16	-36.92	1,281,095.05	3,239,654.76	40.101820	-104.643267
6,852.00	38.29	178.99	6,803.40	49.78	-36.74	1,281,075.67	3,239,655.12	40.101767	-104.643266
6,884.00	41.40	177.71	6,827.97	29.29	-36.14	1,281,055.18	3,239,655.92	40.101710	-104.643264
6,915.00	45.54	177.52	6,850.46	7.98	-35.25	1,281,033.89	3,239,657.01	40.101652	-104.643261
6,947.00	49.63	176.55	6,872.04	-15.61	-34.02	1,281,010.31	3,239,658.47	40.101587	-104.643257
6,978.00	53.60	174.73	6,891.28	-39.83	-32.17	1,280,986.11	3,239,660.56	40.101521	-104.643250
7,010.00	57.32	174.67	6,909.43	-66.07	-29.73	1,280,959.90	3,239,663.25	40.101449	-104.643241
7,042.00	60.94	174.84	6,925.84	-93.42	-27.22	1,280,932.58	3,239,666.02	40.101373	-104.643232
7,073.00	62.55	174.86	6,940.52	-120.61	-24.77	1,280,905.41	3,239,668.74	40.101299	-104.643224
7,105.00	63.49	174.49	6,955.03	-149.01	-22.12	1,280,877.04	3,239,671.66	40.101221	-104.643214
7,137.00	64.72	174.70	6,969.01	-177.66	-19.41	1,280,848.41	3,239,674.65	40.101142	-104.643204
7,168.00	65.32	176.10	6,982.10	-205.67	-17.16	1,280,820.43	3,239,677.17	40.101065	-104.643196
7,200.00	68.15	177.19	6,994.74	-235.02	-15.44	1,280,791.10	3,239,679.17	40.100985	-104.643190
7,231.00	70.33	179.82	7,005.73	-263.99	-14.69	1,280,762.14	3,239,680.20	40.100905	-104.643188
7,263.00	72.25	180.45	7,015.99	-294.30	-14.76	1,280,731.83	3,239,680.42	40.100822	-104.643188
7,294.00	73.17	181.06	7,025.21	-323.89	-15.15	1,280,702.24	3,239,680.32	40.100741	-104.643189
7,326.00	75.91	181.60	7,033.74	-354.72	-15.87	1,280,671.40	3,239,679.90	40.100656	-104.643192
7,358.00	79.71	181.00	7,040.49	-385.99	-16.58	1,280,640.13	3,239,679.49	40.100570	-104.643194
7,389.00	82.02	181.76	7,045.41	-416.58	-17.32	1,280,609.53	3,239,679.05	40.100486	-104.643197
7,421.00	85.18	182.10	7,048.98	-448.36	-18.39	1,280,577.75	3,239,678.29	40.100399	-104.643201
7,462.90	87.68	182.38	7,051.59	-490.15	-20.02	1,280,535.95	3,239,677.06	40.100284	-104.643207
<b>7" Casing Point @ 7462.9' MD :: 7051.59' TVD</b>									
7,537.00	92.10	182.86	7,051.73	-564.15	-23.40	1,280,461.92	3,239,674.39	40.100081	-104.643219
7,632.00	89.88	182.64	7,050.09	-659.02	-27.96	1,280,367.01	3,239,670.75	40.099821	-104.643235
7,727.00	90.06	181.43	7,050.14	-753.96	-31.33	1,280,272.05	3,239,668.29	40.099560	-104.643247
7,819.00	88.45	180.96	7,051.34	-845.93	-33.25	1,280,180.07	3,239,667.26	40.099308	-104.643254
7,911.00	88.08	181.17	7,054.12	-937.87	-34.96	1,280,088.12	3,239,666.44	40.099055	-104.643260
8,003.00	89.69	180.75	7,055.91	-1,029.84	-36.50	1,279,996.15	3,239,665.79	40.098803	-104.643265
8,094.00	89.01	180.46	7,056.94	-1,120.82	-37.46	1,279,905.16	3,239,665.71	40.098553	-104.643269
8,186.00	88.58	179.31	7,058.88	-1,212.80	-37.28	1,279,813.19	3,239,666.78	40.098301	-104.643268
8,278.00	88.45	179.41	7,061.26	-1,304.77	-36.25	1,279,721.25	3,239,668.70	40.098048	-104.643265
8,370.00	89.88	179.25	7,062.60	-1,396.75	-35.18	1,279,629.28	3,239,670.66	40.097796	-104.643261
8,462.00	91.05	179.32	7,061.86	-1,488.74	-34.03	1,279,537.31	3,239,672.70	40.097543	-104.643257

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
8,553.00	92.41	179.78	7,059.11	-1,579.69	-33.31	1,279,446.37	3,239,674.29	40.097294	-104.643254
8,645.00	92.54	180.76	7,055.14	-1,671.60	-33.75	1,279,354.47	3,239,674.75	40.097041	-104.643256
8,737.00	91.42	180.70	7,051.96	-1,763.54	-34.92	1,279,262.53	3,239,674.47	40.096789	-104.643260
8,829.00	88.27	181.53	7,052.21	-1,855.51	-36.71	1,279,170.55	3,239,673.56	40.096536	-104.643266
8,921.00	88.33	180.66	7,054.94	-1,947.45	-38.46	1,279,078.60	3,239,672.70	40.096284	-104.643272
9,012.00	88.45	180.42	7,057.49	-2,038.41	-39.32	1,278,987.64	3,239,672.72	40.096034	-104.643276
9,104.00	88.95	180.60	7,059.58	-2,130.38	-40.14	1,278,895.66	3,239,672.79	40.095782	-104.643278
9,196.00	90.06	180.18	7,060.37	-2,222.37	-40.77	1,278,803.67	3,239,673.05	40.095529	-104.643281
9,288.00	89.51	180.01	7,060.72	-2,314.37	-40.92	1,278,711.68	3,239,673.79	40.095277	-104.643281
9,380.00	89.20	178.88	7,061.76	-2,406.36	-40.03	1,278,619.71	3,239,675.57	40.095024	-104.643278
9,472.00	89.57	178.49	7,062.74	-2,498.33	-37.92	1,278,527.77	3,239,678.57	40.094772	-104.643271
9,563.00	89.88	178.69	7,063.18	-2,589.30	-35.68	1,278,436.83	3,239,681.68	40.094522	-104.643263
9,655.00	90.74	177.39	7,062.68	-2,681.24	-32.53	1,278,344.92	3,239,685.72	40.094270	-104.643251
9,747.00	89.01	177.75	7,062.88	-2,773.16	-28.63	1,278,253.05	3,239,690.51	40.094017	-104.643237
9,839.00	89.26	178.42	7,064.27	-2,865.09	-25.56	1,278,161.15	3,239,694.47	40.093765	-104.643226
9,931.00	89.44	179.33	7,065.32	-2,957.07	-23.75	1,278,069.20	3,239,697.16	40.093513	-104.643220
10,023.00	89.88	180.34	7,065.86	-3,049.07	-23.49	1,277,977.22	3,239,698.32	40.093260	-104.643219
10,115.00	89.51	179.50	7,066.35	-3,141.06	-23.36	1,277,885.23	3,239,699.33	40.093008	-104.643218
10,208.00	89.57	181.50	7,067.10	-3,234.05	-24.17	1,277,792.24	3,239,699.42	40.092752	-104.643221
10,299.00	89.63	180.57	7,067.73	-3,325.04	-25.81	1,277,701.25	3,239,698.66	40.092503	-104.643227
10,391.00	90.19	182.30	7,067.88	-3,417.00	-28.12	1,277,609.27	3,239,697.24	40.092250	-104.643235
10,483.00	90.43	182.14	7,067.38	-3,508.93	-31.68	1,277,517.31	3,239,694.57	40.091998	-104.643248
10,575.00	90.49	182.06	7,066.64	-3,600.87	-35.05	1,277,425.35	3,239,692.08	40.091745	-104.643260
10,670.00	90.31	181.00	7,065.98	-3,695.83	-37.59	1,277,330.38	3,239,690.47	40.091485	-104.643269
10,764.00	90.31	180.42	7,065.47	-3,789.82	-38.75	1,277,236.38	3,239,690.21	40.091227	-104.643274
10,860.00	90.00	180.35	7,065.21	-3,885.82	-39.40	1,277,140.39	3,239,690.49	40.090963	-104.643276
10,955.00	90.06	179.44	7,065.16	-3,980.82	-39.22	1,277,045.40	3,239,691.58	40.090702	-104.643275
11,050.00	89.88	178.80	7,065.21	-4,075.80	-37.76	1,276,950.43	3,239,693.96	40.090442	-104.643270
11,145.00	89.88	177.90	7,065.41	-4,170.76	-35.03	1,276,855.51	3,239,697.61	40.090181	-104.643260
11,240.00	89.94	177.37	7,065.56	-4,265.68	-31.11	1,276,760.63	3,239,702.45	40.089920	-104.643246
11,335.00	90.49	178.27	7,065.20	-4,360.61	-27.50	1,276,665.75	3,239,706.98	40.089660	-104.643233
11,430.00	90.00	181.48	7,064.79	-4,455.60	-27.29	1,276,570.77	3,239,708.11	40.089399	-104.643233
11,525.00	89.63	180.84	7,065.10	-4,550.58	-29.21	1,276,475.78	3,239,707.10	40.089138	-104.643239
11,620.00	89.57	180.52	7,065.76	-4,645.57	-30.34	1,276,380.79	3,239,706.89	40.088878	-104.643243
11,715.00	89.69	179.86	7,066.38	-4,740.57	-30.65	1,276,285.80	3,239,707.49	40.088617	-104.643245
11,810.00	91.36	181.15	7,065.51	-4,835.55	-31.49	1,276,190.81	3,239,707.57	40.088356	-104.643248
11,905.00	91.79	181.19	7,062.90	-4,930.50	-33.43	1,276,095.86	3,239,706.55	40.088095	-104.643254
12,000.00	91.36	180.12	7,060.29	-5,025.45	-34.52	1,276,000.90	3,239,706.39	40.087835	-104.643258
12,095.00	91.48	178.73	7,057.93	-5,120.42	-33.56	1,275,905.95	3,239,708.26	40.087574	-104.643255
12,190.00	92.17	180.52	7,054.91	-5,215.36	-32.94	1,275,811.02	3,239,709.79	40.087314	-104.643253
12,285.00	91.18	180.82	7,052.13	-5,310.31	-34.05	1,275,716.06	3,239,709.60	40.087053	-104.643257
12,380.00	88.51	181.61	7,052.39	-5,405.28	-36.07	1,275,621.08	3,239,708.51	40.086792	-104.643264
12,475.00	88.45	181.32	7,054.91	-5,500.22	-38.49	1,275,526.13	3,239,707.00	40.086532	-104.643273
12,570.00	88.58	181.30	7,057.37	-5,595.16	-40.66	1,275,431.18	3,239,705.74	40.086271	-104.643280
12,664.00	88.58	180.32	7,059.70	-5,689.12	-41.99	1,275,337.21	3,239,705.32	40.086013	-104.643285
12,759.00	89.01	180.20	7,061.70	-5,784.10	-42.42	1,275,242.24	3,239,705.81	40.085752	-104.643287
12,854.00	89.38	179.18	7,063.03	-5,879.09	-41.91	1,275,147.26	3,239,707.24	40.085492	-104.643285
12,949.00	89.51	178.59	7,063.95	-5,974.06	-40.06	1,275,052.31	3,239,710.01	40.085231	-104.643278
13,044.00	89.69	177.75	7,064.61	-6,069.01	-37.03	1,274,957.40	3,239,713.96	40.084970	-104.643267
13,139.00	89.69	178.74	7,065.13	-6,163.97	-34.12	1,274,862.49	3,239,717.78	40.084710	-104.643257
13,234.00	90.19	178.57	7,065.23	-6,258.94	-31.89	1,274,767.54	3,239,720.93	40.084449	-104.643249
13,329.00	90.68	178.43	7,064.51	-6,353.90	-29.40	1,274,672.61	3,239,724.33	40.084188	-104.643240
13,424.00	91.30	178.04	7,062.86	-6,448.84	-26.48	1,274,577.71	3,239,728.18	40.083928	-104.643230
13,519.00	90.19	178.05	7,061.63	-6,543.78	-23.24	1,274,482.81	3,239,732.33	40.083667	-104.643218
13,613.00	89.63	177.58	7,061.78	-6,637.71	-19.65	1,274,388.92	3,239,736.83	40.083409	-104.643205

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
13,709.00	89.69	177.70	7,062.35	-6,733.63	-15.70	1,274,293.05	3,239,741.71	40.083146	-104.643191
13,804.00	89.51	177.18	7,063.01	-6,828.53	-11.46	1,274,198.20	3,239,746.87	40.082885	-104.643176
13,899.00	89.63	176.78	7,063.72	-6,923.39	-6.45	1,274,103.39	3,239,752.79	40.082625	-104.643158
13,994.00	89.88	177.21	7,064.13	-7,018.26	-1.47	1,274,008.58	3,239,758.68	40.082364	-104.643140
14,090.00	89.94	176.71	7,064.28	-7,114.13	3.62	1,273,912.77	3,239,764.70	40.082101	-104.643122
14,169.00	89.75	177.06	7,064.49	-7,193.01	7.91	1,273,833.94	3,239,769.75	40.081885	-104.643107
<b>Final Sperry MWD Survey @ 14169.00ft</b>									
14,214.00	89.75	177.06	7,064.69	-7,237.95	10.22	1,273,789.02	3,239,772.50	40.081761	-104.643098
<b>Straight Line Proj @ 14,214' MD :: 7064.69' TVD</b>									



# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
Sparboe 8N-3HZ_SB	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-209.55	-4,048.99	1,280,777.59	3,235,645.72		
Point 2			0.00	-2,376.40	-4,047.93	1,278,610.94	3,235,667.72		
Point 3			0.00	-4,548.26	-4,045.06	1,276,439.30	3,235,691.58		
Point 4			0.00	-5,468.54	-4,050.29	1,275,519.05	3,235,695.24		
Point 5			0.00	-7,691.93	-4,077.77	1,273,295.58	3,235,689.25		
Point 6			0.00	-9,862.18	-4,097.37	1,271,125.33	3,235,690.62		
Point 7			0.00	-9,877.93	-1,915.02	1,271,130.67	3,237,872.93		
Point 8			0.00	-9,892.73	282.86	1,271,137.11	3,240,070.76		
Point 9			0.00	-7,711.63	298.55	1,273,318.17	3,240,065.38		
Point 10			0.00	-5,599.89	313.42	1,275,429.87	3,240,059.84		
Point 11			0.00	-4,679.40	313.20	1,276,350.28	3,240,050.73		
Point 12			0.00	-2,457.13	297.54	1,278,572.21	3,240,013.60		
Point 13			0.00	-233.58	281.09	1,280,795.40	3,239,975.66		
Point 14			0.00	-220.73	-1,883.95	1,280,787.33	3,237,810.69		
Sparboe 8N-3HZ_34/	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-4,995.05	-4,504.48	1,275,988.11	3,235,236.51		
Point 2			0.00	-5,072.18	-1,864.88	1,275,936.49	3,237,876.63		
Point 3			0.00	-5,153.68	776.58	1,275,880.52	3,240,518.65		
Sparboe 8N-3HZ_Sec	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	252.84	-4,509.24	1,281,235.50	3,235,181.05		
Point 2			0.00	-2,367.86	-4,507.96	1,278,615.04	3,235,207.65		
Point 3			0.00	-4,995.05	-4,504.48	1,275,988.11	3,235,236.51		
Point 4			0.00	-7,687.02	-4,537.76	1,273,296.05	3,235,229.25		
Point 5			0.00	-10,319.04	-4,561.53	1,270,664.03	3,235,230.91		
Point 6			0.00	-10,337.94	-1,918.30	1,270,670.67	3,237,874.10		
Point 7			0.00	-10,355.82	739.55	1,270,678.47	3,240,531.89		
Point 8			0.00	-7,713.93	758.57	1,273,320.32	3,240,525.38		
Point 9			0.00	-5,154.00	776.58	1,275,880.20	3,240,518.65		
Point 10			0.00	-2,465.67	757.63	1,278,568.11	3,240,473.73		
Point 11			0.00	223.73	737.74	1,281,257.09	3,240,427.85		
Point 12			0.00	239.30	-1,885.76	1,281,247.31	3,237,804.43		
Sparboe 8N-3HZ_BHI	0.00	0.00	7,065.00	-7,250.48	0.00	1,273,776.40	3,239,762.40	40.081727	-104.643135
- actual wellpath misses target center by 16.17ft at 14214.00ft MD (7064.69 TVD, -7237.95 N, 10.22 E)									
- Point									
Sparboe 8N-3HZ_1/2-	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-7,687.02	-4,537.76	1,273,296.05	3,235,229.25		
Point 2			0.00	-7,713.93	758.57	1,273,320.32	3,240,525.38		
Sparboe 8N-3HZ_LD	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Polygon									
Point 1			0.00	-233.58	281.09	1,280,795.40	3,239,975.66		
Point 2			0.00	-229.73	-117.72	1,280,795.40	3,239,576.85		
Point 3			0.00	-5,145.77	-74.42	1,275,880.20	3,239,667.65		
Point 4			0.00	-7,261.82	-88.13	1,273,764.20	3,239,674.38		
Point 5			0.00	-7,265.60	302.86	1,273,764.20	3,240,065.38		
Point 6			0.00	-4,679.40	313.20	1,276,350.28	3,240,050.73		

# Halliburton Company

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corp.	<b>Local Co-ordinate Reference:</b>	Well Sparboe 8N-3HZ
<b>Project:</b>	Weld County, CO (NAD 83)	<b>TVD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Site:</b>	Sec. 34-T2N-R65W	<b>MD Reference:</b>	RKB=25 @ 4995.00ft (HP 308)
<b>Well:</b>	Sparboe 8N-3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C Rev 0	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Actual Field Surveys	<b>Database:</b>	EDM 2003.16 Single User Db

Sparboe 8N-3HZ_SHI	0.00	0.00	0.00	0.00	0.00	1,281,026.25	3,239,692.34	40.101630	-104.643135
- actual wellpath hits target center									
- Point									
Sparboe 8N-3HZ_WP	0.00	0.00	7,062.47	-3,800.00	-60.00	1,277,226.00	3,239,669.06	40.091199	-104.643349
- actual wellpath misses target center by 21.38ft at 10774.33ft MD (7065.42 TVD, -3800.15 N, -38.83 E)									
- Point									
Sparboe 8N-3HZ_BHI	0.00	0.00	7,065.00	-7,250.48	101.86	1,273,777.38	3,239,864.25	40.081727	-104.642771
- actual wellpath misses target center by 92.49ft at 14214.00ft MD (7064.69 TVD, -7237.95 N, 10.22 E)									
- Point									

Casing Points						
Measured Depth (ft)	Vertical Depth (ft)	Name			Casing Diameter (")	Hole Diameter (")
7,462.90	7,051.59	7" Casing Point @ 7462.9' MD :: 7051.59' TVD			7	8-3/4

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	0.13	-0.75	First MS Energy Services Gyro @ 125.00ft
1,675.00	1,674.97	0.21	-3.73	Final MS Energy Services Gyro @ 1675.00ft
1,675.00	1,674.97	0.21	-3.73	Tie-On to Surface Gyros @ 1675.00ft
1,928.00	1,927.96	1.96	-3.48	First Sperry MWD Survey @ 1928.00ft
14,169.00	7,064.49	-7,193.01	7.91	Final Sperry MWD Survey @ 14169.00ft
14,214.00	7,064.69	-7,237.95	10.22	Straight Line Proj @ 14,214' MD :: 7064.69' TVD

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