

Project: Weld County, CO (NAD 83)
Site: Sec. 17-T2N-R65W
Well: Melbon 23C-8HZ
Wellbore: Plan B Rev 0
Design: Actual Field Surveys



Straight Line Proj @ 11888' MD :: 7312.31' TVD

BHL: -2155.81' FNL, -2417.30' FEL
Lat/Long: 40.151878 N, -104.688549 E
State Planes - CO Northern: 1,299,210.33' N, 3,226,821.43' E
Location: Sec. 8-T2N-R65W

Final Sperry MWD Survey @ 11839.00ft

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

Sec. 8-T2N-R65W

Sec. 17-T2N-R65W

7" Casing @ 7834.9' MD :: 7318.78' TVD

7" Casing: -1877.04' FNL, -2378.33' FWL
Lat/Long: 40.140807 N, -104.688820 E
State Planes - CO Northern: 1,295,176.96' N, 3,226,782.70' E
Location: Sec. 17-T2N-R65W

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

LEGEND

- Melbon 23C-8HZ, Plan B Rev 0, Plan B Rev 0 Proposal V0
- Actual Field Survey Hudson 13N-35HZ

Xtreme 22: RKB = 16ft

First MS Energy Services Gyro @ 116.00ft

Final MS Energy Services Gyro @ 981.00ft

Tie-On to Surface Gyros @ 981.00ft

First Sperry MWD Survey @ 1162.00ft

Final Sperry MWD Survey @ 11839.00ft

7" Casing @ 7834.9' MD :: 7318.78' TVD

Straight Line Proj @ 11888' MD :: 7312.31' TVD

Vertical Section at 0.93° (2000 ft/in)

WELL DETAILS: Melbon 23C-8HZ

Ground Level: 4948.00

RKB=16 @ 4964.00ft (Xtreme 22)

Design: Actual Field Surveys (Melbon 23C-8HZ/Plan B Rev 0)

Created By: Fred Hartmann Date: 05/17/2013

Reviewed: Date:

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 17-T2N-R65W

Melbon 23C-8HZ

Plan B Rev 0

Design: Actual Field Surveys

Sperry Drilling Services Standard Report

17 May, 2013

Well Coordinates: 1,294,543.81 N, 3,225,559.59 E (40° 08' 20.76" N, 104° 41' 35.57" W)

Ground Level: 4,948.00 ft

Local Coordinate Origin:

Centered on Well Melbon 23C-8HZ

Viewing Datum:

RKB=16 @ 4964.00ft (Xtreme 22)

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 Melbon 23C-8HZ - 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
16.00	0.00	0.00	16.00	0.00	0.00	0.00	0.00
Xtreme 22: RKB = 16ft							
116.00	0.19	286.34	116.00	0.05	-0.16	0.04	0.19
First MS Energy Services Gyro @ 116.00ft							
216.00	0.09	214.93	216.00	0.03	-0.36	0.02	0.18
316.00	0.14	356.87	316.00	0.09	-0.41	0.08	0.22
416.00	0.15	129.84	416.00	0.12	-0.32	0.12	0.27
516.00	0.20	146.46	516.00	-0.10	-0.12	-0.11	0.07
616.00	0.27	339.80	616.00	-0.03	-0.11	-0.03	0.47
716.00	0.22	283.38	716.00	0.24	-0.38	0.23	0.24
816.00	0.34	245.28	816.00	0.16	-0.83	0.14	0.22
916.00	0.31	247.11	916.00	-0.07	-1.35	-0.09	0.03
981.00	0.50	283.49	980.99	-0.07	-1.79	-0.10	0.48
Final MS Energy Services Gyro @ 981.00ft - Tie-On to Surface Gyros @ 981.00ft							
1,162.00	0.28	233.31	1,161.99	-0.15	-2.91	-0.20	0.21
First Sperry MWD Survey @ 1162.00ft							
1,254.00	0.15	242.11	1,253.99	-0.35	-3.20	-0.40	0.15
1,344.00	0.35	256.65	1,343.99	-0.46	-3.57	-0.52	0.23
1,434.00	0.34	328.35	1,433.99	-0.30	-3.98	-0.36	0.45
1,527.00	2.00	105.01	1,526.97	-0.49	-2.56	-0.53	2.43
1,618.00	4.01	99.17	1,617.84	-1.40	2.12	-1.37	2.23
1,710.00	5.87	99.29	1,709.49	-2.68	9.94	-2.51	2.02
1,801.00	7.77	95.81	1,799.85	-4.05	20.65	-3.71	2.14
1,893.00	8.89	96.53	1,890.87	-5.49	33.90	-4.94	1.22
1,984.00	10.09	97.82	1,980.63	-7.37	48.79	-6.58	1.34
2,075.00	13.44	100.90	2,069.70	-10.46	67.07	-9.37	3.74
2,167.00	13.00	99.17	2,159.27	-14.13	87.79	-12.70	0.64
2,259.00	11.88	97.98	2,249.11	-17.09	107.38	-15.35	1.25
2,350.00	12.03	89.24	2,338.14	-18.27	126.14	-16.22	1.99
2,443.00	10.81	87.84	2,429.30	-17.81	144.55	-15.46	1.35
2,535.00	10.09	99.44	2,519.78	-18.81	161.12	-16.19	2.41
2,626.00	8.38	97.16	2,609.60	-20.94	175.57	-18.09	1.92
2,718.00	8.33	96.34	2,700.62	-22.51	188.84	-19.44	0.14
2,810.00	9.90	92.98	2,791.46	-23.66	203.36	-20.36	1.80
2,902.00	10.87	97.41	2,881.95	-25.19	219.86	-21.62	1.36
2,994.00	11.88	94.97	2,972.14	-27.13	237.90	-23.26	1.22
3,086.00	12.77	93.70	3,062.02	-28.61	257.48	-24.42	1.01
3,171.00	13.91	96.33	3,144.73	-30.34	277.01	-25.84	1.52
3,257.00	13.00	95.78	3,228.37	-32.45	296.91	-27.63	1.07
3,342.00	11.83	93.08	3,311.38	-33.88	315.12	-28.76	1.54
3,428.00	12.07	96.70	3,395.51	-35.41	332.86	-30.00	0.91
3,514.00	13.21	96.44	3,479.43	-37.56	351.55	-31.85	1.33
3,599.00	12.17	94.98	3,562.35	-39.42	370.13	-33.41	1.28
3,685.00	12.93	95.57	3,646.30	-41.14	388.74	-34.83	0.90
3,771.00	13.21	96.84	3,730.07	-43.25	408.07	-36.62	0.47
3,856.00	11.08	99.96	3,813.16	-45.82	425.76	-38.90	2.62
3,942.00	12.33	94.58	3,897.37	-47.98	443.05	-40.78	1.93
4,028.00	14.01	91.18	3,981.11	-48.93	462.61	-41.41	2.15
4,114.00	13.70	90.64	4,064.61	-49.26	483.21	-41.41	0.39

Design Report for Melbon 23C-8HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,199.00	13.92	89.52	4,147.15	-49.28	503.49	-41.11	0.41
4,285.00	12.91	95.42	4,230.81	-50.10	523.40	-41.60	1.98
4,371.00	11.39	95.79	4,314.88	-51.87	541.42	-43.07	1.77
4,456.00	13.31	98.64	4,397.91	-54.19	559.44	-45.10	2.37
4,542.00	13.08	100.45	4,481.64	-57.44	578.80	-48.04	0.55
4,627.00	13.38	91.73	4,564.39	-59.48	598.09	-49.76	2.37
4,713.00	12.83	94.16	4,648.15	-60.47	617.56	-50.44	0.91
4,799.00	13.83	91.97	4,731.83	-61.52	637.36	-51.17	1.30
4,884.00	13.24	90.54	4,814.47	-61.96	657.24	-51.28	0.80
4,970.00	12.64	86.95	4,898.29	-61.55	676.49	-50.56	1.17
5,056.00	12.11	90.04	4,982.29	-61.06	694.91	-49.77	0.99
5,141.00	12.97	85.91	5,065.27	-60.38	713.34	-48.80	1.46
5,227.00	12.61	88.42	5,149.13	-59.44	732.35	-47.54	0.77
5,312.00	14.14	90.01	5,231.83	-59.18	752.01	-46.97	1.85
5,398.00	13.12	90.56	5,315.40	-59.28	772.27	-46.74	1.20
5,484.00	12.39	93.03	5,399.28	-59.86	791.25	-47.01	1.06
5,570.00	13.48	94.19	5,483.10	-61.08	810.46	-47.92	1.30
5,655.00	12.07	94.72	5,565.99	-62.54	829.20	-49.07	1.66
5,741.00	12.65	97.46	5,650.00	-64.50	847.49	-50.74	0.96
5,827.00	13.70	96.61	5,733.73	-66.90	866.95	-52.82	1.24
5,912.00	13.62	98.45	5,816.33	-69.52	886.85	-55.12	0.52
5,998.00	14.56	94.76	5,899.74	-71.91	907.64	-57.17	1.51
6,084.00	12.69	93.28	5,983.32	-73.35	927.84	-58.28	2.21
6,169.00	13.19	96.21	6,066.16	-74.93	946.80	-59.55	0.97
6,255.00	13.76	95.67	6,149.79	-77.00	966.73	-61.30	0.68
6,340.00	13.37	92.02	6,232.42	-78.35	986.62	-62.32	1.11
6,426.00	13.74	87.81	6,316.03	-78.31	1,006.76	-61.96	1.23
6,512.00	13.86	83.39	6,399.55	-76.73	1,027.20	-60.05	1.23
6,597.00	13.64	80.44	6,482.11	-73.90	1,047.19	-56.89	0.86
6,640.00	12.96	79.75	6,523.96	-72.20	1,056.94	-55.03	1.62
6,699.00	12.17	75.60	6,581.55	-69.47	1,069.47	-52.10	2.03
6,742.00	13.89	58.22	6,623.46	-65.62	1,078.26	-48.11	9.90
6,785.00	15.21	48.90	6,665.08	-59.20	1,086.89	-41.55	6.24
6,827.00	18.84	43.33	6,705.24	-50.64	1,095.70	-32.85	9.47
6,870.00	22.90	42.05	6,745.41	-39.37	1,106.08	-21.41	9.50
6,913.00	25.69	41.13	6,784.60	-26.14	1,117.81	-7.99	6.55
6,956.00	27.59	37.97	6,823.03	-11.26	1,130.07	7.08	5.51
6,998.00	27.12	36.29	6,860.34	4.12	1,141.72	22.65	2.15
7,041.00	28.87	32.82	6,898.31	20.75	1,153.15	39.46	5.56
7,084.00	30.65	29.60	6,935.64	39.00	1,164.19	57.89	5.56
7,129.00	32.17	26.13	6,974.04	59.73	1,175.13	78.80	5.25
7,170.00	35.73	20.52	7,008.06	80.76	1,184.14	99.97	11.56
7,213.00	38.81	18.07	7,042.27	105.33	1,192.73	124.68	7.95
7,255.00	39.60	16.03	7,074.82	130.71	1,200.51	150.18	3.60
7,298.00	40.44	14.77	7,107.75	157.37	1,207.85	176.95	2.71
7,341.00	44.21	14.30	7,139.54	185.39	1,215.11	205.09	8.80
7,384.00	47.44	15.62	7,169.50	215.18	1,223.08	235.00	7.83
7,427.00	50.22	12.63	7,197.80	246.57	1,230.96	266.51	8.32
7,470.00	54.76	8.92	7,223.99	280.06	1,237.30	300.11	12.58
7,512.00	58.62	6.48	7,247.05	314.84	1,241.98	334.95	10.39
7,555.00	63.53	6.11	7,267.84	352.23	1,246.10	372.41	11.44

Design Report for Melbon 23C-8HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,598.00	67.69	3.87	7,285.60	391.24	1,249.50	411.47	10.77
7,641.00	72.65	359.98	7,300.18	431.64	1,250.83	451.89	14.33
7,684.00	78.44	356.44	7,310.92	473.24	1,249.52	493.45	15.65
7,727.00	84.37	353.73	7,317.34	515.57	1,245.87	535.73	15.13
7,777.00	90.40	350.56	7,319.62	565.02	1,239.04	585.06	13.62
7,795.00	90.74	349.70	7,319.44	582.75	1,235.96	602.74	5.14
7,834.90	91.17	349.84	7,318.78	622.01	1,228.87	641.88	1.12
7" Casing @ 7834.9' MD :: 7318.78' TVD							
7,899.00	91.85	350.06	7,317.09	685.11	1,217.69	704.78	1.12
7,939.00	92.10	349.95	7,315.71	724.48	1,210.75	744.03	0.68
8,025.00	90.00	351.12	7,314.14	809.29	1,196.61	828.60	2.80
8,110.00	88.58	351.42	7,315.19	893.29	1,183.71	912.39	1.71
8,195.00	89.75	352.23	7,316.43	977.42	1,171.63	996.31	1.67
8,280.00	89.63	352.45	7,316.89	1,061.66	1,160.30	1,080.35	0.29
8,366.00	89.07	352.64	7,317.86	1,146.93	1,149.14	1,165.43	0.69
8,452.00	89.63	353.51	7,318.84	1,232.29	1,138.77	1,250.61	1.20
8,537.00	90.06	356.41	7,319.07	1,316.95	1,131.30	1,335.14	3.45
8,622.00	90.31	357.92	7,318.80	1,401.85	1,127.10	1,419.96	1.80
8,708.00	91.11	359.86	7,317.73	1,487.82	1,125.43	1,505.89	2.44
8,793.00	91.42	2.19	7,315.85	1,572.78	1,126.95	1,590.86	2.76
8,879.00	91.36	1.72	7,313.77	1,658.70	1,129.89	1,676.82	0.55
8,964.00	91.48	5.15	7,311.66	1,743.51	1,134.98	1,761.70	4.04
9,050.00	90.49	4.23	7,310.18	1,829.21	1,142.01	1,847.50	1.57
9,136.00	90.93	5.20	7,309.12	1,914.91	1,149.08	1,933.31	1.24
9,221.00	89.57	5.59	7,308.74	1,999.53	1,157.07	2,018.05	1.66
9,307.00	89.75	7.38	7,309.25	2,084.98	1,166.78	2,103.64	2.09
9,393.00	90.06	7.11	7,309.40	2,170.29	1,177.63	2,189.12	0.48
9,478.00	89.81	7.56	7,309.49	2,254.59	1,188.48	2,273.59	0.61
9,564.00	89.26	8.84	7,310.19	2,339.71	1,200.74	2,358.89	1.62
9,650.00	89.14	7.74	7,311.39	2,424.80	1,213.14	2,444.17	1.29
9,735.00	91.55	6.90	7,310.88	2,509.10	1,223.97	2,528.63	3.00
9,821.00	89.94	7.03	7,309.76	2,594.45	1,234.40	2,614.15	1.88
9,907.00	91.11	7.94	7,308.97	2,679.72	1,245.60	2,699.58	1.72
9,992.00	91.67	8.73	7,306.91	2,763.79	1,257.92	2,783.85	1.14
10,078.00	90.43	8.23	7,305.34	2,848.84	1,270.60	2,869.08	1.55
10,164.00	89.75	7.56	7,305.20	2,934.02	1,282.41	2,954.45	1.11
10,250.00	90.31	5.98	7,305.16	3,019.42	1,292.55	3,040.00	1.95
10,335.00	89.51	5.32	7,305.29	3,104.00	1,300.92	3,124.71	1.22
10,421.00	89.44	4.38	7,306.08	3,189.69	1,308.19	3,210.50	1.10
10,507.00	89.38	3.31	7,306.96	3,275.49	1,313.95	3,296.39	1.25
10,593.00	90.56	1.74	7,307.01	3,361.40	1,317.74	3,382.35	2.28
10,678.00	91.48	1.76	7,305.50	3,446.35	1,320.34	3,467.33	1.08
10,764.00	91.36	1.59	7,303.36	3,532.29	1,322.85	3,553.29	0.24
10,850.00	89.38	358.73	7,302.81	3,618.27	1,323.09	3,639.27	4.04
10,935.00	88.39	357.67	7,304.46	3,703.21	1,320.42	3,724.15	1.71
11,021.00	90.12	357.36	7,305.58	3,789.12	1,316.69	3,809.99	2.04
11,106.00	88.46	356.37	7,306.63	3,873.98	1,312.04	3,894.77	2.27
11,192.00	88.08	356.66	7,309.23	3,959.78	1,306.82	3,980.47	0.56
11,278.00	86.72	356.41	7,313.13	4,045.53	1,301.63	4,066.13	1.61
11,364.00	86.59	358.47	7,318.15	4,131.30	1,297.79	4,151.82	2.40
11,449.00	89.13	0.35	7,321.32	4,216.22	1,296.92	4,236.72	3.72

Design Report for Melbon 23C-8HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
11,535.00	91.92	1.35	7,320.54	4,302.20	1,298.19	4,322.70	3.45
11,620.00	92.35	0.76	7,317.37	4,387.13	1,299.76	4,407.65	0.86
11,706.00	90.68	0.94	7,315.10	4,473.08	1,301.03	4,493.61	1.95
11,839.00	90.99	1.08	7,313.16	4,606.05	1,303.38	4,626.60	0.26
Final Sperry MWD Survey @ 11839.00ft							
11,888.00	90.99	1.08	7,312.31	4,655.03	1,304.30	4,675.59	0.00
Straight Line Proj @ 11888' MD :: 7312.31' TVD							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
16.00	16.00	0.00	0.00	Xtreme 22: RKB = 16ft
116.00	116.00	0.05	-0.16	First MS Energy Services Gyro @ 116.00ft
981.00	980.99	-0.07	-1.79	Final MS Energy Services Gyro @ 981.00ft
981.00	980.99	-0.07	-1.79	Tie-On to Surface Gyros @ 981.00ft
1,162.00	1,161.99	-0.15	-2.91	First Sperry MWD Survey @ 1162.00ft
11,839.00	7,313.16	4,606.05	1,303.38	Final Sperry MWD Survey @ 11839.00ft
11,888.00	7,312.31	4,655.03	1,304.30	Straight Line Proj @ 11888' MD :: 7312.31' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	0.93	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
16.00	981.00	MS Energy Services - Surface Gyros	NS-GYRO-MS
1,162.00	7,795.00	Sperry MWD Surveys - Vert/Build	MWD+SC
7,899.00	11,839.00	Sperry MWD Surveys - Lateral	MWD+SC

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,834.90	7,318.78	7" Casing @ 7834.9' MD :: 7318.78' TVD	7	8-3/4