

CERTIFIED SURVEY SHEET

HALLIBURTON

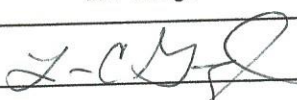
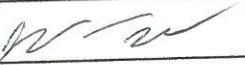
Sperry Drilling

OPERATOR:	Anadarko Petroleum Corp.		
WELL:	Melba 27N-14HZ		
FIELD:	Wattenberg		
GRADED ELEVATION:	4961	ft. above MSL	
RIG FLOOR (KB) HEIGHT:	13		
TVD REFERENCE:	4974	ft. above MSL	
RIG:	Ensign 123		
LEGALS:	Sec. 23	Twn. 3N	Rng. 66W
COUNTY	Weld		
STATE:	Colorado		
CAL. METHOD:	Minimum Curvature		
NORTH REFERENCE:	True	Declination:	8.50°
VERTICAL SEC. DIR.:	359.99		

SSDS Job Number:	901205056
Start Date of Job:	4/25/2014
End Date of Job:	5/17/2014
Lead Directional Driller:	Bryan Seghetti
	Levi George
Other SSDS DDs:	John Rizzuti
SSDS MWDs:	James Tilley
	Evan Ponder

Hole Section	Surface	Intermediate	Production	1st Sidetrack	2nd Sidetrack	3rd Sidetrack	4th Sidetrack
Hole Size	13 1/2	8 3/4	6 1/8				
Casing Size	9 5/8	7	4 1/2				
Casing Depth	1221	7701					
Survey Type	MWD+IFR+SC	MWD+IFR+SC	MWD+IFR+SC				
Tie-On Depth	0	1177	7663				
First Survey Depth	142	1237	7729				
Last Survey Depth	1177	7663	13737				
Bit Projection	1230	7711	13782				

The following Halliburton - Sperry Drilling personnel, do certify the above information to be accurate:

Print Name:	Levi George	Print Name:	
Sign Name:		Sign Name:	
Print Name:	James Tilley	Print Name:	
Sign Name:		Sign Name:	

Examples of Survey

Types:

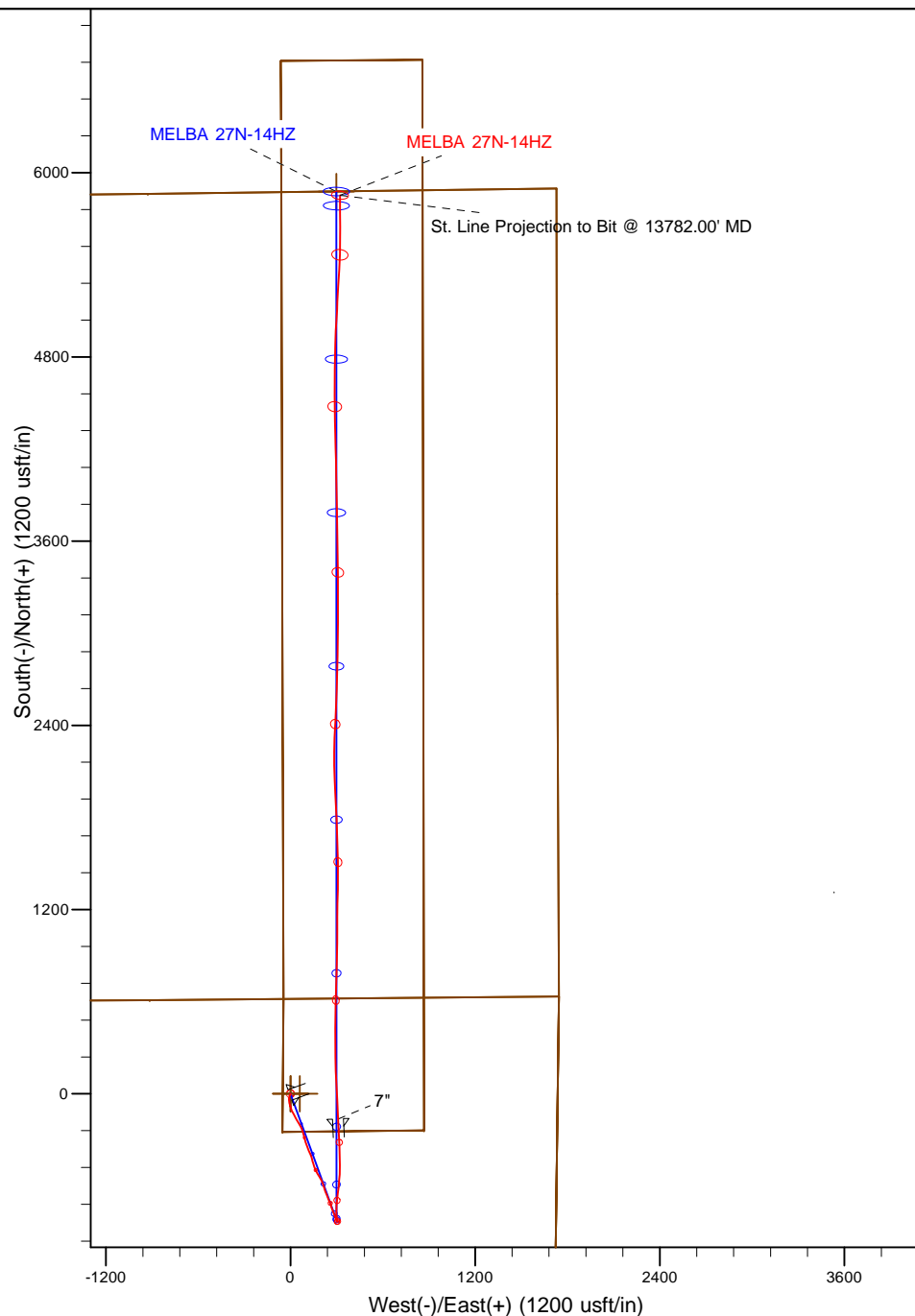
Tie-On to Surface Casing (Assumed Vertical), Tie-On to existing MWD Survey (prior drilled hole)
 Gyro Surveys - Provided by third party vendor
 MWD - Halliburton-Sperry Drilling - Measurement While Drilling Surveys
 MWD+IFR - Measurement While Drilling Surveys + In-Field Referencing services

Version 1.2

Project: Weld County, CO (NAD 83)
 Site: Sec. 23-T3N-R66W
 Well: MELBA 27N-14HZ
 Wellbore: Plan A
 Design: Actual Field Surveys

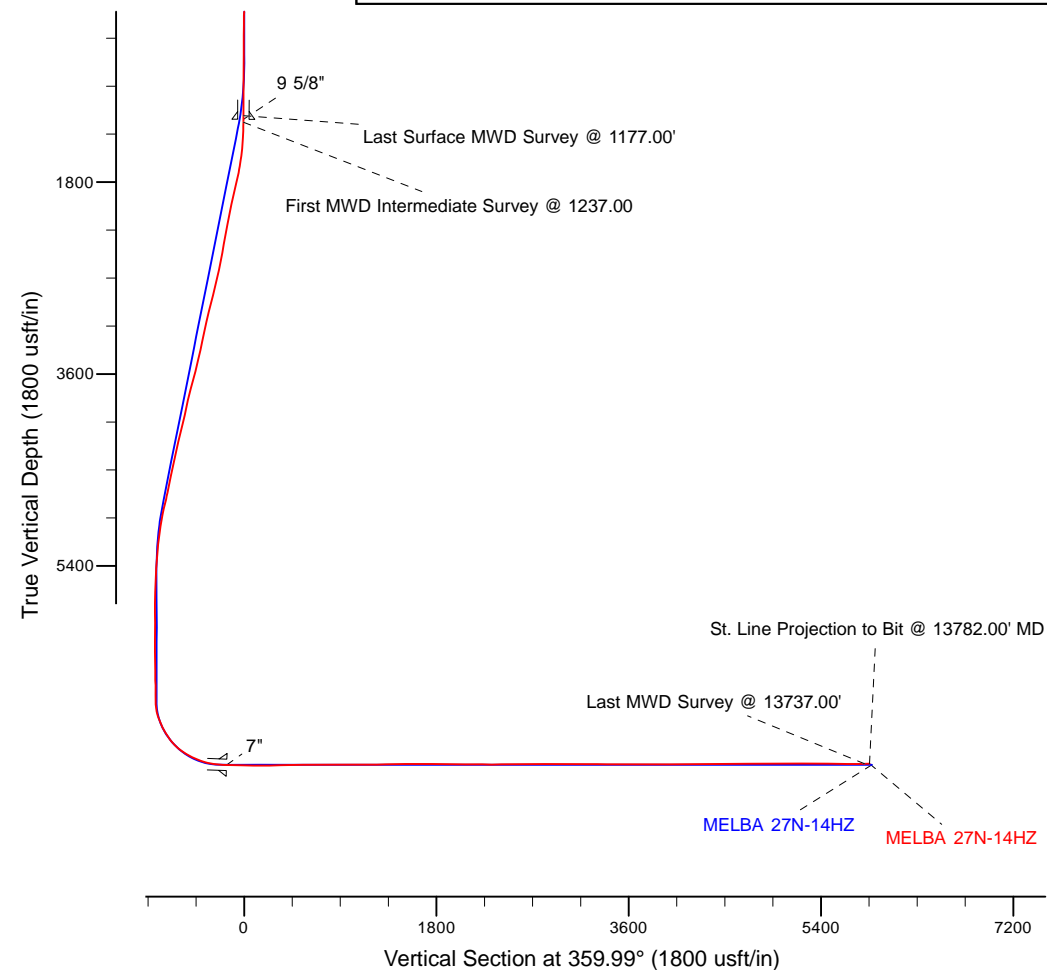


HALLIBURTON
 Sperry Drilling



LEGEND

- MELBA 27N-14HZ, Plan A, Rev A0 V0
- Actual Field Surveys



7" Casing: ~785.14' FNL, ~1425.00' FEL
 Lat/Long: 40.215713 N, -104.739897 E
 State Planes - CO Northern: 1,322,336.10' N, 3,212,269.45' E
 Location: Sec. 23-T3N-R66W

BHL: ~25.11' FNL, ~1406.78' FEL
 Lat/Long: 40.232231 N, -104.739854 E
 State Planes - CO Northern: 1,328,353.50' N, 3,212,230.01' E
 Location: Sec. 14-T3N-R66W

WELL DETAILS: MELBA 27N-14HZ	
Ground Level:	4961.00
RKB= 13' @ 4974.00usft (Ensign 123)	
Design: Actual Field Surveys (MELBA 27N-14HZ/Plan A)	
Created By: Katie Benner	Date: 8/25/2014
Reviewed: _____	Date: _____

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 23-T3N-R66W

MELBA 27N-14HZ

Job# 901205056:: API: 05-123-39002

Plan A

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

25 August, 2014

Surface UWI : Job# 901205056:: API: 05-123-39002

Well Coordinates: 1,322,497.47 N, 3,211,958.88 E (40° 12' 58.19" N, 104° 44' 27.61" W)

Ground Level: 4,961.00 usft

Local Coordinate Origin:

Centered on Well MELBA 27N-14HZ

Viewing Datum:

RKB= 13' @ 4974.00usft (Ensign 123)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
142.00	0.37	149.11	142.00	-0.39	0.24	-0.39	0.26
236.00	0.76	194.54	235.99	-1.26	0.23	-1.26	0.60
329.00	0.53	179.53	328.99	-2.28	0.08	-2.28	0.30
423.00	0.39	186.20	422.99	-3.04	0.05	-3.04	0.16
516.00	0.36	203.06	515.98	-3.62	-0.10	-3.62	0.12
609.00	0.39	207.41	608.98	-4.17	-0.36	-4.17	0.04
703.00	0.37	232.36	702.98	-4.64	-0.74	-4.64	0.18
798.00	0.51	209.90	797.98	-5.19	-1.20	-5.19	0.23
893.00	0.56	200.26	892.97	-6.00	-1.57	-6.00	0.11
988.00	0.66	223.16	987.97	-6.83	-2.10	-6.83	0.28
1,082.00	0.53	223.50	1,081.96	-7.54	-2.77	-7.54	0.14
1,177.00	0.46	231.37	1,176.96	-8.10	-3.37	-8.10	0.10
Last Surface MWD Survey @ 1177.00'							
1,211.00	0.68	249.98	1,210.96	-8.25	-3.67	-8.25	0.83
9 5/8"							
1,237.00	0.87	257.39	1,236.95	-8.35	-4.01	-8.35	0.83
First MWD Intermediate Survey @ 1237.00							
1,272.00	0.98	248.54	1,271.95	-8.51	-4.54	-8.51	0.51
1,367.00	2.38	205.47	1,366.91	-10.59	-6.15	-10.59	1.89
1,462.00	5.16	191.96	1,461.70	-16.55	-7.88	-16.55	3.05
1,558.00	7.91	185.40	1,557.07	-27.36	-9.40	-27.35	2.96
1,652.00	10.03	179.23	1,649.91	-41.98	-9.90	-41.98	2.47
1,745.00	11.97	168.18	1,741.21	-59.52	-7.81	-59.52	3.07
1,839.00	13.86	161.94	1,832.83	-79.77	-2.33	-79.77	2.50
1,932.00	13.41	160.73	1,923.21	-100.54	4.69	-100.54	0.57
2,026.00	12.94	152.77	2,014.74	-120.19	13.10	-120.19	1.99
2,119.00	12.28	150.53	2,105.50	-138.06	22.73	-138.07	0.88
2,213.00	12.65	153.97	2,197.29	-156.01	32.17	-156.02	0.88
2,400.00	11.93	145.87	2,380.01	-190.41	52.00	-190.42	1.00
2,494.00	11.96	149.79	2,471.98	-206.87	62.35	-206.88	0.86
2,587.00	11.96	157.11	2,562.97	-224.08	70.95	-224.09	1.63
2,681.00	12.61	161.68	2,654.82	-242.79	77.96	-242.81	1.24
2,774.00	14.20	165.40	2,745.28	-263.47	84.03	-263.49	1.94
2,868.00	14.40	164.44	2,836.37	-285.89	90.07	-285.90	0.33
2,961.00	14.63	163.88	2,926.40	-308.31	96.43	-308.33	0.29
3,055.00	14.85	162.64	3,017.31	-331.21	103.32	-331.23	0.41
3,148.00	13.56	157.08	3,107.46	-352.63	111.12	-352.65	2.02
3,241.00	13.18	156.86	3,197.94	-372.42	119.54	-372.44	0.41
3,335.00	13.05	154.90	3,289.49	-391.89	128.25	-391.91	0.49
3,425.00	13.26	163.92	3,377.14	-411.01	135.42	-411.03	2.29
3,515.00	12.82	165.64	3,464.82	-430.60	140.76	-430.62	0.65
3,605.00	14.53	163.84	3,552.27	-451.12	146.37	-451.14	1.96
3,695.00	16.03	161.57	3,639.08	-473.75	153.45	-473.78	1.79
3,785.00	16.00	152.59	3,725.60	-496.56	163.09	-496.58	2.75
3,875.00	15.23	149.90	3,812.28	-517.80	174.72	-517.83	1.17
3,965.00	14.59	148.99	3,899.25	-537.74	186.49	-537.77	0.76
4,055.00	14.15	151.52	3,986.44	-557.12	197.58	-557.16	0.85
4,145.00	14.49	159.29	4,073.65	-577.33	206.81	-577.36	2.17
4,235.00	14.60	161.98	4,160.76	-598.65	214.30	-598.68	0.76

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,325.00	14.36	162.08	4,247.91	-620.05	221.24	-620.09	0.27
4,415.00	13.33	160.39	4,335.29	-640.44	228.16	-640.48	1.23
4,594.00	12.54	156.94	4,509.75	-677.76	242.70	-677.81	0.62
4,684.00	12.31	156.18	4,597.64	-695.53	250.40	-695.57	0.31
4,774.00	12.00	157.37	4,685.62	-712.94	257.87	-712.99	0.44
4,864.00	13.60	163.55	4,773.39	-731.73	264.47	-731.78	2.34
4,954.00	13.33	162.72	4,860.91	-751.78	270.55	-751.83	0.37
5,044.00	11.40	156.88	4,948.83	-769.87	277.12	-769.92	2.55
5,134.00	9.48	156.73	5,037.33	-784.86	283.54	-784.91	2.13
5,224.00	7.63	159.97	5,126.33	-797.29	288.52	-797.34	2.12
5,404.00	4.24	161.39	5,305.34	-814.83	294.74	-814.88	1.88
5,494.00	3.90	163.33	5,395.11	-820.91	296.68	-820.96	0.41
5,584.00	4.15	161.86	5,484.89	-826.94	298.57	-826.99	0.30
5,674.00	1.82	157.72	5,574.76	-831.36	300.12	-831.41	2.60
5,763.00	1.47	148.02	5,663.72	-833.63	301.27	-833.68	0.50
5,853.00	0.20	114.68	5,753.71	-834.68	302.02	-834.73	1.45
5,943.00	0.35	53.24	5,843.71	-834.58	302.38	-834.63	0.34
6,033.00	0.41	31.59	5,933.71	-834.14	302.77	-834.19	0.17
6,213.00	1.27	129.36	6,113.69	-834.86	304.65	-834.91	0.77
6,303.00	1.18	44.67	6,203.68	-834.83	306.07	-834.88	1.84
6,393.00	0.98	26.80	6,293.66	-833.48	307.07	-833.54	0.43
6,483.00	0.82	2.55	6,383.65	-832.15	307.45	-832.21	0.45
6,573.00	0.62	331.79	6,473.64	-831.08	307.25	-831.13	0.48
6,663.00	0.79	305.55	6,563.64	-830.29	306.51	-830.34	0.40
6,708.00	0.90	288.30	6,608.63	-830.00	305.92	-830.05	0.61
6,753.00	1.47	299.17	6,653.62	-829.61	305.08	-829.66	1.36
6,798.00	4.82	350.70	6,698.56	-827.46	304.27	-827.51	9.05
6,843.00	9.24	350.24	6,743.21	-822.03	303.36	-822.08	9.82
6,888.00	14.39	349.53	6,787.24	-812.96	301.73	-813.02	11.45
6,933.00	19.31	353.85	6,830.29	-800.06	299.91	-800.11	11.27
6,978.00	23.53	357.24	6,872.18	-783.68	298.68	-783.73	9.77
7,023.00	26.28	358.32	6,912.99	-764.75	297.96	-764.80	6.19
7,068.00	29.94	1.50	6,952.68	-743.56	297.96	-743.61	8.79
7,113.00	33.19	5.26	6,991.02	-720.06	299.38	-720.11	8.44
7,158.00	36.80	6.61	7,027.88	-694.39	302.06	-694.45	8.20
7,203.00	41.60	6.67	7,062.74	-666.15	305.35	-666.21	10.67
7,248.00	47.38	6.79	7,094.83	-634.85	309.05	-634.90	12.85
7,293.00	52.84	5.81	7,123.68	-600.54	312.82	-600.60	12.25
7,338.00	57.28	4.86	7,149.44	-563.82	316.24	-563.88	10.02
7,383.00	60.57	2.79	7,172.67	-525.37	318.80	-525.43	8.30
7,428.00	63.74	0.78	7,193.69	-485.61	320.03	-485.67	8.08
7,473.00	66.60	359.84	7,212.58	-444.78	320.25	-444.83	6.63
7,518.00	70.86	358.73	7,228.90	-402.85	319.72	-402.91	9.74
7,563.00	74.59	357.77	7,242.26	-359.91	318.40	-359.97	8.54
7,608.00	79.15	357.40	7,252.48	-316.14	316.56	-316.20	10.16
7,653.00	84.14	357.41	7,259.02	-271.68	314.54	-271.73	11.09
7,663.00	84.51	357.20	7,260.01	-261.74	314.07	-261.79	4.25
7,729.00	87.81	357.10	7,264.43	-195.98	310.80	-196.03	5.00
7,761.00	88.03	357.16	7,265.59	-164.04	309.20	-164.09	0.70
7"							
7,885.00	88.86	357.40	7,268.96	-40.22	303.32	-40.28	0.70

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7,978.00	88.61	357.02	7,271.01	52.64	298.79	52.59	0.49
8,072.00	90.49	357.84	7,271.75	146.54	294.58	146.49	2.18
8,165.00	91.14	358.21	7,270.43	239.48	291.37	239.42	0.80
8,352.00	91.36	1.10	7,266.35	426.41	290.25	426.36	1.55
8,446.00	90.65	1.08	7,264.70	520.38	292.04	520.32	0.76
8,536.00	90.00	1.78	7,264.19	610.34	294.28	610.29	1.06
8,626.00	90.56	1.77	7,263.75	700.30	297.07	700.25	0.62
8,716.00	90.83	1.61	7,262.66	790.25	299.72	790.20	0.35
8,806.00	89.32	0.52	7,262.54	880.23	301.40	880.18	2.07
8,896.00	91.11	0.77	7,262.20	970.22	302.41	970.17	2.01
8,986.00	89.38	0.39	7,261.82	1,060.22	303.32	1,060.16	1.97
9,076.00	90.06	0.30	7,262.26	1,150.21	303.86	1,150.16	0.76
9,166.00	90.68	1.19	7,261.68	1,240.20	305.03	1,240.15	1.21
9,256.00	91.66	1.48	7,259.84	1,330.16	307.13	1,330.10	1.14
9,346.00	90.59	359.94	7,258.07	1,420.13	308.24	1,420.08	2.08
9,436.00	90.25	359.39	7,257.41	1,510.12	307.72	1,510.07	0.72
9,525.00	89.57	358.14	7,257.55	1,599.10	305.80	1,599.05	1.60
9,615.00	91.57	358.55	7,256.66	1,689.05	303.20	1,689.00	2.27
9,705.00	88.67	357.53	7,256.47	1,778.99	300.12	1,778.94	3.42
9,795.00	88.98	356.93	7,258.31	1,868.87	295.77	1,868.81	0.75
9,885.00	89.20	357.17	7,259.74	1,958.74	291.14	1,958.68	0.36
9,975.00	90.28	357.26	7,260.15	2,048.63	286.77	2,048.58	1.20
10,065.00	89.60	358.65	7,260.24	2,138.57	283.56	2,138.52	1.72
10,155.00	89.41	0.92	7,261.02	2,228.56	283.22	2,228.51	2.53
10,245.00	89.41	2.70	7,261.95	2,318.50	286.06	2,318.45	1.98
10,335.00	91.45	2.97	7,261.27	2,408.39	290.51	2,408.34	2.29
10,425.00	90.52	2.68	7,259.73	2,498.26	294.95	2,498.21	1.08
10,515.00	89.88	1.98	7,259.41	2,588.19	298.61	2,588.13	1.05
10,605.00	90.65	1.63	7,259.00	2,678.14	301.44	2,678.09	0.94
10,695.00	89.75	0.46	7,258.68	2,768.12	303.08	2,768.07	1.64
10,785.00	91.26	1.65	7,257.89	2,858.10	304.74	2,858.05	2.14
10,964.00	89.32	0.49	7,256.98	3,037.05	308.08	3,037.00	1.26
11,054.00	90.15	0.50	7,257.40	3,127.05	308.86	3,127.00	0.92
11,144.00	89.29	0.52	7,257.84	3,217.04	309.66	3,216.99	0.96
11,234.00	89.20	359.06	7,259.03	3,307.03	309.33	3,306.98	1.63
11,324.00	89.75	358.76	7,259.85	3,397.01	307.62	3,396.96	0.70
11,414.00	89.01	359.25	7,260.82	3,486.99	306.06	3,486.94	0.99
11,504.00	89.54	359.19	7,261.96	3,576.98	304.83	3,576.92	0.59
11,594.00	90.80	359.09	7,261.70	3,666.96	303.48	3,666.91	1.40
11,774.00	90.40	358.68	7,259.81	3,846.92	299.98	3,846.87	0.32
11,864.00	89.38	359.05	7,259.98	3,936.90	298.20	3,936.85	1.21
11,954.00	89.66	359.03	7,260.74	4,026.88	296.69	4,026.83	0.31
12,044.00	90.15	358.90	7,260.89	4,116.87	295.06	4,116.82	0.56
12,134.00	91.42	358.73	7,259.65	4,206.84	293.20	4,206.79	1.42
12,224.00	91.63	358.54	7,257.26	4,296.78	291.06	4,296.73	0.31
12,404.00	90.83	358.91	7,253.39	4,476.69	287.05	4,476.64	0.49
12,494.00	89.20	0.69	7,253.37	4,566.69	286.74	4,566.64	2.68
12,584.00	89.69	0.72	7,254.24	4,656.68	287.85	4,656.63	0.55
12,764.00	90.71	0.59	7,253.61	4,836.66	289.90	4,836.61	0.57
12,854.00	89.54	2.41	7,253.42	4,926.62	292.26	4,926.57	2.40
12,944.00	90.95	3.53	7,253.03	5,016.50	296.92	5,016.45	2.00

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,034.00	89.63	3.06	7,252.58	5,106.35	302.10	5,106.29	1.56
13,124.00	89.29	2.39	7,253.43	5,196.24	306.37	5,196.19	0.83
13,214.00	90.71	3.98	7,253.43	5,286.10	311.37	5,286.04	2.37
13,304.00	89.75	2.95	7,253.06	5,375.93	316.81	5,375.87	1.56
13,394.00	89.08	1.86	7,253.98	5,465.84	320.59	5,465.79	1.42
13,574.00	89.17	359.49	7,256.73	5,645.80	322.71	5,645.74	1.32
13,664.00	90.92	359.79	7,256.66	5,735.79	322.14	5,735.73	1.97
13,737.00	91.79	359.47	7,254.94	5,808.77	321.67	5,808.71	1.27
Last MWD Survey @ 13737.00'							
13,782.00	91.79	359.47	7,253.53	5,853.74	321.26	5,853.69	0.00
St. Line Projection to Bit @ 13782.00' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,177.00	1,176.96	-8.10	-3.37	Last Surface MWD Survey @ 1177.00'
1,237.00	1,236.95	-8.35	-4.01	First MWD Intermediate Survey @ 1237.00
13,737.00	7,254.94	5,808.77	321.67	Last MWD Survey @ 13737.00'
13,782.00	7,253.53	5,853.74	321.26	St. Line Projection to Bit @ 13782.00' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	359.99	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
142.00	1,177.00	MWD Surface Surveys	MWD+IFR1+SC
1,237.00	7,729.00	MWD Surveys-Intermediate	MWD+IFR1+SC
7,885.00	13,737.00	MWD Surveys-Lateral	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,211.00	1,210.96	9 5/8"	9-5/8	13-1/2
7,761.00	7,265.59	7"	7	8-3/4

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
MELBA 27N-14HZ LD	0.00	0.00	0.00	0.01	0.00	1,322,497.49	3,211,958.88	40.216163	-104.741004
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	-238.94	867.40	1,322,265.99	3,212,828.25	
Point 2				0.00	-248.70	-52.74	1,322,248.35	3,211,908.27	
Point 3				0.00	617.98	-45.40	1,323,115.03	3,211,908.19	
Point 4				0.00	3,237.28	-54.13	1,325,734.04	3,211,877.04	
Point 5				0.00	5,872.82	-59.86	1,328,369.33	3,211,848.76	
Point 6				0.00	6,728.23	-63.02	1,329,224.64	3,211,838.28	
Point 7				0.00	6,735.99	857.00	1,329,240.27	3,212,758.16	
Point 8				0.00	-238.94	867.40	1,322,265.99	3,212,828.25	
MELBA 27N-14HZ SH	0.00	0.00	0.00	0.01	0.00	1,322,497.49	3,211,958.88	40.216163	-104.741004
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
MELBA 2-23 Pad Sec.	0.00	0.00	-1.00	0.75	60.04	1,322,498.74	3,212,018.91	40.216165	-104.740789
- actual wellpath misses target center by 60.06usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-1.00	-4,628.25	1,636.80	1,317,884.86	3,213,695.19	
Point 2				-1.00	-4,627.85	-996.34	1,317,862.73	3,211,062.26	
Point 3				-1.00	-4,628.05	-3,629.19	1,317,839.99	3,208,429.62	
Point 4				-1.00	-2,079.54	-3,632.23	1,320,388.27	3,208,404.77	
Point 5				-1.00	597.74	-3,634.72	1,323,065.32	3,208,379.36	
Point 6				-1.00	3,193.94	-3,638.83	1,325,661.28	3,208,353.03	
Point 7				-1.00	5,838.13	-3,642.86	1,328,305.22	3,208,326.37	
Point 8				-1.00	5,861.68	-987.76	1,328,351.50	3,210,981.06	
Point 9				-1.00	5,896.60	1,667.99	1,328,409.14	3,213,636.30	
Point 10				-1.00	3,258.09	1,673.16	1,325,770.89	3,213,664.05	
Point 11				-1.00	633.24	1,684.86	1,323,146.35	3,213,698.22	
Point 12				-1.00	-2,014.41	1,649.96	1,320,498.61	3,213,685.98	
Point 13				-1.00	-4,628.25	1,636.80	1,317,884.86	3,213,695.19	
Point 14				-1.00	-2,014.41	1,649.96	1,320,498.61	3,213,685.98	
Point 15				-1.00	633.24	1,684.86	1,323,146.35	3,213,698.22	
Point 16				-1.00	609.49	-975.36	1,323,099.83	3,211,038.41	
Point 17				-1.00	597.74	-3,634.72	1,323,065.32	3,208,379.36	
Point 18				-1.00	-2,079.54	-3,632.23	1,320,388.27	3,208,404.77	
Point 19				-1.00	-4,628.05	-3,629.19	1,317,839.99	3,208,429.62	
MELBA 27N-14HZ BH	0.00	0.00	7,264.00	5,877.64	297.92	1,328,377.20	3,212,206.47	40.232297	-104.739937
- actual wellpath misses target center by 35.01usft at 13782.00usft MD (7253.53 TVD, 5853.74 N, 321.26 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.73 °/100usft	Maximum Dogleg over Survey:	12.85 °/100usft at 7,248.00 usft
Net Tortosity applicable to Plans:	0.90 °/100usft	Directional Difficulty Index:	6.537

Audit Info

North Reference Sheet for Sec. 23-T3N-R66W - MELBA 27N-14HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB= 13' @ 4974.00usft (Ensign 123). Northing and Easting are relative to MELBA 27N-14HZ

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995703

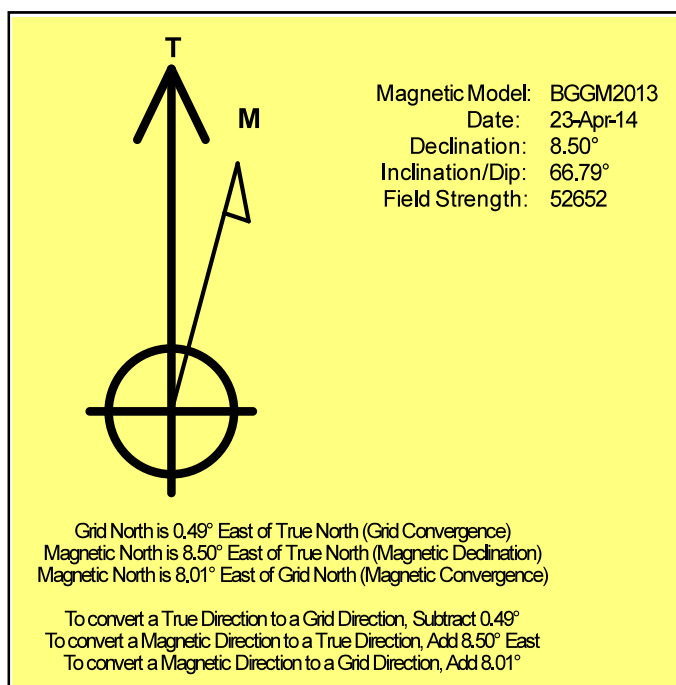
Grid Coordinates of Well: 1,322,497.47 usft N, 3,211,958.88 usft E

Geographical Coordinates of Well: 40° 12' 58.19" N, 104° 44' 27.61" W

Grid Convergence at Surface is: 0.49°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,782.00usft
the Bottom Hole Displacement is 5,862.55usft in the Direction of 3.14° (True).

Magnetic Convergence at surface is: -8.01° (23 April 2014, , BGGM2013)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 23-T3N-R66W

MELBA 27N-14HZ

Job# 901205056:: API: 05-123-39002

Plan A

Design: Actual Field Surveys

Sperry Drilling Services

Geodetic Report

25 August, 2014

Well Coordinates: 1,322,497.47 N, 3,211,958.88 E (40° 12' 58.19" N, 104° 44' 27.61" W)

Ground Level: 4,961.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well MELBA 27N-14HZ

RKB= 13' @ 4974.00usft (Ensign 123)

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.216163	-104.741004	1,322,497.47	3,211,958.88
142.00	0.37	149.11	142.00	-0.39	0.24	40.216162	-104.741003	1,322,497.08	3,211,959.12
236.00	0.76	194.54	235.99	-1.26	0.23	40.216160	-104.741003	1,322,496.22	3,211,959.12
329.00	0.53	179.53	328.99	-2.28	0.08	40.216157	-104.741004	1,322,495.19	3,211,958.98
423.00	0.39	186.20	422.99	-3.04	0.05	40.216155	-104.741004	1,322,494.44	3,211,958.95
516.00	0.36	203.06	515.98	-3.62	-0.10	40.216153	-104.741005	1,322,493.85	3,211,958.81
609.00	0.39	207.41	608.98	-4.17	-0.36	40.216152	-104.741006	1,322,493.30	3,211,958.56
703.00	0.37	232.36	702.98	-4.64	-0.74	40.216150	-104.741007	1,322,492.83	3,211,958.17
798.00	0.51	209.90	797.98	-5.19	-1.20	40.216149	-104.741009	1,322,492.27	3,211,957.72
893.00	0.56	200.26	892.97	-6.00	-1.57	40.216147	-104.741010	1,322,491.46	3,211,957.36
988.00	0.66	223.16	987.97	-6.83	-2.10	40.216144	-104.741012	1,322,490.63	3,211,956.83
1,082.00	0.53	223.50	1,081.96	-7.54	-2.77	40.216142	-104.741014	1,322,489.91	3,211,956.17
1,177.00	0.46	231.37	1,176.96	-8.10	-3.37	40.216141	-104.741016	1,322,489.35	3,211,955.57
1,211.00	0.68	249.98	1,210.96	-8.25	-3.67	40.216140	-104.741017	1,322,489.19	3,211,955.28
1,237.00	0.87	257.39	1,236.95	-8.35	-4.01	40.216140	-104.741019	1,322,489.09	3,211,954.94
1,272.00	0.98	248.54	1,271.95	-8.51	-4.54	40.216140	-104.741021	1,322,488.92	3,211,954.40
1,367.00	2.38	205.47	1,366.91	-10.59	-6.15	40.216134	-104.741026	1,322,486.83	3,211,952.82
1,462.00	5.16	191.96	1,461.70	-16.55	-7.88	40.216118	-104.741032	1,322,480.85	3,211,951.14
1,558.00	7.91	185.40	1,557.07	-27.36	-9.40	40.216088	-104.741038	1,322,470.04	3,211,949.71
1,652.00	10.03	179.23	1,649.91	-41.98	-9.90	40.216048	-104.741040	1,322,455.41	3,211,949.34
1,745.00	11.97	168.18	1,741.21	-59.52	-7.81	40.216000	-104.741032	1,322,437.89	3,211,951.57
1,839.00	13.86	161.94	1,832.83	-79.77	-2.33	40.215944	-104.741013	1,322,417.69	3,211,957.23
1,932.00	13.41	160.73	1,923.21	-100.54	4.69	40.215887	-104.740987	1,322,396.98	3,211,964.42
2,026.00	12.94	152.77	2,014.74	-120.19	13.10	40.215833	-104.740957	1,322,377.40	3,211,973.00
2,119.00	12.28	150.53	2,105.50	-138.06	22.73	40.215784	-104.740923	1,322,359.62	3,211,982.79
2,213.00	12.65	153.97	2,197.29	-156.01	32.17	40.215735	-104.740889	1,322,341.75	3,211,992.37
2,400.00	11.93	145.87	2,380.01	-190.41	52.00	40.215640	-104.740818	1,322,307.52	3,212,012.50
2,494.00	11.96	149.79	2,471.98	-206.87	62.35	40.215595	-104.740781	1,322,291.15	3,212,022.99
2,587.00	11.96	157.11	2,562.97	-224.08	70.95	40.215548	-104.740750	1,322,274.02	3,212,031.74
2,681.00	12.61	161.68	2,654.82	-242.79	77.96	40.215497	-104.740725	1,322,255.37	3,212,038.91
2,774.00	14.20	165.40	2,745.28	-263.47	84.03	40.215440	-104.740703	1,322,234.74	3,212,045.15
2,868.00	14.40	164.44	2,836.37	-285.89	90.07	40.215378	-104.740682	1,322,212.38	3,212,051.38
2,961.00	14.63	163.88	2,926.40	-308.31	96.43	40.215317	-104.740659	1,322,190.01	3,212,057.94
3,055.00	14.85	162.64	3,017.31	-331.21	103.32	40.215254	-104.740634	1,322,167.17	3,212,065.02
3,148.00	13.56	157.08	3,107.46	-352.63	111.12	40.215195	-104.740606	1,322,145.82	3,212,073.01
3,241.00	13.18	156.86	3,197.94	-372.42	119.54	40.215141	-104.740576	1,322,126.10	3,212,081.59
3,335.00	13.05	154.90	3,289.49	-391.89	128.25	40.215087	-104.740545	1,322,106.71	3,212,090.47
3,425.00	13.26	163.92	3,377.14	-411.01	135.42	40.215035	-104.740519	1,322,087.66	3,212,097.80
3,515.00	12.82	165.64	3,464.82	-430.60	140.76	40.214981	-104.740500	1,322,068.11	3,212,103.31
3,605.00	14.53	163.84	3,552.27	-451.12	146.37	40.214925	-104.740480	1,322,047.64	3,212,109.10
3,695.00	16.03	161.57	3,639.08	-473.75	153.45	40.214863	-104.740455	1,322,025.07	3,212,116.36
3,785.00	16.00	152.59	3,725.60	-496.56	163.09	40.214800	-104.740420	1,322,002.35	3,212,126.20

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
3,875.00	15.23	149.90	3,812.28	-517.80	174.72	40.214742	-104.740379	1,321,981.21	3,212,138.02
3,965.00	14.59	148.99	3,899.25	-537.74	186.49	40.214687	-104.740337	1,321,961.37	3,212,149.96
4,055.00	14.15	151.52	3,986.44	-557.12	197.58	40.214634	-104.740297	1,321,942.09	3,212,161.21
4,145.00	14.49	159.29	4,073.65	-577.33	206.81	40.214578	-104.740264	1,321,921.96	3,212,170.61
4,235.00	14.60	161.98	4,160.76	-598.65	214.30	40.214520	-104.740237	1,321,900.71	3,212,178.28
4,325.00	14.36	162.08	4,247.91	-620.05	221.24	40.214461	-104.740212	1,321,879.36	3,212,185.41
4,415.00	13.33	160.39	4,335.29	-640.44	228.16	40.214405	-104.740187	1,321,859.03	3,212,192.50
4,594.00	12.54	156.94	4,509.75	-677.76	242.70	40.214303	-104.740135	1,321,821.84	3,212,207.35
4,684.00	12.31	156.18	4,597.64	-695.53	250.40	40.214254	-104.740108	1,321,804.14	3,212,215.21
4,774.00	12.00	157.37	4,685.62	-712.94	257.87	40.214206	-104.740081	1,321,786.79	3,212,222.83
4,864.00	13.60	163.55	4,773.39	-731.73	264.47	40.214154	-104.740057	1,321,768.07	3,212,229.59
4,954.00	13.33	162.72	4,860.91	-751.78	270.55	40.214099	-104.740036	1,321,748.06	3,212,235.84
5,044.00	11.40	156.88	4,948.83	-769.87	277.12	40.214050	-104.740012	1,321,730.03	3,212,242.57
5,134.00	9.48	156.73	5,037.33	-784.86	283.54	40.214009	-104.739989	1,321,715.10	3,212,249.12
5,224.00	7.63	159.97	5,126.33	-797.29	288.52	40.213974	-104.739971	1,321,702.72	3,212,254.20
5,404.00	4.24	161.39	5,305.34	-814.83	294.74	40.213926	-104.739949	1,321,685.24	3,212,260.56
5,494.00	3.90	163.33	5,395.11	-820.91	296.68	40.213910	-104.739942	1,321,679.17	3,212,262.56
5,584.00	4.15	161.86	5,484.89	-826.94	298.57	40.213893	-104.739935	1,321,673.16	3,212,264.50
5,674.00	1.82	157.72	5,574.76	-831.36	300.12	40.213881	-104.739930	1,321,668.75	3,212,266.09
5,763.00	1.47	148.02	5,663.72	-833.63	301.27	40.213875	-104.739926	1,321,666.49	3,212,267.25
5,853.00	0.20	114.68	5,753.71	-834.68	302.02	40.213872	-104.739923	1,321,665.45	3,212,268.02
5,943.00	0.35	53.24	5,843.71	-834.58	302.38	40.213872	-104.739922	1,321,665.55	3,212,268.38
6,033.00	0.41	31.59	5,933.71	-834.14	302.77	40.213873	-104.739920	1,321,665.99	3,212,268.76
6,213.00	1.27	129.36	6,113.69	-834.86	304.65	40.213871	-104.739913	1,321,665.29	3,212,270.65
6,303.00	1.18	44.67	6,203.68	-834.83	306.07	40.213871	-104.739908	1,321,665.33	3,212,272.07
6,393.00	0.98	26.80	6,293.66	-833.48	307.07	40.213875	-104.739905	1,321,666.69	3,212,273.06
6,483.00	0.82	2.55	6,383.65	-832.15	307.45	40.213879	-104.739903	1,321,668.02	3,212,273.42
6,573.00	0.62	331.79	6,473.64	-831.08	307.25	40.213882	-104.739904	1,321,669.09	3,212,273.21
6,663.00	0.79	305.55	6,563.64	-830.29	306.51	40.213884	-104.739907	1,321,669.87	3,212,272.47
6,708.00	0.90	288.30	6,608.63	-830.00	305.92	40.213885	-104.739909	1,321,670.16	3,212,271.88
6,753.00	1.47	299.17	6,653.62	-829.61	305.08	40.213886	-104.739912	1,321,670.54	3,212,271.04
6,798.00	4.82	350.70	6,698.56	-827.46	304.27	40.213892	-104.739915	1,321,672.68	3,212,270.21
6,843.00	9.24	350.24	6,743.21	-822.03	303.36	40.213907	-104.739918	1,321,678.11	3,212,269.24
6,888.00	14.39	349.53	6,787.24	-812.96	301.73	40.213931	-104.739924	1,321,687.16	3,212,267.54
6,933.00	19.31	353.85	6,830.29	-800.06	299.91	40.213967	-104.739930	1,321,700.04	3,212,265.61
6,978.00	23.53	357.24	6,872.18	-783.68	298.68	40.214012	-104.739935	1,321,716.41	3,212,264.24
7,023.00	26.28	358.32	6,912.99	-764.75	297.96	40.214064	-104.739937	1,321,735.34	3,212,263.35
7,068.00	29.94	1.50	6,952.68	-743.56	297.96	40.214122	-104.739937	1,321,756.53	3,212,263.17
7,113.00	33.19	5.26	6,991.02	-720.06	299.38	40.214186	-104.739932	1,321,780.04	3,212,264.40
7,158.00	36.80	6.61	7,027.88	-694.39	302.06	40.214257	-104.739923	1,321,805.72	3,212,266.86
7,203.00	41.60	6.67	7,062.74	-666.15	305.35	40.214334	-104.739911	1,321,833.99	3,212,269.91
7,248.00	47.38	6.79	7,094.83	-634.85	309.05	40.214420	-104.739898	1,321,865.32	3,212,273.33

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
7,293.00	52.84	5.81	7,123.68	-600.54	312.82	40.214515	-104.739884	1,321,899.66	3,212,276.81
7,338.00	57.28	4.86	7,149.44	-563.82	316.24	40.214615	-104.739872	1,321,936.40	3,212,279.92
7,383.00	60.57	2.79	7,172.67	-525.37	318.80	40.214721	-104.739863	1,321,974.87	3,212,282.15
7,428.00	63.74	0.78	7,193.69	-485.61	320.03	40.214830	-104.739858	1,322,014.64	3,212,283.04
7,473.00	66.60	359.84	7,212.58	-444.78	320.25	40.214942	-104.739858	1,322,055.47	3,212,282.91
7,518.00	70.86	358.73	7,228.90	-402.85	319.72	40.215057	-104.739859	1,322,097.39	3,212,282.02
7,563.00	74.59	357.77	7,242.26	-359.91	318.40	40.215175	-104.739864	1,322,140.31	3,212,280.34
7,608.00	79.15	357.40	7,252.48	-316.14	316.56	40.215295	-104.739871	1,322,184.07	3,212,278.11
7,653.00	84.14	357.41	7,259.02	-271.68	314.54	40.215417	-104.739878	1,322,228.51	3,212,275.72
7,663.00	84.51	357.20	7,260.01	-261.74	314.07	40.215445	-104.739880	1,322,238.44	3,212,275.16
7,729.00	87.81	357.10	7,264.43	-195.98	310.80	40.215625	-104.739891	1,322,304.17	3,212,271.33
7,761.00	88.03	357.16	7,265.59	-164.04	309.20	40.215713	-104.739897	1,322,336.10	3,212,269.45
7,885.00	88.86	357.40	7,268.96	-40.22	303.32	40.216053	-104.739918	1,322,459.85	3,212,262.51
7,978.00	88.61	357.02	7,271.01	52.64	298.79	40.216308	-104.739934	1,322,552.67	3,212,257.19
8,072.00	90.49	357.84	7,271.75	146.54	294.58	40.216565	-104.739949	1,322,646.52	3,212,252.18
8,165.00	91.14	358.21	7,270.43	239.48	291.37	40.216820	-104.739961	1,322,739.42	3,212,248.18
8,352.00	91.36	1.10	7,266.35	426.41	290.25	40.217334	-104.739965	1,322,926.33	3,212,245.45
8,446.00	90.65	1.08	7,264.70	520.38	292.04	40.217591	-104.739959	1,323,020.31	3,212,246.43
8,536.00	90.00	1.78	7,264.19	610.34	294.28	40.217838	-104.739951	1,323,110.29	3,212,247.91
8,626.00	90.56	1.77	7,263.75	700.30	297.07	40.218085	-104.739941	1,323,200.26	3,212,249.93
8,716.00	90.83	1.61	7,262.66	790.25	299.72	40.218332	-104.739931	1,323,290.23	3,212,251.81
8,806.00	89.32	0.52	7,262.54	880.23	301.40	40.218579	-104.739925	1,323,380.22	3,212,252.71
8,896.00	91.11	0.77	7,262.20	970.22	302.41	40.218826	-104.739921	1,323,470.21	3,212,252.96
8,986.00	89.38	0.39	7,261.82	1,060.22	303.32	40.219073	-104.739918	1,323,560.20	3,212,253.10
9,076.00	90.06	0.30	7,262.26	1,150.21	303.86	40.219320	-104.739916	1,323,650.19	3,212,252.87
9,166.00	90.68	1.19	7,261.68	1,240.20	305.03	40.219567	-104.739912	1,323,740.19	3,212,253.27
9,256.00	91.66	1.48	7,259.84	1,330.16	307.13	40.219814	-104.739904	1,323,830.15	3,212,254.60
9,346.00	90.59	359.94	7,258.07	1,420.13	308.24	40.220061	-104.739900	1,323,920.13	3,212,254.94
9,436.00	90.25	359.39	7,257.41	1,510.12	307.72	40.220308	-104.739902	1,324,010.11	3,212,253.64
9,525.00	89.57	358.14	7,257.55	1,599.10	305.80	40.220553	-104.739909	1,324,099.06	3,212,250.96
9,615.00	91.57	358.55	7,256.66	1,689.05	303.20	40.220799	-104.739919	1,324,188.99	3,212,247.60
9,705.00	88.67	357.53	7,256.47	1,778.99	300.12	40.221046	-104.739930	1,324,278.89	3,212,243.75
9,795.00	88.98	356.93	7,258.31	1,868.87	295.77	40.221293	-104.739945	1,324,368.72	3,212,238.63
9,885.00	89.20	357.17	7,259.74	1,958.74	291.14	40.221540	-104.739962	1,324,458.55	3,212,233.23
9,975.00	90.28	357.26	7,260.15	2,048.63	286.77	40.221786	-104.739977	1,324,548.39	3,212,228.09
10,065.00	89.60	358.65	7,260.24	2,138.57	283.56	40.222033	-104.739989	1,324,638.30	3,212,224.11
10,155.00	89.41	0.92	7,261.02	2,228.56	283.22	40.222280	-104.739990	1,324,728.28	3,212,223.00
10,245.00	89.41	2.70	7,261.95	2,318.50	286.06	40.222527	-104.739980	1,324,818.24	3,212,225.07
10,335.00	91.45	2.97	7,261.27	2,408.39	290.51	40.222774	-104.739964	1,324,908.15	3,212,228.75
10,425.00	90.52	2.68	7,259.73	2,498.26	294.95	40.223021	-104.739948	1,324,998.06	3,212,232.42
10,515.00	89.88	1.98	7,259.41	2,588.19	298.61	40.223268	-104.739935	1,325,088.01	3,212,235.31
10,605.00	90.65	1.63	7,259.00	2,678.14	301.44	40.223514	-104.739925	1,325,177.98	3,212,237.37

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
10,695.00	89.75	0.46	7,258.68	2,768.12	303.08	40.223761	-104.739919	1,325,267.97	3,212,238.24
10,785.00	91.26	1.65	7,257.89	2,858.10	304.74	40.224008	-104.739913	1,325,357.95	3,212,239.13
10,964.00	89.32	0.49	7,256.98	3,037.05	308.08	40.224500	-104.739901	1,325,536.92	3,212,240.94
11,054.00	90.15	0.50	7,257.40	3,127.05	308.86	40.224747	-104.739898	1,325,626.92	3,212,240.95
11,144.00	89.29	0.52	7,257.84	3,217.04	309.66	40.224994	-104.739895	1,325,716.91	3,212,240.98
11,234.00	89.20	359.06	7,259.03	3,307.03	309.33	40.225241	-104.739897	1,325,806.89	3,212,239.88
11,324.00	89.75	358.76	7,259.85	3,397.01	307.62	40.225488	-104.739903	1,325,896.85	3,212,237.40
11,414.00	89.01	359.25	7,260.82	3,486.99	306.06	40.225735	-104.739908	1,325,986.81	3,212,235.06
11,504.00	89.54	359.19	7,261.96	3,576.98	304.83	40.225982	-104.739913	1,326,076.77	3,212,233.07
11,594.00	90.80	359.09	7,261.70	3,666.96	303.48	40.226229	-104.739917	1,326,166.74	3,212,230.95
11,774.00	90.40	358.68	7,259.81	3,846.92	299.98	40.226723	-104.739930	1,326,346.65	3,212,225.91
11,864.00	89.38	359.05	7,259.98	3,936.90	298.20	40.226970	-104.739936	1,326,436.61	3,212,223.35
11,954.00	89.66	359.03	7,260.74	4,026.88	296.69	40.227217	-104.739942	1,326,526.58	3,212,221.07
12,044.00	90.15	358.90	7,260.89	4,116.87	295.06	40.227464	-104.739948	1,326,616.54	3,212,218.68
12,134.00	91.42	358.73	7,259.65	4,206.84	293.20	40.227711	-104.739954	1,326,706.49	3,212,216.05
12,224.00	91.63	358.54	7,257.26	4,296.78	291.06	40.227958	-104.739962	1,326,796.40	3,212,213.14
12,404.00	90.83	358.91	7,253.39	4,476.69	287.05	40.228452	-104.739976	1,326,976.27	3,212,207.59
12,494.00	89.20	0.69	7,253.37	4,566.69	286.74	40.228699	-104.739977	1,327,066.25	3,212,206.51
12,584.00	89.69	0.72	7,254.24	4,656.68	287.85	40.228946	-104.739973	1,327,156.24	3,212,206.84
12,764.00	90.71	0.59	7,253.61	4,836.66	289.90	40.229440	-104.739966	1,327,336.23	3,212,207.36
12,854.00	89.54	2.41	7,253.42	4,926.62	292.26	40.229687	-104.739958	1,327,426.21	3,212,208.95
12,944.00	90.95	3.53	7,253.03	5,016.50	296.92	40.229933	-104.739941	1,327,516.11	3,212,212.84
13,034.00	89.63	3.06	7,252.58	5,106.35	302.10	40.230180	-104.739922	1,327,606.00	3,212,217.24
13,124.00	89.29	2.39	7,253.43	5,196.24	306.37	40.230427	-104.739907	1,327,695.92	3,212,220.75
13,214.00	90.71	3.98	7,253.43	5,286.10	311.37	40.230673	-104.739889	1,327,785.81	3,212,224.98
13,304.00	89.75	2.95	7,253.06	5,375.93	316.81	40.230920	-104.739870	1,327,875.69	3,212,229.65
13,394.00	89.08	1.86	7,253.98	5,465.84	320.59	40.231167	-104.739856	1,327,965.62	3,212,232.66
13,574.00	89.17	359.49	7,256.73	5,645.80	322.71	40.231661	-104.739848	1,328,145.58	3,212,233.24
13,664.00	90.92	359.79	7,256.66	5,735.79	322.14	40.231908	-104.739851	1,328,235.56	3,212,231.90
13,737.00	91.79	359.47	7,254.94	5,808.77	321.67	40.232108	-104.739852	1,328,308.53	3,212,230.81
13,782.00	91.79	359.47	7,253.53	5,853.74	321.26	40.232231	-104.739854	1,328,353.50	3,212,230.01

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,177.00	1,176.96	-8.10	-3.37	Last Surface MWD Survey @ 1177.00'
1,237.00	1,236.95	-8.35	-4.01	First MWD Intermediate Survey @ 1237.00
13,737.00	7,254.94	5,808.77	321.67	Last MWD Survey @ 13737.00'
13,782.00	7,253.53	5,853.74	321.26	St. Line Projection to Bit @ 13782.00' MD

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	359.99	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
142.00	1,177.00	MWD Surface Surveys	MWD+IFR1+SC
1,237.00	7,729.00	MWD Surveys-Intermediate	MWD+IFR1+SC
7,885.00	13,737.00	MWD Surveys-Lateral	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,211.00	1,210.96	9 5/8"	9-5/8	13-1/2
7,761.00	7,265.59	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD (usft)	Northing (usft)	Easting (usft)	+N/-S usft	+E/-W usft	Created	Updated
Polygon	MELBA 27N-14HZ LD	0.00	1,322,497.49	3,211,958.88	0.01	0.00	3/31/2014	3/31/2014
Polygon	MELBA 2-23 Pad Sec. Line	-1.00	1,322,498.74	3,212,018.91	0.75	60.04	3/31/2014	3/31/2014

Design Report for MELBA 27N-14HZ - Actual Field Surveys

Directional Difficulty Index

Average Dogleg over Survey: 1.73 °/100usft

Maximum Dogleg over Survey: 12.85 °/100usft at 7,248.00
usft

Net Tortosity applicable to Plans: 0.90 °/100usft

Directional Difficulty Index: 6.537

Audit Info

North Reference Sheet for Sec. 23-T3N-R66W - MELBA 27N-14HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB= 13' @ 4974.00usft (Ensign 123). Northing and Easting are relative to MELBA 27N-14HZ

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995703

Grid Coordinates of Well: 1,322,497.47 usft N, 3,211,958.88 usft E

Geographical Coordinates of Well: 40° 12' 58.19" N, 104° 44' 27.61" W

Grid Convergence at Surface is: 0.49°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,782.00usft

the Bottom Hole Displacement is 5,862.55usft in the Direction of 3.14° (True).

Magnetic Convergence at surface is: -8.01° (23 April 2014, , BGGM2013)

