

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 9-T2N-R65W

Thomason 2C-9HZ

Plan B Rev 0

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

13 November, 2012

Well Coordinates: 1,297,439.01 N, 3,232,788.15 E (40° 08' 48.71" N, 104° 40' 02.15" W)

Ground Level: 4,881.00 ft

Local Coordinate Origin: Centered on Well Thomason 2C-9HZ

Viewing Datum: RKB=16 @ 4897.00ft (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

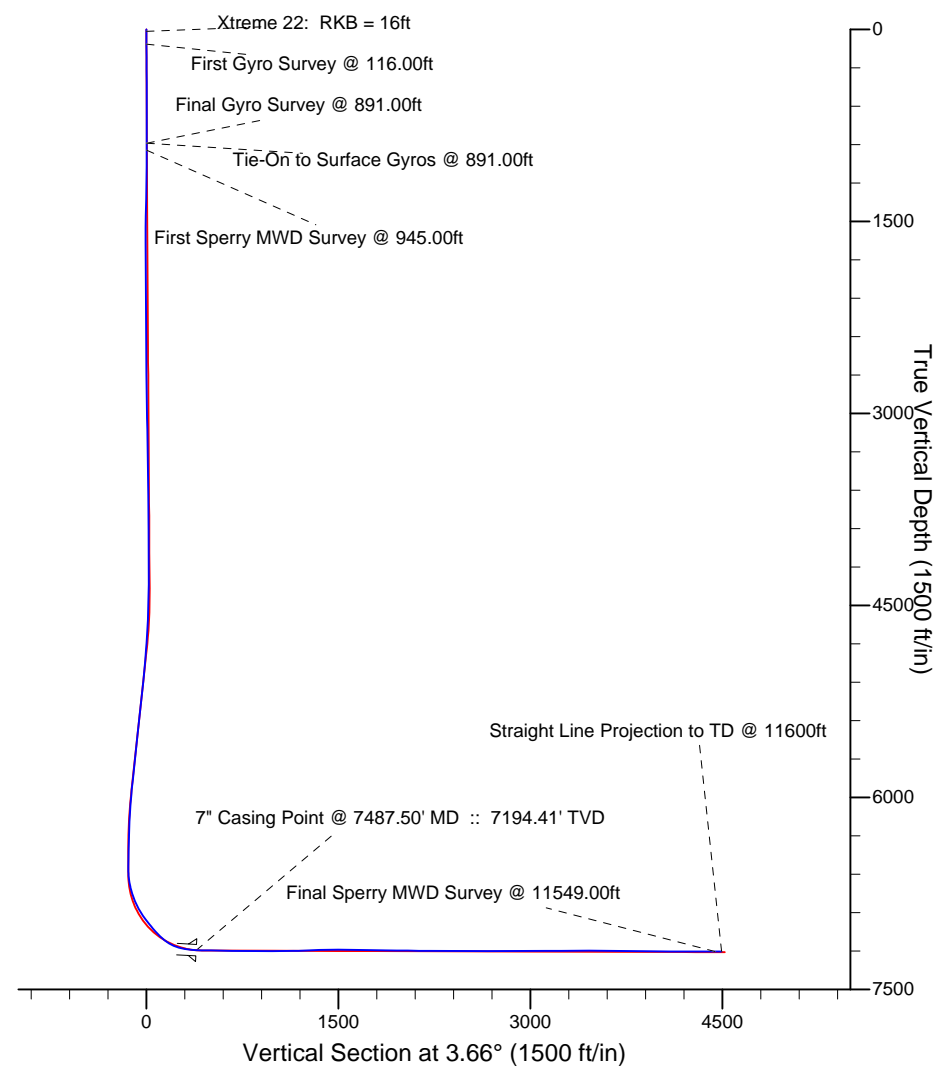
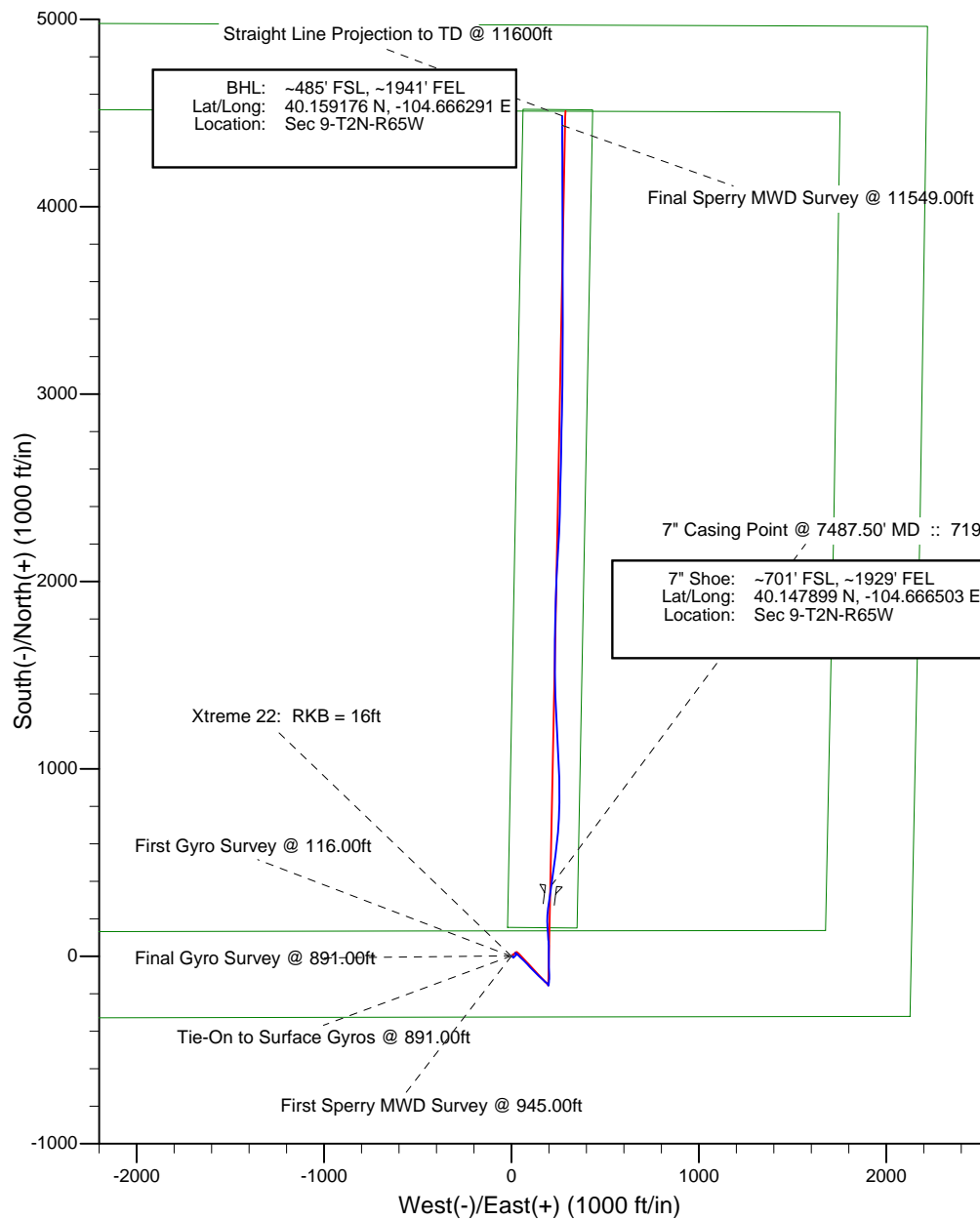
HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 9-T2N-R65W
 Well: Thomason 2C-9HZ



LEGEND

- ▲ Thomason 2C-9HZ, Plan B Rev 0, Plan B Rev 0 Proposal V0
- Actual Field Surveys



Design Report for Thomason 2C-9HZ - 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	0.40	353.61	116.00	0.35	-0.04	0.34	0.40
First Gyro Survey @ 116.00ft							
216.00	0.37	9.89	216.00	1.01	-0.02	1.01	0.11
316.00	0.38	352.10	315.99	1.66	-0.01	1.65	0.12
416.00	0.09	321.24	415.99	2.05	-0.11	2.04	0.31
516.00	0.20	60.69	515.99	2.19	0.00	2.19	0.23
616.00	0.31	22.80	615.99	2.53	0.25	2.54	0.20
716.00	0.06	23.73	715.99	2.83	0.38	2.85	0.25
816.00	0.26	102.68	815.99	2.83	0.62	2.86	0.26
891.00	0.55	52.22	890.99	3.01	1.07	3.07	0.58
Final Gyro Survey @ 891.00ft - Tie-On to Surface Gyros @ 891.00ft							
945.00	0.33	275.04	944.99	3.18	1.12	3.25	1.52
First Sperry MWD Survey @ 945.00ft							
1,035.00	1.24	121.06	1,034.98	2.70	1.70	2.80	1.71
1,185.00	1.51	134.97	1,184.94	0.47	4.49	0.75	0.28
1,366.00	1.52	144.74	1,365.88	-3.18	7.56	-2.69	0.14
1,457.00	1.55	135.51	1,456.85	-5.04	9.12	-4.45	0.27
1,547.00	0.94	122.45	1,546.82	-6.31	10.59	-5.62	0.74
1,669.00	0.45	2.27	1,668.82	-6.36	11.46	-5.62	1.01
1,822.00	0.54	3.95	1,821.81	-5.05	11.53	-4.30	0.06
1,911.00	0.50	282.99	1,910.81	-4.54	11.18	-3.82	0.76
2,003.00	0.88	255.48	2,002.80	-4.63	10.11	-3.97	0.54
2,097.00	0.71	41.01	2,096.80	-4.37	9.79	-3.73	1.62
2,268.00	0.63	75.25	2,267.79	-3.33	11.39	-2.59	0.23
2,354.00	0.72	92.17	2,353.78	-3.23	12.39	-2.43	0.25
2,440.00	0.68	53.63	2,439.78	-2.95	13.34	-2.09	0.54
2,612.00	1.17	57.52	2,611.75	-1.40	15.65	-0.40	0.29
2,783.00	1.11	36.53	2,782.72	0.87	18.10	2.02	0.25
2,954.00	1.41	47.86	2,953.68	3.61	20.65	4.92	0.23
3,040.00	1.42	54.00	3,039.65	4.95	22.30	6.36	0.18
3,126.00	1.51	64.92	3,125.63	6.06	24.19	7.59	0.34
3,297.00	1.05	356.28	3,296.59	8.57	26.12	10.22	0.87
3,469.00	0.81	6.95	3,468.57	11.35	26.17	13.00	0.17
3,640.00	0.52	321.25	3,639.56	13.16	25.83	14.78	0.34
3,812.00	0.88	330.93	3,811.54	14.92	24.70	16.47	0.22
4,069.00	0.61	294.59	4,068.52	17.22	22.50	18.62	0.21
4,155.00	0.89	283.34	4,154.52	17.56	21.43	18.89	0.37
4,241.00	0.39	244.47	4,240.51	17.59	20.52	18.86	0.74
4,326.00	1.10	103.04	4,325.51	17.28	21.05	18.59	1.68
4,412.00	2.78	107.98	4,411.45	16.45	23.84	17.94	1.96
4,498.00	3.38	131.24	4,497.33	14.13	27.73	15.88	1.60
4,584.00	4.01	127.57	4,583.15	10.63	32.02	12.65	0.78
4,669.00	4.63	138.77	4,667.91	6.24	36.64	8.56	1.23
4,755.00	4.65	134.09	4,753.63	1.20	41.43	3.84	0.44
4,841.00	6.30	131.44	4,839.24	-4.35	47.47	-1.31	1.94
4,927.00	7.58	135.59	4,924.61	-11.52	54.98	-7.99	1.60
5,012.00	7.88	133.04	5,008.83	-19.50	63.16	-15.43	0.54

Design Report for Thomason 2C-9HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,098.00	9.20	134.51	5,093.88	-28.35	72.37	-23.67	1.56
5,184.00	9.96	137.46	5,178.68	-38.65	82.30	-33.31	1.05
5,270.00	8.52	135.84	5,263.56	-48.70	91.77	-42.74	1.70
5,355.00	8.99	138.04	5,347.57	-58.15	100.59	-51.61	0.68
5,441.00	9.08	134.55	5,432.50	-67.91	109.92	-60.75	0.65
5,527.00	9.04	134.84	5,517.43	-77.44	119.55	-69.65	0.07
5,613.00	9.49	136.92	5,602.31	-87.38	129.18	-78.95	0.65
5,699.00	8.95	132.10	5,687.20	-97.04	138.99	-87.97	1.10
5,784.00	9.16	135.15	5,771.14	-106.27	148.67	-96.56	0.62
5,870.00	8.85	134.66	5,856.08	-115.77	158.20	-105.44	0.37
5,956.00	9.11	130.19	5,941.03	-124.82	168.11	-113.83	0.87
6,041.00	7.95	131.42	6,025.09	-133.05	177.65	-121.44	1.38
6,127.00	6.25	129.75	6,110.42	-139.98	185.71	-127.84	1.99
6,213.00	4.32	130.27	6,196.05	-145.07	191.79	-132.52	2.24
6,299.00	2.50	134.53	6,281.90	-148.47	195.59	-135.68	2.14
6,384.00	1.68	157.81	6,366.84	-150.93	197.39	-138.02	1.37
6,470.00	0.91	190.43	6,452.82	-152.77	197.74	-139.83	1.21
6,516.00	0.76	185.52	6,498.82	-153.43	197.64	-140.50	0.36
6,557.00	0.76	167.78	6,539.81	-153.97	197.67	-141.03	0.57
6,600.00	1.68	29.20	6,582.81	-153.70	198.04	-140.74	5.36
6,642.00	5.99	8.34	6,624.70	-150.99	198.66	-138.00	10.62
6,684.00	10.53	5.86	6,666.26	-145.00	199.37	-131.97	10.84
6,728.00	14.06	7.60	6,709.24	-135.70	200.49	-122.62	8.07
6,770.00	17.10	7.27	6,749.69	-124.51	201.95	-111.37	7.24
6,814.00	20.77	0.70	6,791.31	-110.29	202.86	-97.11	9.63
6,856.00	25.04	356.03	6,829.99	-93.97	202.34	-80.86	11.04
6,900.00	28.98	356.92	6,869.19	-74.03	201.12	-61.04	9.00
6,942.00	32.86	358.88	6,905.21	-52.47	200.35	-39.57	9.54
6,985.00	35.39	359.28	6,940.80	-28.35	199.96	-15.52	5.91
7,027.00	38.01	0.26	6,974.48	-3.25	199.87	9.52	6.39
7,071.00	39.64	359.24	7,008.75	24.33	199.74	37.04	3.98
7,113.00	41.28	359.17	7,040.71	51.58	199.37	64.21	3.91
7,157.00	44.53	356.79	7,072.94	81.51	198.29	94.00	8.25
7,195.00	48.38	354.17	7,099.11	108.96	196.10	121.25	11.30
7,238.00	54.06	356.28	7,126.04	142.35	193.34	154.40	13.75
7,282.00	61.87	359.34	7,149.36	179.59	191.96	191.47	18.70
7,324.00	69.65	1.94	7,166.59	217.85	192.41	229.69	19.36
7,368.00	77.06	8.04	7,179.20	259.79	196.11	271.78	21.44
7,410.00	82.43	9.46	7,186.67	300.62	202.40	312.93	13.21
7,440.00	83.43	7.33	7,190.37	330.07	206.75	342.59	7.79
7,487.50	86.80	7.52	7,194.41	376.99	212.87	389.81	7.10
7" Casing Point @ 7487.50' MD :: 7194.41' TVD							
7,517.00	88.89	7.64	7,195.52	406.21	216.75	419.22	7.10
7,602.00	89.44	8.20	7,196.76	490.39	228.47	503.98	0.92
7,688.00	89.26	6.78	7,197.74	575.65	239.67	589.78	1.66
7,774.00	88.83	4.70	7,199.17	661.20	248.27	675.70	2.47
7,860.00	89.01	2.51	7,200.79	747.01	253.68	761.68	2.55
7,945.00	89.69	0.75	7,201.76	831.97	256.10	846.62	2.22
8,031.00	90.19	359.33	7,201.85	917.97	256.16	932.45	1.75
8,117.00	91.30	357.63	7,200.73	1,003.92	253.88	1,018.08	2.36
8,203.00	90.19	357.02	7,199.61	1,089.82	249.86	1,103.55	1.47

Design Report for Thomason 2C-9HZ - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,288.00	91.30	356.89	7,198.50	1,174.69	245.35	1,187.96	1.31
8,374.00	91.60	356.54	7,196.33	1,260.52	240.42	1,273.30	0.54
8,460.00	91.91	357.88	7,193.69	1,346.38	236.24	1,358.71	1.60
8,546.00	91.17	358.89	7,191.38	1,432.31	233.82	1,444.32	1.46
8,631.00	89.94	359.56	7,190.56	1,517.30	232.67	1,529.06	1.65
8,717.00	89.81	0.09	7,190.75	1,603.30	232.40	1,614.86	0.63
8,803.00	87.40	0.57	7,192.84	1,689.26	232.90	1,700.69	2.86
8,889.00	88.95	0.48	7,195.58	1,775.21	233.69	1,786.51	1.81
8,974.00	89.94	2.13	7,196.40	1,860.18	235.62	1,871.43	2.26
9,060.00	89.20	1.70	7,197.05	1,946.13	238.50	1,957.39	1.00
9,146.00	89.14	2.88	7,198.29	2,032.05	241.93	2,043.35	1.37
9,232.00	90.06	3.21	7,198.89	2,117.93	246.50	2,129.35	1.14
9,317.00	90.31	3.62	7,198.62	2,202.78	251.56	2,214.34	0.56
9,403.00	89.63	2.72	7,198.66	2,288.64	256.32	2,300.34	1.31
9,489.00	89.51	0.76	7,199.31	2,374.60	258.93	2,386.28	2.28
9,575.00	89.44	1.08	7,200.10	2,460.58	260.31	2,472.18	0.38
9,660.00	89.63	1.54	7,200.79	2,545.56	262.25	2,557.11	0.59
9,746.00	90.19	1.38	7,200.92	2,631.53	264.44	2,643.04	0.68
9,832.00	90.12	1.12	7,200.69	2,717.51	266.32	2,728.97	0.31
9,918.00	90.06	1.08	7,200.56	2,803.49	267.97	2,814.88	0.08
10,003.00	90.12	1.12	7,200.42	2,888.48	269.60	2,899.80	0.08
10,089.00	90.37	0.70	7,200.05	2,974.46	270.97	2,985.70	0.57
10,175.00	90.93	0.93	7,199.08	3,060.45	272.19	3,071.58	0.70
10,261.00	89.69	0.51	7,198.61	3,146.44	273.27	3,157.47	1.52
10,346.00	89.51	359.96	7,199.21	3,231.44	273.62	3,242.31	0.68
10,432.00	89.94	0.23	7,199.62	3,317.44	273.76	3,328.15	0.59
10,518.00	90.25	359.92	7,199.48	3,403.43	273.88	3,413.98	0.51
10,604.00	90.43	0.10	7,198.97	3,489.43	273.89	3,499.80	0.30
10,689.00	90.49	0.01	7,198.28	3,574.43	273.97	3,584.63	0.13
10,775.00	89.07	0.19	7,198.61	3,660.43	274.12	3,670.46	1.66
10,861.00	88.95	359.42	7,200.10	3,746.41	273.83	3,756.25	0.91
10,946.00	88.83	359.73	7,201.75	3,831.40	273.20	3,841.02	0.39
11,032.00	88.70	359.88	7,203.60	3,917.37	272.91	3,926.81	0.23
11,118.00	89.63	359.78	7,204.85	4,003.36	272.65	4,012.60	1.09
11,204.00	89.69	0.09	7,205.36	4,089.36	272.56	4,098.42	0.37
11,289.00	89.94	359.64	7,205.64	4,174.36	272.36	4,183.23	0.61
11,375.00	90.06	359.99	7,205.64	4,260.36	272.08	4,269.04	0.43
11,461.00	89.94	359.57	7,205.64	4,346.36	271.75	4,354.84	0.51
11,549.00	90.00	0.30	7,205.68	4,434.36	271.65	4,442.66	0.83
Final Sperry MWD Survey @ 11549.00ft							
11,600.00	90.00	0.30	7,205.68	4,485.36	271.91	4,493.57	0.00
Straight Line Projection to TD @ 11600ft							

Design Report for Thomason 2C-9HZ - Actual Field Surveys**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	0.35	-0.04	First Gyro Survey @ 116.00ft
891.00	890.99	3.01	1.07	Final Gyro Survey @ 891.00ft
891.00	890.99	3.01	1.07	Tie-On to Surface Gyros @ 891.00ft
945.00	944.99	3.18	1.12	First Sperry MWD Survey @ 945.00ft
11,549.00	7,205.68	4,434.36	271.65	Final Sperry MWD Survey @ 11549.00ft
11,600.00	7,205.68	4,485.36	271.91	Straight Line Projection to TD @ 11600ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	Thomason 2C-9HZ_BHL ReLoc	3.66	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
16.00	891.00	Surface Gyros	NS-GYRO-MS
891.00	7,440.00	Sperry MWD Surveys - Vert/Build	MWD+SC
7,517.00	11,549.00	Sperry MWD Surveys - Lateral	MWD+SC

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,487.50	7,194.41	7" Casing Point @ 7487.50' MD :: 7194.41' TVD	7	8-3/4

Design Report for Thomason 2C-9HZ - 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
Thomason 2C-9HZ_ - actual wellpath hits target center	0.00	0.00	0.00	0.01	0.00	1,297,439.02	3,232,788.15	40.146864	-104.667264
- Polygon									
Point 1			1,676.91	138.93		1,297,593.68	3,234,463.62		
Point 2			-478.80	135.26		1,297,569.76	3,232,308.13		
Point 3			-2,647.57	131.56		1,297,545.70	3,230,139.58		
Point 4			-2,629.26	2,305.12		1,299,719.24	3,230,137.47		
Point 5			-2,614.97	4,519.62		1,301,933.69	3,230,130.97		
Point 6			-429.60	4,512.23		1,301,946.82	3,232,316.22		
Point 7			1,753.24	4,504.98		1,301,960.07	3,234,498.94		
Point 8			1,720.53	2,307.75		1,299,762.72	3,234,486.87		
Thomason 2C-9HZ_ - actual wellpath misses target center by 12.69ft at 7530.70ft MD (7195.78 TVD, 419.79 N, 218.59 E)	0.00	0.00	7,204.00	421.00	209.00	1,297,861.93	3,232,993.18	40.148020	-104.666516
- Point									
Thomason 2C-9HZ_ - actual wellpath hits target center	0.00	0.00	0.00	0.01	0.00	1,297,439.02	3,232,788.15	40.146864	-104.667264
- Polygon									
Point 1			2,127.79	-320.32		1,297,138.70	3,234,918.77		
Point 2			-485.41	-324.78		1,297,109.70	3,232,305.84		
Point 3			-3,111.48	-329.25		1,297,080.57	3,229,680.03		
Point 4			-3,059.29	2,304.81		1,299,714.90	3,229,707.48		
Point 5			-3,072.02	4,981.19		1,302,390.93	3,229,669.62		
Point 6			-425.85	4,972.24		1,302,406.83	3,232,315.65		
Point 7			2,220.12	4,963.45		1,302,422.88	3,234,961.48		
Point 8			2,180.65	2,307.98		1,299,767.27	3,234,946.95		
Thomason 2C-9HZ_ - actual wellpath hits target center	0.00	0.00	0.00	0.01	0.00	1,297,439.02	3,232,788.15	40.146864	-104.667264
- Polygon									
Point 1			-20.94	154.88		1,297,593.68	3,232,765.76		
Point 2			350.06	151.40		1,297,593.68	3,233,136.76		
Point 3			433.78	4,517.37		1,301,960.07	3,233,179.48		
Point 4			62.78	4,520.86		1,301,960.07	3,232,808.48		
Thomason 2C-9HZ_ - actual wellpath misses target center by 30.04ft at 11600.00ft MD (7205.68 TVD, 4485.36 N, 271.91 E)	0.00	0.00	7,210.00	4,510.01	288.53	1,301,951.34	3,233,034.31	40.159244	-104.666232
- Point									
Thomason 2C-9HZ_ - actual wellpath hits target center	0.00	0.00	0.00	0.01	0.00	1,297,439.02	3,232,788.15	40.146864	-104.667264
- Point									

North Reference Sheet for Sec. 9-T2N-R65W - Thomason 2C-9HZ - Plan B 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=16 @ 4897.00ft (Xtreme 22). Northing and Easting are relative to Thomason 2C-9HZ

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: 0.99995848

Grid Coordinates of Well: 1,297,439.01 ft N, 3,232,788.15 ft E

Geographical Coordinates of Well: 40° 08' 48.71" N, 104° 40' 02.15" W

Grid Convergence at Surface is: 0.54°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,600.00ft the Bottom Hole Displacement is 4,493.59ft in the Direction of 3.47° (True).

Magnetic Convergence at surface is: -8.12° (31 October 2012, , BGGM2012)

