

# Anadarko Petroleum Corp.

Adams County, CO (NAD83)

Sec. 14-T3S-R65W

Richardson 14-37-2H

Plan A Rev 0

Plan: Plan A Rev 0 Proposal

## Sperry Drilling Services Proposal Report

26 March, 2012

Well Coordinates: 1,165,630.90 N, 3,245,984.64 E (39° 47' 04.90" N, 104° 37' 28.97" W)

Ground Level: 5,441.00 ft

Local Coordinate Origin:

Centered on Well Richardson 14-37-2H

Viewing Datum:

RKB=25' @ 5466.00ft (Unknown Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Version: 2003.16 Build: 431

**HALLIBURTON**

Project: Adams County, CO (NAD83)  
Site: Sec. 14-T3S-R65W  
Well: Richardson 14-37-2H  
Wellbore: Plan A Rev 0  
Design: Plan A Rev 0 Proposal

# Anadarko Petroleum Corp.

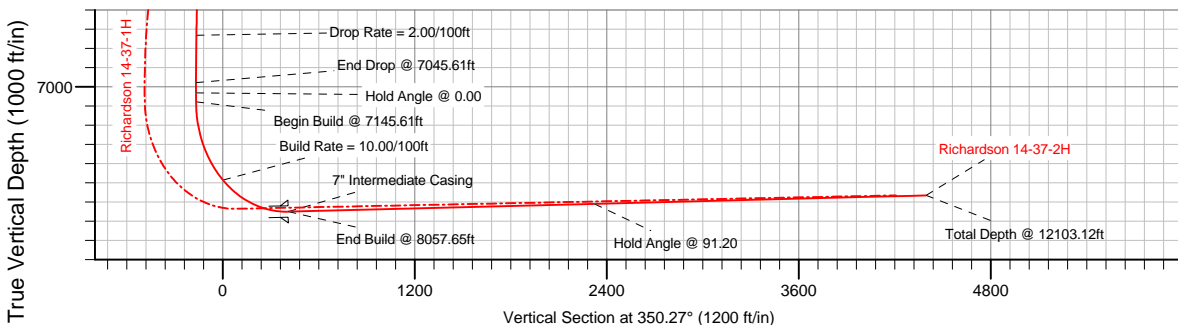
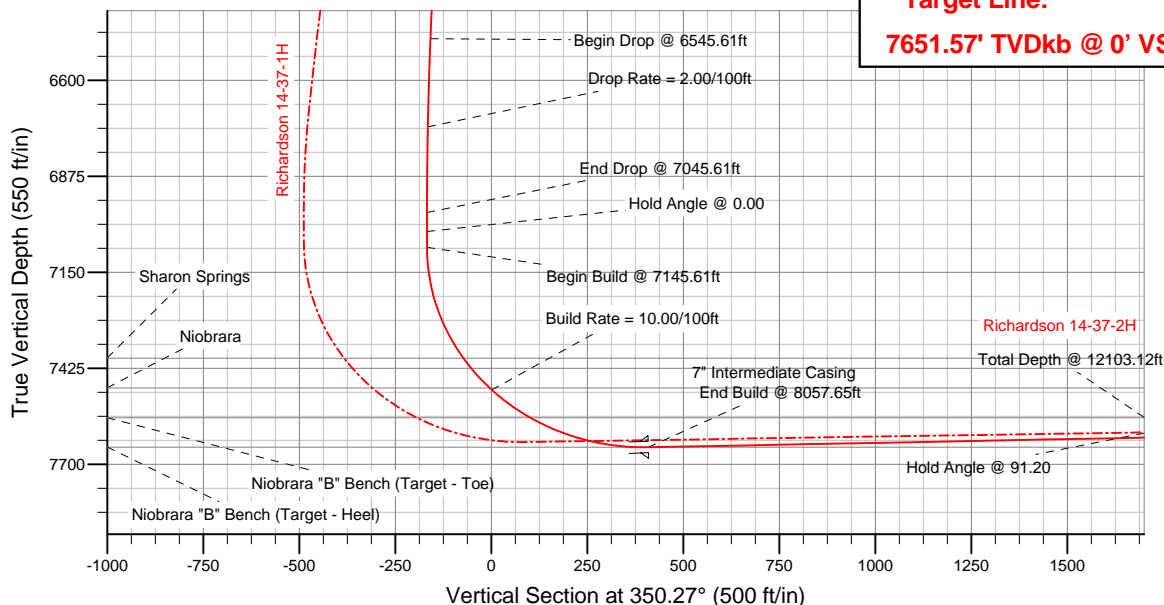
**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

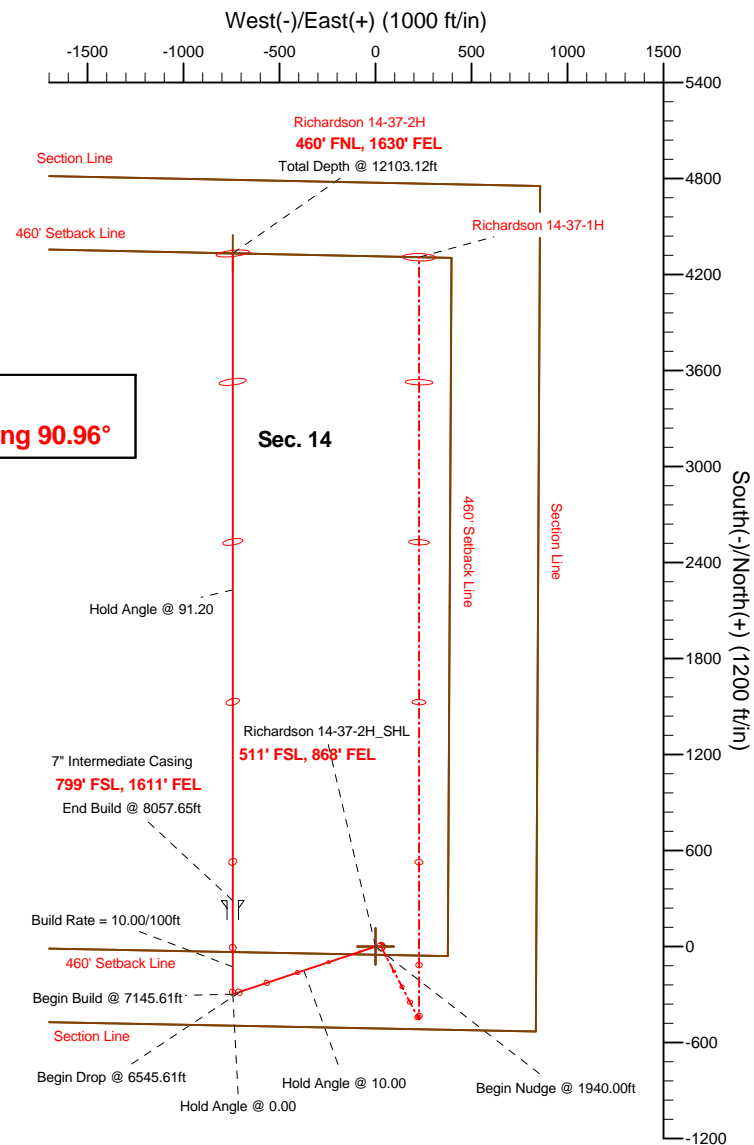
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1840.00	0.00	0.00	1840.00	0.00	0.00	0.00	0.00	0.00	
3	1940.00	0.00	0.00	1940.00	0.00	0.00	0.00	0.00	0.00	
4	2440.00	10.00	248.20	2437.47	-16.16	-40.41	2.00	248.20	-9.10	
5	6545.61	10.00	248.20	6480.70	-280.92	-702.36	0.00	0.00	-158.18	
6	7045.61	0.00	0.00	6978.17	-297.09	-742.77	2.00	180.00	-167.28	
7	7145.61	0.00	0.00	7078.17	-297.09	-742.77	0.00	0.00	-167.28	
8	8057.65	91.20	360.00	7651.00	287.91	-742.78	10.00	360.00	409.30	
9	12103.12	91.20	360.00	7566.00	4332.49	-742.90	0.00	0.00	4395.72	Richardson 14-37-2H_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Richardson 14-37-2H_SHL	0.00	0.00	0.00	39.784693	-104.624714	Point
Richardson 14-37-xH_460' Setback Lines	0.00	0.00	0.00	39.784693	-104.624714	Polygon
Richardson 14-37-xH_Setback Lines	0.00	0.00	0.00	39.784693	-104.624714	Polygon
Richardson 14-37-2H_BHL	7566.00	4332.49	-742.90	39.796587	-104.627358	Point



**Target Line:**  
**7651.57' TVDkb @ 0' VS Drilling 90.96°**



## WELL DETAILS: Richardson 14-37-2H

Ground Level: 5441.00 RKB=25' @ 5466.00ft (Unknown Rig)

Plan: Plan A Rev 0 Proposal (Richardson 14-37-2H/Plan A Rev 0)

Created By: Fred Hartmann Date: 03/26/2012  
Reviewed: Date:

**Plan Report for Richardson 14-37-2H - Plan A Rev 0 Proposal**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Richardson 14-37-2H_SHL - Richardson 14-37-xH_460' Setback Lines - Richardson 14-37-xH_Section Lines</b>										
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,691.00	0.00	0.00	1,691.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Fox Hills</b>										
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,840.00	0.00	0.00	1,840.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Tie-On to Surface Casing (Assume Vertical) @ 1840.00ft</b>										
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Hold Angle @ 0.00</b>										
1,940.00	0.00	0.00	1,940.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1940.00ft</b>										
2,000.00	1.20	248.20	2,000.00	-0.23	-0.58	-0.13	2.00	2.00	0.00	248.20
2,100.00	3.20	248.20	2,099.92	-1.66	-4.15	-0.93	2.00	2.00	0.00	0.00
2,200.00	5.20	248.20	2,199.64	-4.38	-10.95	-2.47	2.00	2.00	0.00	0.00
<b>Nudge Rate = 2.00/100ft</b>										
2,300.00	7.20	248.20	2,299.05	-8.39	-20.97	-4.72	2.00	2.00	0.00	0.00
2,400.00	9.20	248.20	2,398.03	-13.69	-34.22	-7.71	2.00	2.00	0.00	0.00
2,440.00	10.00	248.20	2,437.47	-16.16	-40.41	-9.10	2.00	2.00	0.00	0.00
<b>End Nudge @ 2440.00ft</b>										
2,500.00	10.00	248.20	2,496.55	-20.03	-50.08	-11.28	0.00	0.00	0.00	0.00
2,524.82	10.00	248.20	2,521.00	-21.63	-54.09	-12.18	0.00	0.00	0.00	0.00
<b>Parkman</b>										
2,600.00	10.00	248.20	2,595.03	-26.48	-66.21	-14.91	0.00	0.00	0.00	0.00
2,700.00	10.00	248.20	2,693.52	-32.93	-82.33	-18.54	0.00	0.00	0.00	0.00
2,800.00	10.00	248.20	2,792.00	-39.38	-98.45	-22.17	0.00	0.00	0.00	0.00
2,900.00	10.00	248.20	2,890.48	-45.83	-114.58	-25.80	0.00	0.00	0.00	0.00
3,000.00	10.00	248.20	2,988.96	-52.28	-130.70	-29.43	0.00	0.00	0.00	0.00
3,100.00	10.00	248.20	3,087.44	-58.72	-146.82	-33.07	0.00	0.00	0.00	0.00
3,200.00	10.00	248.20	3,185.92	-65.17	-162.94	-36.70	0.00	0.00	0.00	0.00
3,300.00	10.00	248.20	3,284.40	-71.62	-179.07	-40.33	0.00	0.00	0.00	0.00
3,400.00	10.00	248.20	3,382.88	-78.07	-195.19	-43.96	0.00	0.00	0.00	0.00
3,500.00	10.00	248.20	3,481.36	-84.52	-211.31	-47.59	0.00	0.00	0.00	0.00
3,600.00	10.00	248.20	3,579.84	-90.97	-227.44	-51.22	0.00	0.00	0.00	0.00
3,700.00	10.00	248.20	3,678.32	-97.42	-243.56	-54.85	0.00	0.00	0.00	0.00
3,800.00	10.00	248.20	3,776.80	-103.87	-259.68	-58.48	0.00	0.00	0.00	0.00
3,900.00	10.00	248.20	3,875.28	-110.31	-275.81	-62.11	0.00	0.00	0.00	0.00
4,000.00	10.00	248.20	3,973.77	-116.76	-291.93	-65.75	0.00	0.00	0.00	0.00
4,100.00	10.00	248.20	4,072.25	-123.21	-308.05	-69.38	0.00	0.00	0.00	0.00
4,200.00	10.00	248.20	4,170.73	-129.66	-324.17	-73.01	0.00	0.00	0.00	0.00
4,300.00	10.00	248.20	4,269.21	-136.11	-340.30	-76.64	0.00	0.00	0.00	0.00
4,400.00	10.00	248.20	4,367.69	-142.56	-356.42	-80.27	0.00	0.00	0.00	0.00

## Plan Report for Richardson 14-37-2H - Plan A Rev 0 Proposal

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
4,500.00	10.00	248.20	4,466.17	-149.01	-372.54	-83.90	0.00	0.00	0.00	0.00
<b>Hold Angle @ 10.00</b>										
4,600.00	10.00	248.20	4,564.65	-155.46	-388.67	-87.53	0.00	0.00	0.00	0.00
4,700.00	10.00	248.20	4,663.13	-161.90	-404.79	-91.16	0.00	0.00	0.00	0.00
4,800.00	10.00	248.20	4,761.61	-168.35	-420.91	-94.79	0.00	0.00	0.00	0.00
4,900.00	10.00	248.20	4,860.09	-174.80	-437.04	-98.43	0.00	0.00	0.00	0.00
5,000.00	10.00	248.20	4,958.57	-181.25	-453.16	-102.06	0.00	0.00	0.00	0.00
5,100.00	10.00	248.20	5,057.05	-187.70	-469.28	-105.69	0.00	0.00	0.00	0.00
5,200.00	10.00	248.20	5,155.53	-194.15	-485.40	-109.32	0.00	0.00	0.00	0.00
5,261.40	10.00	248.20	5,216.00	-198.11	-495.30	-111.55	0.00	0.00	0.00	0.00
<b>Sussex</b>										
5,300.00	10.00	248.20	5,254.02	-200.60	-501.53	-112.95	0.00	0.00	0.00	0.00
5,400.00	10.00	248.20	5,352.50	-207.05	-517.65	-116.58	0.00	0.00	0.00	0.00
5,494.95	10.00	248.20	5,446.00	-213.17	-532.96	-120.03	0.00	0.00	0.00	0.00
<b>Shannon</b>										
5,500.00	10.00	248.20	5,450.98	-213.49	-533.77	-120.21	0.00	0.00	0.00	0.00
5,600.00	10.00	248.20	5,549.46	-219.94	-549.90	-123.84	0.00	0.00	0.00	0.00
5,700.00	10.00	248.20	5,647.94	-226.39	-566.02	-127.47	0.00	0.00	0.00	0.00
5,800.00	10.00	248.20	5,746.42	-232.84	-582.14	-131.11	0.00	0.00	0.00	0.00
5,900.00	10.00	248.20	5,844.90	-239.29	-598.27	-134.74	0.00	0.00	0.00	0.00
6,000.00	10.00	248.20	5,943.38	-245.74	-614.39	-138.37	0.00	0.00	0.00	0.00
6,100.00	10.00	248.20	6,041.86	-252.19	-630.51	-142.00	0.00	0.00	0.00	0.00
6,200.00	10.00	248.20	6,140.34	-258.64	-646.63	-145.63	0.00	0.00	0.00	0.00
6,300.00	10.00	248.20	6,238.82	-265.08	-662.76	-149.26	0.00	0.00	0.00	0.00
6,400.00	10.00	248.20	6,337.30	-271.53	-678.88	-152.89	0.00	0.00	0.00	0.00
6,500.00	10.00	248.20	6,435.78	-277.98	-695.00	-156.52	0.00	0.00	0.00	0.00
6,545.61	10.00	248.20	6,480.70	-280.92	-702.36	-158.18	0.00	0.00	0.00	0.00
<b>Begin Drop @ 6545.61ft</b>										
6,600.00	8.91	248.20	6,534.35	-284.24	-710.65	-160.05	2.00	-2.00	0.00	180.00
6,700.00	6.91	248.20	6,633.40	-289.35	-723.43	-162.93	2.00	-2.00	0.00	180.00
6,800.00	4.91	248.20	6,732.86	-293.18	-733.00	-165.08	2.00	-2.00	0.00	180.00
<b>Drop Rate = 2.00/100ft</b>										
6,900.00	2.91	248.20	6,832.62	-295.71	-739.33	-166.51	2.00	-2.00	0.00	-180.00
7,000.00	0.91	248.20	6,932.56	-296.95	-742.43	-167.20	2.00	-2.00	0.00	180.00
7,045.61	0.00	0.00	6,978.17	-297.09	-742.77	-167.28	2.00	-2.00	0.00	180.00
<b>End Drop @ 7045.61ft</b>										
7,100.00	0.00	0.00	7,032.56	-297.09	-742.77	-167.28	0.00	0.00	0.00	0.00
<b>Hold Angle @ 0.00</b>										
7,145.61	0.00	0.00	7,078.17	-297.09	-742.77	-167.28	0.00	0.00	0.00	0.00
<b>Begin Build @ 7145.61ft</b>										
7,200.00	5.44	360.00	7,132.48	-294.51	-742.77	-164.74	10.00	10.00	0.00	360.00
7,300.00	15.44	360.00	7,230.70	-276.41	-742.77	-146.90	10.00	10.00	0.00	0.00
7,400.00	25.44	360.00	7,324.28	-241.53	-742.77	-112.53	10.00	10.00	0.00	0.00
7,482.53	33.69	360.00	7,396.00	-200.85	-742.77	-72.43	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,500.00	35.44	360.00	7,410.39	-190.93	-742.77	-62.66	10.00	10.00	0.00	0.00
7,592.35	44.67	360.00	7,481.00	-131.56	-742.77	-4.14	10.00	10.00	0.00	0.00
<b>Niobrara</b>										
7,600.00	45.44	360.00	7,486.40	-126.15	-742.77	1.20	10.00	10.00	0.00	0.00
<b>Build Rate = 10.00/100ft</b>										
7,700.00	55.44	360.00	7,550.01	-49.16	-742.77	77.09	10.00	10.00	0.00	0.00
7,729.29	58.37	360.00	7,566.00	-24.62	-742.77	101.26	10.00	10.00	0.00	0.00
<b>Niobrara "B" Bench (Target - Toe)</b>										
7,800.00	65.44	360.00	7,599.28	37.72	-742.78	162.71	10.00	10.00	0.00	0.00
7,900.00	75.44	360.00	7,632.72	131.83	-742.78	255.46	10.00	10.00	0.00	0.00
8,000.00	85.44	360.00	7,649.31	230.31	-742.78	352.53	10.00	10.00	0.00	0.00
8,033.73	88.81	360.00	7,651.00	263.99	-742.78	385.73	10.00	10.00	0.00	0.00
<b>Niobrara "B" Bench (Target - Heel)</b>										

**Plan Report for Richardson 14-37-2H - Plan A Rev 0 Proposal**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
8,057.65	91.20	360.00	7,651.00	287.91	-742.78	409.31	10.00	10.00	0.00	0.00
<b>End Build @ 8057.65ft - 7" Intermediate Casing</b>										
8,100.00	91.20	360.00	7,650.11	330.25	-742.79	451.04	0.00	0.00	0.00	0.00
8,200.00	91.20	360.00	7,648.01	430.23	-742.79	549.58	0.00	0.00	0.00	0.00
8,300.00	91.20	360.00	7,645.90	530.21	-742.79	648.12	0.00	0.00	0.00	0.00
8,400.00	91.20	360.00	7,643.80	630.19	-742.79	746.66	0.00	0.00	0.00	0.00
8,500.00	91.20	360.00	7,641.70	730.17	-742.80	845.20	0.00	0.00	0.00	0.00
8,600.00	91.20	360.00	7,639.60	830.14	-742.80	943.74	0.00	0.00	0.00	0.00
8,700.00	91.20	360.00	7,637.50	930.12	-742.80	1,042.28	0.00	0.00	0.00	0.00
8,800.00	91.20	360.00	7,635.40	1,030.10	-742.81	1,140.82	0.00	0.00	0.00	0.00
8,900.00	91.20	360.00	7,633.30	1,130.08	-742.81	1,239.36	0.00	0.00	0.00	0.00
9,000.00	91.20	360.00	7,631.20	1,230.06	-742.81	1,337.90	0.00	0.00	0.00	0.00
9,100.00	91.20	360.00	7,629.10	1,330.03	-742.82	1,436.44	0.00	0.00	0.00	0.00
9,200.00	91.20	360.00	7,627.00	1,430.01	-742.82	1,534.98	0.00	0.00	0.00	0.00
9,300.00	91.20	360.00	7,624.89	1,529.99	-742.82	1,633.52	0.00	0.00	0.00	0.00
9,400.00	91.20	360.00	7,622.79	1,629.97	-742.82	1,732.06	0.00	0.00	0.00	0.00
9,500.00	91.20	360.00	7,620.69	1,729.94	-742.83	1,830.60	0.00	0.00	0.00	0.00
9,600.00	91.20	360.00	7,618.59	1,829.92	-742.83	1,929.14	0.00	0.00	0.00	0.00
9,700.00	91.20	360.00	7,616.49	1,929.90	-742.83	2,027.68	0.00	0.00	0.00	0.00
9,800.00	91.20	360.00	7,614.39	2,029.88	-742.84	2,126.22	0.00	0.00	0.00	0.00
9,900.00	91.20	360.00	7,612.29	2,129.86	-742.84	2,224.76	0.00	0.00	0.00	0.00
10,000.00	91.20	360.00	7,610.19	2,229.83	-742.84	2,323.30	0.00	0.00	0.00	0.00
<b>Hold Angle @ 91.20</b>										
10,100.00	91.20	360.00	7,608.09	2,329.81	-742.84	2,421.84	0.00	0.00	0.00	0.00
10,200.00	91.20	360.00	7,605.99	2,429.79	-742.85	2,520.38	0.00	0.00	0.00	0.00
10,300.00	91.20	360.00	7,603.88	2,529.77	-742.85	2,618.92	0.00	0.00	0.00	0.00
10,400.00	91.20	360.00	7,601.78	2,629.75	-742.85	2,717.46	0.00	0.00	0.00	0.00
10,500.00	91.20	360.00	7,599.68	2,729.72	-742.86	2,816.00	0.00	0.00	0.00	0.00
10,600.00	91.20	360.00	7,597.58	2,829.70	-742.86	2,914.54	0.00	0.00	0.00	0.00
10,700.00	91.20	360.00	7,595.48	2,929.68	-742.86	3,013.08	0.00	0.00	0.00	0.00
10,800.00	91.20	360.00	7,593.38	3,029.66	-742.87	3,111.63	0.00	0.00	0.00	0.00
10,900.00	91.20	360.00	7,591.28	3,129.64	-742.87	3,210.17	0.00	0.00	0.00	0.00
11,000.00	91.20	360.00	7,589.18	3,229.61	-742.87	3,308.71	0.00	0.00	0.00	0.00
11,100.00	91.20	360.00	7,587.08	3,329.59	-742.87	3,407.25	0.00	0.00	0.00	0.00
11,200.00	91.20	360.00	7,584.97	3,429.57	-742.88	3,505.79	0.00	0.00	0.00	0.00
11,300.00	91.20	360.00	7,582.87	3,529.55	-742.88	3,604.33	0.00	0.00	0.00	0.00
11,400.00	91.20	360.00	7,580.77	3,629.53	-742.88	3,702.87	0.00	0.00	0.00	0.00
11,500.00	91.20	360.00	7,578.67	3,729.50	-742.89	3,801.41	0.00	0.00	0.00	0.00
11,600.00	91.20	360.00	7,576.57	3,829.48	-742.89	3,899.95	0.00	0.00	0.00	0.00
11,700.00	91.20	360.00	7,574.47	3,929.46	-742.89	3,998.49	0.00	0.00	0.00	0.00
11,800.00	91.20	360.00	7,572.37	4,029.44	-742.90	4,097.03	0.00	0.00	0.00	0.00
11,900.00	91.20	360.00	7,570.27	4,129.42	-742.90	4,195.57	0.00	0.00	0.00	0.00
12,000.00	91.20	360.00	7,568.17	4,229.39	-742.90	4,294.11	0.00	0.00	0.00	0.00
12,100.00	91.20	360.00	7,566.07	4,329.37	-742.90	4,392.65	0.00	0.00	0.00	0.00
12,103.12	91.20	360.00	7,566.00	4,332.49	-742.90	4,395.72	0.00	0.00	0.00	0.00
<b>Richardson 14-37-2H_BHL</b>										

## Plan Report for Richardson 14-37-2H - Plan A Rev 0 Proposal

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,840.00	1,840.00	0.00	0.00	Tie-On to Surface Casing (Assume Vertical) @ 1840.00ft
1,900.00	1,900.00	0.00	0.00	Hold Angle @ 0.00
1,940.00	1,940.00	0.00	0.00	Begin Nudge @ 1940.00ft
2,200.00	2,199.64	-4.38	-10.95	Nudge Rate = 2.00/100ft
2,440.00	2,437.47	-16.16	-40.41	End Nudge @ 2440.00ft
4,500.00	4,466.17	-149.01	-372.54	Hold Angle @ 10.00
6,545.61	6,480.70	-280.92	-702.36	Begin Drop @ 6545.61ft
6,800.00	6,732.86	-293.18	-733.00	Drop Rate = 2.00/100ft
7,045.61	6,978.17	-297.09	-742.77	End Drop @ 7045.61ft
7,100.00	7,032.56	-297.09	-742.77	Hold Angle @ 0.00
7,145.61	7,078.17	-297.09	-742.77	Begin Build @ 7145.61ft
7,600.00	7,486.40	-126.15	-742.77	Build Rate = 10.00/100ft
8,057.65	7,651.00	287.91	-742.78	End Build @ 8057.65ft
10,000.00	7,610.19	2,229.83	-742.84	Hold Angle @ 91.20
12,103.12	7,566.00	4,332.49	-742.90	Total Depth @ 12103.12ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	Richardson 14-37-2H_BHL	350.27	Slot	0.00	0.00	7,566.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	12,103.12	Plan A Rev 0 Proposal	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
8,057.65	7,651.00	7" Intermediate Casing	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,691.00	1,691.00	Fox Hills			
2,524.82	2,521.00	Parkman			
5,261.40	5,216.00	Sussex			
5,494.95	5,446.00	Shannon			
7,482.53	7,396.00	Sharon Springs			
7,592.35	7,481.00	Niobrara			
7,729.29	7,566.00	Niobrara "B" Bench (Target - Toe)			
8,033.73	7,651.00	Niobrara "B" Bench (Target - Heel)			

## Plan Report for Richardson 14-37-2H - Plan A Rev 0 Proposal

*Targets associated with this wellbore*

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Richardson 14-37-xH_460' Setback Lines	0.00	0.00	0.00	Polygon
Richardson 14-37-xH_Section Lines	0.00	0.00	0.00	Polygon
Richardson 14-37-2H_BHL	7,566.00	4,332.49	-742.90	Point
Richardson 14-37-2H_SHL	0.00	0.00	0.00	Point

**North Reference Sheet for Sec. 14-T3S-R65W - Richardson 14-37-2H - Plan A 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' @ 5466.00ft (Unknown Rig). Northing and Easting are relative to Richardson 14-37-2H  
 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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°  
 False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99998972

Grid Coordinates of Well: 1,165,630.90 ft N, 3,245,984.64 ft E  
 Geographical Coordinates of Well: 39° 47' 04.90" N, 104° 37' 28.97" W  
 Grid Convergence at Surface is: 0.57°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,103.12ft  
 the Bottom Hole Displacement is 4,395.72ft in the Direction of 350.27° (True).

Magnetic Convergence at surface is: -8.06° ( 1 April 2012, , BGGM2011)

