

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 11-T1N-R68W

Front Range Farms 15N-14HZ

Plan A

Plan: Rev A0 Permit

Sperry Drilling Services

Proposal Report

04 March, 2014

Well Coordinates: 1,267,054.52 N, 3,148,916.18 E (40° 03' 54.82" N, 104° 58' 04.57" W)

Ground Level: 5,046.00 usft

Local Coordinate Origin:

Centered on Well Front Range Farms 15N-14HZ

Viewing Datum:

RKB = 17' @ 5063.00usft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 11-T1N-R68W
 Well: Front Range Farms 15N-14HZ
 Wellbore: Plan A
 Design: Rev A0 Permit

Anadarko Petroleum Corp.



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	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00	
3	1766.96	5.34	49.06	1766.58	8.14	9.39	2.00	49.06	-8.13	
4	6999.78	5.34	49.06	6976.69	327.19	377.23	0.00	0.00	-326.73	
5	7937.01	90.23	179.93	7583.00	-246.98	420.97	10.00	130.73	247.49	Front Range Farms 15N-14HZ_CP
6	15317.22	90.23	179.93	7553.00	-7627.12	430.05	0.00	0.00	7627.64	Front Range Farms 15N-14HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	
Front Range Farms 15N-14HZ_LD	0.00	0.00	0.00	40° 3' 54.821 N	104° 58' 4.570 W	
Front Range Farms 15N-14HZ_SEC	0.00	0.00	0.00	40° 3' 54.821 N	104° 58' 4.570 W	Polygon
Front Range Farms 15N-14HZ_SHL	0.00	0.00	0.00	40° 3' 54.821 N	104° 58' 4.570 W	
Front Range Farms 15N-14HZ_BHL	7553.00	-7627.12	430.05	40° 2' 39.448 N	104° 57' 59.040 W	
Front Range Farms 15N-14HZ_CP	7583.00	-246.98	420.97	40° 3' 52.380 N	104° 57' 59.155 W	Point

WELL DETAILS: Front Range Farms 15N-14HZ

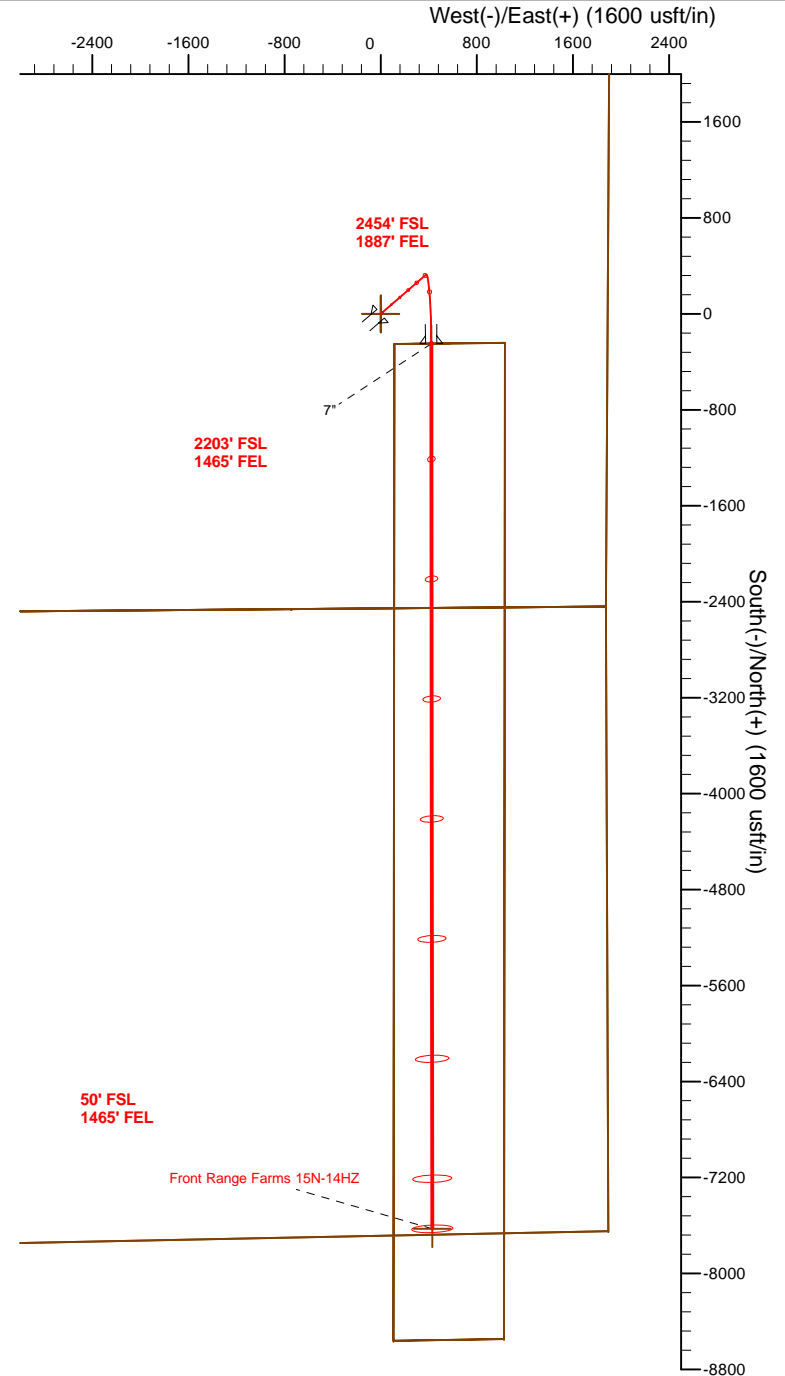
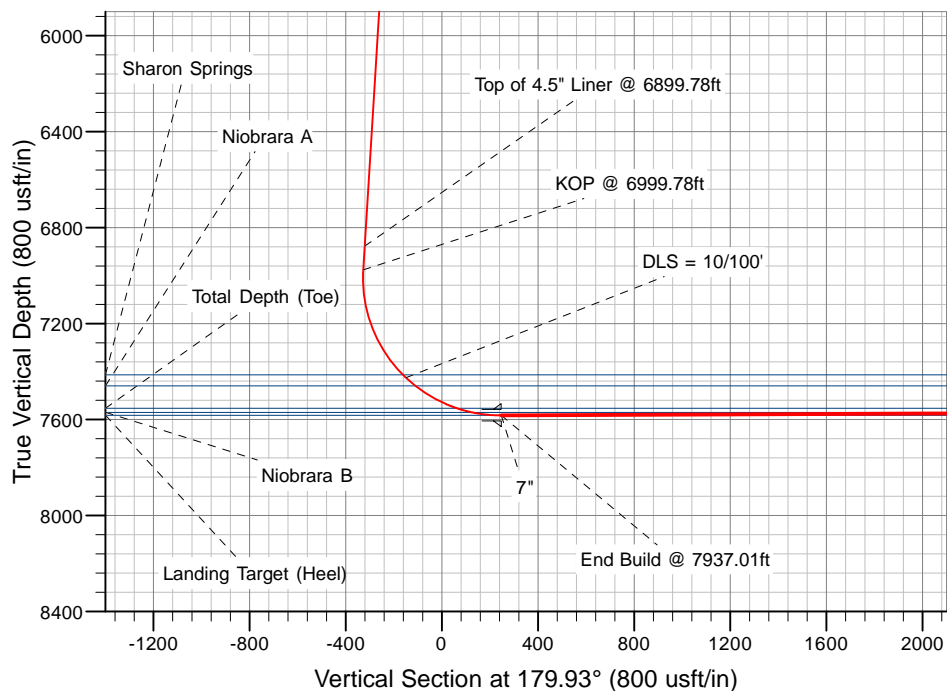
Ground Level: 5046.00

RKB = 17' @ 5063.00usft (Drilling Rig)

Plan: Rev A0 Permit (Front Range Farms 15N-14HZ/Plan A)

Created By: Clint Eshelman Date: 3/4/2014
 Reviewed: _____ Date: _____

6877.12 6899.78 Top of 4.5" Liner @ 6899.78ft
 6976.69 6999.78 KOP @ 6999.78ft



Plan Report for Front Range Farms 15N-14HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Front Range Farms 15N-14HZ_SHL - Front Range Farms 15N-14HZ_SEC - Front Range Farms 15N-14HZ_LD										
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
1,221.00	0.00	0.00	1,221.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Marker										
1,271.00	0.00	0.00	1,271.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"										
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
Begin Nudge @ 1500.00ft										
1,600.00	2.00	49.06	1,599.98	1.14	1.32	-1.14	2.00	2.00	0.00	49.06
1,700.00	4.00	49.06	1,699.84	4.57	5.27	-4.57	2.00	2.00	0.00	0.00
1,766.96	5.34	49.06	1,766.57	8.14	9.39	-8.13	2.00	2.00	0.00	0.00
End Nudge @ 1766.96ft										
1,800.00	5.34	49.06	1,799.47	10.16	11.71	-10.14	0.00	0.00	0.00	0.00
1,900.00	5.34	49.06	1,899.04	16.26	18.74	-16.23	0.00	0.00	0.00	0.00
2,000.00	5.34	49.06	1,998.60	22.35	25.77	-22.32	0.00	0.00	0.00	0.00
2,100.00	5.34	49.06	2,098.17	28.45	32.80	-28.41	0.00	0.00	0.00	0.00
2,200.00	5.34	49.06	2,197.73	34.55	39.83	-34.50	0.00	0.00	0.00	0.00
2,300.00	5.34	49.06	2,297.30	40.64	46.86	-40.59	0.00	0.00	0.00	0.00
2,400.00	5.34	49.06	2,396.87	46.74	53.89	-46.67	0.00	0.00	0.00	0.00
2,500.00	5.34	49.06	2,496.43	52.84	60.92	-52.76	0.00	0.00	0.00	0.00
2,600.00	5.34	49.06	2,596.00	58.93	67.95	-58.85	0.00	0.00	0.00	0.00
2,700.00	5.34	49.06	2,695.57	65.03	74.98	-64.94	0.00	0.00	0.00	0.00
2,800.00	5.34	49.06	2,795.13	71.13	82.01	-71.03	0.00	0.00	0.00	0.00
2,900.00	5.34	49.06	2,894.70	77.23	89.04	-77.12	0.00	0.00	0.00	0.00
3,000.00	5.34	49.06	2,994.26	83.32	96.07	-83.20	0.00	0.00	0.00	0.00
3,100.00	5.34	49.06	3,093.83	89.42	103.10	-89.29	0.00	0.00	0.00	0.00
3,200.00	5.34	49.06	3,193.40	95.52	110.13	-95.38	0.00	0.00	0.00	0.00
3,300.00	5.34	49.06	3,292.96	101.61	117.16	-101.47	0.00	0.00	0.00	0.00
3,400.00	5.34	49.06	3,392.53	107.71	124.19	-107.56	0.00	0.00	0.00	0.00
3,500.00	5.34	49.06	3,492.09	113.81	131.21	-113.65	0.00	0.00	0.00	0.00
3,600.00	5.34	49.06	3,591.66	119.90	138.24	-119.74	0.00	0.00	0.00	0.00
3,700.00	5.34	49.06	3,691.23	126.00	145.27	-125.82	0.00	0.00	0.00	0.00
3,800.00	5.34	49.06	3,790.79	132.10	152.30	-131.91	0.00	0.00	0.00	0.00
3,900.00	5.34	49.06	3,890.36	138.20	159.33	-138.00	0.00	0.00	0.00	0.00
4,000.00	5.34	49.06	3,989.93	144.29	166.36	-144.09	0.00	0.00	0.00	0.00
4,100.00	5.34	49.06	4,089.49	150.39	173.39	-150.18	0.00	0.00	0.00	0.00
4,200.00	5.34	49.06	4,189.06	156.49	180.42	-156.27	0.00	0.00	0.00	0.00
4,230.07	5.34	49.06	4,219.00	158.32	182.54	-158.10	0.00	0.00	0.00	0.00
Parkman										
4,300.00	5.34	49.06	4,288.62	162.58	187.45	-162.35	0.00	0.00	0.00	0.00
4,400.00	5.34	49.06	4,388.19	168.68	194.48	-168.44	0.00	0.00	0.00	0.00
4,500.00	5.34	49.06	4,487.76	174.78	201.51	-174.53	0.00	0.00	0.00	0.00
4,600.00	5.34	49.06	4,587.32	180.87	208.54	-180.62	0.00	0.00	0.00	0.00
4,606.71	5.34	49.06	4,594.00	181.28	209.01	-181.03	0.00	0.00	0.00	0.00

Plan Report for Front Range Farms 15N-14HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
Sussex										
4,700.00	5.34	49.06	4,686.89	186.97	215.57	-186.71	0.00	0.00	0.00	0.00
4,800.00	5.34	49.06	4,786.45	193.07	222.60	-192.80	0.00	0.00	0.00	0.00
4,900.00	5.34	49.06	4,886.02	199.16	229.63	-198.88	0.00	0.00	0.00	0.00
5,000.00	5.34	49.06	4,985.59	205.26	236.66	-204.97	0.00	0.00	0.00	0.00
5,100.00	5.34	49.06	5,085.15	211.36	243.69	-211.06	0.00	0.00	0.00	0.00
5,200.00	5.34	49.06	5,184.72	217.46	250.72	-217.15	0.00	0.00	0.00	0.00
5,300.00	5.34	49.06	5,284.28	223.55	257.75	-223.24	0.00	0.00	0.00	0.00
5,400.00	5.34	49.06	5,383.85	229.65	264.78	-229.33	0.00	0.00	0.00	0.00
5,500.00	5.34	49.06	5,483.42	235.75	271.81	-235.41	0.00	0.00	0.00	0.00
5,600.00	5.34	49.06	5,582.98	241.84	278.84	-241.50	0.00	0.00	0.00	0.00
5,700.00	5.34	49.06	5,682.55	247.94	285.86	-247.59	0.00	0.00	0.00	0.00
5,800.00	5.34	49.06	5,782.12	254.04	292.89	-253.68	0.00	0.00	0.00	0.00
5,900.00	5.34	49.06	5,881.68	260.13	299.92	-259.77	0.00	0.00	0.00	0.00
6,000.00	5.34	49.06	5,981.25	266.23	306.95	-265.86	0.00	0.00	0.00	0.00
6,100.00	5.34	49.06	6,080.81	272.33	313.98	-271.94	0.00	0.00	0.00	0.00
6,200.00	5.34	49.06	6,180.38	278.43	321.01	-278.03	0.00	0.00	0.00	0.00
6,300.00	5.34	49.06	6,279.95	284.52	328.04	-284.12	0.00	0.00	0.00	0.00
6,400.00	5.34	49.06	6,379.51	290.62	335.07	-290.21	0.00	0.00	0.00	0.00
6,500.00	5.34	49.06	6,479.08	296.72	342.10	-296.30	0.00	0.00	0.00	0.00
6,600.00	5.34	49.06	6,578.64	302.81	349.13	-302.39	0.00	0.00	0.00	0.00
6,700.00	5.34	49.06	6,678.21	308.91	356.16	-308.48	0.00	0.00	0.00	0.00
6,800.00	5.34	49.06	6,777.78	315.01	363.19	-314.56	0.00	0.00	0.00	0.00
6,899.78	5.34	49.06	6,877.12	321.09	370.20	-320.64	0.00	0.00	0.00	0.00
Top of 4.5" Liner @ 6899.78ft										
6,900.00	5.34	49.06	6,877.34	321.10	370.22	-320.65	0.00	0.00	0.00	0.00
6,999.78	5.34	49.06	6,976.69	327.19	377.23	-326.73	0.00	0.00	0.00	0.00
KOP @ 6999.78ft										
7,000.00	5.34	49.06	6,976.91	327.20	377.25	-326.74	0.00	0.00	0.00	0.00
7,100.00	7.68	148.29	7,076.50	324.54	384.29	-324.07	10.02	2.34	99.22	130.73
7,200.00	17.01	166.55	7,174.11	304.58	391.22	-304.11	10.00	9.33	18.26	31.86
7,300.00	26.82	171.87	7,266.78	267.94	397.83	-267.45	10.00	9.81	5.32	13.95
7,400.00	36.72	174.48	7,351.70	215.71	403.91	-215.22	10.00	9.91	2.60	8.99
7,482.40	44.92	175.85	7,414.00	162.09	408.40	-161.59	10.00	9.94	1.66	6.77
Sharon Springs										
7,500.00	46.67	176.09	7,426.27	149.50	409.29	-149.00	10.00	9.95	1.37	5.73
DLS = 10/100'										
7,551.68	51.81	176.73	7,460.00	110.45	411.73	-109.95	10.00	9.96	1.23	5.56
Niobrara A										
7,600.00	56.63	177.24	7,488.25	71.31	413.79	-70.81	10.00	9.96	1.07	5.15
7,700.00	66.59	178.16	7,535.73	-16.48	417.28	16.99	10.00	9.97	0.92	4.84
7,800.00	76.57	178.95	7,567.29	-111.21	419.65	111.72	10.00	9.97	0.79	4.41
7,817.03	78.27	179.07	7,571.00	-127.83	419.94	128.34	10.00	9.97	0.74	4.16
Niobrara B										
7,900.00	86.54	179.67	7,581.96	-209.99	420.84	210.51	10.00	9.97	0.72	4.13
7,937.01	90.23	179.93	7,583.00	-246.98	420.97	247.49	10.00	9.97	0.71	4.05
End Build @ 7937.01ft - Landing Target (Heel) - 7" - Front Range Farms 15N-14HZ_CP										
8,000.00	90.23	179.93	7,582.74	-309.97	421.05	310.48	0.00	0.00	0.00	4.04
8,100.00	90.23	179.93	7,582.34	-409.97	421.17	410.48	0.00	0.00	0.00	0.00
8,200.00	90.23	179.93	7,581.93	-509.97	421.29	510.48	0.00	0.00	0.00	0.00
8,300.00	90.23	179.93	7,581.52	-609.97	421.41	610.48	0.00	0.00	0.00	0.00
8,400.00	90.23	179.93	7,581.12	-709.97	421.54	710.48	0.00	0.00	0.00	0.00
8,500.00	90.23	179.93	7,580.71	-809.96	421.66	810.48	0.00	0.00	0.00	0.00
8,600.00	90.23	179.93	7,580.30	-909.96	421.78	910.48	0.00	0.00	0.00	0.00
8,700.00	90.23	179.93	7,579.90	-1,009.96	421.91	1,010.48	0.00	0.00	0.00	0.00
8,800.00	90.23	179.93	7,579.49	-1,109.96	422.03	1,110.48	0.00	0.00	0.00	0.00
8,900.00	90.23	179.93	7,579.09	-1,209.96	422.15	1,210.48	0.00	0.00	0.00	0.00
9,000.00	90.23	179.93	7,578.68	-1,309.96	422.28	1,310.48	0.00	0.00	0.00	0.00
9,100.00	90.23	179.93	7,578.27	-1,409.96	422.40	1,410.47	0.00	0.00	0.00	0.00

Plan Report for Front Range Farms 15N-14HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
9,200.00	90.23	179.93	7,577.87	-1,509.96	422.52	1,510.47	0.00	0.00	0.00	0.00
9,300.00	90.23	179.93	7,577.46	-1,609.96	422.65	1,610.47	0.00	0.00	0.00	0.00
9,400.00	90.23	179.93	7,577.05	-1,709.96	422.77	1,710.47	0.00	0.00	0.00	0.00
9,500.00	90.23	179.93	7,576.65	-1,809.96	422.89	1,810.47	0.00	0.00	0.00	0.00
9,600.00	90.23	179.93	7,576.24	-1,909.95	423.02	1,910.47	0.00	0.00	0.00	0.00
9,700.00	90.23	179.93	7,575.83	-2,009.95	423.14	2,010.47	0.00	0.00	0.00	0.00
9,800.00	90.23	179.93	7,575.43	-2,109.95	423.26	2,110.47	0.00	0.00	0.00	0.00
9,900.00	90.23	179.93	7,575.02	-2,209.95	423.38	2,210.47	0.00	0.00	0.00	0.00
10,000.00	90.23	179.93	7,574.61	-2,309.95	423.51	2,310.47	0.00	0.00	0.00	0.00
10,100.00	90.23	179.93	7,574.21	-2,409.95	423.63	2,410.47	0.00	0.00	0.00	0.00
10,200.00	90.23	179.93	7,573.80	-2,509.95	423.75	2,510.47	0.00	0.00	0.00	0.00
10,300.00	90.23	179.93	7,573.39	-2,609.95	423.88	2,610.46	0.00	0.00	0.00	0.00
10,400.00	90.23	179.93	7,572.99	-2,709.95	424.00	2,710.46	0.00	0.00	0.00	0.00
10,500.00	90.23	179.93	7,572.58	-2,809.95	424.12	2,810.46	0.00	0.00	0.00	0.00
10,600.00	90.23	179.93	7,572.18	-2,909.95	424.25	2,910.46	0.00	0.00	0.00	0.00
10,700.00	90.23	179.93	7,571.77	-3,009.94	424.37	3,010.46	0.00	0.00	0.00	0.00
10,800.00	90.23	179.93	7,571.36	-3,109.94	424.49	3,110.46	0.00	0.00	0.00	0.00
10,900.00	90.23	179.93	7,570.96	-3,209.94	424.62	3,210.46	0.00	0.00	0.00	0.00
11,000.00	90.23	179.93	7,570.55	-3,309.94	424.74	3,310.46	0.00	0.00	0.00	0.00
11,100.00	90.23	179.93	7,570.14	-3,409.94	424.86	3,410.46	0.00	0.00	0.00	0.00
11,200.00	90.23	179.93	7,569.74	-3,509.94	424.98	3,510.46	0.00	0.00	0.00	0.00
11,300.00	90.23	179.93	7,569.33	-3,609.94	425.11	3,610.46	0.00	0.00	0.00	0.00
11,400.00	90.23	179.93	7,568.92	-3,709.94	425.23	3,710.46	0.00	0.00	0.00	0.00
11,500.00	90.23	179.93	7,568.52	-3,809.94	425.35	3,810.45	0.00	0.00	0.00	0.00
11,600.00	90.23	179.93	7,568.11	-3,909.94	425.48	3,910.45	0.00	0.00	0.00	0.00
11,700.00	90.23	179.93	7,567.70	-4,009.94	425.60	4,010.45	0.00	0.00	0.00	0.00
11,800.00	90.23	179.93	7,567.30	-4,109.94	425.72	4,110.45	0.00	0.00	0.00	0.00
11,900.00	90.23	179.93	7,566.89	-4,209.93	425.85	4,210.45	0.00	0.00	0.00	0.00
12,000.00	90.23	179.93	7,566.48	-4,309.93	425.97	4,310.45	0.00	0.00	0.00	0.00
12,100.00	90.23	179.93	7,566.08	-4,409.93	426.09	4,410.45	0.00	0.00	0.00	0.00
12,200.00	90.23	179.93	7,565.67	-4,509.93	426.22	4,510.45	0.00	0.00	0.00	0.00
12,300.00	90.23	179.93	7,565.26	-4,609.93	426.34	4,610.45	0.00	0.00	0.00	0.00
12,400.00	90.23	179.93	7,564.86	-4,709.93	426.46	4,710.45	0.00	0.00	0.00	0.00
12,500.00	90.23	179.93	7,564.45	-4,809.93	426.58	4,810.45	0.00	0.00	0.00	0.00
12,600.00	90.23	179.93	7,564.05	-4,909.93	426.71	4,910.45	0.00	0.00	0.00	0.00
12,700.00	90.23	179.93	7,563.64	-5,009.93	426.83	5,010.44	0.00	0.00	0.00	0.00
12,800.00	90.23	179.93	7,563.23	-5,109.93	426.95	5,110.44	0.00	0.00	0.00	0.00
12,900.00	90.23	179.93	7,562.83	-5,209.93	427.08	5,210.44	0.00	0.00	0.00	0.00
13,000.00	90.23	179.93	7,562.42	-5,309.92	427.20	5,310.44	0.00	0.00	0.00	0.00
13,100.00	90.23	179.93	7,562.01	-5,409.92	427.32	5,410.44	0.00	0.00	0.00	0.00
13,200.00	90.23	179.93	7,561.61	-5,509.92	427.45	5,510.44	0.00	0.00	0.00	0.00
13,300.00	90.23	179.93	7,561.20	-5,609.92	427.57	5,610.44	0.00	0.00	0.00	0.00
13,400.00	90.23	179.93	7,560.79	-5,709.92	427.69	5,710.44	0.00	0.00	0.00	0.00
13,500.00	90.23	179.93	7,560.39	-5,809.92	427.82	5,810.44	0.00	0.00	0.00	0.00
13,600.00	90.23	179.93	7,559.98	-5,909.92	427.94	5,910.44	0.00	0.00	0.00	0.00
13,700.00	90.23	179.93	7,559.57	-6,009.92	428.06	6,010.44	0.00	0.00	0.00	0.00
13,800.00	90.23	179.93	7,559.17	-6,109.92	428.19	6,110.44	0.00	0.00	0.00	0.00
13,900.00	90.23	179.93	7,558.76	-6,209.92	428.31	6,210.43	0.00	0.00	0.00	0.00
14,000.00	90.23	179.93	7,558.35	-6,309.92	428.43	6,310.43	0.00	0.00	0.00	0.00
14,100.00	90.23	179.93	7,557.95	-6,409.91	428.55	6,410.43	0.00	0.00	0.00	0.00
14,200.00	90.23	179.93	7,557.54	-6,509.91	428.68	6,510.43	0.00	0.00	0.00	0.00
14,300.00	90.23	179.93	7,557.13	-6,609.91	428.80	6,610.43	0.00	0.00	0.00	0.00
14,400.00	90.23	179.93	7,556.73	-6,709.91	428.92	6,710.43	0.00	0.00	0.00	0.00
14,500.00	90.23	179.93	7,556.32	-6,809.91	429.05	6,810.43	0.00	0.00	0.00	0.00
14,600.00	90.23	179.93	7,555.92	-6,909.91	429.17	6,910.43	0.00	0.00	0.00	0.00
14,700.00	90.23	179.93	7,555.51	-7,009.91	429.29	7,010.43	0.00	0.00	0.00	0.00
14,800.00	90.23	179.93	7,555.10	-7,109.91	429.42	7,110.43	0.00	0.00	0.00	0.00
14,900.00	90.23	179.93	7,554.70	-7,209.91	429.54	7,210.43	0.00	0.00	0.00	0.00
15,000.00	90.23	179.93	7,554.29	-7,309.91	429.66	7,310.43	0.00	0.00	0.00	0.00
15,100.00	90.23	179.93	7,553.88	-7,409.91	429.79	7,410.42	0.00	0.00	0.00	0.00

Plan Report for Front Range Farms 15N-14HZ - Rev A0 Permit

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Tooface Azimuth (°)
15,200.00	90.23	179.93	7,553.48	-7,509.90	429.91	7,510.42	0.00	0.00	0.00	0.00
15,300.00	90.23	179.93	7,553.07	-7,609.90	430.03	7,610.42	0.00	0.00	0.00	0.00
15,317.22	90.23	179.93	7,553.00	-7,627.12	430.05	7,627.64	0.00	0.00	0.00	0.00

TD Well @ 15317.22ft - Total Depth (Toe) - Front Range Farms 15N-14HZ_BHL

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
1,500.00	1,500.00	0.00	0.00	Begin Nudge @ 1500.00ft
1,766.96	1,766.57	8.14	9.39	End Nudge @ 1766.96ft
6,899.78	6,877.12	321.09	370.20	Top of 4.5" Liner @ 6899.78ft
6,999.78	6,976.69	327.19	377.23	KOP @ 6999.78ft
7,500.00	7,426.27	149.50	409.29	DLS = 10/100'
7,937.01	7,583.00	-246.98	420.97	End Build @ 7937.01ft
15,317.22	7,553.00	-7,627.12	430.05	TD Well @ 15317.22ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.93	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	7,937.01	Rev A0 Permit	MWD
7,937.01	15,317.22	Rev A0 Permit	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,271.00	1,271.00	9 5/8"	9-5/8	13-1/2
7,937.01	7,583.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,221.00	1,221.00	Fox Hills Marker		0.00	
4,230.07	4,219.00	Parkman		0.00	
4,606.71	4,594.00	Sussex		0.00	
7,482.40	7,414.00	Sharon Springs		0.00	
7,551.68	7,460.00	Niobrara A		0.00	
7,817.03	7,571.00	Niobrara B		0.00	
7,937.01	7,583.00	Landing Target (Heel)		0.00	
15,317.22	7,553.00	Total Depth (Toe)		0.00	

Plan Report for Front Range Farms 15N-14HZ - Rev A0 Permit

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Front Range Farms 15N-14HZ_SHL	0.00	0.00	0.00	Point
Front Range Farms 15N-14HZ_SEC	0.00	0.00	0.00	Polygon
Front Range Farms 15N-14HZ_LD	0.00	0.00	0.00	Polygon
Front Range Farms 15N-14HZ_BHL	7,553.00	-7,627.12	430.05	Point
Front Range Farms 15N-14HZ_CP	7,583.00	-246.98	420.97	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.65 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 7,937.01 usft
Net Tortosity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.462

Audit Info

North Reference Sheet for Sec. 11-T1N-R68W - Front Range Farms 15N-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 = 17' @ 5063.00usft (Drilling Rig). Northing and Easting are relative to Front Range Farms 15N-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 -105.50°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996206

Grid Coordinates of Well: 1,267,054.52 usft N, 3,148,916.18 usft E

Geographical Coordinates of Well: 40° 03' 54.82" N, 104° 58' 04.57" W

Grid Convergence at Surface is: 0.34°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,317.22usft the Bottom Hole Displacement is 7,639.24usft in the Direction of 176.77° (True).

Magnetic Convergence at surface is: -8.28° (3 March 2014, , BGGM2013)

Magnetic Model: BGGM2013
 Date: 03-Mar-14
 Declination: 8.62°
 Inclination/Dip: 66.64°
 Field Strength: 52565

Grid North is 0.34° East of True North (Grid Convergence)
 Magnetic North is 8.62° East of True North (Magnetic Declination)
 Magnetic North is 8.28° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 0.34°
 To convert a Magnetic Direction to a True Direction, Add 8.62° East
 To convert a Magnetic Direction to a Grid Direction, Add 8.28°