

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 13-T1N-R66W

Lochbuie 30C-13HZ

Plan A 0

Plan: Plan A 0 Permit

## Sperry Drilling Services

## Proposal Report

09 July, 2013

Well Coordinates: 1,260,375.80 N, 3,214,765.98 E (40° 02' 44.05" N, 104° 43' 58.36" W)

Ground Level: 5,078.00 ft

Local Coordinate Origin:

Centered on Well Lochbuie 30C-13HZ

Viewing Datum:

RKB = 17' @ 5095.00ft (Drilling Rig)

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. 13-T1N-R66W  
 Well: Lochbuie 30C-13HZ  
 Wellbore: Plan A 0  
 Design: Plan A 0 Permit

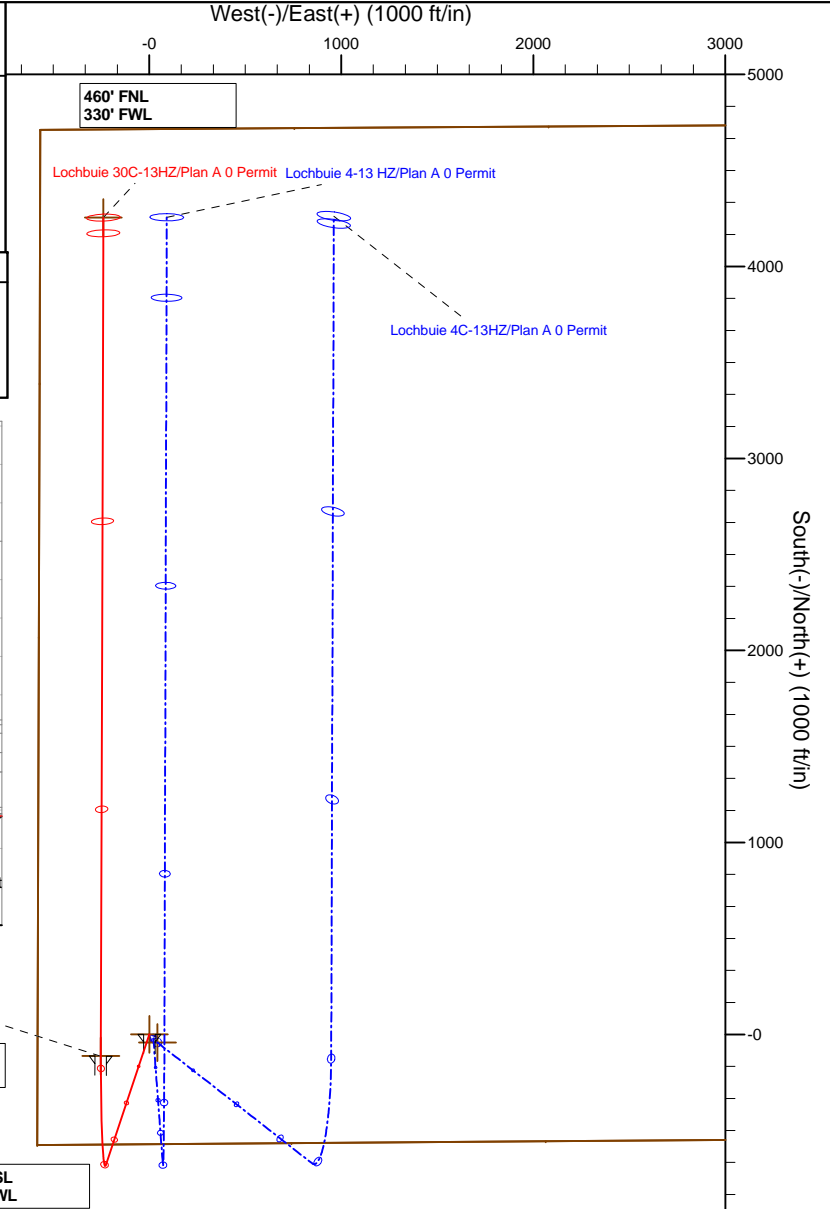
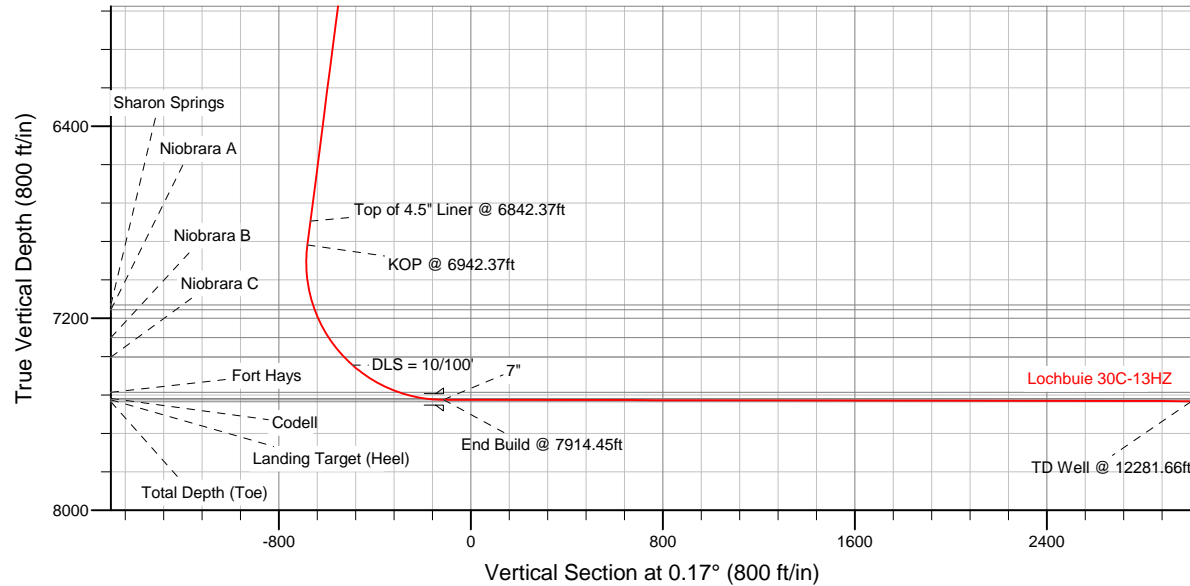


#### SECTION DETAILS

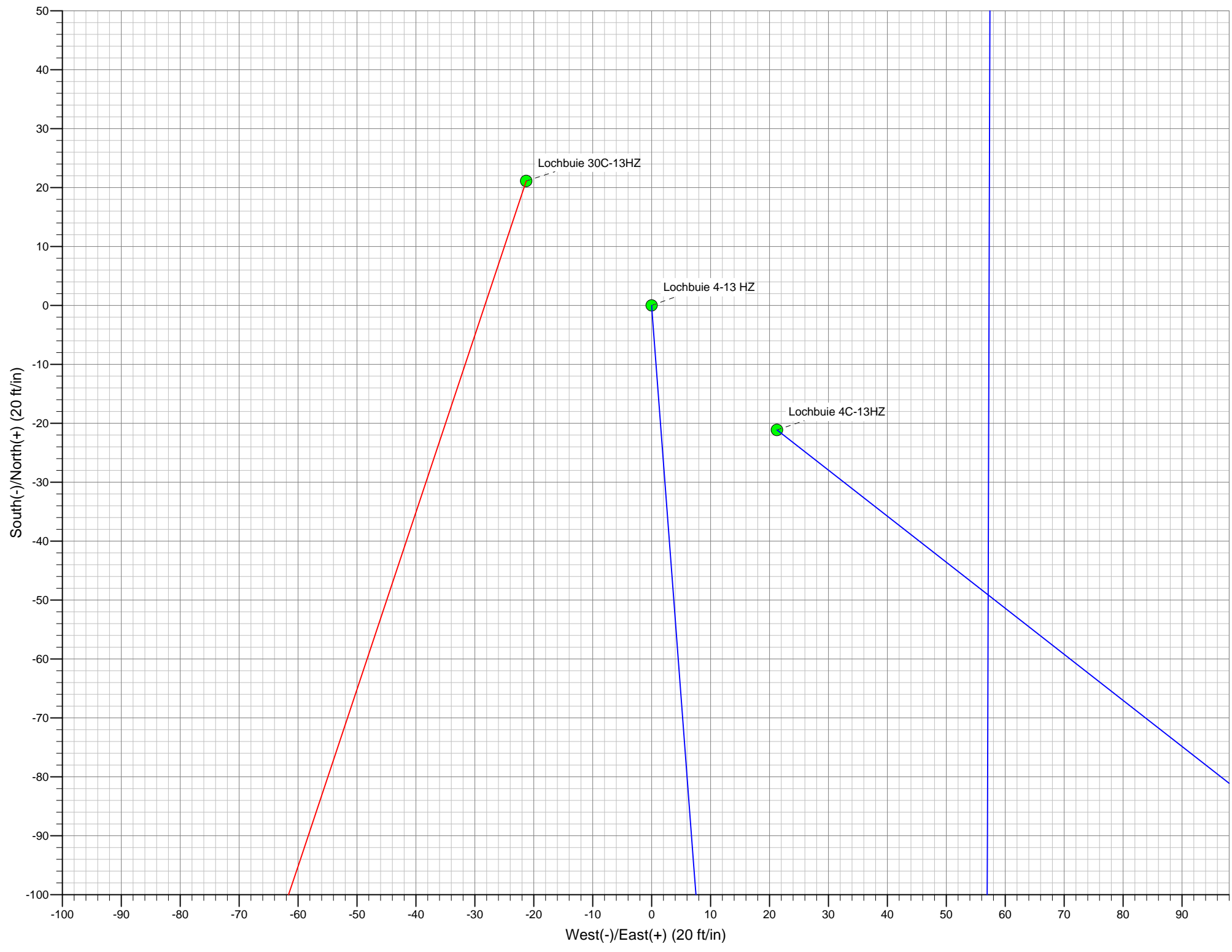
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	
3	1785.09	7.70	198.41	1783.93	-24.52	-8.16	2.00	198.41	-24.55	
4	6942.37	7.70	198.41	6894.69	-680.33	-226.42	0.00	0.00	-681.00	
5	7914.45	89.90	0.17	7540.00	-113.00	-252.00	10.00	161.61	-113.75	LOCH BUIE 30C-13HZ_CP
6	12281.66	89.90	0.17	7548.00	4254.18	-239.06	0.00	0.00	4253.46	

#### WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LOCH BUIE 30C-13HZ_SEC	0.00	-42.25	42.56	40.045454	-104.732725	Polygon
LOCH BUIE 30C-13HZ_SHL	0.00	0.00	0.00	40.045570	-104.732877	Point
LOCH BUIE 30C-13HZ_CP	7540.00	-113.00	-252.00	40.045260	-104.733777	Point
LOCH BUIE 30C-13HZ_BHL	7548.00	4254.18	-239.06	40.057248	-104.733731	Point



WELL DETAILS: Lochbuie 30C-13HZ		
Ground Level: 5078.00 RKB = 17' @ 5095.00ft (Drilling Rig)		
Plan: Plan A 0 Permit (Lochbuie 30C-13HZ/Plan A 0)		
Created By: Clint Eshelman Date: 07/08/2013		
TVD	MD	
6795.59	6842.37	Top of 4.5" Liner @ 6842.37ft
6894.69	6942.37	KOP @ 6942.37ft



**Plan Report for Lochbuie 30C-13HZ - Plan A 0 Permit**

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
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
1,199.00	0.00	0.00	1,199.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Fox Hills Base</b>										
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,249.00	0.00	0.00	1,249.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8"</b>										
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
<b>Begin Nudge @ 1400.00ft</b>										
1,500.00	2.00	198.41	1,499.98	-1.66	-0.55	-1.66	2.00	2.00	0.00	198.41
1,600.00	4.00	198.41	1,599.84	-6.62	-2.20	-6.63	2.00	2.00	0.00	0.00
1,700.00	6.00	198.41	1,699.45	-14.89	-4.96	-14.91	2.00	2.00	0.00	0.00
1,785.09	7.70	198.41	1,783.93	-24.52	-8.16	-24.55	2.00	2.00	0.00	0.00
<b>End Nudge @ 1785.09ft</b>										
1,800.00	7.70	198.41	1,798.71	-26.42	-8.79	-26.44	0.00	0.00	0.00	0.00
1,900.00	7.70	198.41	1,897.80	-39.13	-13.02	-39.17	0.00	0.00	0.00	0.00
2,000.00	7.70	198.41	1,996.90	-51.85	-17.26	-51.90	0.00	0.00	0.00	0.00
2,100.00	7.70	198.41	2,096.00	-64.57	-21.49	-64.63	0.00	0.00	0.00	0.00
2,200.00	7.70	198.41	2,195.10	-77.28	-25.72	-77.36	0.00	0.00	0.00	0.00
2,300.00	7.70	198.41	2,294.20	-90.00	-29.95	-90.09	0.00	0.00	0.00	0.00
2,400.00	7.70	198.41	2,393.29	-102.71	-34.18	-102.81	0.00	0.00	0.00	0.00
2,500.00	7.70	198.41	2,492.39	-115.43	-38.42	-115.54	0.00	0.00	0.00	0.00
2,600.00	7.70	198.41	2,591.49	-128.15	-42.65	-128.27	0.00	0.00	0.00	0.00
2,700.00	7.70	198.41	2,690.59	-140.86	-46.88	-141.00	0.00	0.00	0.00	0.00
2,800.00	7.70	198.41	2,789.69	-153.58	-51.11	-153.73	0.00	0.00	0.00	0.00
2,900.00	7.70	198.41	2,888.78	-166.29	-55.34	-166.46	0.00	0.00	0.00	0.00
3,000.00	7.70	198.41	2,987.88	-179.01	-59.58	-179.19	0.00	0.00	0.00	0.00
3,100.00	7.70	198.41	3,086.98	-191.73	-63.81	-191.91	0.00	0.00	0.00	0.00
3,200.00	7.70	198.41	3,186.08	-204.44	-68.04	-204.64	0.00	0.00	0.00	0.00
3,300.00	7.70	198.41	3,285.18	-217.16	-72.27	-217.37	0.00	0.00	0.00	0.00
3,400.00	7.70	198.41	3,384.27	-229.87	-76.50	-230.10	0.00	0.00	0.00	0.00
3,500.00	7.70	198.41	3,483.37	-242.59	-80.74	-242.83	0.00	0.00	0.00	0.00
3,600.00	7.70	198.41	3,582.47	-255.31	-84.97	-255.56	0.00	0.00	0.00	0.00
3,700.00	7.70	198.41	3,681.57	-268.02	-89.20	-268.29	0.00	0.00	0.00	0.00
3,800.00	7.70	198.41	3,780.66	-280.74	-93.43	-281.02	0.00	0.00	0.00	0.00
3,900.00	7.70	198.41	3,879.76	-293.46	-97.66	-293.74	0.00	0.00	0.00	0.00
4,000.00	7.70	198.41	3,978.86	-306.17	-101.90	-306.47	0.00	0.00	0.00	0.00
4,100.00	7.70	198.41	4,077.96	-318.89	-106.13	-319.20	0.00	0.00	0.00	0.00
4,200.00	7.70	198.41	4,177.06	-331.60	-110.36	-331.93	0.00	0.00	0.00	0.00
4,300.00	7.70	198.41	4,276.15	-344.32	-114.59	-344.66	0.00	0.00	0.00	0.00
4,315.99	7.70	198.41	4,292.00	-346.35	-115.27	-346.69	0.00	0.00	0.00	0.00
<b>Parkman</b>										
4,400.00	7.70	198.41	4,375.25	-357.04	-118.82	-357.39	0.00	0.00	0.00	0.00
4,500.00	7.70	198.41	4,474.35	-369.75	-123.06	-370.12	0.00	0.00	0.00	0.00
4,600.00	7.70	198.41	4,573.45	-382.47	-127.29	-382.84	0.00	0.00	0.00	0.00
4,700.00	7.70	198.41	4,672.55	-395.18	-131.52	-395.57	0.00	0.00	0.00	0.00
4,800.00	7.70	198.41	4,771.64	-407.90	-135.75	-408.30	0.00	0.00	0.00	0.00

## Plan Report for Lochbuie 30C-13HZ - Plan A 0 Permit

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 (°)
4,900.00	7.70	198.41	4,870.74	-420.62	-139.98	-421.03	0.00	0.00	0.00	0.00
5,000.00	7.70	198.41	4,969.84	-433.33	-144.22	-433.76	0.00	0.00	0.00	0.00
5,100.00	7.70	198.41	5,068.94	-446.05	-148.45	-446.49	0.00	0.00	0.00	0.00
5,200.00	7.70	198.41	5,168.03	-458.76	-152.68	-459.22	0.00	0.00	0.00	0.00
5,300.00	7.70	198.41	5,267.13	-471.48	-156.91	-471.94	0.00	0.00	0.00	0.00
5,400.00	7.70	198.41	5,366.23	-484.20	-161.14	-484.67	0.00	0.00	0.00	0.00
5,500.00	7.70	198.41	5,465.33	-496.91	-165.38	-497.40	0.00	0.00	0.00	0.00
5,600.00	7.70	198.41	5,564.43	-509.63	-169.61	-510.13	0.00	0.00	0.00	0.00
5,620.76	7.70	198.41	5,585.00	-512.27	-170.49	-512.77	0.00	0.00	0.00	0.00
<b>Sussex</b>										
5,700.00	7.70	198.41	5,663.52	-522.35	-173.84	-522.86	0.00	0.00	0.00	0.00
5,800.00	7.70	198.41	5,762.62	-535.06	-178.07	-535.59	0.00	0.00	0.00	0.00
5,900.00	7.70	198.41	5,861.72	-547.78	-182.31	-548.32	0.00	0.00	0.00	0.00
6,000.00	7.70	198.41	5,960.82	-560.49	-186.54	-561.04	0.00	0.00	0.00	0.00
6,100.00	7.70	198.41	6,059.92	-573.21	-190.77	-573.77	0.00	0.00	0.00	0.00
6,200.00	7.70	198.41	6,159.01	-585.93	-195.00	-586.50	0.00	0.00	0.00	0.00
6,300.00	7.70	198.41	6,258.11	-598.64	-199.23	-599.23	0.00	0.00	0.00	0.00
6,400.00	7.70	198.41	6,357.21	-611.36	-203.47	-611.96	0.00	0.00	0.00	0.00
6,500.00	7.70	198.41	6,456.31	-624.07	-207.70	-624.69	0.00	0.00	0.00	0.00
6,600.00	7.70	198.41	6,555.41	-636.79	-211.93	-637.42	0.00	0.00	0.00	0.00
6,700.00	7.70	198.41	6,654.50	-649.51	-216.16	-650.15	0.00	0.00	0.00	0.00
6,800.00	7.70	198.41	6,753.60	-662.22	-220.39	-662.87	0.00	0.00	0.00	0.00
6,842.37	7.70	198.41	6,795.59	-667.61	-222.19	-668.27	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 6842.37ft</b>										
6,900.00	7.70	198.41	6,852.70	-674.94	-224.63	-675.60	0.00	0.00	0.00	0.00
6,942.37	7.70	198.41	6,894.69	-680.33	-226.42	-681.00	0.00	0.00	0.00	0.00
<b>KOP @ 6942.37ft</b>										
6,950.00	6.98	200.39	6,902.25	-681.25	-226.74	-681.92	10.00	-9.43	25.95	161.61
7,000.00	2.88	237.55	6,952.07	-684.77	-228.86	-685.45	10.00	-8.21	74.32	159.65
7,050.00	4.21	325.13	7,002.00	-683.94	-230.97	-684.62	10.00	2.68	175.16	122.59
7,100.00	8.79	344.29	7,051.67	-678.75	-233.06	-679.44	10.00	9.15	38.31	35.12
7,150.00	13.66	350.15	7,100.70	-669.25	-235.10	-669.94	10.00	9.75	11.72	16.06
7,196.08	18.21	352.79	7,145.00	-656.73	-236.94	-657.43	10.00	9.88	5.72	10.31
<b>Sharon Springs</b>										
7,200.00	18.60	352.95	7,148.72	-655.51	-237.09	-656.21	10.00	9.91	4.24	7.77
7,217.27	20.32	353.61	7,165.00	-649.79	-237.76	-650.50	10.00	9.92	3.82	7.62
<b>Niobrara A</b>										
7,250.00	23.57	354.61	7,195.36	-637.63	-239.01	-638.33	10.00	9.94	3.04	6.99
7,300.00	28.54	355.71	7,240.26	-615.75	-240.85	-616.46	10.00	9.95	2.21	6.07
7,347.50	33.28	356.48	7,281.00	-591.41	-242.50	-592.13	10.00	9.97	1.61	5.08
<b>Niobrara B</b>										
7,350.00	33.53	356.51	7,283.09	-590.04	-242.58	-590.76	10.00	9.97	1.39	4.42
7,400.00	38.51	357.13	7,323.52	-560.69	-244.20	-561.41	10.00	9.97	1.23	4.39
7,450.00	43.50	357.62	7,361.24	-527.93	-245.70	-528.65	10.00	9.98	0.98	3.89
7,451.05	43.61	357.63	7,362.00	-527.20	-245.73	-527.93	10.00	9.98	0.89	3.52
<b>Niobrara C</b>										
7,500.00	48.50	358.03	7,395.96	-492.00	-247.06	-492.73	10.00	9.98	0.82	3.51
<b>DLS = 10/100'</b>										
7,550.00	53.49	358.38	7,427.42	-453.17	-248.27	-453.91	10.00	9.99	0.70	3.24
7,600.00	58.48	358.69	7,455.38	-411.76	-249.33	-412.49	10.00	9.99	0.62	3.02
7,650.00	63.48	358.96	7,479.63	-368.06	-250.22	-368.80	10.00	9.99	0.55	2.84
7,700.00	68.47	359.22	7,499.98	-322.41	-250.94	-323.15	10.00	9.99	0.51	2.71
7,726.08	71.08	359.34	7,509.00	-297.95	-251.25	-298.69	10.00	9.99	0.48	2.60
<b>Fort Hays</b>										
7,750.00	73.46	359.45	7,516.28	-275.16	-251.49	-275.91	10.00	9.99	0.47	2.56
7,800.00	78.46	359.68	7,528.41	-226.67	-251.86	-227.42	10.00	9.99	0.45	2.53
7,839.71	82.43	359.85	7,535.00	-187.52	-252.02	-188.27	10.00	9.99	0.43	2.47
<b>Codell</b>										

**Plan Report for Lochbuie 30C-13HZ - Plan A 0 Permit**

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 (°)
7,850.00	83.46	359.90	7,536.26	-177.31	-252.04	-178.06	10.00	9.99	0.43	2.44
7,900.00	88.45	0.11	7,539.79	-127.45	-252.04	-128.20	10.00	9.99	0.43	2.44
7,914.45	89.89	0.17	7,540.00	-113.00	-252.00	-113.75	10.00	9.99	0.42	2.42
<b>End Build @ 7914.45ft - Landing Target (Heel) - 7" - LOCH BUIE 30C-13HZ_CP</b>										
8,000.00	89.90	0.17	7,540.16	-27.45	-251.75	-28.20	0.00	0.00	0.00	2.42
8,100.00	89.90	0.17	7,540.34	72.55	-251.45	71.80	0.00	0.00	0.00	0.00
8,200.00	89.90	0.17	7,540.52	172.55	-251.15	171.80	0.00	0.00	0.00	0.00
8,300.00	89.90	0.17	7,540.71	272.55	-250.86	271.80	0.00	0.00	0.00	0.00
8,400.00	89.90	0.17	7,540.89	372.55	-250.56	371.80	0.00	0.00	0.00	0.00
8,500.00	89.90	0.17	7,541.07	472.54	-250.26	471.80	0.00	0.00	0.00	0.00
8,600.00	89.90	0.17	7,541.26	572.54	-249.97	571.80	0.00	0.00	0.00	0.00
8,700.00	89.90	0.17	7,541.44	672.54	-249.67	671.80	0.00	0.00	0.00	0.00
8,800.00	89.90	0.17	7,541.62	772.54	-249.38	771.80	0.00	0.00	0.00	0.00
8,900.00	89.90	0.17	7,541.81	872.54	-249.08	871.80	0.00	0.00	0.00	0.00
9,000.00	89.90	0.17	7,541.99	972.54	-248.78	971.80	0.00	0.00	0.00	0.00
9,100.00	89.90	0.17	7,542.17	1,072.54	-248.49	1,071.80	0.00	0.00	0.00	0.00
9,200.00	89.90	0.17	7,542.35	1,172.54	-248.19	1,171.80	0.00	0.00	0.00	0.00
9,300.00	89.90	0.17	7,542.54	1,272.54	-247.89	1,271.80	0.00	0.00	0.00	0.00
9,400.00	89.90	0.17	7,542.72	1,372.54	-247.60	1,371.80	0.00	0.00	0.00	0.00
9,500.00	89.90	0.17	7,542.90	1,472.54	-247.30	1,471.80	0.00	0.00	0.00	0.00
9,600.00	89.90	0.17	7,543.09	1,572.54	-247.01	1,571.80	0.00	0.00	0.00	0.00
9,700.00	89.90	0.17	7,543.27	1,672.54	-246.71	1,671.80	0.00	0.00	0.00	0.00
9,800.00	89.90	0.17	7,543.45	1,772.54	-246.41	1,771.80	0.00	0.00	0.00	0.00
9,900.00	89.90	0.17	7,543.64	1,872.54	-246.12	1,871.80	0.00	0.00	0.00	0.00
10,000.00	89.90	0.17	7,543.82	1,972.54	-245.82	1,971.80	0.00	0.00	0.00	0.00
10,100.00	89.90	0.17	7,544.00	2,072.53	-245.52	2,071.80	0.00	0.00	0.00	0.00
10,200.00	89.90	0.17	7,544.19	2,172.53	-245.23	2,171.80	0.00	0.00	0.00	0.00
10,300.00	89.90	0.17	7,544.37	2,272.53	-244.93	2,271.80	0.00	0.00	0.00	0.00
10,400.00	89.90	0.17	7,544.55	2,372.53	-244.63	2,371.80	0.00	0.00	0.00	0.00
10,500.00	89.90	0.17	7,544.74	2,472.53	-244.34	2,471.80	0.00	0.00	0.00	0.00
10,600.00	89.90	0.17	7,544.92	2,572.53	-244.04	2,571.80	0.00	0.00	0.00	0.00
10,700.00	89.90	0.17	7,545.10	2,672.53	-243.75	2,671.80	0.00	0.00	0.00	0.00
10,800.00	89.90	0.17	7,545.29	2,772.53	-243.45	2,771.80	0.00	0.00	0.00	0.00
10,900.00	89.90	0.17	7,545.47	2,872.53	-243.15	2,871.80	0.00	0.00	0.00	0.00
11,000.00	89.90	0.17	7,545.65	2,972.53	-242.86	2,971.80	0.00	0.00	0.00	0.00
11,100.00	89.90	0.17	7,545.84	3,072.53	-242.56	3,071.80	0.00	0.00	0.00	0.00
11,200.00	89.90	0.17	7,546.02	3,172.53	-242.26	3,171.80	0.00	0.00	0.00	0.00
11,300.00	89.90	0.17	7,546.20	3,272.53	-241.97	3,271.80	0.00	0.00	0.00	0.00
11,400.00	89.90	0.17	7,546.38	3,372.53	-241.67	3,371.79	0.00	0.00	0.00	0.00
11,500.00	89.90	0.17	7,546.57	3,472.53	-241.38	3,471.79	0.00	0.00	0.00	0.00
11,600.00	89.90	0.17	7,546.75	3,572.53	-241.08	3,571.79	0.00	0.00	0.00	0.00
11,700.00	89.90	0.17	7,546.93	3,672.53	-240.78	3,671.79	0.00	0.00	0.00	0.00
11,800.00	89.90	0.17	7,547.12	3,772.52	-240.49	3,771.79	0.00	0.00	0.00	0.00
11,900.00	89.90	0.17	7,547.30	3,872.52	-240.19	3,871.79	0.00	0.00	0.00	0.00
12,000.00	89.90	0.17	7,547.48	3,972.52	-239.89	3,971.79	0.00	0.00	0.00	0.00
12,100.00	89.90	0.17	7,547.67	4,072.52	-239.60	4,071.79	0.00	0.00	0.00	0.00
12,200.00	89.90	0.17	7,547.85	4,172.52	-239.30	4,171.79	0.00	0.00	0.00	0.00
12,281.66	89.90	0.17	7,548.00	4,254.18	-239.06	4,253.45	0.00	0.00	0.00	0.00
<b>TD Well @ 12281.66ft - Total Depth (Toe)</b>										

## Plan Report for Lochbuie 30C-13HZ - Plan A 0 Permit

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,400.00	1,400.00	0.00	0.00	Begin Nudge @ 1400.00ft
1,785.09	1,783.93	-24.52	-8.16	End Nudge @ 1785.09ft
6,842.37	6,795.59	-667.61	-222.19	Top of 4.5" Liner @ 6842.37ft
6,942.37	6,894.69	-680.33	-226.42	KOP @ 6942.37ft
7,500.00	7,395.96	-492.00	-247.06	DLS = 10/100'
7,914.45	7,540.00	-113.00	-252.00	End Build @ 7914.45ft
12,281.66	7,548.00	4,254.18	-239.06	TD Well @ 12281.66ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	+N/-S (ft)	+E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	0.17	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	12,281.66	Plan A 0 Permit	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,249.00	1,249.00	9 5/8"	9-5/8	13-1/2
7,914.45	7,540.00	7"	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,199.00	1,199.00	Fox Hills Base		0.00	
4,315.99	4,292.00	Parkman		0.00	
5,620.76	5,585.00	Sussex		0.00	
7,196.08	7,145.00	Sharon Springs		0.00	
7,217.27	7,165.00	Niobrara A		0.00	
7,347.50	7,281.00	Niobrara B		0.00	
7,451.05	7,362.00	Niobrara C		0.00	
7,726.08	7,509.00	Fort Hays		0.00	
7,839.71	7,535.00	Codell		0.00	
7,914.45	7,540.00	Landing Target (Heel)		0.00	
12,281.66	7,548.00	Total Depth (Toe)		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
LOCH BUIE 30C-13HZ_SEC	0.00	-42.25	42.56	Polygon
LOCH BUIE 30C-13HZ_BHL	7,548.00	4,254.18	-239.06	Point
LOCH BUIE 30C-13HZ_CP	7,540.00	-113.00	-252.00	Point
LOCH BUIE 30C-13HZ_SHL	0.00	0.00	0.00	Point

## North Reference Sheet for Sec. 13-T1N-R66W - Lochbuie 30C-13HZ - Plan A 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 = 17' @ 5095.00ft (Drilling Rig). Northing and Easting are relative to Lochbuie 30C-13HZ

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: 3,000,000.000644ft, False Northing: 1,000,000.001308ft, Scale Reduction: 0.99996322

Grid Coordinates of Well: 1,260,375.797956 ft N, 3,214,765.978594 ft E

Geographical Coordinates of Well: 40° 02' 44.05" N, 104° 43' 58.36" W

Grid Convergence at Surface is: 0.50°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,281.66ft  
the Bottom Hole Displacement is 4,260.89ft in the Direction of 356.78° (True).

Magnetic Convergence at surface is: -8.08° (25 June 2013, , BGGM2013)

