



Project: COLORADO NORTHERN ZONE - 83  
Site: BUFFALO & BADGER 4C-15HZ PAD  
Well: BUFFALO 13N-15HZ  
Wellbore: OH  
Design: PLAN #2 PRELIMINARY

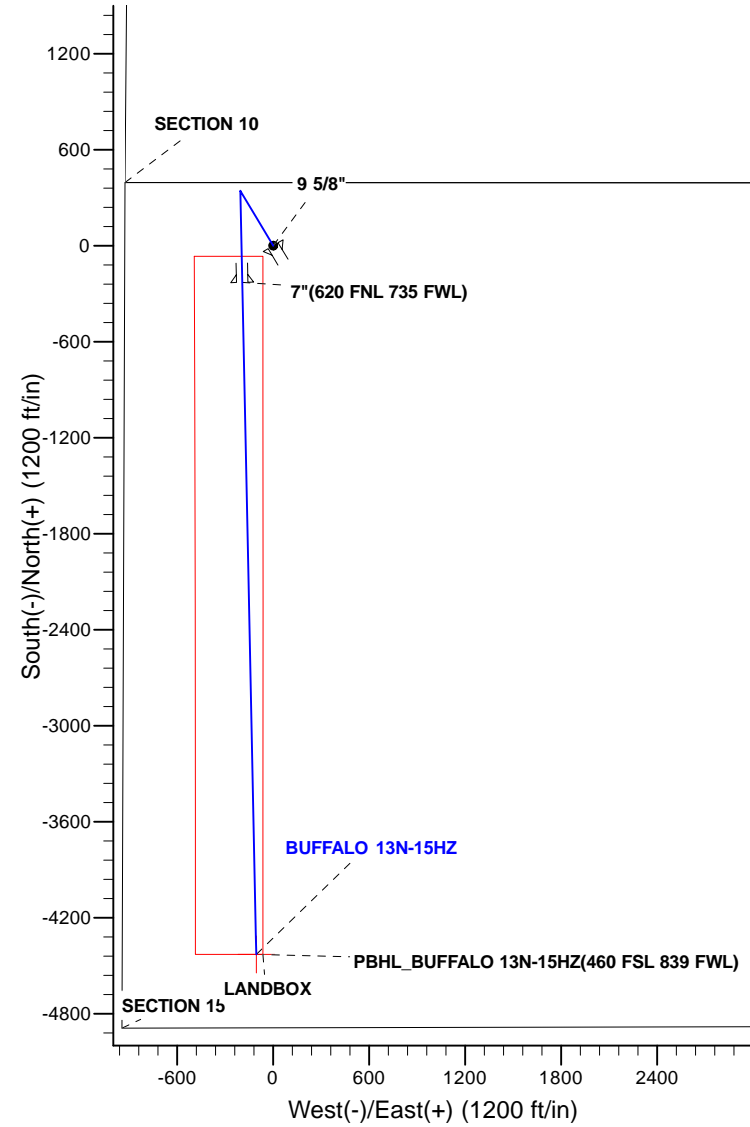
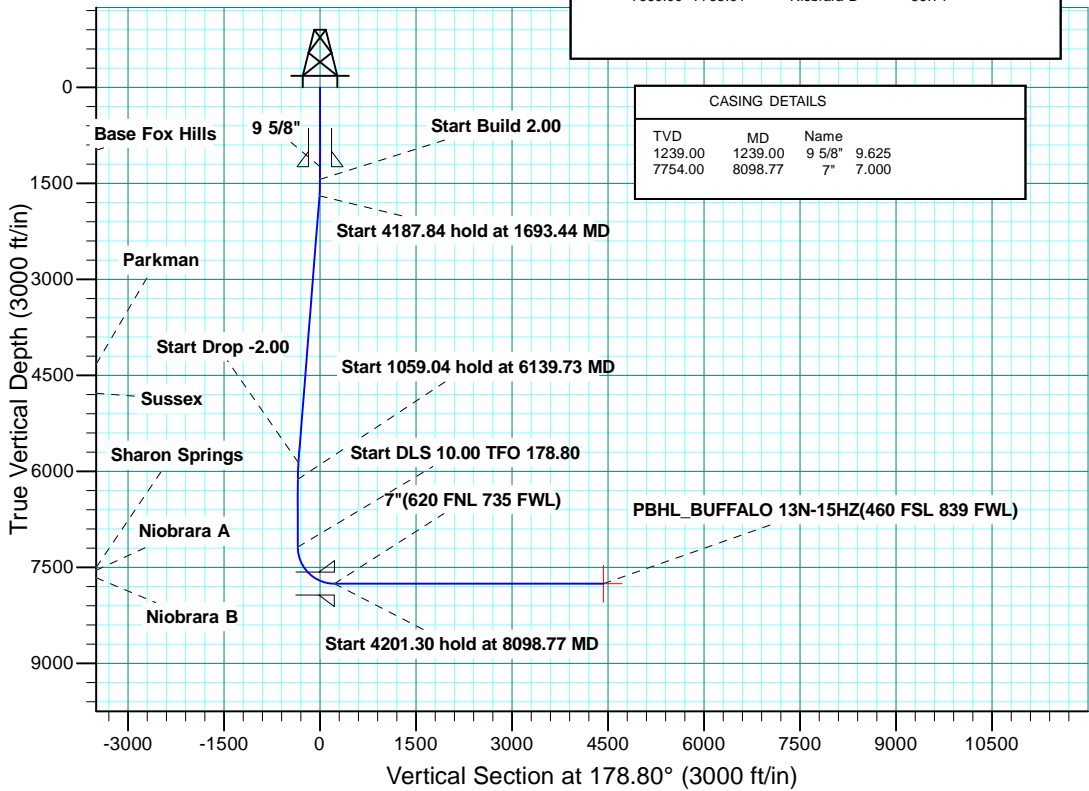


WELL DETAILS: BUFFALO 13N-15HZ									
GL 5138 & KB 21 @ 5159.00ft (UNIT 403)									
		+N/-S	+E/-W	Northing	Easting	Latitude		Longitude	
		0.00	0.00	1264135.19	3141130.84	40.0573389		-104.9958110	
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1435.00	0.00	0.00	1435.00	0.00	0.00	0.00	0.00	0.00	
1693.44	5.17	329.17	1693.09	10.00	-5.97	2.00	329.17	-10.13	
5881.29	5.17	329.17	5863.91	334.00	-199.30	0.00	0.00	-338.10	
6139.73	0.00	0.00	6122.00	344.00	-205.27	2.00	180.00	-348.22	
7198.77	0.00	0.00	7181.04	344.00	-205.27	0.00	0.00	-348.22	
8098.77	90.00	178.80	7754.00	-228.83	-193.27	10.00	178.80	224.73	
12300.07	90.00	178.80	7754.00	-4429.21	-105.27	0.00	0.00	4426.04	PBHL_BUFFALO 13N-15HZ(460 FSL 839 FWL)
DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude		Longitude	Shape
PBHL	7754.00	-4429.21	-105.27	1259705.46	3141050.75	40.0451800		-104.9961870	Point
- plan hits target center									

PROJECT DETAILS: COLORADO NORTHERN ZONE - 83	
Geodetic System: US State Plane 1983	
Datum: North American Datum 1983	
Ellipsoid: GRS 1980	
Zone: Colorado Northern Zone	
Location: SECTION 15 T1N R68W	
System Datum: Mean Sea Level	

FORMATION TOP DETAILS			
TVDPath	MDPath	Formation	Inc
979.00	979.00	Base Fox Hills	0.00
4321.00	4332.08	Parkman	5.17
4779.00	4791.95	Sussex	5.17
7499.00	7535.84	Sharon Springs	33.71
7544.00	7591.85	Niobrara A	39.31
7660.00	7765.91	Niobrara B	56.71

CASING DETAILS			
TVD	MD	Name	
1239.00	1239.00	9 5/8"	9.625
7754.00	8098.77	7"	7.000





**Scientific Drilling**

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83  
BUFFALO & BADGER 4C-15HZ PAD  
BUFFALO 13N-15HZ**

**OH**

**Plan: PLAN #2 PRELIMINARY**

## **Standard Planning Report**

**03 October, 2014**

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 13N-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4C-15HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 13N-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

<b>Project</b>	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

<b>Site</b>	BUFFALO & BADGER 4C-15HZ PAD, SECTION 15 T1N R68W			
<b>Site Position:</b>		<b>Northing:</b>	1,264,136.65 usft	<b>Latitude:</b> 40.0573420
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,141,190.73 usft	<b>Longitude:</b> -104.9955970
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> 0.33 °

<b>Well</b>	BUFFALO 13N-15HZ, 393' FNL 929' FWL			
<b>Well Position</b>	<b>+N/-S</b>	-1.12 ft	<b>Northing:</b>	1,264,135.19 usft
	<b>+E/-W</b>	-59.90 ft	<b>Easting:</b>	3,141,130.84 usft
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	0.00 ft
			<b>Ground Level:</b>	5,138.00 ft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2013	6/5/2014	8.61	66.62	52,525

<b>Design</b>	PLAN #2 PRELIMINARY			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	178.80

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,435.00	0.00	0.00	1,435.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,693.44	5.17	329.17	1,693.09	10.00	-5.97	2.00	2.00	0.00	329.17	
5,881.29	5.17	329.17	5,863.91	334.00	-199.30	0.00	0.00	0.00	0.00	
6,139.73	0.00	0.00	6,122.00	344.00	-205.27	2.00	-2.00	0.00	180.00	
7,198.77	0.00	0.00	7,181.04	344.00	-205.27	0.00	0.00	0.00	0.00	
8,098.77	90.00	178.80	7,754.00	-228.83	-193.27	10.00	10.00	19.87	178.80	
12,300.07	90.00	178.80	7,754.00	-4,429.21	-105.27	0.00	0.00	0.00	0.00	PBHL_BUFFALO 13N

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 13N-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4C-15HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 13N-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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
200.00	0.00	0.00	200.00	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
400.00	0.00	0.00	400.00	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
600.00	0.00	0.00	600.00	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
800.00	0.00	0.00	800.00	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
979.00	0.00	0.00	979.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Base Fox Hills</b>									
1,000.00	0.00	0.00	1,000.00	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
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,239.00	0.00	0.00	1,239.00	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
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,435.00	0.00	0.00	1,435.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
1,500.00	1.30	329.17	1,499.99	0.63	-0.38	-0.64	2.00	2.00	0.00
1,600.00	3.30	329.17	1,599.91	4.08	-2.43	-4.13	2.00	2.00	0.00
1,693.44	5.17	329.17	1,693.09	10.00	-5.97	-10.13	2.00	2.00	0.00
<b>Start 4187.84 hold at 1693.44 MD</b>									
1,700.00	5.17	329.17	1,699.62	10.51	-6.27	-10.64	0.00	0.00	0.00
1,800.00	5.17	329.17	1,799.22	18.25	-10.89	-18.47	0.00	0.00	0.00
1,900.00	5.17	329.17	1,898.81	25.98	-15.51	-26.30	0.00	0.00	0.00
2,000.00	5.17	329.17	1,998.40	33.72	-20.12	-34.13	0.00	0.00	0.00
2,100.00	5.17	329.17	2,098.00	41.46	-24.74	-41.97	0.00	0.00	0.00
2,200.00	5.17	329.17	2,197.59	49.19	-29.35	-49.80	0.00	0.00	0.00
2,300.00	5.17	329.17	2,297.18	56.93	-33.97	-57.63	0.00	0.00	0.00
2,400.00	5.17	329.17	2,396.78	64.67	-38.59	-65.46	0.00	0.00	0.00
2,500.00	5.17	329.17	2,496.37	72.40	-43.20	-73.29	0.00	0.00	0.00
2,600.00	5.17	329.17	2,595.96	80.14	-47.82	-81.12	0.00	0.00	0.00
2,700.00	5.17	329.17	2,695.56	87.88	-52.44	-88.95	0.00	0.00	0.00
2,800.00	5.17	329.17	2,795.15	95.61	-57.05	-96.79	0.00	0.00	0.00
2,900.00	5.17	329.17	2,894.74	103.35	-61.67	-104.62	0.00	0.00	0.00
3,000.00	5.17	329.17	2,994.34	111.09	-66.29	-112.45	0.00	0.00	0.00
3,100.00	5.17	329.17	3,093.93	118.82	-70.90	-120.28	0.00	0.00	0.00
3,200.00	5.17	329.17	3,193.52	126.56	-75.52	-128.11	0.00	0.00	0.00
3,300.00	5.17	329.17	3,293.12	134.30	-80.14	-135.94	0.00	0.00	0.00
3,400.00	5.17	329.17	3,392.71	142.03	-84.75	-143.78	0.00	0.00	0.00
3,500.00	5.17	329.17	3,492.30	149.77	-89.37	-151.61	0.00	0.00	0.00
3,600.00	5.17	329.17	3,591.90	157.50	-93.99	-159.44	0.00	0.00	0.00
3,700.00	5.17	329.17	3,691.49	165.24	-98.60	-167.27	0.00	0.00	0.00
3,800.00	5.17	329.17	3,791.08	172.98	-103.22	-175.10	0.00	0.00	0.00
3,900.00	5.17	329.17	3,890.68	180.71	-107.83	-182.93	0.00	0.00	0.00
4,000.00	5.17	329.17	3,990.27	188.45	-112.45	-190.76	0.00	0.00	0.00
4,100.00	5.17	329.17	4,089.86	196.19	-117.07	-198.60	0.00	0.00	0.00
4,200.00	5.17	329.17	4,189.46	203.92	-121.68	-206.43	0.00	0.00	0.00
4,300.00	5.17	329.17	4,289.05	211.66	-126.30	-214.26	0.00	0.00	0.00
4,332.08	5.17	329.17	4,321.00	214.14	-127.78	-216.77	0.00	0.00	0.00
<b>Parkman</b>									

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<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4C-15HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 13N-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,400.00	5.17	329.17	4,388.64	219.40	-130.92	-222.09	0.00	0.00	0.00
4,500.00	5.17	329.17	4,488.24	227.13	-135.53	-229.92	0.00	0.00	0.00
4,600.00	5.17	329.17	4,587.83	234.87	-140.15	-237.75	0.00	0.00	0.00
4,700.00	5.17	329.17	4,687.42	242.61	-144.77	-245.58	0.00	0.00	0.00
4,791.95	5.17	329.17	4,779.00	249.72	-149.01	-252.79	0.00	0.00	0.00
<b>Sussex</b>									
4,800.00	5.17	329.17	4,787.02	250.34	-149.38	-253.42	0.00	0.00	0.00
4,900.00	5.17	329.17	4,886.61	258.08	-154.00	-261.25	0.00	0.00	0.00
5,000.00	5.17	329.17	4,986.20	265.82	-158.62	-269.08	0.00	0.00	0.00
5,100.00	5.17	329.17	5,085.80	273.55	-163.23	-276.91	0.00	0.00	0.00
5,200.00	5.17	329.17	5,185.39	281.29	-167.85	-284.74	0.00	0.00	0.00
5,300.00	5.17	329.17	5,284.98	289.02	-172.47	-292.57	0.00	0.00	0.00
5,400.00	5.17	329.17	5,384.58	296.76	-177.08	-300.40	0.00	0.00	0.00
5,500.00	5.17	329.17	5,484.17	304.50	-181.70	-308.24	0.00	0.00	0.00
5,600.00	5.17	329.17	5,583.76	312.23	-186.31	-316.07	0.00	0.00	0.00
5,700.00	5.17	329.17	5,683.36	319.97	-190.93	-323.90	0.00	0.00	0.00
5,800.00	5.17	329.17	5,782.95	327.71	-195.55	-331.73	0.00	0.00	0.00
5,881.29	5.17	329.17	5,863.91	334.00	-199.30	-338.10	0.00	0.00	0.00
<b>Start Drop -2.00</b>									
5,900.00	4.79	329.17	5,882.55	335.39	-200.13	-339.51	2.00	-2.00	0.00
6,000.00	2.79	329.17	5,982.32	341.07	-203.52	-345.26	2.00	-2.00	0.00
6,100.00	0.79	329.17	6,082.27	343.76	-205.13	-347.98	2.00	-2.00	0.00
6,139.73	0.00	0.00	6,122.00	344.00	-205.27	-348.22	2.00	-2.00	0.00
<b>Start 1059.04 hold at 6139.73 MD</b>									
6,200.00	0.00	0.00	6,182.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,300.00	0.00	0.00	6,282.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,400.00	0.00	0.00	6,382.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,500.00	0.00	0.00	6,482.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,600.00	0.00	0.00	6,582.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,700.00	0.00	0.00	6,682.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,800.00	0.00	0.00	6,782.27	344.00	-205.27	-348.22	0.00	0.00	0.00
6,900.00	0.00	0.00	6,882.27	344.00	-205.27	-348.22	0.00	0.00	0.00
7,000.00	0.00	0.00	6,982.27	344.00	-205.27	-348.22	0.00	0.00	0.00
7,100.00	0.00	0.00	7,082.27	344.00	-205.27	-348.22	0.00	0.00	0.00
7,198.77	0.00	0.00	7,181.04	344.00	-205.27	-348.22	0.00	0.00	0.00
<b>Start DLS 10.00 TFO 178.80</b>									
7,200.00	0.12	178.80	7,182.27	344.00	-205.27	-348.22	10.00	10.00	0.00
7,300.00	10.12	178.80	7,281.74	335.08	-205.08	-339.30	10.00	10.00	0.00
7,400.00	20.12	178.80	7,378.16	309.03	-204.54	-313.25	10.00	10.00	0.00
7,500.00	30.12	178.80	7,468.58	266.64	-203.65	-270.85	10.00	10.00	0.00
7,535.84	33.71	178.80	7,499.00	247.70	-203.25	-251.90	10.00	10.00	0.00
<b>Sharon Springs</b>									
7,591.85	39.31	178.80	7,544.00	214.40	-202.55	-218.59	10.00	10.00	0.00
<b>Niobrara A</b>									
7,600.00	40.12	178.80	7,550.27	209.19	-202.45	-213.39	10.00	10.00	0.00
7,700.00	50.12	178.80	7,620.74	138.44	-200.96	-142.61	10.00	10.00	0.00
7,765.91	56.71	178.80	7,660.00	85.55	-199.86	-89.71	10.00	10.00	0.00
<b>Niobrara B</b>									
7,800.00	60.12	178.80	7,677.85	56.52	-199.25	-60.68	10.00	10.00	0.00
7,900.00	70.12	178.80	7,719.86	-34.07	-197.35	29.93	10.00	10.00	0.00
8,000.00	80.12	178.80	7,745.51	-130.57	-195.33	126.45	10.00	10.00	0.00
8,098.77	90.00	178.80	7,754.00	-228.83	-193.27	224.73	10.00	10.00	0.00
<b>Start 4201.30 hold at 8098.77 MD - 7"(620 FNL 735 FWL)</b>									

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 13N-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4C-15HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 13N-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,100.00	90.00	178.80	7,754.00	-230.06	-193.24	225.96	0.00	0.00	0.00
8,200.00	90.00	178.80	7,754.00	-330.04	-191.15	325.96	0.00	0.00	0.00
8,300.00	90.00	178.80	7,754.00	-430.02	-189.05	425.96	0.00	0.00	0.00
8,400.00	90.00	178.80	7,754.00	-530.00	-186.96	525.96	0.00	0.00	0.00
8,500.00	90.00	178.80	7,754.00	-629.97	-184.87	625.96	0.00	0.00	0.00
8,600.00	90.00	178.80	7,754.00	-729.95	-182.77	725.96	0.00	0.00	0.00
8,700.00	90.00	178.80	7,754.00	-829.93	-180.68	825.96	0.00	0.00	0.00
8,800.00	90.00	178.80	7,754.00	-929.91	-178.58	925.96	0.00	0.00	0.00
8,900.00	90.00	178.80	7,754.00	-1,029.89	-176.49	1,025.96	0.00	0.00	0.00
9,000.00	90.00	178.80	7,754.00	-1,129.86	-174.39	1,125.96	0.00	0.00	0.00
9,100.00	90.00	178.80	7,754.00	-1,229.84	-172.30	1,225.96	0.00	0.00	0.00
9,200.00	90.00	178.80	7,754.00	-1,329.82	-170.20	1,325.96	0.00	0.00	0.00
9,300.00	90.00	178.80	7,754.00	-1,429.80	-168.11	1,425.96	0.00	0.00	0.00
9,400.00	90.00	178.80	7,754.00	-1,529.78	-166.01	1,525.96	0.00	0.00	0.00
9,500.00	90.00	178.80	7,754.00	-1,629.75	-163.92	1,625.96	0.00	0.00	0.00
9,600.00	90.00	178.80	7,754.00	-1,729.73	-161.82	1,725.96	0.00	0.00	0.00
9,700.00	90.00	178.80	7,754.00	-1,829.71	-159.73	1,825.96	0.00	0.00	0.00
9,800.00	90.00	178.80	7,754.00	-1,929.69	-157.64	1,925.96	0.00	0.00	0.00
9,900.00	90.00	178.80	7,754.00	-2,029.67	-155.54	2,025.96	0.00	0.00	0.00
10,000.00	90.00	178.80	7,754.00	-2,129.64	-153.45	2,125.96	0.00	0.00	0.00
10,100.00	90.00	178.80	7,754.00	-2,229.62	-151.35	2,225.96	0.00	0.00	0.00
10,200.00	90.00	178.80	7,754.00	-2,329.60	-149.26	2,325.96	0.00	0.00	0.00
10,300.00	90.00	178.80	7,754.00	-2,429.58	-147.16	2,425.96	0.00	0.00	0.00
10,400.00	90.00	178.80	7,754.00	-2,529.56	-145.07	2,525.96	0.00	0.00	0.00
10,500.00	90.00	178.80	7,754.00	-2,629.53	-142.97	2,625.96	0.00	0.00	0.00
10,600.00	90.00	178.80	7,754.00	-2,729.51	-140.88	2,725.96	0.00	0.00	0.00
10,700.00	90.00	178.80	7,754.00	-2,829.49	-138.78	2,825.96	0.00	0.00	0.00
10,800.00	90.00	178.80	7,754.00	-2,929.47	-136.69	2,925.96	0.00	0.00	0.00
10,900.00	90.00	178.80	7,754.00	-3,029.45	-134.60	3,025.96	0.00	0.00	0.00
11,000.00	90.00	178.80	7,754.00	-3,129.42	-132.50	3,125.96	0.00	0.00	0.00
11,100.00	90.00	178.80	7,754.00	-3,229.40	-130.41	3,225.96	0.00	0.00	0.00
11,200.00	90.00	178.80	7,754.00	-3,329.38	-128.31	3,325.96	0.00	0.00	0.00
11,300.00	90.00	178.80	7,754.00	-3,429.36	-126.22	3,425.96	0.00	0.00	0.00
11,400.00	90.00	178.80	7,754.00	-3,529.34	-124.12	3,525.96	0.00	0.00	0.00
11,500.00	90.00	178.80	7,754.00	-3,629.32	-122.03	3,625.96	0.00	0.00	0.00
11,600.00	90.00	178.80	7,754.00	-3,729.29	-119.93	3,725.96	0.00	0.00	0.00
11,700.00	90.00	178.80	7,754.00	-3,829.27	-117.84	3,825.96	0.00	0.00	0.00
11,800.00	90.00	178.80	7,754.00	-3,929.25	-115.74	3,925.96	0.00	0.00	0.00
11,900.00	90.00	178.80	7,754.00	-4,029.23	-113.65	4,025.96	0.00	0.00	0.00
12,000.00	90.00	178.80	7,754.00	-4,129.21	-111.56	4,125.96	0.00	0.00	0.00
12,100.00	90.00	178.80	7,754.00	-4,229.18	-109.46	4,225.96	0.00	0.00	0.00
12,200.00	90.00	178.80	7,754.00	-4,329.16	-107.37	4,325.96	0.00	0.00	0.00
12,300.00	90.00	178.80	7,754.00	-4,429.14	-105.27	4,425.96	0.00	0.00	0.00
12,300.07	90.00	178.80	7,754.00	-4,429.21	-105.27	4,426.04	0.00	0.00	0.00
TD at 12300.07 - PBHL_BUFFALO 13N-15HZ(460 FSL 839 FWL)									

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 13N-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5138 & KB 21 @ 5159.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4C-15HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 13N-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL_BUFFALO 13N-1	0.00	0.00	7,754.00	-4,429.21	-105.27	1,259,705.46	3,141,050.75	40.0451800	-104.9961870
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,239.00	1,239.00	9 5/8"	9.625	12.250	
8,098.77	7,754.00	7"(620 FNL 735 FWL)	7.000	7.500	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
979.00	966.00	Base Fox Hills				
4,332.08	4,308.00	Parkman				
4,791.95	4,766.00	Sussex				
7,535.84	7,486.00	Sharon Springs				
7,591.85	7,531.00	Niobrara A				
7,765.91	7,647.00	Niobrara B				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,435.00	1,435.00	0.00	0.00	Start Build 2.00	
1,693.44	1,693.09	10.00	-5.97	Start 4187.84 hold at 1693.44 MD	
5,881.29	5,863.91	334.00	-199.30	Start Drop -2.00	
6,139.73	6,122.00	344.00	-205.27	Start 1059.04 hold at 6139.73 MD	
7,198.77	7,181.04	344.00	-205.27	Start DLS 10.00 TFO 178.80	
8,098.77	7,754.00	-228.83	-193.27	Start 4201.30 hold at 8098.77 MD	
12,300.07	7,754.00	-4,429.21	-105.27	TD at 12300.07	