



Project: COLORADO NORTHERN ZONE - 83  
Site: BUFFALO & BADGER 4-4 PAD  
Well: BUFFALO 36C-15HZ  
Wellbore: OH  
Design: PLAN #2 PRELIMINARY

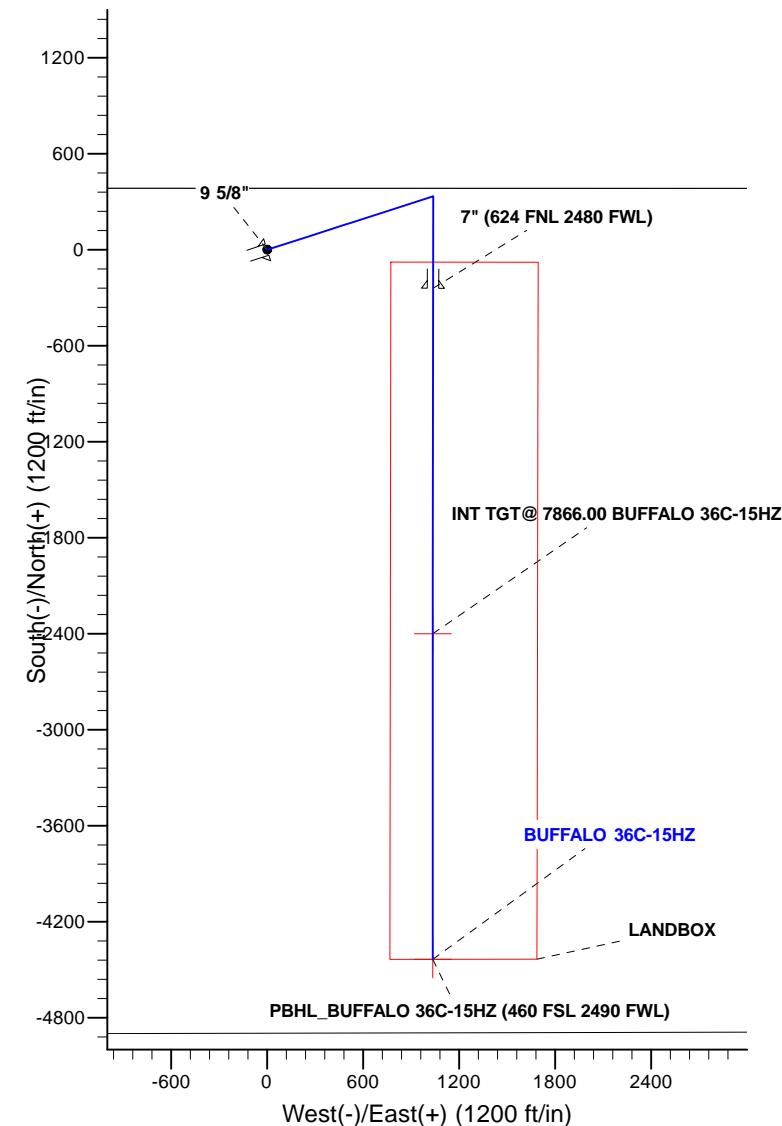
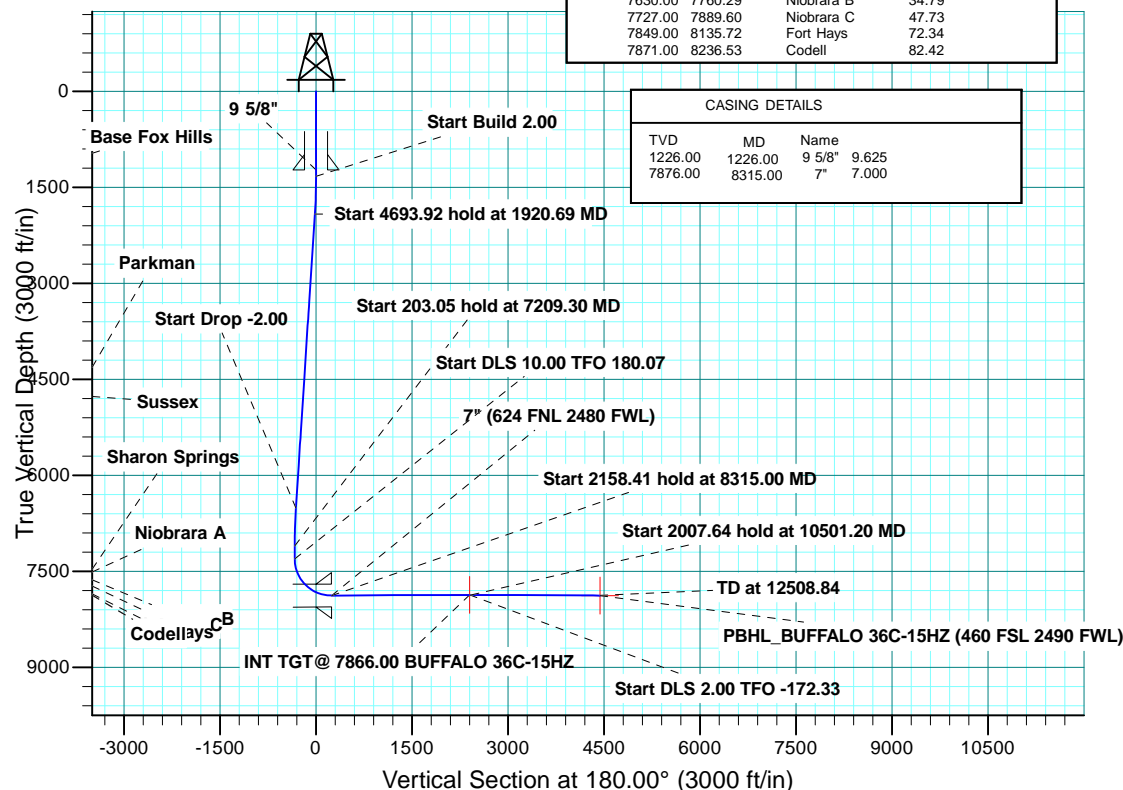


WELL DETAILS: BUFFALO 36C-15HZ								
GL 5128 & KB 21 @ 5149.00ft (UNIT 403)								
		+N-S	+E-W	Northing	Easting	Latitude	Longitude	
		0.00	0.00	1264147.58	3141640.79	40.0573650	-104.9939890	
SECTION DETAILS								
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1326.00	0.00	0.00	1326.00	0.00	0.00	0.00	0.00	0.00
1920.69	11.89	72.16	1916.43	18.84	58.55	2.00	72.16	-18.84
6614.61	11.89	72.16	6509.57	315.16	979.45	0.00	0.00	-315.16
7209.30	0.00	0.00	7100.00	334.00	1038.00	2.00	180.00	-334.00
7412.35	0.00	0.00	7303.05	334.00	1038.00	0.00	0.00	-334.00
8315.00	90.27	180.07	7876.00	-241.61	1037.26	10.00	180.07	241.61
10473.41	90.27	180.07	7866.00	-2400.00	1034.48	0.00	0.00	2400.00
10501.20	89.71	180.00	7866.00	-2427.79	1034.47	2.00	-172.33	2427.79
12508.84	89.71	180.00	7876.00	-4435.40	1034.48	0.00	0.00	4435.40
INT TGT@ 7866.00 BUFFALO 36C-15HZ								
PBHL_BUFFALO 36C-15HZ (460 FSL 2490 FWL)								
DESIGN TARGET DETAILS								
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
INT TGT@ 7866.00	-2400.00	1034.48	1261753.53	3142688.95	40.0507765	-104.9902937		Point
- plan hits target center								
PBHL 7876.00	-4435.40	1034.48	1259718.17	3142700.56	40.0451890	-104.9902940		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: NENW SECTION 15 T1N R68W	
System Datum: Mean Sea Level	

FORMATION TOP DETAILS			
TVDPath	MDPath	Formation	Inc
966.00	966.00	Base Fox Hills	0.00
4308.00	4364.73	Parkman	11.89
4766.00	4832.78	Sussex	11.89
7463.00	7574.45	Sharon Springs	16.21
7507.00	7620.87	Niobrara A	20.85
7630.00	7760.29	Niobrara B	34.79
7727.00	7889.60	Niobrara C	47.73
7849.00	8135.72	Fort Hays	72.34
7871.00	8236.53	Codell	82.42

CASING DETAILS			
TVD	MD	Name	
1226.00	1226.00	9 5/8"	9.625
7876.00	8315.00	7"	7.000





**Scientific Drilling**

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**BUFFALO & BADGER 4-4 PAD**

**BUFFALO 36C-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 36C-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-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 4-4 PAD, NENW SECTION 15 T1N R68W			
<b>Site Position:</b>		<b>Northing:</b>	1,264,146.69 usft	<b>Latitude:</b> 40.0573630
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,141,610.56 usft	<b>Longitude:</b> -104.9940970
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> 0.33 °

<b>Well</b>	BUFFALO 36C-15HZ, 383 FNL 1439 FWL			
<b>Well Position</b>	<b>+N/-S</b>	0.72 ft	<b>Northing:</b>	1,264,147.58 usft
	<b>+E/-W</b>	30.23 ft	<b>Easting:</b>	3,141,640.79 usft
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	0.00 ft
			<b>Ground Level:</b>	5,128.00 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	6/3/2014	8.61	66.62	52,526

<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	180.00

<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	
1,326.00	0.00	0.00	1,326.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,920.69	11.89	72.16	1,916.43	18.84	58.55	2.00	2.00	0.00	72.16	
6,614.61	11.89	72.16	6,509.57	315.16	979.45	0.00	0.00	0.00	0.00	
7,209.30	0.00	0.00	7,100.00	334.00	1,038.00	2.00	-2.00	0.00	180.00	
7,412.35	0.00	0.00	7,303.05	334.00	1,038.00	0.00	0.00	0.00	0.00	
8,315.00	90.27	180.07	7,876.00	-241.61	1,037.26	10.00	10.00	-19.93	180.07	
10,473.41	90.27	180.07	7,866.00	-2,400.00	1,034.48	0.00	0.00	0.00	0.00	INT TGT@ 7866.00 B
10,501.20	89.71	180.00	7,866.00	-2,427.79	1,034.47	2.00	-1.98	-0.27	-172.33	
12,508.84	89.71	180.00	7,876.00	-4,435.40	1,034.48	0.00	0.00	0.00	0.00	PBHL_BUFFALO 36C

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<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-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
966.00	0.00	0.00	966.00	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
1,226.00	0.00	0.00	1,226.00	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
1,326.00	0.00	0.00	1,326.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
1,400.00	1.48	72.16	1,399.99	0.29	0.91	-0.29	2.00	2.00	0.00
1,500.00	3.48	72.16	1,499.89	1.62	5.03	-1.62	2.00	2.00	0.00
1,600.00	5.48	72.16	1,599.58	4.01	12.46	-4.01	2.00	2.00	0.00
1,700.00	7.48	72.16	1,698.94	7.47	23.21	-7.47	2.00	2.00	0.00
1,800.00	9.48	72.16	1,797.84	11.98	37.24	-11.98	2.00	2.00	0.00
1,900.00	11.48	72.16	1,896.17	17.56	54.56	-17.56	2.00	2.00	0.00
1,920.69	11.89	72.16	1,916.43	18.84	58.55	-18.84	2.00	2.00	0.00
<b>Start 4693.92 hold at 1920.69 MD</b>									
2,000.00	11.89	72.16	1,994.04	23.85	74.11	-23.85	0.00	0.00	0.00
2,100.00	11.89	72.16	2,091.89	30.16	93.73	-30.16	0.00	0.00	0.00
2,200.00	11.89	72.16	2,189.74	36.47	113.35	-36.47	0.00	0.00	0.00
2,300.00	11.89	72.16	2,287.59	42.78	132.96	-42.78	0.00	0.00	0.00
2,400.00	11.89	72.16	2,385.45	49.10	152.58	-49.10	0.00	0.00	0.00
2,500.00	11.89	72.16	2,483.30	55.41	172.20	-55.41	0.00	0.00	0.00
2,600.00	11.89	72.16	2,581.15	61.72	191.82	-61.72	0.00	0.00	0.00
2,700.00	11.89	72.16	2,679.01	68.04	211.44	-68.04	0.00	0.00	0.00
2,800.00	11.89	72.16	2,776.86	74.35	231.06	-74.35	0.00	0.00	0.00
2,900.00	11.89	72.16	2,874.71	80.66	250.68	-80.66	0.00	0.00	0.00
3,000.00	11.89	72.16	2,972.57	86.97	270.30	-86.97	0.00	0.00	0.00
3,100.00	11.89	72.16	3,070.42	93.29	289.92	-93.29	0.00	0.00	0.00
3,200.00	11.89	72.16	3,168.27	99.60	309.54	-99.60	0.00	0.00	0.00
3,300.00	11.89	72.16	3,266.13	105.91	329.16	-105.91	0.00	0.00	0.00
3,400.00	11.89	72.16	3,363.98	112.23	348.77	-112.23	0.00	0.00	0.00
3,500.00	11.89	72.16	3,461.83	118.54	368.39	-118.54	0.00	0.00	0.00
3,600.00	11.89	72.16	3,559.69	124.85	388.01	-124.85	0.00	0.00	0.00
3,700.00	11.89	72.16	3,657.54	131.16	407.63	-131.16	0.00	0.00	0.00
3,800.00	11.89	72.16	3,755.39	137.48	427.25	-137.48	0.00	0.00	0.00
3,900.00	11.89	72.16	3,853.25	143.79	446.87	-143.79	0.00	0.00	0.00
4,000.00	11.89	72.16	3,951.10	150.10	466.49	-150.10	0.00	0.00	0.00
4,100.00	11.89	72.16	4,048.95	156.42	486.11	-156.42	0.00	0.00	0.00
4,200.00	11.89	72.16	4,146.80	162.73	505.73	-162.73	0.00	0.00	0.00
4,300.00	11.89	72.16	4,244.66	169.04	525.35	-169.04	0.00	0.00	0.00
4,364.73	11.89	72.16	4,308.00	173.13	538.05	-173.13	0.00	0.00	0.00
<b>Parkman</b>									

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<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-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	11.89	72.16	4,342.51	175.36	544.97	-175.36	0.00	0.00	0.00
4,500.00	11.89	72.16	4,440.36	181.67	564.59	-181.67	0.00	0.00	0.00
4,600.00	11.89	72.16	4,538.22	187.98	584.20	-187.98	0.00	0.00	0.00
4,700.00	11.89	72.16	4,636.07	194.29	603.82	-194.29	0.00	0.00	0.00
4,800.00	11.89	72.16	4,733.92	200.61	623.44	-200.61	0.00	0.00	0.00
4,832.78	11.89	72.16	4,766.00	202.68	629.87	-202.68	0.00	0.00	0.00
<b>Sussex</b>									
4,900.00	11.89	72.16	4,831.78	206.92	643.06	-206.92	0.00	0.00	0.00
5,000.00	11.89	72.16	4,929.63	213.23	662.68	-213.23	0.00	0.00	0.00
5,100.00	11.89	72.16	5,027.48	219.55	682.30	-219.55	0.00	0.00	0.00
5,200.00	11.89	72.16	5,125.34	225.86	701.92	-225.86	0.00	0.00	0.00
5,300.00	11.89	72.16	5,223.19	232.17	721.54	-232.17	0.00	0.00	0.00
5,400.00	11.89	72.16	5,321.04	238.48	741.16	-238.48	0.00	0.00	0.00
5,500.00	11.89	72.16	5,418.90	244.80	760.78	-244.80	0.00	0.00	0.00
5,600.00	11.89	72.16	5,516.75	251.11	780.40	-251.11	0.00	0.00	0.00
5,700.00	11.89	72.16	5,614.60	257.42	800.02	-257.42	0.00	0.00	0.00
5,800.00	11.89	72.16	5,712.45	263.74	819.63	-263.74	0.00	0.00	0.00
5,900.00	11.89	72.16	5,810.31	270.05	839.25	-270.05	0.00	0.00	0.00
6,000.00	11.89	72.16	5,908.16	276.36	858.87	-276.36	0.00	0.00	0.00
6,100.00	11.89	72.16	6,006.01	282.67	878.49	-282.67	0.00	0.00	0.00
6,200.00	11.89	72.16	6,103.87	288.99	898.11	-288.99	0.00	0.00	0.00
6,300.00	11.89	72.16	6,201.72	295.30	917.73	-295.30	0.00	0.00	0.00
6,400.00	11.89	72.16	6,299.57	301.61	937.35	-301.61	0.00	0.00	0.00
6,500.00	11.89	72.16	6,397.43	307.93	956.97	-307.93	0.00	0.00	0.00
6,600.00	11.89	72.16	6,495.28	314.24	976.59	-314.24	0.00	0.00	0.00
6,614.61	11.89	72.16	6,509.57	315.16	979.45	-315.16	0.00	0.00	0.00
<b>Start Drop -2.00</b>									
6,700.00	10.19	72.16	6,593.38	320.17	995.02	-320.17	2.00	-2.00	0.00
6,800.00	8.19	72.16	6,692.10	325.06	1,010.21	-325.06	2.00	-2.00	0.00
6,900.00	6.19	72.16	6,791.31	328.89	1,022.12	-328.89	2.00	-2.00	0.00
7,000.00	4.19	72.16	6,890.89	331.66	1,030.73	-331.66	2.00	-2.00	0.00
7,100.00	2.19	72.16	6,990.73	333.36	1,036.02	-333.36	2.00	-2.00	0.00
7,200.00	0.19	72.16	7,090.70	334.00	1,037.99	-334.00	2.00	-2.00	0.00
7,209.30	0.00	0.00	7,100.00	334.00	1,038.00	-334.00	2.00	-2.00	0.00
<b>Start 203.05 hold at 7209.30 MD</b>									
7,300.00	0.00	0.00	7,190.70	334.00	1,038.00	-334.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,290.70	334.00	1,038.00	-334.00	0.00	0.00	0.00
7,412.35	0.00	0.00	7,303.05	334.00	1,038.00	-334.00	0.00	0.00	0.00
<b>Start DLS 10.00 TFO 180.07</b>									
7,500.00	8.77	180.07	7,390.36	327.31	1,037.99	-327.31	10.00	10.00	0.00
7,574.45	16.21	180.07	7,463.00	311.22	1,037.97	-311.22	10.00	10.00	0.00
<b>Sharon Springs</b>									
7,600.00	18.77	180.07	7,487.37	303.54	1,037.96	-303.54	10.00	10.00	0.00
7,620.87	20.85	180.07	7,507.00	296.47	1,037.95	-296.47	10.00	10.00	0.00
<b>Niobrara A</b>									
7,700.00	28.77	180.07	7,578.77	263.30	1,037.91	-263.30	10.00	10.00	0.00
7,760.29	34.79	180.07	7,630.00	231.56	1,037.87	-231.56	10.00	10.00	0.00
<b>Niobrara B</b>									
7,800.00	38.77	180.07	7,661.80	207.79	1,037.84	-207.79	10.00	10.00	0.00
7,889.60	47.73	180.07	7,727.00	146.46	1,037.76	-146.46	10.00	10.00	0.00
<b>Niobrara C</b>									
7,900.00	48.77	180.07	7,733.92	138.70	1,037.75	-138.70	10.00	10.00	0.00
8,000.00	58.77	180.07	7,792.96	58.15	1,037.65	-58.15	10.00	10.00	0.00

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 36C-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-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	68.77	180.07	7,837.11	-31.44	1,037.53	31.44	10.00	10.00	0.00	
8,135.72	72.34	180.07	7,849.00	-65.12	1,037.49	65.12	10.00	10.00	0.00	
<b>Fort Hays</b>										
8,200.00	78.77	180.07	7,865.03	-127.33	1,037.41	127.33	10.00	10.00	0.00	
8,236.53	82.42	180.07	7,871.00	-163.36	1,037.36	163.36	10.00	10.00	0.00	
<b>Codell</b>										
8,300.00	88.77	180.07	7,875.88	-226.61	1,037.28	226.61	10.00	10.00	0.00	
8,315.00	90.27	180.07	7,876.00	-241.61	1,037.26	241.61	10.00	10.00	0.00	
<b>Start 2158.41 hold at 8315.00 MD - 7" (624 FNL 2480 FWL)</b>										
8,400.00	90.27	180.07	7,875.61	-326.61	1,037.15	326.61	0.00	0.00	0.00	
8,500.00	90.27	180.07	7,875.15	-426.61	1,037.02	426.61	0.00	0.00	0.00	
8,600.00	90.27	180.07	7,874.68	-526.61	1,036.89	526.61	0.00	0.00	0.00	
8,700.00	90.27	180.07	7,874.22	-626.61	1,036.76	626.61	0.00	0.00	0.00	
8,800.00	90.27	180.07	7,873.76	-726.61	1,036.64	726.61	0.00	0.00	0.00	
8,900.00	90.27	180.07	7,873.29	-826.60	1,036.51	826.60	0.00	0.00	0.00	
9,000.00	90.27	180.07	7,872.83	-926.60	1,036.38	926.60	0.00	0.00	0.00	
9,100.00	90.27	180.07	7,872.37	-1,026.60	1,036.25	1,026.60	0.00	0.00	0.00	
9,200.00	90.27	180.07	7,871.90	-1,126.60	1,036.12	1,126.60	0.00	0.00	0.00	
9,300.00	90.27	180.07	7,871.44	-1,226.60	1,035.99	1,226.60	0.00	0.00	0.00	
9,400.00	90.27	180.07	7,870.97	-1,326.60	1,035.86	1,326.60	0.00	0.00	0.00	
9,500.00	90.27	180.07	7,870.51	-1,426.60	1,035.74	1,426.60	0.00	0.00	0.00	
9,600.00	90.27	180.07	7,870.05	-1,526.60	1,035.61	1,526.60	0.00	0.00	0.00	
9,700.00	90.27	180.07	7,869.58	-1,626.60	1,035.48	1,626.60	0.00	0.00	0.00	
9,800.00	90.27	180.07	7,869.12	-1,726.59	1,035.35	1,726.59	0.00	0.00	0.00	
9,900.00	90.27	180.07	7,868.66	-1,826.59	1,035.22	1,826.59	0.00	0.00	0.00	
10,000.00	90.27	180.07	7,868.19	-1,926.59	1,035.09	1,926.59	0.00	0.00	0.00	
10,100.00	90.27	180.07	7,867.73	-2,026.59	1,034.96	2,026.59	0.00	0.00	0.00	
10,200.00	90.27	180.07	7,867.27	-2,126.59	1,034.84	2,126.59	0.00	0.00	0.00	
10,300.00	90.27	180.07	7,866.80	-2,226.59	1,034.71	2,226.59	0.00	0.00	0.00	
10,400.00	90.27	180.07	7,866.34	-2,326.59	1,034.58	2,326.59	0.00	0.00	0.00	
10,473.41	90.27	180.07	7,866.00	-2,400.00	1,034.48	2,400.00	0.00	0.00	0.00	
<b>Start DLS 2.00 TFO -172.33 - INT TGT@ 7866.00 BUFFALO 36C-15HZ</b>										
10,500.00	89.74	180.00	7,866.00	-2,426.59	1,034.47	2,426.59	2.00	-1.98	-0.27	
10,501.20	89.71	180.00	7,866.00	-2,427.79	1,034.47	2,427.79	2.00	-1.98	-0.27	
<b>Start 2007.64 hold at 10501.20 MD</b>										
10,600.00	89.71	180.00	7,866.50	-2,526.58	1,034.47	2,526.58	0.00	0.00	0.00	
10,700.00	89.71	180.00	7,866.99	-2,626.58	1,034.47	2,626.58	0.00	0.00	0.00	
10,800.00	89.71	180.00	7,867.49	-2,726.58	1,034.47	2,726.58	0.00	0.00	0.00	
10,900.00	89.71	180.00	7,867.99	-2,826.58	1,034.47	2,826.58	0.00	0.00	0.00	
11,000.00	89.71	180.00	7,868.49	-2,926.58	1,034.47	2,926.58	0.00	0.00	0.00	
11,100.00	89.71	180.00	7,868.99	-3,026.58	1,034.47	3,026.58	0.00	0.00	0.00	
11,200.00	89.71	180.00	7,869.48	-3,126.58	1,034.47	3,126.58	0.00	0.00	0.00	
11,300.00	89.71	180.00	7,869.98	-3,226.58	1,034.47	3,226.58	0.00	0.00	0.00	
11,400.00	89.71	180.00	7,870.48	-3,326.57	1,034.47	3,326.57	0.00	0.00	0.00	
11,500.00	89.71	180.00	7,870.98	-3,426.57	1,034.47	3,426.57	0.00	0.00	0.00	
11,600.00	89.71	180.00	7,871.48	-3,526.57	1,034.48	3,526.57	0.00	0.00	0.00	
11,700.00	89.71	180.00	7,871.97	-3,626.57	1,034.48	3,626.57	0.00	0.00	0.00	
11,800.00	89.71	180.00	7,872.47	-3,726.57	1,034.48	3,726.57	0.00	0.00	0.00	
11,900.00	89.71	180.00	7,872.97	-3,826.57	1,034.48	3,826.57	0.00	0.00	0.00	
12,000.00	89.71	180.00	7,873.47	-3,926.57	1,034.48	3,926.57	0.00	0.00	0.00	
12,100.00	89.71	180.00	7,873.96	-4,026.57	1,034.48	4,026.57	0.00	0.00	0.00	
12,200.00	89.71	180.00	7,874.46	-4,126.56	1,034.48	4,126.56	0.00	0.00	0.00	
12,300.00	89.71	180.00	7,874.96	-4,226.56	1,034.48	4,226.56	0.00	0.00	0.00	

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 36C-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-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)
12,400.00	89.71	180.00	7,875.46	-4,326.56	1,034.48	4,326.56	0.00	0.00	0.00
12,500.00	89.71	180.00	7,875.96	-4,426.56	1,034.48	4,426.56	0.00	0.00	0.00
12,508.84	89.71	180.00	7,876.00	-4,435.40	1,034.48	4,435.40	0.00	0.00	0.00
TD at 12508.84 - PBHL_BUFFALO 36C-15HZ (460 FSL 2490 FWL)									

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									
INT TGT@ 7866.00 BUF	0.00	0.00	7,866.00	-2,400.00	1,034.48	1,261,753.53	3,142,688.95	40.0507765	-104.9902937
- plan hits target center									
- Point									
PBHL_BUFFALO 36C-1	0.00	0.00	7,876.00	-4,435.40	1,034.48	1,259,718.16	3,142,700.56	40.0451890	-104.9902940
- plan hits target center									
- Point									

Casing Points									
Measured Depth (ft)	Vertical Depth (ft)	Name				Casing Diameter (in)	Hole Diameter (in)		
1,226.00	1,226.00	9 5/8"				9.625	12.250		
8,315.00	7,876.00	7" (624 FNL 2480 FWL)				7.000	7.500		

Formations									
Measured Depth (ft)	Vertical Depth (ft)	Name		Lithology		Dip (°)	Dip Direction (°)		
966.00	967.00	Base Fox Hills							
4,364.73	4,309.00	Parkman							
4,832.78	4,767.00	Sussex							
7,574.45	7,464.00	Sharon Springs							
7,620.87	7,508.00	Niobrara A							
7,760.29	7,631.00	Niobrara B							
7,889.60	7,728.00	Niobrara C							
8,135.72	7,850.00	Fort Hays							
8,236.53	7,872.00	Codell							

<b>Database:</b>	Denver Sales	<b>Local Co-ordinate Reference:</b>	Well BUFFALO 36C-15HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5128 & KB 21 @ 5149.00ft (UNIT 403)
<b>Site:</b>	BUFFALO & BADGER 4-4 PAD	<b>North Reference:</b>	True
<b>Well:</b>	BUFFALO 36C-15HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #2 PRELIMINARY		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,326.00	1,326.00	0.00	0.00	Start Build 2.00
1,920.69	1,916.43	18.84	58.55	Start 4693.92 hold at 1920.69 MD
6,614.61	6,509.57	315.16	979.45	Start Drop -2.00
7,209.30	7,100.00	334.00	1,038.00	Start 203.05 hold at 7209.30 MD
7,412.35	7,303.05	334.00	1,038.00	Start DLS 10.00 TFO 180.07
8,315.00	7,876.00	-241.61	1,037.26	Start 2158.41 hold at 8315.00 MD
10,473.41	7,866.00	-2,400.00	1,034.48	Start DLS 2.00 TFO -172.33
10,501.20	7,866.00	-2,427.79	1,034.47	Start 2007.64 hold at 10501.20 MD
12,508.84	7,876.00	-4,435.40	1,034.48	TD at 12508.84