



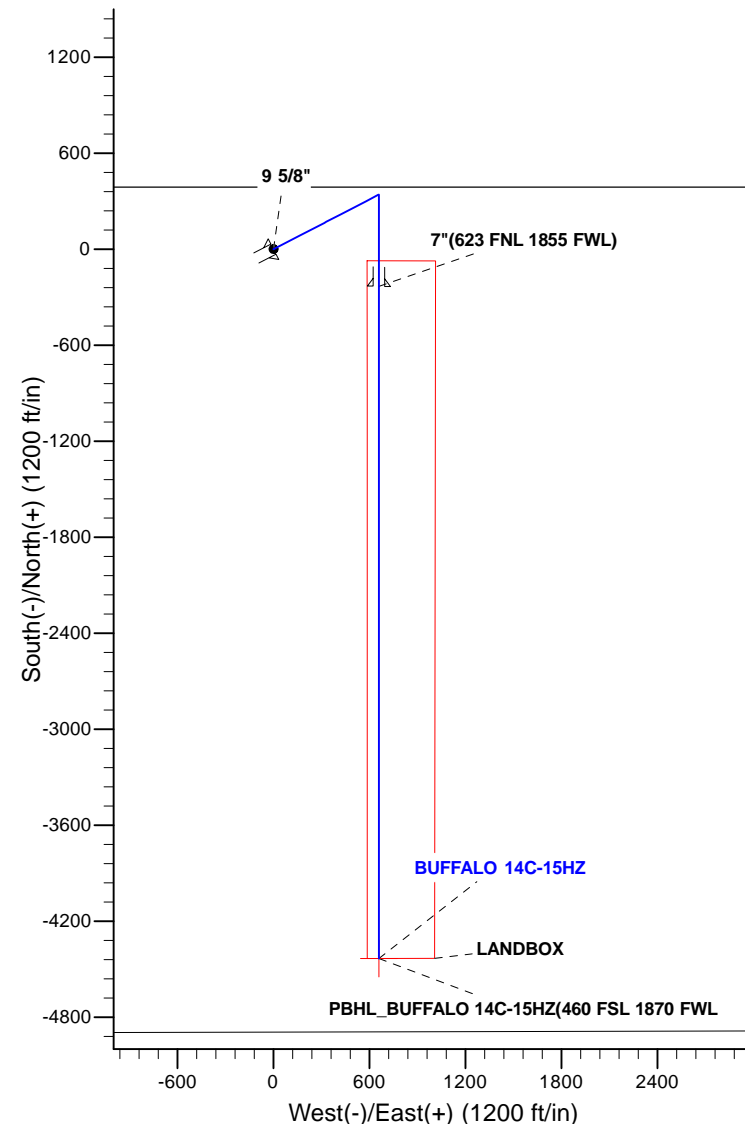
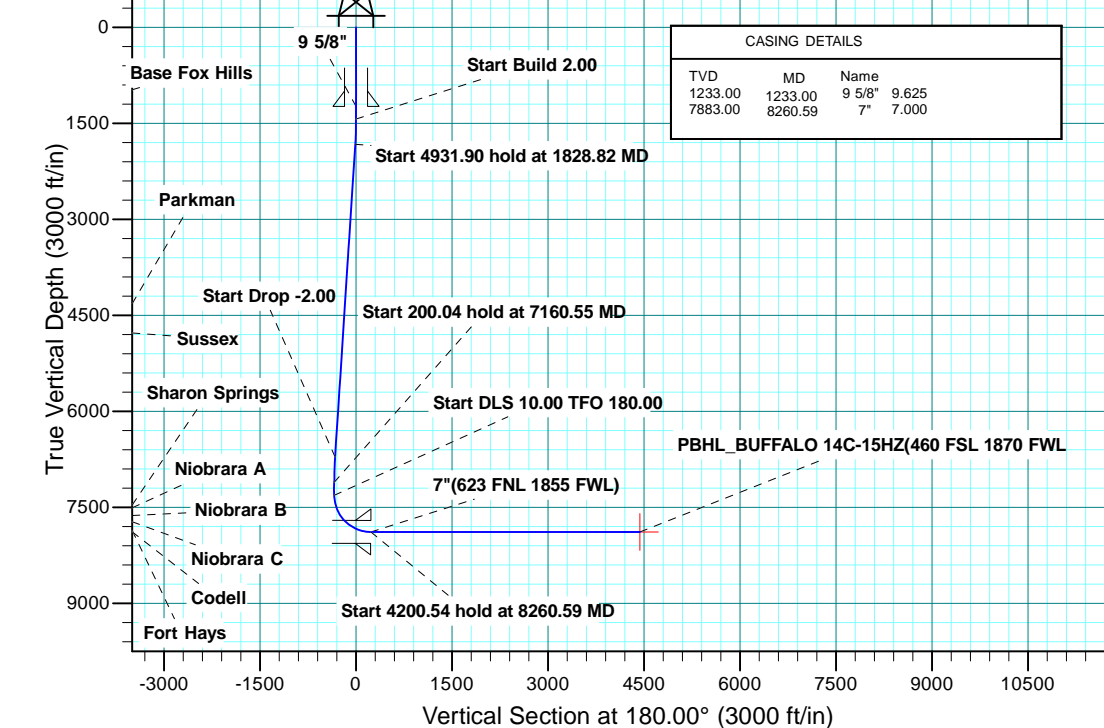
Project: COLORADO NORTHERN ZONE - 83
Site: BUFFALO & BADGER 4E-15HZ PAD
Well: BUFFALO 14C-15HZ
Wellbore: OH
Design: PLAN #2 PRELIMINARY



WELL DETAILS: BUFFALO 14C-15HZ									
GL 5132 & KB 21 @ 5153.00ft (UNIT 403)									
		+N-S	+E-W	Northing	Easting	Latitude		Longitude	
		0.00	0.00	1264141.83	3141400.65	40.0573529		-104.9948470	
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1429.00	0.00	0.00	1429.00	0.00	0.00	0.00	0.00	0.00	
1828.82	8.00	62.63	1827.52	12.80	24.74	2.00	62.63	-12.80	
6760.73	8.00	62.63	6711.48	328.20	634.03	0.00	0.00	-328.20	
7160.55	0.00	0.00	7110.00	341.00	658.77	2.00	180.00	-341.00	
7360.59	0.00	0.00	7310.04	341.00	658.77	0.00	0.00	-341.00	
8260.59	90.00	180.00	7883.00	-231.96	658.77	10.00	180.00	231.96	
12461.12	90.00	180.00	7883.00	-4432.49	658.77	0.00	0.00	4432.49PBHL_BUFFALO 14C-15HZ(460 FSL 1870 FWL	
DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude		Longitude	Shape
PBHL 7883.00		-4432.49	658.77	1259713.17	3142084.65	40.0451850		-104.9924940	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	
973.00	973.00	Base Fox Hills	0.00	
4315.00	4340.72	Parkman	8.00	
4773.00	4803.22	Sussex	8.00	
7461.00	7513.35	Sharon Springs	15.28	
7506.00	7560.58	Niobrara A	20.00	
7625.00	7694.06	Niobrara B	33.35	
7725.00	7824.65	Niobrara C	46.41	
7859.00	8094.17	Fort Hays	73.36	
7881.00	8212.73	Codell	85.21	



US ROCKIES REGION PLANNING

**COLORADO NORTHERN ZONE - 83
BUFFALO & BADGER 4E-15HZ PAD
BUFFALO 14C-15HZ**

OH

Plan: PLAN #2 PRELIMINARY

Standard Survey Report

03 October, 2014

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

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

Site						BUFFALO & BADGER 4E-15HZ PAD, SECTION 15 T1N R68W											
Site Position:			Northing:			1,264,140.95 usft			Latitude:			40.0573510					
From:			Lat/Long			Easting:			3,141,370.70 usft			Longitude:			-104.9949540		
Position Uncertainty:			0.00 ft			Slot Radius:			13.200 in			Grid Convergence:			0.33 °		

Well	BUFFALO 14C-15HZ, 388 FNL 1199 FWL					
Well Position	+N/-S	0.00 ft	Northing:	1,264,141.83 usft	Latitude:	40.0573530
	+E/-W	0.00 ft	Easting:	3,141,400.65 usft	Longitude:	-104.9948470
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,132.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	6/5/2014	8.61	66.62	52,526

Design	PLAN #2 PRELIMINARY				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	180.00	

Survey Tool Program	Date	10/3/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	12,460.42	PLAN #2 PRELIMINARY (OH)	SDI_MWD+CRUST_1.0	SDI MWD + Crustal anomaly, Version 1.0	

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	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

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)
973.00	0.00	0.00	973.00	0.00	0.00	0.00	0.00	0.00	0.00
Base Fox Hills									
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
1,233.00	0.00	0.00	1,233.00	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
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,429.00	0.00	0.00	1,429.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,500.00	1.42	62.63	1,499.99	0.40	0.78	-0.40	2.00	2.00	0.00
1,600.00	3.42	62.63	1,599.90	2.35	4.53	-2.35	2.00	2.00	0.00
1,700.00	5.42	62.63	1,699.60	5.89	11.37	-5.89	2.00	2.00	0.00
1,800.00	7.42	62.63	1,798.96	11.03	21.30	-11.03	2.00	2.00	0.00
1,828.82	8.00	62.63	1,827.52	12.80	24.74	-12.80	2.00	2.00	0.00
Start 4931.90 hold at 1828.82 MD									
1,900.00	8.00	62.63	1,898.01	17.36	33.53	-17.36	0.00	0.00	0.00
2,000.00	8.00	62.63	1,997.04	23.75	45.89	-23.75	0.00	0.00	0.00
2,100.00	8.00	62.63	2,096.07	30.15	58.24	-30.15	0.00	0.00	0.00
2,200.00	8.00	62.63	2,195.09	36.54	70.59	-36.54	0.00	0.00	0.00
2,300.00	8.00	62.63	2,294.12	42.94	82.95	-42.94	0.00	0.00	0.00
2,400.00	8.00	62.63	2,393.15	49.33	95.30	-49.33	0.00	0.00	0.00
2,500.00	8.00	62.63	2,492.18	55.73	107.66	-55.73	0.00	0.00	0.00
2,600.00	8.00	62.63	2,591.20	62.12	120.01	-62.12	0.00	0.00	0.00
2,700.00	8.00	62.63	2,690.23	68.52	132.36	-68.52	0.00	0.00	0.00
2,800.00	8.00	62.63	2,789.26	74.91	144.72	-74.91	0.00	0.00	0.00
2,900.00	8.00	62.63	2,888.29	81.31	157.07	-81.31	0.00	0.00	0.00
3,000.00	8.00	62.63	2,987.32	87.70	169.43	-87.70	0.00	0.00	0.00
3,100.00	8.00	62.63	3,086.34	94.10	181.78	-94.10	0.00	0.00	0.00
3,200.00	8.00	62.63	3,185.37	100.49	194.13	-100.49	0.00	0.00	0.00
3,300.00	8.00	62.63	3,284.40	106.89	206.49	-106.89	0.00	0.00	0.00
3,400.00	8.00	62.63	3,383.43	113.28	218.84	-113.28	0.00	0.00	0.00
3,500.00	8.00	62.63	3,482.45	119.68	231.20	-119.68	0.00	0.00	0.00
3,600.00	8.00	62.63	3,581.48	126.07	243.55	-126.07	0.00	0.00	0.00
3,700.00	8.00	62.63	3,680.51	132.46	255.91	-132.46	0.00	0.00	0.00
3,800.00	8.00	62.63	3,779.54	138.86	268.26	-138.86	0.00	0.00	0.00
3,900.00	8.00	62.63	3,878.56	145.25	280.61	-145.25	0.00	0.00	0.00
4,000.00	8.00	62.63	3,977.59	151.65	292.97	-151.65	0.00	0.00	0.00
4,100.00	8.00	62.63	4,076.62	158.04	305.32	-158.04	0.00	0.00	0.00
4,200.00	8.00	62.63	4,175.65	164.44	317.68	-164.44	0.00	0.00	0.00
4,300.00	8.00	62.63	4,274.68	170.83	330.03	-170.83	0.00	0.00	0.00
4,340.72	8.00	62.63	4,315.00	173.44	335.06	-173.44	0.00	0.00	0.00
Parkman									
4,400.00	8.00	62.63	4,373.70	177.23	342.38	-177.23	0.00	0.00	0.00

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

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)
4,500.00	8.00	62.63	4,472.73	183.62	354.74	-183.62	0.00	0.00	0.00
4,600.00	8.00	62.63	4,571.76	190.02	367.09	-190.02	0.00	0.00	0.00
4,700.00	8.00	62.63	4,670.79	196.41	379.45	-196.41	0.00	0.00	0.00
4,800.00	8.00	62.63	4,769.81	202.81	391.80	-202.81	0.00	0.00	0.00
4,803.22	8.00	62.63	4,773.00	203.01	392.20	-203.01	0.00	0.00	0.00
Sussex									
4,900.00	8.00	62.63	4,868.84	209.20	404.16	-209.20	0.00	0.00	0.00
5,000.00	8.00	62.63	4,967.87	215.60	416.51	-215.60	0.00	0.00	0.00
5,100.00	8.00	62.63	5,066.90	221.99	428.86	-221.99	0.00	0.00	0.00
5,200.00	8.00	62.63	5,165.92	228.39	441.22	-228.39	0.00	0.00	0.00
5,300.00	8.00	62.63	5,264.95	234.78	453.57	-234.78	0.00	0.00	0.00
5,400.00	8.00	62.63	5,363.98	241.18	465.93	-241.18	0.00	0.00	0.00
5,500.00	8.00	62.63	5,463.01	247.57	478.28	-247.57	0.00	0.00	0.00
5,600.00	8.00	62.63	5,562.04	253.97	490.63	-253.97	0.00	0.00	0.00
5,700.00	8.00	62.63	5,661.06	260.36	502.99	-260.36	0.00	0.00	0.00
5,800.00	8.00	62.63	5,760.09	266.76	515.34	-266.76	0.00	0.00	0.00
5,900.00	8.00	62.63	5,859.12	273.15	527.70	-273.15	0.00	0.00	0.00
6,000.00	8.00	62.63	5,958.15	279.55	540.05	-279.55	0.00	0.00	0.00
6,100.00	8.00	62.63	6,057.17	285.94	552.41	-285.94	0.00	0.00	0.00
6,200.00	8.00	62.63	6,156.20	292.34	564.76	-292.34	0.00	0.00	0.00
6,300.00	8.00	62.63	6,255.23	298.73	577.11	-298.73	0.00	0.00	0.00
6,400.00	8.00	62.63	6,354.26	305.13	589.47	-305.13	0.00	0.00	0.00
6,500.00	8.00	62.63	6,453.28	311.52	601.82	-311.52	0.00	0.00	0.00
6,600.00	8.00	62.63	6,552.31	317.92	614.18	-317.92	0.00	0.00	0.00
6,700.00	8.00	62.63	6,651.34	324.31	626.53	-324.31	0.00	0.00	0.00
6,760.73	8.00	62.63	6,711.48	328.20	634.03	-328.20	0.00	0.00	0.00
Start Drop -2.00									
6,800.00	7.21	62.63	6,750.40	330.58	638.65	-330.58	2.00	-2.00	0.00
6,900.00	5.21	62.63	6,849.81	335.56	648.26	-335.56	2.00	-2.00	0.00
7,000.00	3.21	62.63	6,949.54	338.93	654.78	-338.93	2.00	-2.00	0.00
7,100.00	1.21	62.63	7,049.46	340.71	658.20	-340.71	2.00	-2.00	0.00
7,160.55	0.00	0.00	7,110.00	341.00	658.77	-341.00	2.00	-2.00	0.00
Start 200.04 hold at 7160.55 MD									
7,200.00	0.00	0.00	7,149.45	341.00	658.77	-341.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,249.45	341.00	658.77	-341.00	0.00	0.00	0.00
7,360.59	0.00	0.00	7,310.04	341.00	658.77	-341.00	0.00	0.00	0.00
Start DLS 10.00 TFO 180.00									
7,400.00	3.94	180.00	7,349.42	339.65	658.77	-339.65	10.00	10.00	0.00
7,500.00	13.94	180.00	7,448.08	324.12	658.77	-324.12	10.00	10.00	0.00
7,513.35	15.28	180.00	7,461.00	320.76	658.77	-320.76	10.00	10.00	0.00
Sharon Springs									
7,560.58	20.00	180.00	7,506.00	306.45	658.77	-306.45	10.00	10.00	0.00
Niobrara A									
7,600.00	23.94	180.00	7,542.55	291.70	658.77	-291.70	10.00	10.00	0.00

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

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)
7,694.06	33.35	180.00	7,625.00	246.67	658.77	-246.67	10.00	10.00	0.00
Niobrara B									
7,700.00	33.94	180.00	7,629.95	243.37	658.77	-243.37	10.00	10.00	0.00
7,800.00	43.94	180.00	7,707.63	180.60	658.77	-180.60	10.00	10.00	0.00
7,824.65	46.41	180.00	7,725.00	163.12	658.77	-163.12	10.00	10.00	0.00
Niobrara C									
7,900.00	53.94	180.00	7,773.23	105.29	658.77	-105.29	10.00	10.00	0.00
8,000.00	63.94	180.00	7,824.75	19.74	658.77	-19.74	10.00	10.00	0.00
8,094.17	73.36	180.00	7,859.00	-67.87	658.77	67.87	10.00	10.00	0.00
Fort Hays									
8,100.00	73.94	180.00	7,860.64	-73.46	658.77	73.46	10.00	10.00	0.00
8,200.00	83.94	180.00	7,879.80	-171.48	658.77	171.48	10.00	10.00	0.00
8,212.73	85.21	180.00	7,881.00	-184.15	658.77	184.15	10.00	10.00	0.00
Codell									
8,260.59	90.00	180.00	7,883.00	-231.96	658.77	231.96	10.00	10.00	0.00
Start 4200.54 hold at 8260.59 MD - 7"(623 FNL 1855 FWL)									
8,300.00	90.00	180.00	7,883.00	-271.37	658.77	271.37	0.00	0.00	0.00
8,400.00	90.00	180.00	7,883.00	-371.37	658.77	371.37	0.00	0.00	0.00
8,500.00	90.00	180.00	7,883.00	-471.37	658.77	471.37	0.00	0.00	0.00
8,600.00	90.00	180.00	7,883.00	-571.37	658.77	571.37	0.00	0.00	0.00
8,700.00	90.00	180.00	7,883.00	-671.37	658.77	671.37	0.00	0.00	0.00
8,800.00	90.00	180.00	7,883.00	-771.37	658.77	771.37	0.00	0.00	0.00
8,900.00	90.00	180.00	7,883.00	-871.37	658.77	871.37	0.00	0.00	0.00
9,000.00	90.00	180.00	7,883.00	-971.37	658.77	971.37	0.00	0.00	0.00
9,100.00	90.00	180.00	7,883.00	-1,071.37	658.77	1,071.37	0.00	0.00	0.00
9,200.00	90.00	180.00	7,883.00	-1,171.37	658.77	1,171.37	0.00	0.00	0.00
9,300.00	90.00	180.00	7,883.00	-1,271.37	658.77	1,271.37	0.00	0.00	0.00
9,400.00	90.00	180.00	7,883.00	-1,371.37	658.77	1,371.37	0.00	0.00	0.00
9,500.00	90.00	180.00	7,883.00	-1,471.37	658.77	1,471.37	0.00	0.00	0.00
9,600.00	90.00	180.00	7,883.00	-1,571.37	658.77	1,571.37	0.00	0.00	0.00
9,700.00	90.00	180.00	7,883.00	-1,671.37	658.77	1,671.37	0.00	0.00	0.00
9,800.00	90.00	180.00	7,883.00	-1,771.37	658.77	1,771.37	0.00	0.00	0.00
9,900.00	90.00	180.00	7,883.00	-1,871.37	658.77	1,871.37	0.00	0.00	0.00
10,000.00	90.00	180.00	7,883.00	-1,971.37	658.77	1,971.37	0.00	0.00	0.00
10,100.00	90.00	180.00	7,883.00	-2,071.37	658.77	2,071.37	0.00	0.00	0.00
10,200.00	90.00	180.00	7,883.00	-2,171.37	658.77	2,171.37	0.00	0.00	0.00
10,300.00	90.00	180.00	7,883.00	-2,271.37	658.77	2,271.37	0.00	0.00	0.00
10,400.00	90.00	180.00	7,883.00	-2,371.37	658.77	2,371.37	0.00	0.00	0.00
10,500.00	90.00	180.00	7,883.00	-2,471.37	658.77	2,471.37	0.00	0.00	0.00
10,600.00	90.00	180.00	7,883.00	-2,571.37	658.77	2,571.37	0.00	0.00	0.00
10,700.00	90.00	180.00	7,883.00	-2,671.37	658.77	2,671.37	0.00	0.00	0.00
10,800.00	90.00	180.00	7,883.00	-2,771.37	658.77	2,771.37	0.00	0.00	0.00
10,900.00	90.00	180.00	7,883.00	-2,871.37	658.77	2,871.37	0.00	0.00	0.00
11,000.00	90.00	180.00	7,883.00	-2,971.37	658.77	2,971.37	0.00	0.00	0.00

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

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)	
11,100.00	90.00	180.00	7,883.00	-3,071.37	658.77	3,071.37	0.00	0.00	0.00	
11,200.00	90.00	180.00	7,883.00	-3,171.37	658.77	3,171.37	0.00	0.00	0.00	
11,300.00	90.00	180.00	7,883.00	-3,271.37	658.77	3,271.37	0.00	0.00	0.00	
11,400.00	90.00	180.00	7,883.00	-3,371.37	658.77	3,371.37	0.00	0.00	0.00	
11,500.00	90.00	180.00	7,883.00	-3,471.37	658.77	3,471.37	0.00	0.00	0.00	
11,600.00	90.00	180.00	7,883.00	-3,571.37	658.77	3,571.37	0.00	0.00	0.00	
11,700.00	90.00	180.00	7,883.00	-3,671.37	658.77	3,671.37	0.00	0.00	0.00	
11,800.00	90.00	180.00	7,883.00	-3,771.37	658.77	3,771.37	0.00	0.00	0.00	
11,900.00	90.00	180.00	7,883.00	-3,871.37	658.77	3,871.37	0.00	0.00	0.00	
12,000.00	90.00	180.00	7,883.00	-3,971.37	658.77	3,971.37	0.00	0.00	0.00	
12,100.00	90.00	180.00	7,883.00	-4,071.37	658.77	4,071.37	0.00	0.00	0.00	
12,200.00	90.00	180.00	7,883.00	-4,171.37	658.77	4,171.37	0.00	0.00	0.00	
12,300.00	90.00	180.00	7,883.00	-4,271.37	658.77	4,271.37	0.00	0.00	0.00	
12,400.00	90.00	180.00	7,883.00	-4,371.37	658.77	4,371.37	0.00	0.00	0.00	
12,461.12	90.00	180.00	7,883.00	-4,432.49	658.77	4,432.49	0.00	0.00	0.00	
TD at 12461.12 - PBHL_BUFFALO 14C-15HZ(460 FSL 1870 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										
PBHL_BUFFALO 14C-1	0.00	0.00	7,883.00	-4,432.49	658.77	1,259,713.17	3,142,084.65	40.0451850		-104.9924940
- plan hits target center										
- Point										

Casing Points							Casing Diameter (in)	Hole Diameter (in)
Measured Depth (ft)	Vertical Depth (ft)	Name						
1,233.00	1,233.00	9 5/8"					9.625	12.250
8,260.59	7,883.00	7"(623 FNL 1855 FWL)					7.000	7.500

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 14C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4E-15HZ PAD	MD Reference:	GL 5132 & KB 21 @ 5153.00ft (UNIT 403)
Well:	BUFFALO 14C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	PLAN #2 PRELIMINARY	Database:	Denver Sales

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
973.00	973.00	Base Fox Hills			
4,340.72	4,315.00	Parkman			
4,803.22	4,773.00	Sussex			
7,513.35	7,461.00	Sharon Springs			
7,560.58	7,506.00	Niobrara A			
7,694.06	7,625.00	Niobrara B			
7,824.65	7,725.00	Niobrara C			
8,094.17	7,859.00	Fort Hays			
8,212.73	7,881.00	Codell			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1429	1429	0	0	Start Build 2.00
1829	1828	13	25	Start 4931.90 hold at 1828.82 MD
6761	6711	328	634	Start Drop -2.00
7161	7110	341	659	Start 200.04 hold at 7160.55 MD
7361	7310	341	659	Start DLS 10.00 TFO 180.00
8261	7883	-232	659	Start 4200.54 hold at 8260.59 MD
12,461	7883	-4432	659	TD at 12461.12

Checked By: _____ Approved By: _____ Date: _____