



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

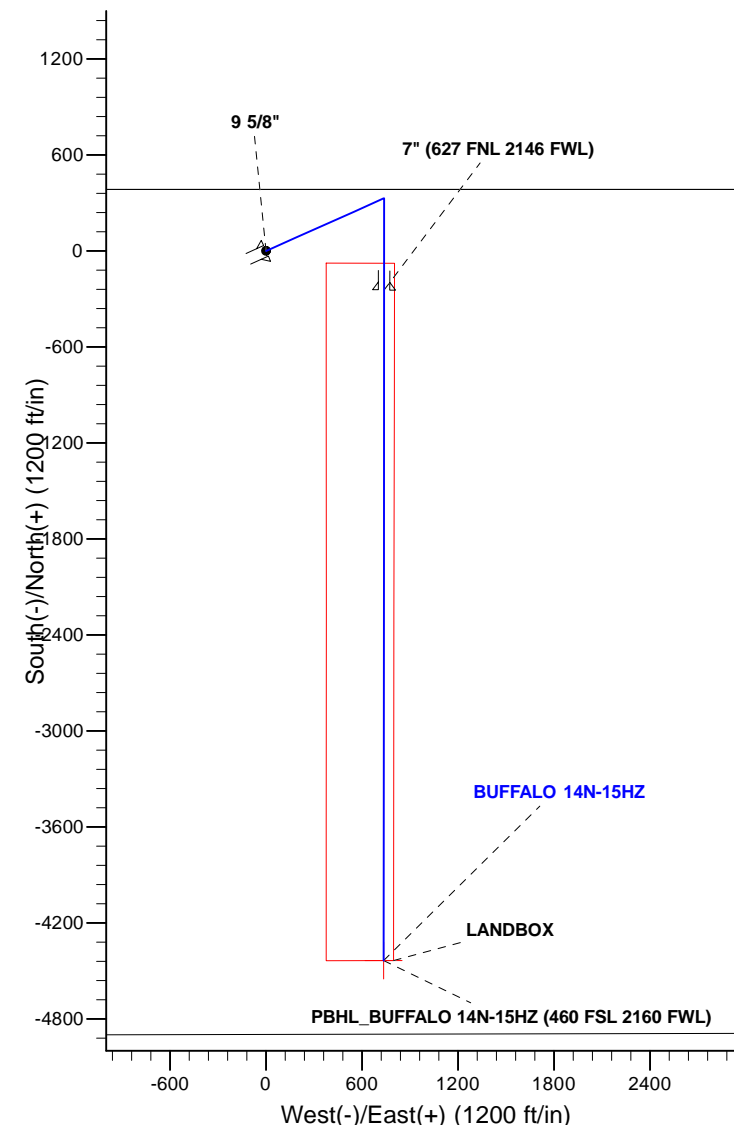
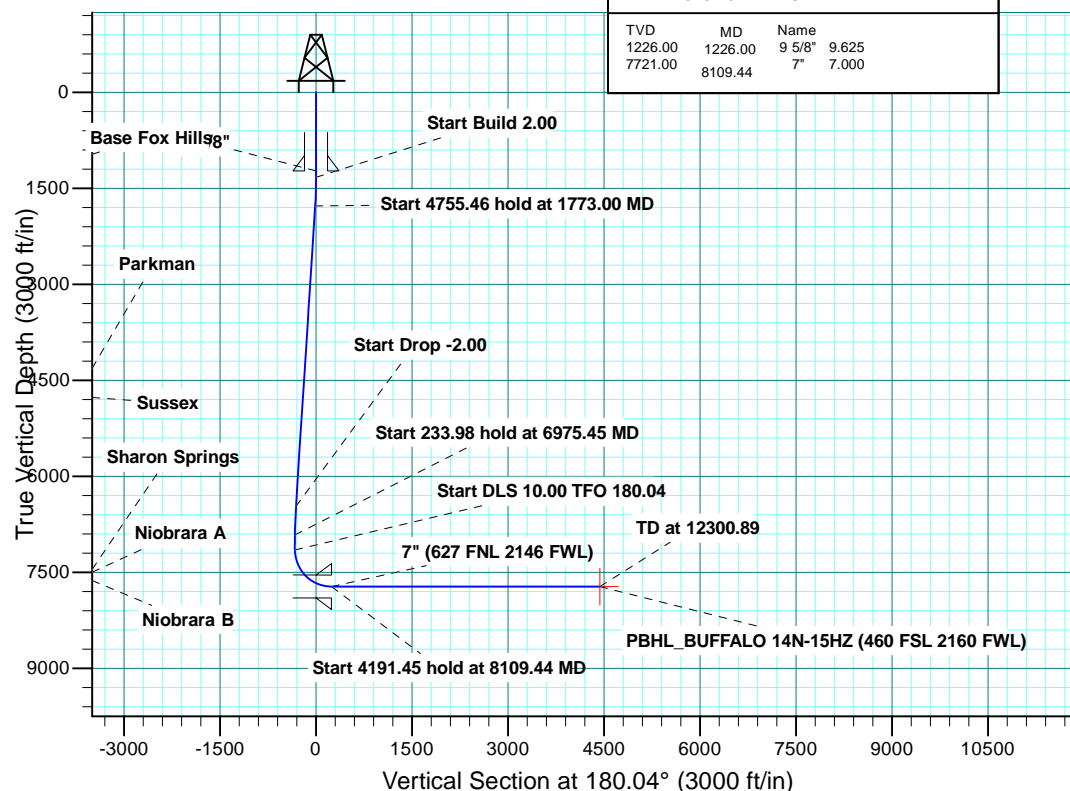


WELL DETAILS: BUFFALO 14N-15HZ									
GL 5129 & KB 21 @ 5150.00ft (UNIT 403)									
		+N-S	+E-W	Northing	Easting	Latitude		Longitude	
		0.00	0.00	1264146.68	3141610.56	40.0573630		-104.9940970	
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1326.00	0.00	0.00	1326.00	0.00	0.00	0.00	0.00	0.00	
1773.00	8.94	65.99	1771.19	14.16	31.79	2.00	65.99	-14.18	
6528.46	8.94	65.99	6468.87	314.84	706.85	0.00	0.00	-315.33	
6975.45	0.00	0.00	6914.06	329.00	738.64	2.00	180.00	-329.52	
7209.43	0.00	0.00	7148.04	329.00	738.64	0.00	0.00	-329.52	
8109.44	90.00	180.04	7721.00	-243.96	738.19	10.00	180.04	243.44	PBHL_BUFFALO 14N-15HZ (460 FSL 2160 FWL)
12300.89	90.00	180.04	7721.00	-4435.41	734.92	0.00	0.00	4434.90	
DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude		Longitude	Shape
PBHL 7721.00		-4435.41	734.92	1259715.54	3142370.77	40.0451870		-104.9914720	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	4341.01	Parkman	8.94
4766.00	4804.64	Sussex	8.94
7451.00	7528.65	Sharon Springs	31.92
7496.00	7583.38	Niobrara A	37.39
7625.00	7772.95	Niobrara B	56.35

CASING DETAILS			
TVD	MD	Name	
1226.00	1226.00	9 5/8"	9.625
7721.00	8109.44	7"	7.000





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

BUFFALO & BADGER 4-4 PAD

BUFFALO 14N-15HZ

OH

Plan: PLAN #2 PRELIMINARY

Standard Planning Report

03 October, 2014

Database:	Denver Sales	Local Co-ordinate Reference:	Well BUFFALO 14N-15HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4-4 PAD	North Reference:	True
Well:	BUFFALO 14N-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

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 4-4 PAD, NENW SECTION 15 T1N R68W			
Site Position:		Northing:	1,264,146.69 usft	Latitude: 40.0573630
From:	Lat/Long	Easting:	3,141,610.56 usft	Longitude: -104.9940970
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence: 0.33 °

Well	BUFFALO 14N-15HZ, 384' FNL 1409' FWL			
Well Position	+N/-S	-0.01 ft	Northing:	1,264,146.68 usft
	+E/-W	0.00 ft	Easting:	3,141,610.56 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft
			Ground Level:	5,129.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	6/3/2014	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	180.04

Plan Sections										
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	
1,773.00	8.94	65.99	1,771.19	14.16	31.79	2.00	2.00	0.00	65.99	
6,528.46	8.94	65.99	6,468.87	314.84	706.85	0.00	0.00	0.00	0.00	
6,975.45	0.00	0.00	6,914.06	329.00	738.64	2.00	-2.00	0.00	180.00	
7,209.43	0.00	0.00	7,148.04	329.00	738.64	0.00	0.00	0.00	0.00	
8,109.44	90.00	180.04	7,721.00	-243.96	738.19	10.00	10.00	-20.00	180.04	
12,300.89	90.00	180.04	7,721.00	-4,435.41	734.92	0.00	0.00	0.00	0.00	PBHL_BUFFALO 14N

Database:	Denver Sales	Local Co-ordinate Reference:	Well BUFFALO 14N-15HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4-4 PAD	North Reference:	True
Well:	BUFFALO 14N-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	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
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
1,226.00	0.00	0.00	1,226.00	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
1,326.00	0.00	0.00	1,326.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,400.00	1.48	65.99	1,399.99	0.39	0.87	-0.39	2.00	2.00	0.00
1,500.00	3.48	65.99	1,499.89	2.15	4.83	-2.15	2.00	2.00	0.00
1,600.00	5.48	65.99	1,599.58	5.33	11.96	-5.34	2.00	2.00	0.00
1,700.00	7.48	65.99	1,698.94	9.92	22.27	-9.93	2.00	2.00	0.00
1,773.00	8.94	65.99	1,771.19	14.16	31.79	-14.18	2.00	2.00	0.00
Start 4755.46 hold at 1773.00 MD									
1,800.00	8.94	65.99	1,797.86	15.87	35.62	-15.89	0.00	0.00	0.00
1,900.00	8.94	65.99	1,896.65	22.19	49.82	-22.23	0.00	0.00	0.00
2,000.00	8.94	65.99	1,995.43	28.51	64.02	-28.56	0.00	0.00	0.00
2,100.00	8.94	65.99	2,094.22	34.84	78.21	-34.89	0.00	0.00	0.00
2,200.00	8.94	65.99	2,193.00	41.16	92.41	-41.22	0.00	0.00	0.00
2,300.00	8.94	65.99	2,291.79	47.48	106.60	-47.56	0.00	0.00	0.00
2,400.00	8.94	65.99	2,390.57	53.80	120.80	-53.89	0.00	0.00	0.00
2,500.00	8.94	65.99	2,489.36	60.13	134.99	-60.22	0.00	0.00	0.00
2,600.00	8.94	65.99	2,588.14	66.45	149.19	-66.55	0.00	0.00	0.00
2,700.00	8.94	65.99	2,686.93	72.77	163.38	-72.89	0.00	0.00	0.00
2,800.00	8.94	65.99	2,785.71	79.10	177.58	-79.22	0.00	0.00	0.00
2,900.00	8.94	65.99	2,884.50	85.42	191.77	-85.55	0.00	0.00	0.00
3,000.00	8.94	65.99	2,983.28	91.74	205.97	-91.89	0.00	0.00	0.00
3,100.00	8.94	65.99	3,082.07	98.06	220.16	-98.22	0.00	0.00	0.00
3,200.00	8.94	65.99	3,180.85	104.39	234.36	-104.55	0.00	0.00	0.00
3,300.00	8.94	65.99	3,279.64	110.71	248.56	-110.88	0.00	0.00	0.00
3,400.00	8.94	65.99	3,378.42	117.03	262.75	-117.22	0.00	0.00	0.00
3,500.00	8.94	65.99	3,477.21	123.36	276.95	-123.55	0.00	0.00	0.00
3,600.00	8.94	65.99	3,575.99	129.68	291.14	-129.88	0.00	0.00	0.00
3,700.00	8.94	65.99	3,674.78	136.00	305.34	-136.21	0.00	0.00	0.00
3,800.00	8.94	65.99	3,773.56	142.32	319.53	-142.55	0.00	0.00	0.00
3,900.00	8.94	65.99	3,872.35	148.65	333.73	-148.88	0.00	0.00	0.00
4,000.00	8.94	65.99	3,971.13	154.97	347.92	-155.21	0.00	0.00	0.00
4,100.00	8.94	65.99	4,069.92	161.29	362.12	-161.55	0.00	0.00	0.00
4,200.00	8.94	65.99	4,168.70	167.62	376.31	-167.88	0.00	0.00	0.00
4,300.00	8.94	65.99	4,267.49	173.94	390.51	-174.21	0.00	0.00	0.00
4,341.01	8.94	65.99	4,308.00	176.53	396.33	-176.81	0.00	0.00	0.00
Parkman									

Database:	Denver Sales	Local Co-ordinate Reference:	Well BUFFALO 14N-15HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4-4 PAD	North Reference:	True
Well:	BUFFALO 14N-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	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	8.94	65.99	4,366.28	180.26	404.71	-180.54	0.00	0.00	0.00
4,500.00	8.94	65.99	4,465.06	186.58	418.90	-186.88	0.00	0.00	0.00
4,600.00	8.94	65.99	4,563.85	192.91	433.10	-193.21	0.00	0.00	0.00
4,700.00	8.94	65.99	4,662.63	199.23	447.29	-199.54	0.00	0.00	0.00
4,800.00	8.94	65.99	4,761.42	205.55	461.49	-205.87	0.00	0.00	0.00
4,804.64	8.94	65.99	4,766.00	205.85	462.15	-206.17	0.00	0.00	0.00
Sussex									
4,900.00	8.94	65.99	4,860.20	211.88	475.68	-212.21	0.00	0.00	0.00
5,000.00	8.94	65.99	4,958.99	218.20	489.88	-218.54	0.00	0.00	0.00
5,100.00	8.94	65.99	5,057.77	224.52	504.07	-224.87	0.00	0.00	0.00
5,200.00	8.94	65.99	5,156.56	230.84	518.27	-231.21	0.00	0.00	0.00
5,300.00	8.94	65.99	5,255.34	237.17	532.46	-237.54	0.00	0.00	0.00
5,400.00	8.94	65.99	5,354.13	243.49	546.66	-243.87	0.00	0.00	0.00
5,500.00	8.94	65.99	5,452.91	249.81	560.86	-250.20	0.00	0.00	0.00
5,600.00	8.94	65.99	5,551.70	256.14	575.05	-256.54	0.00	0.00	0.00
5,700.00	8.94	65.99	5,650.48	262.46	589.25	-262.87	0.00	0.00	0.00
5,800.00	8.94	65.99	5,749.27	268.78	603.44	-269.20	0.00	0.00	0.00
5,900.00	8.94	65.99	5,848.05	275.10	617.64	-275.53	0.00	0.00	0.00
6,000.00	8.94	65.99	5,946.84	281.43	631.83	-281.87	0.00	0.00	0.00
6,100.00	8.94	65.99	6,045.62	287.75	646.03	-288.20	0.00	0.00	0.00
6,200.00	8.94	65.99	6,144.41	294.07	660.22	-294.53	0.00	0.00	0.00
6,300.00	8.94	65.99	6,243.19	300.39	674.42	-300.87	0.00	0.00	0.00
6,400.00	8.94	65.99	6,341.98	306.72	688.61	-307.20	0.00	0.00	0.00
6,500.00	8.94	65.99	6,440.76	313.04	702.81	-313.53	0.00	0.00	0.00
6,528.46	8.94	65.99	6,468.87	314.84	706.85	-315.33	0.00	0.00	0.00
Start Drop -2.00									
6,600.00	7.51	65.99	6,539.68	319.00	716.20	-319.50	2.00	-2.00	0.00
6,700.00	5.51	65.99	6,639.03	323.62	726.55	-324.12	2.00	-2.00	0.00
6,800.00	3.51	65.99	6,738.72	326.81	733.73	-327.33	2.00	-2.00	0.00
6,900.00	1.51	65.99	6,838.62	328.60	737.73	-329.11	2.00	-2.00	0.00
6,975.45	0.00	0.00	6,914.06	329.00	738.64	-329.52	2.00	-2.00	0.00
Start 233.98 hold at 6975.45 MD									
7,000.00	0.00	0.00	6,938.61	329.00	738.64	-329.52	0.00	0.00	0.00
7,100.00	0.00	0.00	7,038.61	329.00	738.64	-329.52	0.00	0.00	0.00
7,200.00	0.00	0.00	7,138.61	329.00	738.64	-329.52	0.00	0.00	0.00
7,209.43	0.00	0.00	7,148.04	329.00	738.64	-329.52	0.00	0.00	0.00
Start DLS 10.00 TFO 180.04									
7,300.00	9.06	180.04	7,238.23	321.86	738.63	-322.37	10.00	10.00	0.00
7,400.00	19.06	180.04	7,335.11	297.60	738.62	-298.12	10.00	10.00	0.00
7,500.00	29.06	180.04	7,426.31	256.89	738.58	-257.40	10.00	10.00	0.00
7,528.65	31.92	180.04	7,451.00	242.35	738.57	-242.87	10.00	10.00	0.00
Sharon Springs									
7,583.38	37.39	180.04	7,496.00	211.24	738.55	-211.76	10.00	10.00	0.00
Niobrara A									
7,600.00	39.06	180.04	7,509.05	200.96	738.54	-201.47	10.00	10.00	0.00
7,700.00	49.06	180.04	7,580.83	131.51	738.49	-132.02	10.00	10.00	0.00
7,772.95	56.35	180.04	7,625.00	73.52	738.44	-74.03	10.00	10.00	0.00
Niobrara B									
7,800.00	59.06	180.04	7,639.45	50.65	738.42	-51.17	10.00	10.00	0.00
7,900.00	69.06	180.04	7,683.15	-39.16	738.35	38.64	10.00	10.00	0.00
8,000.00	79.06	180.04	7,710.58	-135.19	738.28	134.67	10.00	10.00	0.00
8,100.00	89.06	180.04	7,720.92	-234.52	738.20	234.01	10.00	10.00	0.00
8,109.44	90.00	180.04	7,721.00	-243.96	738.19	243.45	9.99	9.99	0.00

Database:	Denver Sales	Local Co-ordinate Reference:	Well BUFFALO 14N-15HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4-4 PAD	North Reference:	True
Well:	BUFFALO 14N-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	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)
Start 4191.45 hold at 8109.44 MD - 7" (627 FNL 2146 FWL)									
8,200.00	90.00	180.04	7,721.00	-334.52	738.12	334.01	0.00	0.00	0.00
8,300.00	90.00	180.04	7,721.00	-434.52	738.04	434.01	0.00	0.00	0.00
8,400.00	90.00	180.04	7,721.00	-534.52	737.97	534.01	0.00	0.00	0.00
8,500.00	90.00	180.04	7,721.00	-634.52	737.89	634.01	0.00	0.00	0.00
8,600.00	90.00	180.04	7,721.00	-734.52	737.81	734.01	0.00	0.00	0.00
8,700.00	90.00	180.04	7,721.00	-834.52	737.73	834.01	0.00	0.00	0.00
8,800.00	90.00	180.04	7,721.00	-934.52	737.65	934.01	0.00	0.00	0.00
8,900.00	90.00	180.04	7,721.00	-1,034.52	737.57	1,034.01	0.00	0.00	0.00
9,000.00	90.00	180.04	7,721.00	-1,134.52	737.50	1,134.01	0.00	0.00	0.00
9,100.00	90.00	180.04	7,721.00	-1,234.52	737.42	1,234.01	0.00	0.00	0.00
9,200.00	90.00	180.04	7,721.00	-1,334.52	737.34	1,334.01	0.00	0.00	0.00
9,300.00	90.00	180.04	7,721.00	-1,434.52	737.26	1,434.01	0.00	0.00	0.00
9,400.00	90.00	180.04	7,721.00	-1,534.52	737.18	1,534.01	0.00	0.00	0.00
9,500.00	90.00	180.04	7,721.00	-1,634.52	737.11	1,634.01	0.00	0.00	0.00
9,600.00	90.00	180.04	7,721.00	-1,734.52	737.03	1,734.01	0.00	0.00	0.00
9,700.00	90.00	180.04	7,721.00	-1,834.52	736.95	1,834.01	0.00	0.00	0.00
9,800.00	90.00	180.04	7,721.00	-1,934.52	736.87	1,934.01	0.00	0.00	0.00
9,900.00	90.00	180.04	7,721.00	-2,034.52	736.79	2,034.01	0.00	0.00	0.00
10,000.00	90.00	180.04	7,721.00	-2,134.52	736.72	2,134.01	0.00	0.00	0.00
10,100.00	90.00	180.04	7,721.00	-2,234.52	736.64	2,234.01	0.00	0.00	0.00
10,200.00	90.00	180.04	7,721.00	-2,334.52	736.56	2,334.01	0.00	0.00	0.00
10,300.00	90.00	180.04	7,721.00	-2,434.52	736.48	2,434.01	0.00	0.00	0.00
10,400.00	90.00	180.04	7,721.00	-2,534.52	736.40	2,534.01	0.00	0.00	0.00
10,500.00	90.00	180.04	7,721.00	-2,634.52	736.32	2,634.01	0.00	0.00	0.00
10,600.00	90.00	180.04	7,721.00	-2,734.52	736.25	2,734.01	0.00	0.00	0.00
10,700.00	90.00	180.04	7,721.00	-2,834.52	736.17	2,834.01	0.00	0.00	0.00
10,800.00	90.00	180.04	7,721.00	-2,934.52	736.09	2,934.01	0.00	0.00	0.00
10,900.00	90.00	180.04	7,721.00	-3,034.52	736.01	3,034.01	0.00	0.00	0.00
11,000.00	90.00	180.04	7,721.00	-3,134.52	735.93	3,134.01	0.00	0.00	0.00
11,100.00	90.00	180.04	7,721.00	-3,234.52	735.86	3,234.01	0.00	0.00	0.00
11,200.00	90.00	180.04	7,721.00	-3,334.52	735.78	3,334.01	0.00	0.00	0.00
11,300.00	90.00	180.04	7,721.00	-3,434.52	735.70	3,434.01	0.00	0.00	0.00
11,400.00	90.00	180.04	7,721.00	-3,534.52	735.62	3,534.01	0.00	0.00	0.00
11,500.00	90.00	180.04	7,721.00	-3,634.52	735.54	3,634.01	0.00	0.00	0.00
11,600.00	90.00	180.04	7,721.00	-3,734.52	735.47	3,734.01	0.00	0.00	0.00
11,700.00	90.00	180.04	7,721.00	-3,834.52	735.39	3,834.01	0.00	0.00	0.00
11,800.00	90.00	180.04	7,721.00	-3,934.52	735.31	3,934.01	0.00	0.00	0.00
11,900.00	90.00	180.04	7,721.00	-4,034.52	735.23	4,034.01	0.00	0.00	0.00
12,000.00	90.00	180.04	7,721.00	-4,134.52	735.15	4,134.01	0.00	0.00	0.00
12,100.00	90.00	180.04	7,721.00	-4,234.52	735.07	4,234.01	0.00	0.00	0.00
12,200.00	90.00	180.04	7,721.00	-4,334.52	735.00	4,334.01	0.00	0.00	0.00
12,300.00	90.00	180.04	7,721.00	-4,434.52	734.92	4,434.01	0.00	0.00	0.00
12,300.89	90.00	180.04	7,721.00	-4,435.41	734.92	4,434.90	0.00	0.00	0.00
TD at 12300.89 - PBHL_BUFFALO 14N-15HZ (460 FSL 2160 FWL)									

Database:	Denver Sales	Local Co-ordinate Reference:	Well BUFFALO 14N-15HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5129 & KB 21 @ 5150.00ft (UNIT 403)
Site:	BUFFALO & BADGER 4-4 PAD	North Reference:	True
Well:	BUFFALO 14N-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	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 14N-1	0.00	0.00	7,721.00	-4,435.41	734.92	1,259,715.54	3,142,370.77	40.0451870	-104.9914720
- 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	
8,109.44	7,721.00	7" (627 FNL 2146 FWL)	7.000	7.500	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
966.00	962.00	Base Fox Hills				
4,341.01	4,304.00	Parkman				
4,804.64	4,762.00	Sussex				
7,528.65	7,447.00	Sharon Springs				
7,583.38	7,492.00	Niobrara A				
7,772.95	7,621.00	Niobrara B				

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	
1,773.00	1,771.19	14.16	31.79	Start 4755.46 hold at 1773.00 MD	
6,528.46	6,468.87	314.84	706.85	Start Drop -2.00	
6,975.45	6,914.06	329.00	738.64	Start 233.98 hold at 6975.45 MD	
7,209.43	7,148.04	329.00	738.64	Start DLS 10.00 TFO 180.04	
8,109.44	7,721.00	-243.96	738.19	Start 4191.45 hold at 8109.44 MD	
12,300.89	7,721.00	-4,435.41	734.92	TD at 12300.89	