

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

2N-67W-21 COWBOY 24-21HZ PAD

COWBOY 21-8HZ

Plan A

Plan: Permit Rev-1

SHL Lat/Long: 40.124674/-104.889146

Survey Program: MWD+IFR+MSA

Standard Planning Report

08 December, 2017

Project: WELD-NAD83-UTMFT13N
Site: 2N-67W-21 COWBOY 24-21HZ PAD
Well: COWBOY 21-8HZ
Wellbore: Plan A
Design: Permit Rev-1

US ROCKIES WATTENBERG PLANNING

CASING DETAILS

TVD	MD	Size
1500.00	1523.23	9-5/8
7449.00	7980.03	5-1/2

WELL DETAILS: COWBOY 21-8HZ

GL = 5041'

RKB = 17' @ 5058.00usft (Drilling Rig)

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	1450.00	18.00	144.00	1430.36	-151.25	109.89	1.50	144.00	-150.48	
4	4150.00	18.00	144.00	3998.21	-826.25	600.30	0.00	0.00	-822.03	
5	5050.00	0.00	0.00	4883.48	-939.68	682.72	2.00	-180.00	-934.89	
6	6978.90	0.00	0.00	6812.38	-939.68	682.72	0.00	0.00	-934.89	
7	7980.03	90.10	0.40	7449.00	-301.94	687.19	9.00	0.40	-297.14	
8	21443.33	90.10	0.40	7425.00	13161.00	781.51	0.00	0.00	13166.13	COWBOY 21-8HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
COWBOY 21-8HZ_SHL	0.00	0.00	0.00	40.124674	-104.889146
COWBOY 21-8HZ_BHL	7425.00	13161.00	781.51	40.160816	-104.886349

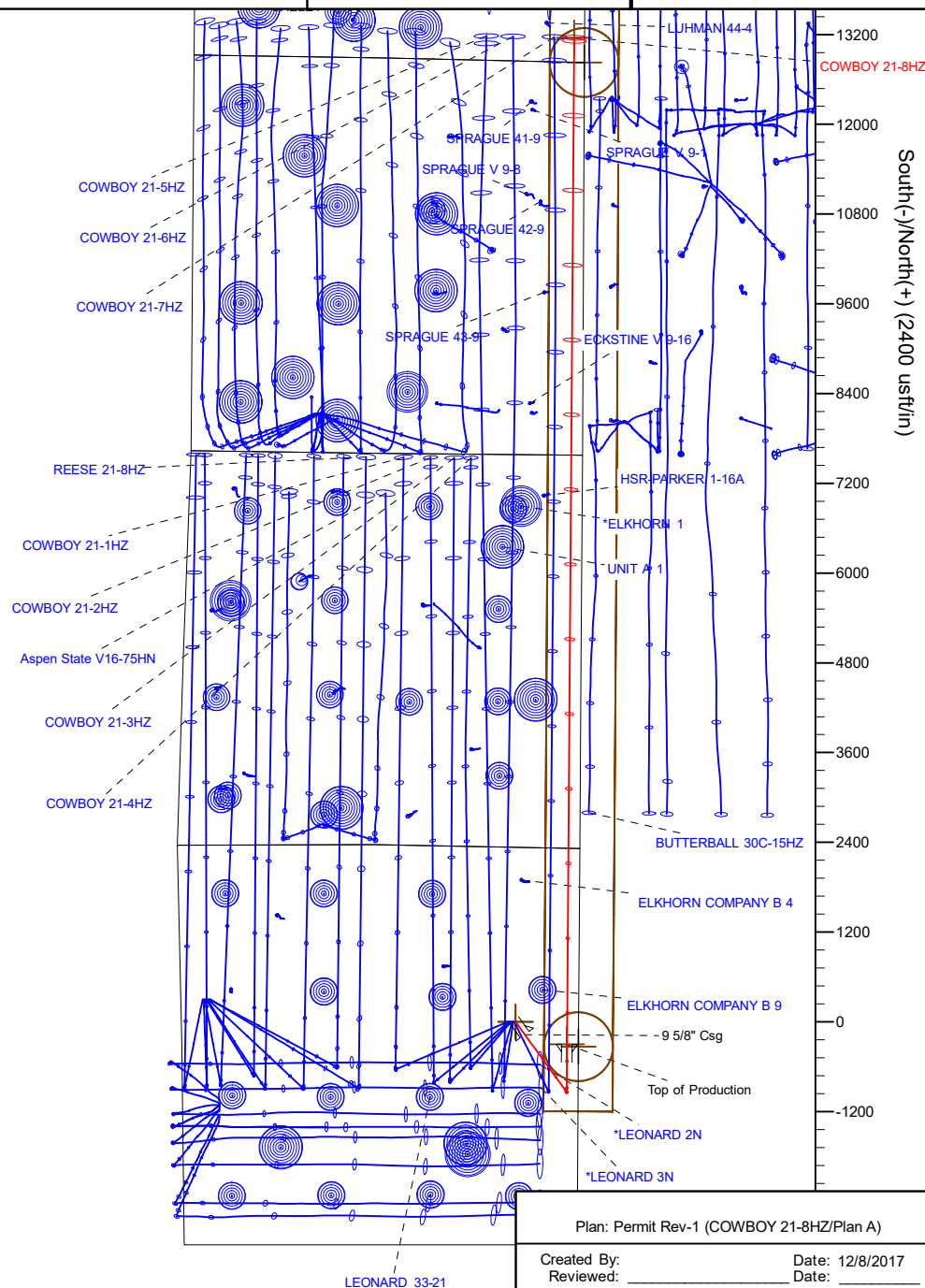
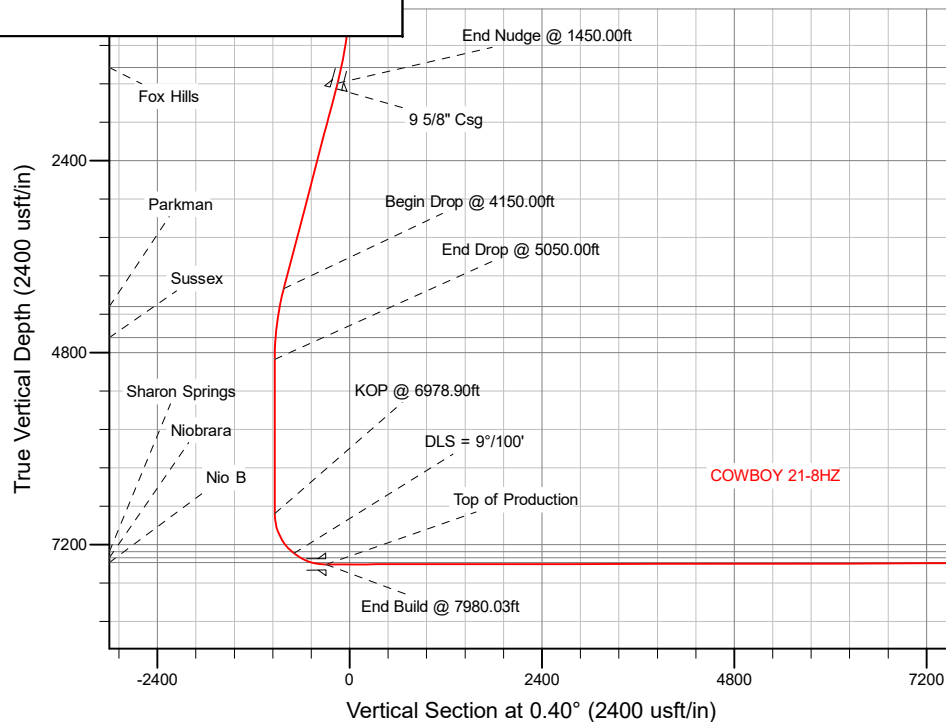
FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
1232.00	1243.15	Fox Hills
4224.00	4384.55	Parkman
4609.00	4775.10	Sussex
7288.00	7516.01	Sharon Springs
7365.00	7648.16	Niobrara
7426.00	7807.26	Nio B

SHL
2334' FNL
841' FEL

HEEL
2620' FNL
158' FEL

TOE
330' FSL
138' FEL



Plan: Permit Rev-1 (COWBOY 21-8HZ/Plan A)

Created By: _____ Date: 12/8/2017
Reviewed: _____ Date: _____

Project	WELD-NAD83-UTMFT13N		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 13N (108 W to 102 W)		

Site	2N-67W-21 COWBOY 24-21HZ PAD		
Site Position:		Northing:	14,572,152.72 usft
From:	Lat/Long	Easting:	1,671,300.07 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	40.124676
		Longitude:	-104.889521
		Grid Convergence:	0.07 °

Well	COWBOY 21-8HZ		
Well Position	+N/-S	-0.73 usft	Northing:
	+E/-W	104.83 usft	Easting:
Position Uncertainty	3.28 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:
			5,041.00 usft

Wellbore	Plan A				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/30/2017	8.04	66.58	52,292.77413650

Design	Permit Rev-1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	0.40

Plan Survey Tool Program	Date	12/7/2017		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	1,500.00	Permit Rev-1 (Plan A)	APC_ISCWSA REV 2 MWD+II
				Fixed:v2:crustal field declination
2	1,500.00	21,443.33	Permit Rev-1 (Plan A)	APC_ISCWSA REV 2 MWD+II
				Fixed:v2:Rockies, crustal dec +

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	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	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,450.00	18.00	144.00	1,430.36	-151.25	109.89	1.50	1.50	0.00	144.00	
4,150.00	18.00	144.00	3,998.21	-826.25	600.30	0.00	0.00	0.00	0.00	
5,050.00	0.00	0.00	4,883.48	-939.68	682.72	2.00	-2.00	-16.00	-180.00	
6,978.90	0.00	0.00	6,812.38	-939.68	682.72	0.00	0.00	0.00	0.00	
7,980.03	90.10	0.40	7,449.00	-301.94	687.19	9.00	9.00	0.04	0.40	
21,443.33	90.10	0.40	7,425.00	13,161.00	781.51	0.00	0.00	0.00	0.00	COWBOY 21-8HZ_BI

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	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	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
Begin Nudge @ 250.00ft										
300.00	0.75	144.00	300.00	-0.26	0.19	-0.26	1.50	1.50	0.00	
400.00	2.25	144.00	399.96	-2.38	1.73	-2.37	1.50	1.50	0.00	
500.00	3.75	144.00	499.82	-6.62	4.81	-6.58	1.50	1.50	0.00	
600.00	5.25	144.00	599.51	-12.96	9.42	-12.90	1.50	1.50	0.00	
700.00	6.75	144.00	698.96	-21.42	15.56	-21.31	1.50	1.50	0.00	
800.00	8.25	144.00	798.10	-31.98	23.23	-31.82	1.50	1.50	0.00	
900.00	9.75	144.00	896.87	-44.63	32.43	-44.41	1.50	1.50	0.00	
1,000.00	11.25	144.00	995.19	-59.38	43.14	-59.08	1.50	1.50	0.00	
1,100.00	12.75	144.00	1,093.00	-76.20	55.36	-75.81	1.50	1.50	0.00	
1,200.00	14.25	144.00	1,190.24	-95.08	69.08	-94.60	1.50	1.50	0.00	
1,243.15	14.90	144.00	1,232.00	-103.87	75.46	-103.34	1.50	1.50	0.00	
Fox Hills										
1,300.00	15.75	144.00	1,286.83	-116.02	84.29	-115.43	1.50	1.50	0.00	
1,400.00	17.25	144.00	1,382.71	-139.00	100.99	-138.29	1.50	1.50	0.00	
1,450.00	18.00	144.00	1,430.36	-151.25	109.89	-150.48	1.50	1.50	0.00	
End Nudge @ 1450.00ft										
1,500.00	18.00	144.00	1,477.91	-163.75	118.97	-162.91	0.00	0.00	0.00	
1,523.23	18.00	144.00	1,500.00	-169.55	123.19	-168.69	0.00	0.00	0.00	
9 5/8" Csg										
1,600.00	18.00	144.00	1,573.02	-188.75	137.13	-187.78	0.00	0.00	0.00	
1,700.00	18.00	144.00	1,668.12	-213.75	155.30	-212.66	0.00	0.00	0.00	
1,800.00	18.00	144.00	1,763.23	-238.75	173.46	-237.53	0.00	0.00	0.00	
1,900.00	18.00	144.00	1,858.33	-263.75	191.62	-262.40	0.00	0.00	0.00	
2,000.00	18.00	144.00	1,953.44	-288.75	209.79	-287.27	0.00	0.00	0.00	
2,100.00	18.00	144.00	2,048.54	-313.75	227.95	-312.15	0.00	0.00	0.00	
2,200.00	18.00	144.00	2,143.65	-338.75	246.11	-337.02	0.00	0.00	0.00	
2,300.00	18.00	144.00	2,238.76	-363.75	264.28	-361.89	0.00	0.00	0.00	
2,400.00	18.00	144.00	2,333.86	-388.75	282.44	-386.76	0.00	0.00	0.00	
2,500.00	18.00	144.00	2,428.97	-413.75	300.60	-411.64	0.00	0.00	0.00	
2,600.00	18.00	144.00	2,524.07	-438.75	318.77	-436.51	0.00	0.00	0.00	
2,700.00	18.00	144.00	2,619.18	-463.75	336.93	-461.38	0.00	0.00	0.00	
2,800.00	18.00	144.00	2,714.28	-488.75	355.09	-486.26	0.00	0.00	0.00	
2,900.00	18.00	144.00	2,809.39	-513.75	373.26	-511.13	0.00	0.00	0.00	
3,000.00	18.00	144.00	2,904.50	-538.75	391.42	-536.00	0.00	0.00	0.00	
3,100.00	18.00	144.00	2,999.60	-563.75	409.59	-560.87	0.00	0.00	0.00	
3,200.00	18.00	144.00	3,094.71	-588.75	427.75	-585.75	0.00	0.00	0.00	
3,300.00	18.00	144.00	3,189.81	-613.75	445.91	-610.62	0.00	0.00	0.00	
3,400.00	18.00	144.00	3,284.92	-638.75	464.08	-635.49	0.00	0.00	0.00	
3,500.00	18.00	144.00	3,380.02	-663.75	482.24	-660.36	0.00	0.00	0.00	
3,600.00	18.00	144.00	3,475.13	-688.75	500.40	-685.24	0.00	0.00	0.00	
3,700.00	18.00	144.00	3,570.24	-713.75	518.57	-710.11	0.00	0.00	0.00	
3,800.00	18.00	144.00	3,665.34	-738.75	536.73	-734.98	0.00	0.00	0.00	
3,900.00	18.00	144.00	3,760.45	-763.75	554.89	-759.85	0.00	0.00	0.00	
4,000.00	18.00	144.00	3,855.55	-788.75	573.06	-784.73	0.00	0.00	0.00	
4,100.00	18.00	144.00	3,950.66	-813.75	591.22	-809.60	0.00	0.00	0.00	
4,150.00	18.00	144.00	3,998.21	-826.25	600.30	-822.04	0.00	0.00	0.00	
Begin Drop @ 4150.00ft										
4,200.00	17.00	144.00	4,045.90	-838.41	609.14	-834.14	2.00	-2.00	0.00	
4,300.00	15.00	144.00	4,142.02	-860.71	625.34	-856.32	2.00	-2.00	0.00	
4,384.55	13.31	144.00	4,224.00	-877.43	637.49	-872.96	2.00	-2.00	0.00	
Parkman										
4,400.00	13.00	144.00	4,239.04	-880.28	639.56	-875.79	2.00	-2.00	0.00	
4,500.00	11.00	144.00	4,336.85	-897.10	651.78	-892.53	2.00	-2.00	0.00	
4,600.00	9.00	144.00	4,435.33	-911.15	661.99	-906.50	2.00	-2.00	0.00	
4,700.00	7.00	144.00	4,534.35	-922.41	670.17	-917.70	2.00	-2.00	0.00	
4,775.10	5.50	144.00	4,609.00	-929.02	674.97	-924.28	2.00	-2.00	0.00	
Sussex										
4,800.00	5.00	144.00	4,633.80	-930.86	676.31	-926.12	2.00	-2.00	0.00	
4,900.00	3.00	144.00	4,733.55	-936.50	680.41	-931.73	2.00	-2.00	0.00	
5,000.00	1.00	144.00	4,833.48	-939.33	682.46	-934.54	2.00	-2.00	0.00	
5,050.00	0.00	0.00	4,883.48	-939.68	682.72	-934.89	2.00	-2.00	-288.00	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
End Drop @ 5050.00ft									
5,100.00	0.00	0.00	4,933.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,200.00	0.00	0.00	5,033.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,300.00	0.00	0.00	5,133.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,400.00	0.00	0.00	5,233.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,500.00	0.00	0.00	5,333.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,600.00	0.00	0.00	5,433.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,700.00	0.00	0.00	5,533.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,800.00	0.00	0.00	5,633.48	-939.68	682.72	-934.89	0.00	0.00	0.00
5,900.00	0.00	0.00	5,733.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,000.00	0.00	0.00	5,833.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,100.00	0.00	0.00	5,933.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,200.00	0.00	0.00	6,033.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,300.00	0.00	0.00	6,133.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,400.00	0.00	0.00	6,233.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,500.00	0.00	0.00	6,333.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,600.00	0.00	0.00	6,433.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,700.00	0.00	0.00	6,533.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,800.00	0.00	0.00	6,633.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,900.00	0.00	0.00	6,733.48	-939.68	682.72	-934.89	0.00	0.00	0.00
6,978.90	0.00	0.00	6,812.38	-939.68	682.72	-934.89	0.00	0.00	0.00
KOP @ 6978.90ft									
7,000.00	1.90	0.40	6,833.48	-939.33	682.72	-934.54	9.00	9.00	1.90
7,100.00	10.90	0.40	6,932.75	-928.20	682.80	-923.41	9.00	9.00	0.00
7,200.00	19.90	0.40	7,029.06	-901.67	682.98	-896.88	9.00	9.00	0.00
7,300.00	28.90	0.40	7,120.04	-860.41	683.27	-855.61	9.00	9.00	0.00
7,400.00	37.90	0.40	7,203.44	-805.42	683.66	-800.62	9.00	9.00	0.00
7,500.00	46.90	0.40	7,277.21	-738.06	684.13	-733.27	9.00	9.00	0.00
7,516.01	48.34	0.40	7,288.00	-726.23	684.21	-721.44	9.00	9.00	0.00
Sharon Springs									
7,550.00	51.40	0.40	7,309.90	-700.25	684.40	-695.45	9.00	9.00	0.00
DLS = 9°/100'									
7,600.00	55.90	0.40	7,339.53	-659.99	684.68	-655.19	9.00	9.00	0.00
7,648.16	60.23	0.40	7,365.00	-619.13	684.96	-614.33	9.00	9.00	0.00
Niobrara									
7,700.00	64.90	0.40	7,388.88	-573.13	685.29	-568.34	9.00	9.00	0.00
7,800.00	73.90	0.40	7,424.03	-479.63	685.94	-474.83	9.00	9.00	0.00
7,807.26	74.55	0.40	7,426.00	-472.64	685.99	-467.84	9.00	9.00	0.00
Nio B									
7,900.00	82.90	0.40	7,444.12	-381.77	686.63	-376.97	9.00	9.00	0.00
7,980.03	90.10	0.40	7,449.00	-301.95	687.19	-297.14	9.00	9.00	0.00
End Build @ 7980.03ft - Top of Production									
8,000.00	90.10	0.40	7,448.96	-281.98	687.33	-277.17	0.00	0.00	0.00
8,100.00	90.10	0.40	7,448.78	-181.98	688.03	-177.17	0.00	0.00	0.00
8,200.00	90.10	0.40	7,448.61	-81.98	688.73	-77.17	0.00	0.00	0.00
8,300.00	90.10	0.40	7,448.43	18.02	689.43	22.83	0.00	0.00	0.00
8,400.00	90.10	0.40	7,448.25	118.01	690.13	122.83	0.00	0.00	0.00
8,500.00	90.10	0.40	7,448.07	218.01	690.83	222.83	0.00	0.00	0.00
8,600.00	90.10	0.40	7,447.89	318.01	691.53	322.83	0.00	0.00	0.00
8,700.00	90.10	0.40	7,447.71	418.00	692.23	422.83	0.00	0.00	0.00
8,800.00	90.10	0.40	7,447.54	518.00	692.93	522.83	0.00	0.00	0.00
8,900.00	90.10	0.40	7,447.36	618.00	693.63	622.83	0.00	0.00	0.00
9,000.00	90.10	0.40	7,447.18	718.00	694.33	722.83	0.00	0.00	0.00
9,100.00	90.10	0.40	7,447.00	817.99	695.03	822.83	0.00	0.00	0.00
9,200.00	90.10	0.40	7,446.82	917.99	695.73	922.83	0.00	0.00	0.00
9,300.00	90.10	0.40	7,446.65	1,017.99	696.43	1,022.83	0.00	0.00	0.00
9,400.00	90.10	0.40	7,446.47	1,117.99	697.13	1,122.83	0.00	0.00	0.00
9,500.00	90.10	0.40	7,446.29	1,217.98	697.83	1,222.83	0.00	0.00	0.00
9,600.00	90.10	0.40	7,446.11	1,317.98	698.54	1,322.83	0.00	0.00	0.00
9,700.00	90.10	0.40	7,445.93	1,417.98	699.24	1,422.83	0.00	0.00	0.00
9,800.00	90.10	0.40	7,445.75	1,517.98	699.94	1,522.83	0.00	0.00	0.00
9,900.00	90.10	0.40	7,445.58	1,617.97	700.64	1,622.83	0.00	0.00	0.00
10,000.00	90.10	0.40	7,445.40	1,717.97	701.34	1,722.83	0.00	0.00	0.00
10,100.00	90.10	0.40	7,445.22	1,817.97	702.04	1,822.83	0.00	0.00	0.00
10,200.00	90.10	0.40	7,445.04	1,917.97	702.74	1,922.82	0.00	0.00	0.00

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,300.00	90.10	0.40	7,444.86	2,017.96	703.44	2,022.82	0.00	0.00	0.00	
10,400.00	90.10	0.40	7,444.68	2,117.96	704.14	2,122.82	0.00	0.00	0.00	
10,500.00	90.10	0.40	7,444.51	2,217.96	704.84	2,222.82	0.00	0.00	0.00	
10,600.00	90.10	0.40	7,444.33	2,317.96	705.54	2,322.82	0.00	0.00	0.00	
10,700.00	90.10	0.40	7,444.15	2,417.95	706.24	2,422.82	0.00	0.00	0.00	
10,800.00	90.10	0.40	7,443.97	2,517.95	706.94	2,522.82	0.00	0.00	0.00	
10,900.00	90.10	0.40	7,443.79	2,617.95	707.64	2,622.82	0.00	0.00	0.00	
11,000.00	90.10	0.40	7,443.61	2,717.94	708.34	2,722.82	0.00	0.00	0.00	
11,100.00	90.10	0.40	7,443.44	2,817.94	709.04	2,822.82	0.00	0.00	0.00	
11,200.00	90.10	0.40	7,443.26	2,917.94	709.75	2,922.82	0.00	0.00	0.00	
11,300.00	90.10	0.40	7,443.08	3,017.94	710.45	3,022.82	0.00	0.00	0.00	
11,400.00	90.10	0.40	7,442.90	3,117.93	711.15	3,122.82	0.00	0.00	0.00	
11,500.00	90.10	0.40	7,442.72	3,217.93	711.85	3,222.82	0.00	0.00	0.00	
11,600.00	90.10	0.40	7,442.55	3,317.93	712.55	3,322.82	0.00	0.00	0.00	
11,700.00	90.10	0.40	7,442.37	3,417.93	713.25	3,422.82	0.00	0.00	0.00	
11,800.00	90.10	0.40	7,442.19	3,517.92	713.95	3,522.82	0.00	0.00	0.00	
11,900.00	90.10	0.40	7,442.01	3,617.92	714.65	3,622.82	0.00	0.00	0.00	
12,000.00	90.10	0.40	7,441.83	3,717.92	715.35	3,722.82	0.00	0.00	0.00	
12,100.00	90.10	0.40	7,441.65	3,817.92	716.05	3,822.82	0.00	0.00	0.00	
12,200.00	90.10	0.40	7,441.48	3,917.91	716.75	3,922.82	0.00	0.00	0.00	
12,300.00	90.10	0.40	7,441.30	4,017.91	717.45	4,022.82	0.00	0.00	0.00	
12,400.00	90.10	0.40	7,441.12	4,117.91	718.15	4,122.82	0.00	0.00	0.00	
12,500.00	90.10	0.40	7,440.94	4,217.91	718.85	4,222.82	0.00	0.00	0.00	
12,600.00	90.10	0.40	7,440.76	4,317.90	719.55	4,322.82	0.00	0.00	0.00	
12,700.00	90.10	0.40	7,440.58	4,417.90	720.25	4,422.82	0.00	0.00	0.00	
12,800.00	90.10	0.40	7,440.41	4,517.90	720.95	4,522.82	0.00	0.00	0.00	
12,900.00	90.10	0.40	7,440.23	4,617.90	721.66	4,622.82	0.00	0.00	0.00	
13,000.00	90.10	0.40	7,440.05	4,717.89	722.36	4,722.82	0.00	0.00	0.00	
13,100.00	90.10	0.40	7,439.87	4,817.89	723.06	4,822.82	0.00	0.00	0.00	
13,200.00	90.10	0.40	7,439.69	4,917.89	723.76	4,922.82	0.00	0.00	0.00	
13,300.00	90.10	0.40	7,439.52	5,017.88	724.46	5,022.82	0.00	0.00	0.00	
13,400.00	90.10	0.40	7,439.34	5,117.88	725.16	5,122.82	0.00	0.00	0.00	
13,500.00	90.10	0.40	7,439.16	5,217.88	725.86	5,222.82	0.00	0.00	0.00	
13,600.00	90.10	0.40	7,438.98	5,317.88	726.56	5,322.82	0.00	0.00	0.00	
13,700.00	90.10	0.40	7,438.80	5,417.87	727.26	5,422.82	0.00	0.00	0.00	
13,800.00	90.10	0.40	7,438.62	5,517.87	727.96	5,522.82	0.00	0.00	0.00	
13,900.00	90.10	0.40	7,438.45	5,617.87	728.66	5,622.82	0.00	0.00	0.00	
14,000.00	90.10	0.40	7,438.27	5,717.87	729.36	5,722.82	0.00	0.00	0.00	
14,100.00	90.10	0.40	7,438.09	5,817.86	730.06	5,822.82	0.00	0.00	0.00	
14,200.00	90.10	0.40	7,437.91	5,917.86	730.76	5,922.82	0.00	0.00	0.00	
14,300.00	90.10	0.40	7,437.73	6,017.86	731.46	6,022.82	0.00	0.00	0.00	
14,400.00	90.10	0.40	7,437.55	6,117.86	732.16	6,122.82	0.00	0.00	0.00	
14,500.00	90.10	0.40	7,437.38	6,217.85	732.86	6,222.82	0.00	0.00	0.00	
14,600.00	90.10	0.40	7,437.20	6,317.85	733.57	6,322.82	0.00	0.00	0.00	
14,700.00	90.10	0.40	7,437.02	6,417.85	734.27	6,422.82	0.00	0.00	0.00	
14,800.00	90.10	0.40	7,436.84	6,517.85	734.97	6,522.82	0.00	0.00	0.00	
14,900.00	90.10	0.40	7,436.66	6,617.84	735.67	6,622.82	0.00	0.00	0.00	
15,000.00	90.10	0.40	7,436.49	6,717.84	736.37	6,722.82	0.00	0.00	0.00	
15,100.00	90.10	0.40	7,436.31	6,817.84	737.07	6,822.82	0.00	0.00	0.00	
15,200.00	90.10	0.40	7,436.13	6,917.84	737.77	6,922.82	0.00	0.00	0.00	
15,300.00	90.10	0.40	7,435.95	7,017.83	738.47	7,022.82	0.00	0.00	0.00	
15,400.00	90.10	0.40	7,435.77	7,117.83	739.17	7,122.82	0.00	0.00	0.00	
15,500.00	90.10	0.40	7,435.59	7,217.83	739.87	7,222.82	0.00	0.00	0.00	
15,600.00	90.10	0.40	7,435.42	7,317.82	740.57	7,322.82	0.00	0.00	0.00	
15,700.00	90.10	0.40	7,435.24	7,417.82	741.27	7,422.82	0.00	0.00	0.00	
15,800.00	90.10	0.40	7,435.06	7,517.82	741.97	7,522.82	0.00	0.00	0.00	
15,900.00	90.10	0.40	7,434.88	7,617.82	742.67	7,622.82	0.00	0.00	0.00	
16,000.00	90.10	0.40	7,434.70	7,717.81	743.37	7,722.82	0.00	0.00	0.00	
16,100.00	90.10	0.40	7,434.52	7,817.81	744.07	7,822.82	0.00	0.00	0.00	
16,200.00	90.10	0.40	7,434.35	7,917.81	744.78	7,922.82	0.00	0.00	0.00	
16,300.00	90.10	0.40	7,434.17	8,017.81	745.48	8,022.82	0.00	0.00	0.00	
16,400.00	90.10	0.40	7,433.99	8,117.80	746.18	8,122.82	0.00	0.00	0.00	
16,500.00	90.10	0.40	7,433.81	8,217.80	746.88	8,222.82	0.00	0.00	0.00	
16,600.00	90.10	0.40	7,433.63	8,317.80	747.58	8,322.81	0.00	0.00	0.00	
16,700.00	90.10	0.40	7,433.45	8,417.80	748.28	8,422.81	0.00	0.00	0.00	
16,800.00	90.10	0.40	7,433.28	8,517.79	748.98	8,522.81	0.00	0.00	0.00	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,900.00	90.10	0.40	7,433.10	8,617.79	749.68	8,622.81	0.00	0.00	0.00
17,000.00	90.10	0.40	7,432.92	8,717.79	750.38	8,722.81	0.00	0.00	0.00
17,100.00	90.10	0.40	7,432.74	8,817.79	751.08	8,822.81	0.00	0.00	0.00
17,200.00	90.10	0.40	7,432.56	8,917.78	751.78	8,922.81	0.00	0.00	0.00
17,300.00	90.10	0.40	7,432.39	9,017.78	752.48	9,022.81	0.00	0.00	0.00
17,400.00	90.10	0.40	7,432.21	9,117.78	753.18	9,122.81	0.00	0.00	0.00
17,500.00	90.10	0.40	7,432.03	9,217.78	753.88	9,222.81	0.00	0.00	0.00
17,600.00	90.10	0.40	7,431.85	9,317.77	754.58	9,322.81	0.00	0.00	0.00
17,700.00	90.10	0.40	7,431.67	9,417.77	755.28	9,422.81	0.00	0.00	0.00
17,800.00	90.10	0.40	7,431.49	9,517.77	755.98	9,522.81	0.00	0.00	0.00
17,900.00	90.10	0.40	7,431.32	9,617.76	756.69	9,622.81	0.00	0.00	0.00
18,000.00	90.10	0.40	7,431.14	9,717.76	757.39	9,722.81	0.00	0.00	0.00
18,100.00	90.10	0.40	7,430.96	9,817.76	758.09	9,822.81	0.00	0.00	0.00
18,200.00	90.10	0.40	7,430.78	9,917.76	758.79	9,922.81	0.00	0.00	0.00
18,300.00	90.10	0.40	7,430.60	10,017.75	759.49	10,022.81	0.00	0.00	0.00
18,400.00	90.10	0.40	7,430.42	10,117.75	760.19	10,122.81	0.00	0.00	0.00
18,500.00	90.10	0.40	7,430.25	10,217.75	760.89	10,222.81	0.00	0.00	0.00
18,600.00	90.10	0.40	7,430.07	10,317.75	761.59	10,322.81	0.00	0.00	0.00
18,700.00	90.10	0.40	7,429.89	10,417.74	762.29	10,422.81	0.00	0.00	0.00
18,800.00	90.10	0.40	7,429.71	10,517.74	762.99	10,522.81	0.00	0.00	0.00
18,900.00	90.10	0.40	7,429.53	10,617.74	763.69	10,622.81	0.00	0.00	0.00
19,000.00	90.10	0.40	7,429.36	10,717.74	764.39	10,722.81	0.00	0.00	0.00
19,100.00	90.10	0.40	7,429.18	10,817.73	765.09	10,822.81	0.00	0.00	0.00
19,200.00	90.10	0.40	7,429.00	10,917.73	765.79	10,922.81	0.00	0.00	0.00
19,300.00	90.10	0.40	7,428.82	11,017.73	766.49	11,022.81	0.00	0.00	0.00
19,400.00	90.10	0.40	7,428.64	11,117.73	767.19	11,122.81	0.00	0.00	0.00
19,500.00	90.10	0.40	7,428.46	11,217.72	767.90	11,222.81	0.00	0.00	0.00
19,600.00	90.10	0.40	7,428.29	11,317.72	768.60	11,322.81	0.00	0.00	0.00
19,700.00	90.10	0.40	7,428.11	11,417.72	769.30	11,422.81	0.00	0.00	0.00
19,800.00	90.10	0.40	7,427.93	11,517.72	770.00	11,522.81	0.00	0.00	0.00
19,900.00	90.10	0.40	7,427.75	11,617.71	770.70	11,622.81	0.00	0.00	0.00
20,000.00	90.10	0.40	7,427.57	11,717.71	771.40	11,722.81	0.00	0.00	0.00
20,100.00	90.10	0.40	7,427.39	11,817.71	772.10	11,822.81	0.00	0.00	0.00
20,200.00	90.10	0.40	7,427.22	11,917.70	772.80	11,922.81	0.00	0.00	0.00
20,300.00	90.10	0.40	7,427.04	12,017.70	773.50	12,022.81	0.00	0.00	0.00
20,400.00	90.10	0.40	7,426.86	12,117.70	774.20	12,122.81	0.00	0.00	0.00
20,500.00	90.10	0.40	7,426.68	12,217.70	774.90	12,222.81	0.00	0.00	0.00
20,600.00	90.10	0.40	7,426.50	12,317.69	775.60	12,322.81	0.00	0.00	0.00
20,700.00	90.10	0.40	7,426.33	12,417.69	776.30	12,422.81	0.00	0.00	0.00
20,800.00	90.10	0.40	7,426.15	12,517.69	777.00	12,522.81	0.00	0.00	0.00
20,900.00	90.10	0.40	7,425.97	12,617.69	777.70	12,622.81	0.00	0.00	0.00
21,000.00	90.10	0.40	7,425.79	12,717.68	778.40	12,722.81	0.00	0.00	0.00
21,100.00	90.10	0.40	7,425.61	12,817.68	779.10	12,822.81	0.00	0.00	0.00
21,200.00	90.10	0.40	7,425.43	12,917.68	779.81	12,922.81	0.00	0.00	0.00
21,300.00	90.10	0.40	7,425.26	13,017.68	780.51	13,022.81	0.00	0.00	0.00
21,400.00	90.10	0.40	7,425.08	13,117.67	781.21	13,122.81	0.00	0.00	0.00
21,443.33	90.10	0.40	7,425.00	13,161.00	781.51	13,166.13	0.00	0.00	0.00
TD Well @ 21443.33ft									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,523.23	1,500.00	9 5/8" Csg	9-5/8	13-1/2	
7,980.03	7,449.00	Top of Production	5-1/2	7-7/8	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,243.15	1,232.00	Fox Hills				
4,384.55	4,224.00	Parkman				
4,775.10	4,609.00	Sussex				
7,516.01	7,288.00	Sharon Springs				
7,648.16	7,365.00	Niobrara				
7,807.26	7,426.00	Nio B				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft	
1,450.00	1,430.36	-151.25	109.89	End Nudge @ 1450.00ft	
4,150.00	3,998.21	-826.25	600.30	Begin Drop @ 4150.00ft	
5,050.00	4,883.48	-939.68	682.72	End Drop @ 5050.00ft	
6,978.90	6,812.38	-939.68	682.72	KOP @ 6978.90ft	
7,550.00	7,309.90	-700.25	684.40	DLS = 9°/100'	
7,980.03	7,449.00	-301.95	687.19	End Build @ 7980.03ft	
21,443.33	7,425.00	13,161.00	781.51	TD Well @ 21443.33ft	