

# **US ROCKIES WATTENBERG PLANNING**

**WELD-NAD83-UTMFT13N**

**3N-66W-19 HARRIS FEDERAL 20-19HZ PAD**

**HARRIS FEDERAL 19-5HZ**

## **Plan A**

### **Plan: Permit Rev-2**

SHL Lat/Long: 40.207843/-104.813492

Survey Program: MWD+IFR+MSA

## **Standard Planning Report**

**01 January, 2019**

Project: WELD-NAD83-UTMFT13N  
Site: 3N-66W-19 HARRIS FEDERAL 20-19HZ PAD  
Well: HARRIS FEDERAL 19-5HZ  
Wellbore: Plan A  
Design: Permit Rev-2

## US ROCKIES WATTENBERG PLANNING

### CASING DETAILS

TVD	MD	Size
1500.00	1523.46	9-5/8
7268.00	8090.42	5-1/2

WELL DETAILS: HARRIS FEDERAL 19-5HZ

GL = 4884.00

RKB = 17' @ 4901.00usft (Drilling Rig)

### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	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	1651.33	21.02	312.04	1620.11	170.21	-188.78	1.50	312.04	195.60	
4	7162.53	21.02	312.04	6764.57	1494.00	-1656.92	0.00	0.00	1716.79	
5	8090.42	90.26	272.35	7268.00	1646.36	-2342.80	8.00	-41.58	2408.34	
6	17760.18	90.26	272.35	7224.00	2042.17	-12004.36	0.00	0.00	12078.00	HARRIS FEDERAL 19-5HZ_BHL

SHL  
1781' FSL  
795' FEL

HEEL  
1807' FNL  
2232' FWL

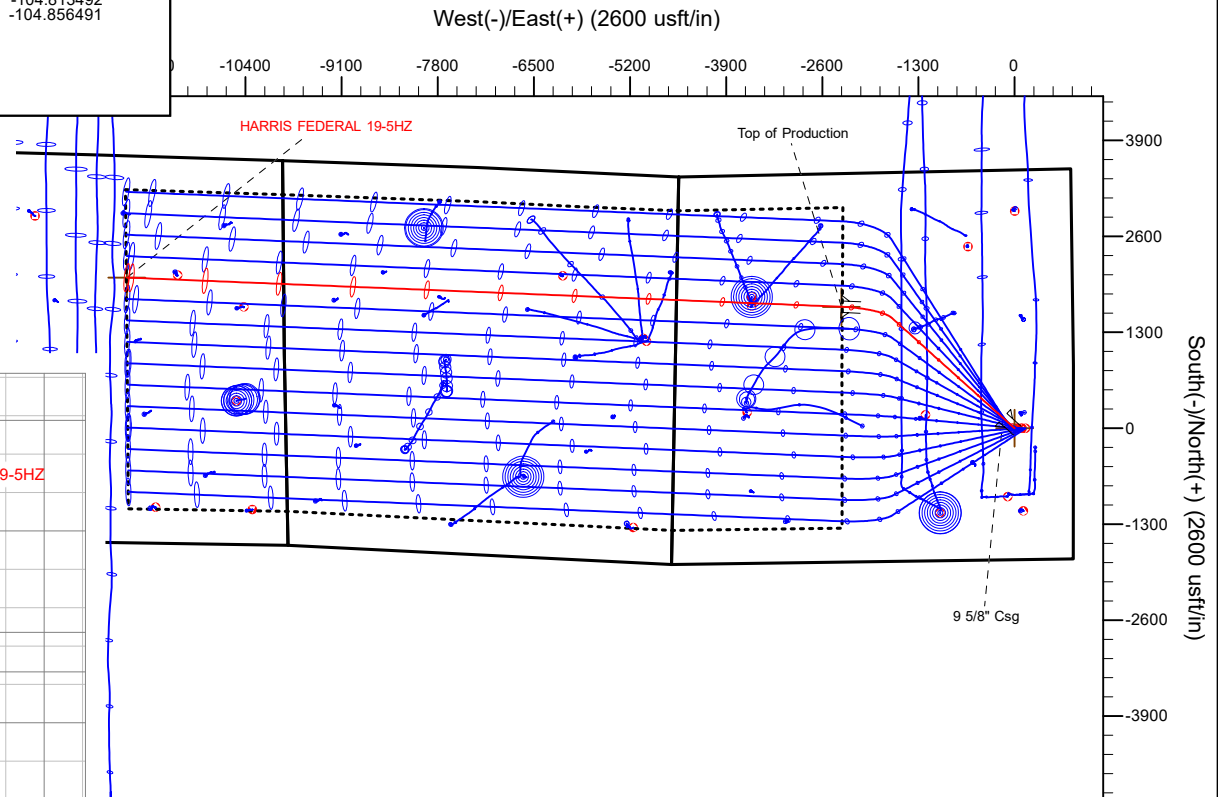
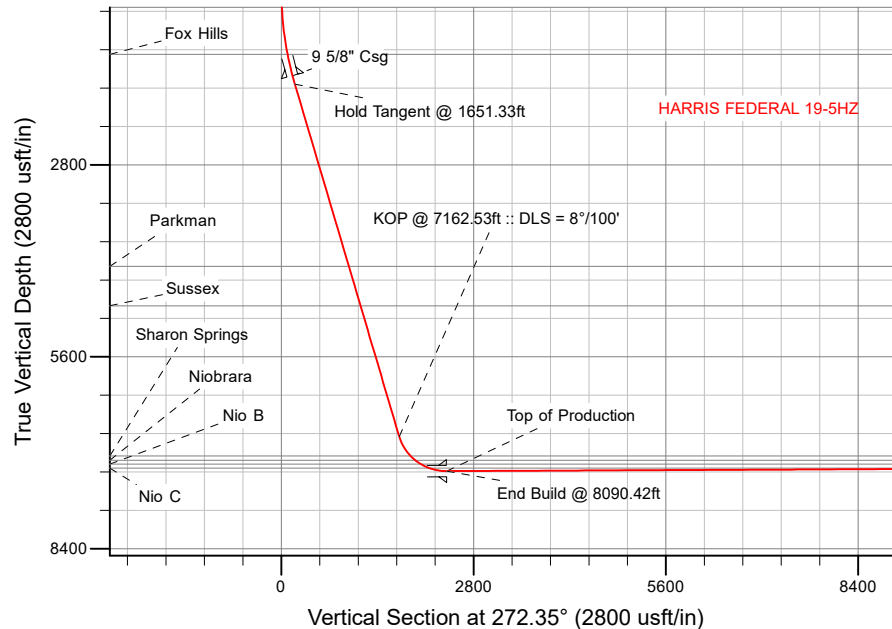
TOE  
1649' FNL  
2122' FEL

### WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HARRIS FEDERAL 19-5HZ_SHL	0.00	0.00	0.00	40.207843	-104.813492
HARRIS FEDERAL 19-5HZ_BHL	7224.00	2042.17	-12004.36	40.213443	-104.856491

### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1187.00	1196.66	Fox Hills
4282.00	4502.99	Parkman
4857.00	5118.98	Sussex
7047.00	7499.85	Sharon Springs
7110.00	7594.70	Niobrara
7165.00	7692.33	Nio B
7223.00	7828.02	Nio C



Plan: Permit Rev-2 (HARRIS FEDERAL 19-5HZ/Plan A)

Date: 12/31/2018

# Corporate Planning Report

<b>Database:</b>	PLANNING	<b>Local Co-ordinate Reference:</b>	Well HARRIS FEDERAL 19-5HZ
<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>TVD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>MD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Site:</b>	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

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

Site		3N-66W-19 HARRIS FEDERAL 20-19HZ PAD			
Site Position:		Northing:	14,602,473.82 usft	Latitude:	40.207844
From:	Lat/Long	Easting:	1,692,429.69 usft	Longitude:	-104.813707
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	HARRIS FEDERAL 19-5HZ					
Well Position	+N/-S	-0.36 usft	Northing:	14,602,473.58 usft	Latitude:	40.207843
	+E/-W	60.03 usft	Easting:	1,692,489.72 usft	Longitude:	-104.813492
Position Uncertainty		3.28 usft	Wellhead Elevation:		Ground Level:	4,884.00 usft

<b>Wellbore</b>	Plan A				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	12/25/2018	8.06	66.65	52,113.27216454

<b>Design</b>	Permit Rev-2			
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	272.35

<b>Plan Survey Tool Program</b>	<b>Date</b>	1/1/2019		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	1,500.00	Permit Rev-2 (Plan A)	APC_ISCWSA REV 2 MWD+I Fixed:v2:crustal field declinatio
2	1,500.00	17,760.19	Permit Rev-2 (Plan A)	APC_ISCWSA REV 2 MWD+I Fixed:v2:Rockies, crustal dec +

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	<b>TFO (°)</b>	<b>Target</b>
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	
1,651.33	21.02	312.04	1,620.11	170.21	-188.78	1.50	1.50	0.00	312.04	
7,162.53	21.02	312.04	6,764.57	1,494.00	-1,656.92	0.00	0.00	0.00	0.00	
8,090.42	90.26	272.35	7,268.00	1,646.36	-2,342.80	8.00	7.46	-4.28	-41.58	
17,760.19	90.26	272.35	7,224.00	2,042.17	-12,004.36	0.00	0.00	0.00	0.00	HARRIS FEDERAL 19

# Corporate Planning Report

<b>Database:</b>	PLANNING	<b>Local Co-ordinate Reference:</b>	Well HARRIS FEDERAL 19-5HZ
<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>TVD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>MD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Site:</b>	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

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	312.04	300.00	0.22	-0.24	0.25	1.50	1.50	0.00
400.00	2.25	312.04	399.96	1.97	-2.19	2.27	1.50	1.50	0.00
500.00	3.75	312.04	499.82	5.48	-6.07	6.29	1.50	1.50	0.00
600.00	5.25	312.04	599.51	10.73	-11.90	12.33	1.50	1.50	0.00
700.00	6.75	312.04	698.96	17.73	-19.66	20.37	1.50	1.50	0.00
800.00	8.25	312.04	798.10	26.47	-29.36	30.42	1.50	1.50	0.00
900.00	9.75	312.04	896.87	36.95	-40.97	42.46	1.50	1.50	0.00
1,000.00	11.25	312.04	995.19	49.15	-54.51	56.48	1.50	1.50	0.00
1,100.00	12.75	312.04	1,093.00	63.07	-69.95	72.48	1.50	1.50	0.00
1,196.66	14.20	312.04	1,187.00	78.15	-86.68	89.81	1.50	1.50	0.00
Fox Hills									
1,200.00	14.25	312.04	1,190.24	78.70	-87.29	90.44	1.50	1.50	0.00
1,300.00	15.75	312.04	1,286.83	96.03	-106.51	110.36	1.50	1.50	0.00
1,400.00	17.25	312.04	1,382.71	115.05	-127.60	132.21	1.50	1.50	0.00
1,500.00	18.75	312.04	1,477.81	135.75	-150.55	155.99	1.50	1.50	0.00
1,523.46	19.10	312.04	1,500.00	140.84	-156.20	161.84	1.50	1.50	0.00
9 5/8" Csg									
1,600.00	20.25	312.04	1,572.07	158.10	-175.34	181.68	1.50	1.50	0.00
1,651.33	21.02	312.04	1,620.11	170.21	-188.78	195.60	1.50	1.50	0.00
Hold Tangent @ 1651.33ft									
1,700.00	21.02	312.04	1,665.54	181.90	-201.74	209.03	0.00	0.00	0.00
1,800.00	21.02	312.04	1,758.88	205.92	-228.38	236.63	0.00	0.00	0.00
1,900.00	21.02	312.04	1,852.23	229.94	-255.02	264.23	0.00	0.00	0.00
2,000.00	21.02	312.04	1,945.57	253.96	-281.66	291.83	0.00	0.00	0.00
2,100.00	21.02	312.04	2,038.92	277.98	-308.30	319.44	0.00	0.00	0.00
2,200.00	21.02	312.04	2,132.27	302.00	-334.94	347.04	0.00	0.00	0.00
2,300.00	21.02	312.04	2,225.61	326.02	-361.58	374.64	0.00	0.00	0.00
2,400.00	21.02	312.04	2,318.96	350.04	-388.22	402.24	0.00	0.00	0.00
2,500.00	21.02	312.04	2,412.30	374.06	-414.85	429.84	0.00	0.00	0.00
2,600.00	21.02	312.04	2,505.65	398.08	-441.49	457.45	0.00	0.00	0.00
2,700.00	21.02	312.04	2,598.99	422.10	-468.13	485.05	0.00	0.00	0.00
2,800.00	21.02	312.04	2,692.34	446.12	-494.77	512.65	0.00	0.00	0.00
2,900.00	21.02	312.04	2,785.68	470.14	-521.41	540.25	0.00	0.00	0.00
3,000.00	21.02	312.04	2,879.03	494.16	-548.05	567.85	0.00	0.00	0.00
3,100.00	21.02	312.04	2,972.38	518.18	-574.69	595.46	0.00	0.00	0.00
3,200.00	21.02	312.04	3,065.72	542.20	-601.33	623.06	0.00	0.00	0.00
3,300.00	21.02	312.04	3,159.07	566.22	-627.97	650.66	0.00	0.00	0.00
3,400.00	21.02	312.04	3,252.41	590.24	-654.61	678.26	0.00	0.00	0.00
3,500.00	21.02	312.04	3,345.76	614.26	-681.25	705.86	0.00	0.00	0.00
3,600.00	21.02	312.04	3,439.10	638.28	-707.89	733.46	0.00	0.00	0.00
3,700.00	21.02	312.04	3,532.45	662.30	-734.53	761.07	0.00	0.00	0.00
3,800.00	21.02	312.04	3,625.79	686.32	-761.17	788.67	0.00	0.00	0.00
3,900.00	21.02	312.04	3,719.14	710.34	-787.81	816.27	0.00	0.00	0.00
4,000.00	21.02	312.04	3,812.48	734.36	-814.45	843.87	0.00	0.00	0.00
4,100.00	21.02	312.04	3,905.83	758.38	-841.09	871.47	0.00	0.00	0.00
4,200.00	21.02	312.04	3,999.18	782.40	-867.72	899.08	0.00	0.00	0.00
4,300.00	21.02	312.04	4,092.52	806.42	-894.36	926.68	0.00	0.00	0.00
4,400.00	21.02	312.04	4,185.87	830.44	-921.00	954.28	0.00	0.00	0.00
4,500.00	21.02	312.04	4,279.21	854.46	-947.64	981.88	0.00	0.00	0.00

# Corporate Planning Report

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<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

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)
4,502.99	21.02	312.04	4,282.00	855.18	-948.44	982.71	0.00	0.00	0.00
<b>Parkman</b>									
4,600.00	21.02	312.04	4,372.56	878.48	-974.28	1,009.48	0.00	0.00	0.00
4,700.00	21.02	312.04	4,465.90	902.50	-1,000.92	1,037.09	0.00	0.00	0.00
4,800.00	21.02	312.04	4,559.25	926.52	-1,027.56	1,064.69	0.00	0.00	0.00
4,900.00	21.02	312.04	4,652.59	950.54	-1,054.20	1,092.29	0.00	0.00	0.00
5,000.00	21.02	312.04	4,745.94	974.56	-1,080.84	1,119.89	0.00	0.00	0.00
5,100.00	21.02	312.04	4,839.29	998.58	-1,107.48	1,147.49	0.00	0.00	0.00
5,118.98	21.02	312.04	4,857.00	1,003.14	-1,112.53	1,152.73	0.00	0.00	0.00
<b>Sussex</b>									
5,200.00	21.02	312.04	4,932.63	1,022.60	-1,134.12	1,175.09	0.00	0.00	0.00
5,300.00	21.02	312.04	5,025.98	1,046.62	-1,160.76	1,202.70	0.00	0.00	0.00
5,400.00	21.02	312.04	5,119.32	1,070.64	-1,187.40	1,230.30	0.00	0.00	0.00
5,500.00	21.02	312.04	5,212.67	1,094.66	-1,214.04	1,257.90	0.00	0.00	0.00
5,600.00	21.02	312.04	5,306.01	1,118.68	-1,240.68	1,285.50	0.00	0.00	0.00
5,700.00	21.02	312.04	5,399.36	1,142.70	-1,267.32	1,313.10	0.00	0.00	0.00
5,800.00	21.02	312.04	5,492.70	1,166.72	-1,293.95	1,340.71	0.00	0.00	0.00
5,900.00	21.02	312.04	5,586.05	1,190.74	-1,320.59	1,368.31	0.00	0.00	0.00
6,000.00	21.02	312.04	5,679.40	1,214.76	-1,347.23	1,395.91	0.00	0.00	0.00
6,100.00	21.02	312.04	5,772.74	1,238.78	-1,373.87	1,423.51	0.00	0.00	0.00
6,200.00	21.02	312.04	5,866.09	1,262.80	-1,400.51	1,451.11	0.00	0.00	0.00
6,300.00	21.02	312.04	5,959.43	1,286.82	-1,427.15	1,478.72	0.00	0.00	0.00
6,400.00	21.02	312.04	6,052.78	1,310.84	-1,453.79	1,506.32	0.00	0.00	0.00
6,500.00	21.02	312.04	6,146.12	1,334.86	-1,480.43	1,533.92	0.00	0.00	0.00
6,600.00	21.02	312.04	6,239.47	1,358.88	-1,507.07	1,561.52	0.00	0.00	0.00
6,700.00	21.02	312.04	6,332.81	1,382.90	-1,533.71	1,589.12	0.00	0.00	0.00
6,800.00	21.02	312.04	6,426.16	1,406.92	-1,560.35	1,616.72	0.00	0.00	0.00
6,900.00	21.02	312.04	6,519.51	1,430.94	-1,586.99	1,644.33	0.00	0.00	0.00
7,000.00	21.02	312.04	6,612.85	1,454.96	-1,613.63	1,671.93	0.00	0.00	0.00
7,100.00	21.02	312.04	6,706.20	1,478.98	-1,640.27	1,699.53	0.00	0.00	0.00
7,162.53	21.02	312.04	6,764.57	1,494.00	-1,656.92	1,716.79	0.00	0.00	0.00
<b>KOP @ 7162.53ft :: DLS = 8°/100'</b>									
7,200.00	23.34	307.02	6,799.26	1,502.97	-1,667.85	1,728.07	8.00	6.20	-13.41
7,300.00	30.10	297.42	6,888.57	1,526.48	-1,705.99	1,767.14	8.00	6.76	-9.60
7,400.00	37.32	291.16	6,971.73	1,549.01	-1,756.60	1,818.64	8.00	7.22	-6.26
7,499.85	44.76	286.72	7,047.00	1,570.09	-1,818.59	1,881.44	8.00	7.45	-4.45
<b>Sharon Springs</b>									
7,500.00	44.77	286.71	7,047.11	1,570.12	-1,818.69	1,881.54	8.00	7.53	-3.84
7,594.70	51.95	283.47	7,110.00	1,588.42	-1,886.99	1,950.54	8.00	7.58	-3.43
<b>Niobrara</b>									
7,600.00	52.35	283.31	7,113.25	1,589.39	-1,891.06	1,954.64	8.00	7.63	-3.05
7,692.33	59.43	280.73	7,165.00	1,605.23	-1,965.79	2,029.96	8.00	7.66	-2.79
<b>Nio B</b>									
7,700.00	60.02	280.54	7,168.87	1,606.45	-1,972.30	2,036.51	8.00	7.69	-2.55
7,800.00	67.73	278.17	7,212.87	1,620.97	-2,060.83	2,125.56	8.00	7.71	-2.37
7,828.02	69.90	277.56	7,223.00	1,624.54	-2,086.71	2,151.57	8.00	7.73	-2.19
<b>Nio C</b>									
7,900.00	75.47	276.05	7,244.41	1,632.67	-2,154.91	2,220.04	8.00	7.75	-2.09
8,000.00	83.24	274.08	7,262.87	1,641.31	-2,252.73	2,318.13	8.00	7.76	-1.98
8,090.42	90.26	272.35	7,268.00	1,646.36	-2,342.80	2,408.34	8.00	7.77	-1.91
<b>End Build @ 8090.42ft - Top of Production</b>									
8,100.00	90.26	272.35	7,267.96	1,646.75	-2,352.37	2,417.92	0.00	0.00	0.00
8,200.00	90.26	272.35	7,267.50	1,650.85	-2,452.29	2,517.92	0.00	0.00	0.00

# Corporate Planning Report

<b>Database:</b>	PLANNING	<b>Local Co-ordinate Reference:</b>	Well HARRIS FEDERAL 19-5HZ
<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>TVD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>MD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Site:</b>	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

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)
8,300.00	90.26	272.35	7,267.05	1,654.94	-2,552.20	2,617.92	0.00	0.00	0.00
8,400.00	90.26	272.35	7,266.59	1,659.03	-2,652.12	2,717.92	0.00	0.00	0.00
8,500.00	90.26	272.35	7,266.14	1,663.13	-2,752.03	2,817.91	0.00	0.00	0.00
8,600.00	90.26	272.35	7,265.68	1,667.22	-2,851.95	2,917.91	0.00	0.00	0.00
8,700.00	90.26	272.35	7,265.23	1,671.31	-2,951.86	3,017.91	0.00	0.00	0.00
8,800.00	90.26	272.35	7,264.77	1,675.41	-3,051.78	3,117.91	0.00	0.00	0.00
8,900.00	90.26	272.35	7,264.32	1,679.50	-3,151.70	3,217.91	0.00	0.00	0.00
9,000.00	90.26	272.35	7,263.86	1,683.59	-3,251.61	3,317.91	0.00	0.00	0.00
9,100.00	90.26	272.35	7,263.41	1,687.69	-3,351.53	3,417.91	0.00	0.00	0.00
9,200.00	90.26	272.35	7,262.95	1,691.78	-3,451.44	3,517.91	0.00	0.00	0.00
9,300.00	90.26	272.35	7,262.50	1,695.87	-3,551.36	3,617.91	0.00	0.00	0.00
9,400.00	90.26	272.35	7,262.04	1,699.97	-3,651.27	3,717.91	0.00	0.00	0.00
9,500.00	90.26	272.35	7,261.59	1,704.06	-3,751.19	3,817.90	0.00	0.00	0.00
9,600.00	90.26	272.35	7,261.13	1,708.15	-3,851.10	3,917.90	0.00	0.00	0.00
9,700.00	90.26	272.35	7,260.68	1,712.25	-3,951.02	4,017.90	0.00	0.00	0.00
9,800.00	90.26	272.35	7,260.22	1,716.34	-4,050.93	4,117.90	0.00	0.00	0.00
9,900.00	90.26	272.35	7,259.76	1,720.43	-4,150.85	4,217.90	0.00	0.00	0.00
10,000.00	90.26	272.35	7,259.31	1,724.53	-4,250.76	4,317.90	0.00	0.00	0.00
10,100.00	90.26	272.35	7,258.85	1,728.62	-4,350.68	4,417.90	0.00	0.00	0.00
10,200.00	90.26	272.35	7,258.40	1,732.71	-4,450.59	4,517.90	0.00	0.00	0.00
10,300.00	90.26	272.35	7,257.94	1,736.81	-4,550.51	4,617.90	0.00	0.00	0.00
10,400.00	90.26	272.35	7,257.49	1,740.90	-4,650.42	4,717.89	0.00	0.00	0.00
10,500.00	90.26	272.35	7,257.03	1,744.99	-4,750.34	4,817.89	0.00	0.00	0.00
10,600.00	90.26	272.35	7,256.58	1,749.09	-4,850.25	4,917.89	0.00	0.00	0.00
10,700.00	90.26	272.35	7,256.12	1,753.18	-4,950.17	5,017.89	0.00	0.00	0.00
10,800.00	90.26	272.35	7,255.67	1,757.27	-5,050.08	5,117.89	0.00	0.00	0.00
10,900.00	90.26	272.35	7,255.21	1,761.37	-5,150.00	5,217.89	0.00	0.00	0.00
11,000.00	90.26	272.35	7,254.76	1,765.46	-5,249.91	5,317.89	0.00	0.00	0.00
11,100.00	90.26	272.35	7,254.30	1,769.55	-5,349.83	5,417.89	0.00	0.00	0.00
11,200.00	90.26	272.35	7,253.85	1,773.65	-5,449.74	5,517.89	0.00	0.00	0.00
11,300.00	90.26	272.35	7,253.39	1,777.74	-5,549.66	5,617.89	0.00	0.00	0.00
11,400.00	90.26	272.35	7,252.94	1,781.83	-5,649.57	5,717.88	0.00	0.00	0.00
11,500.00	90.26	272.35	7,252.48	1,785.93	-5,749.49	5,817.88	0.00	0.00	0.00
11,600.00	90.26	272.35	7,252.03	1,790.02	-5,849.40	5,917.88	0.00	0.00	0.00
11,700.00	90.26	272.35	7,251.57	1,794.11	-5,949.32	6,017.88	0.00	0.00	0.00
11,800.00	90.26	272.35	7,251.12	1,798.21	-6,049.23	6,117.88	0.00	0.00	0.00
11,900.00	90.26	272.35	7,250.66	1,802.30	-6,149.15	6,217.88	0.00	0.00	0.00
12,000.00	90.26	272.35	7,250.21	1,806.39	-6,249.06	6,317.88	0.00	0.00	0.00
12,100.00	90.26	272.35	7,249.75	1,810.49	-6,348.98	6,417.88	0.00	0.00	0.00
12,200.00	90.26	272.35	7,249.30	1,814.58	-6,448.90	6,517.88	0.00	0.00	0.00
12,300.00	90.26	272.35	7,248.84	1,818.67	-6,548.81	6,617.88	0.00	0.00	0.00
12,400.00	90.26	272.35	7,248.39	1,822.76	-6,648.73	6,717.87	0.00	0.00	0.00
12,500.00	90.26	272.35	7,247.93	1,826.86	-6,748.64	6,817.87	0.00	0.00	0.00
12,600.00	90.26	272.35	7,247.48	1,830.95	-6,848.56	6,917.87	0.00	0.00	0.00
12,700.00	90.26	272.35	7,247.02	1,835.04	-6,948.47	7,017.87	0.00	0.00	0.00
12,800.00	90.26	272.35	7,246.57	1,839.14	-7,048.39	7,117.87	0.00	0.00	0.00
12,900.00	90.26	272.35	7,246.11	1,843.23	-7,148.30	7,217.87	0.00	0.00	0.00
13,000.00	90.26	272.35	7,245.66	1,847.32	-7,248.22	7,317.87	0.00	0.00	0.00
13,100.00	90.26	272.35	7,245.20	1,851.42	-7,348.13	7,417.87	0.00	0.00	0.00
13,200.00	90.26	272.35	7,244.75	1,855.51	-7,448.05	7,517.87	0.00	0.00	0.00
13,300.00	90.26	272.35	7,244.29	1,859.60	-7,547.96	7,617.86	0.00	0.00	0.00
13,400.00	90.26	272.35	7,243.84	1,863.70	-7,647.88	7,717.86	0.00	0.00	0.00
13,500.00	90.26	272.35	7,243.38	1,867.79	-7,747.79	7,817.86	0.00	0.00	0.00
13,600.00	90.26	272.35	7,242.93	1,871.88	-7,847.71	7,917.86	0.00	0.00	0.00

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<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>TVD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>MD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Site:</b>	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

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)
13,700.00	90.26	272.35	7,242.47	1,875.98	-7,947.62	8,017.86	0.00	0.00	0.00
13,800.00	90.26	272.35	7,242.02	1,880.07	-8,047.54	8,117.86	0.00	0.00	0.00
13,900.00	90.26	272.35	7,241.56	1,884.16	-8,147.45	8,217.86	0.00	0.00	0.00
14,000.00	90.26	272.35	7,241.11	1,888.26	-8,247.37	8,317.86	0.00	0.00	0.00
14,100.00	90.26	272.35	7,240.65	1,892.35	-8,347.28	8,417.86	0.00	0.00	0.00
14,200.00	90.26	272.35	7,240.20	1,896.44	-8,447.20	8,517.86	0.00	0.00	0.00
14,300.00	90.26	272.35	7,239.74	1,900.54	-8,547.11	8,617.85	0.00	0.00	0.00
14,400.00	90.26	272.35	7,239.29	1,904.63	-8,647.03	8,717.85	0.00	0.00	0.00
14,500.00	90.26	272.35	7,238.83	1,908.72	-8,746.94	8,817.85	0.00	0.00	0.00
14,600.00	90.26	272.35	7,238.38	1,912.82	-8,846.86	8,917.85	0.00	0.00	0.00
14,700.00	90.26	272.35	7,237.92	1,916.91	-8,946.77	9,017.85	0.00	0.00	0.00
14,800.00	90.26	272.35	7,237.47	1,921.00	-9,046.69	9,117.85	0.00	0.00	0.00
14,900.00	90.26	272.35	7,237.01	1,925.10	-9,146.60	9,217.85	0.00	0.00	0.00
15,000.00	90.26	272.35	7,236.56	1,929.19	-9,246.52	9,317.85	0.00	0.00	0.00
15,100.00	90.26	272.35	7,236.10	1,933.28	-9,346.43	9,417.85	0.00	0.00	0.00
15,200.00	90.26	272.35	7,235.65	1,937.38	-9,446.35	9,517.85	0.00	0.00	0.00
15,300.00	90.26	272.35	7,235.19	1,941.47	-9,546.27	9,617.84	0.00	0.00	0.00
15,400.00	90.26	272.35	7,234.74	1,945.56	-9,646.18	9,717.84	0.00	0.00	0.00
15,500.00	90.26	272.35	7,234.28	1,949.66	-9,746.10	9,817.84	0.00	0.00	0.00
15,600.00	90.26	272.35	7,233.83	1,953.75	-9,846.01	9,917.84	0.00	0.00	0.00
15,700.00	90.26	272.35	7,233.37	1,957.84	-9,945.93	10,017.84	0.00	0.00	0.00
15,800.00	90.26	272.35	7,232.92	1,961.94	-10,045.84	10,117.84	0.00	0.00	0.00
15,900.00	90.26	272.35	7,232.46	1,966.03	-10,145.76	10,217.84	0.00	0.00	0.00
16,000.00	90.26	272.35	7,232.01	1,970.12	-10,245.67	10,317.84	0.00	0.00	0.00
16,100.00	90.26	272.35	7,231.55	1,974.22	-10,345.59	10,417.84	0.00	0.00	0.00
16,200.00	90.26	272.35	7,231.10	1,978.31	-10,445.50	10,517.83	0.00	0.00	0.00
16,300.00	90.26	272.35	7,230.64	1,982.40	-10,545.42	10,617.83	0.00	0.00	0.00
16,400.00	90.26	272.35	7,230.19	1,986.50	-10,645.33	10,717.83	0.00	0.00	0.00
16,500.00	90.26	272.35	7,229.73	1,990.59	-10,745.25	10,817.83	0.00	0.00	0.00
16,600.00	90.26	272.35	7,229.28	1,994.68	-10,845.16	10,917.83	0.00	0.00	0.00
16,700.00	90.26	272.35	7,228.82	1,998.78	-10,945.08	11,017.83	0.00	0.00	0.00
16,800.00	90.26	272.35	7,228.37	2,002.87	-11,044.99	11,117.83	0.00	0.00	0.00
16,900.00	90.26	272.35	7,227.91	2,006.96	-11,144.91	11,217.83	0.00	0.00	0.00
17,000.00	90.26	272.35	7,227.46	2,011.06	-11,244.82	11,317.83	0.00	0.00	0.00
17,100.00	90.26	272.35	7,227.00	2,015.15	-11,344.74	11,417.83	0.00	0.00	0.00
17,200.00	90.26	272.35	7,226.55	2,019.24	-11,444.65	11,517.82	0.00	0.00	0.00
17,300.00	90.26	272.35	7,226.09	2,023.34	-11,544.57	11,617.82	0.00	0.00	0.00
17,400.00	90.26	272.35	7,225.64	2,027.43	-11,644.48	11,717.82	0.00	0.00	0.00
17,500.00	90.26	272.35	7,225.18	2,031.52	-11,744.40	11,817.82	0.00	0.00	0.00
17,600.00	90.26	272.35	7,224.73	2,035.62	-11,844.31	11,917.82	0.00	0.00	0.00
17,700.00	90.26	272.35	7,224.27	2,039.71	-11,944.23	12,017.82	0.00	0.00	0.00
17,760.18	90.26	272.35	7,224.00	2,042.17	-12,004.36	12,078.00	0.00	0.00	0.00
TD Well @ 17760.18ft									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,523.46	1,500.00	9 5/8" Csg	9-5/8	13-1/2	
8,090.42	7,268.00	Top of Production	5-1/2	7-7/8	

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<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>MD Reference:</b>	RKB = 17' @ 4901.00usft (Drilling Rig)
<b>Site:</b>	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	HARRIS FEDERAL 19-5HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Plan A		
<b>Design:</b>	Permit Rev-2		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,196.66	1,187.00	Fox Hills				
4,502.99	4,282.00	Parkman				
5,118.98	4,857.00	Sussex				
7,499.85	7,047.00	Sharon Springs				
7,594.70	7,110.00	Niobrara				
7,692.33	7,165.00	Nio B				
7,828.02	7,223.00	Nio C				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft	
1,651.33	1,620.11	170.21	-188.78	Hold Tangent @ 1651.33ft	
7,162.53	6,764.57	1,494.00	-1,656.92	KOP @ 7162.53ft :: DLS = 8"/100'	
8,090.42	7,268.00	1,646.36	-2,342.80	End Build @ 8090.42ft	
17,760.18	7,224.00	2,042.17	-12,004.36	TD Well @ 17760.18ft	