

US ROCKIES WATTENBERG PLANNING

WELD-NAD83-UTMFT13N

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

HARRIS FEDERAL 19-15HZ

Plan A

Plan: Permit Rev-2

SHL Lat/Long: 40.207840/-104.812955

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 19-15HZ
Wellbore: Plan A
Design: Permit Rev-2

US ROCKIES WATTENBERG PLANNING

CASING DETAILS

TVD	MD	Size
1500.00	1523.46	9-5/8
7186.00	7978.77	5-1/2

WELL DETAILS: HARRIS FEDERAL 19-15HZ

GL = 4884.00

RKB = 17' @ 4901.00usft (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	1620.00	20.55	236.86	1590.82	-132.88	-203.53	1.50	236.86	197.88	
4	7061.62	20.55	236.86	6686.16	-1177.13	-1802.96	0.00	0.00	1752.96	
5	7978.77	89.98	272.36	7186.00	-1257.52	-2492.90	8.00	37.31	2439.01	
6	17627.44	89.98	272.36	7190.00	-859.71	-12133.37	0.00	0.00	12087.68	HARRIS FEDERAL 19-15HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HARRIS FEDERAL 19-15HZ_SHL	0.00	0.00	0.00	40.207840	-104.812955
HARRIS FEDERAL 19-15HZ_BHL	7190.00	-859.71	-12133.37	40.205471	-104.856411

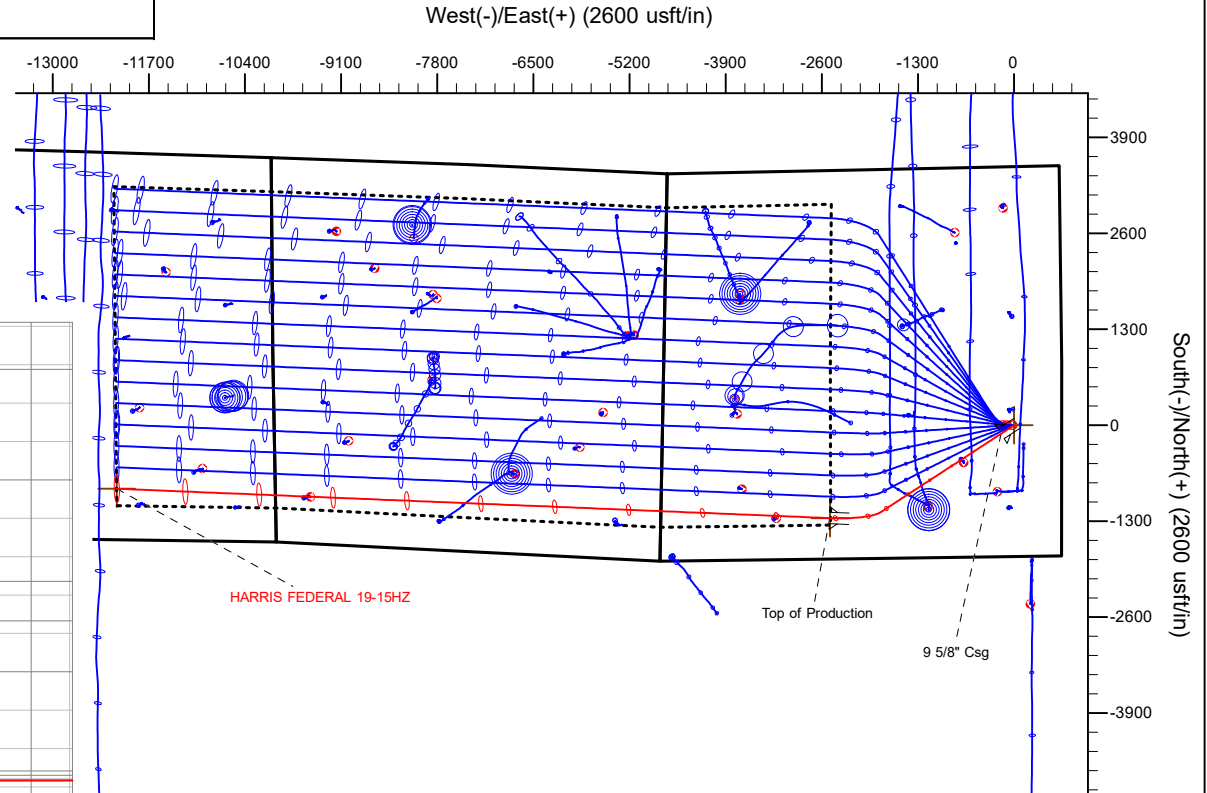
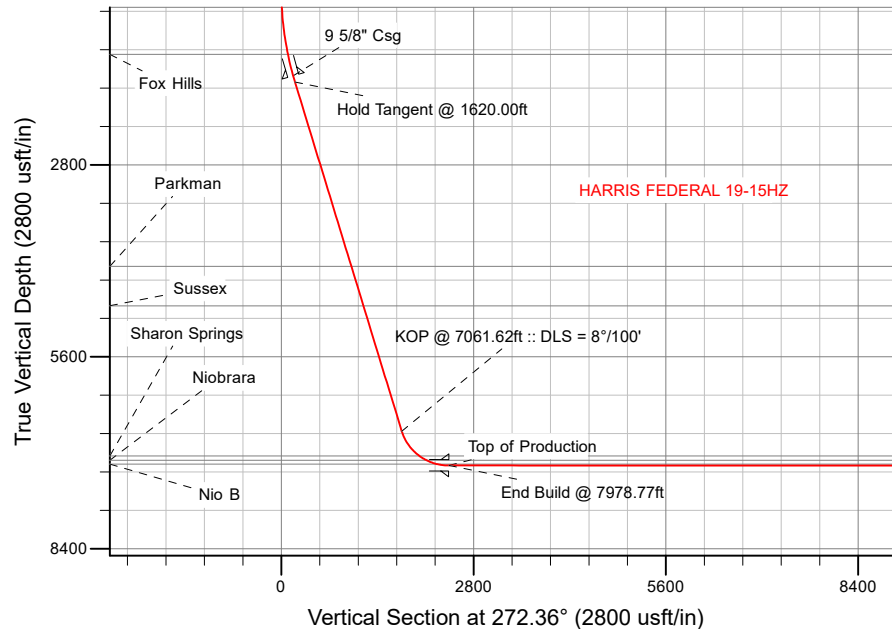
SHL
1778' FSL
645' FEL

HEEL
554' FSL
2290' FWL

TOE
690' FSL
2145' FEL

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1187.00	1196.66	Fox Hills
4282.00	4494.07	Parkman
4857.00	5108.15	Sussex
7047.00	7519.84	Sharon Springs
7110.00	7642.19	Niobrara
7165.00	7803.18	Nio B



Plan: Permit Rev-2 (HARRIS FEDERAL 19-15HZ/Plan A)

Date: 12/31/2018

Corporate Planning Report

Database:	PLANNING	Local Co-ordinate Reference:	Well HARRIS FEDERAL 19-15HZ
Company:	US ROCKIES WATTENBERG PLANNING	TVD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Site:	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	North Reference:	True
Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	Permit Rev-2		

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		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 19-15HZ					
Well Position	+N/-S	-1.46 usft	Northing:	14,602,472.80 usft	Latitude:	40.207840
	+E/-W	209.96 usft	Easting:	1,692,639.65 usft	Longitude:	-104.812955
Position Uncertainty		3.28 usft	Wellhead Elevation:		Ground Level:	4,884.00 usft

Wellbore	Plan A				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/25/2018	8.06	66.65	52,113.32708631

Design	Permit Rev-2			
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	272.36

Plan Survey Tool Program	Date	1/1/2019		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
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	17,627.44	Permit Rev-2 (Plan A)	APC_ISCWSA REV 2 MWD+I 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	
1,620.00	20.55	236.86	1,590.82	-132.88	-203.53	1.50	1.50	0.00	236.86	
7,061.62	20.55	236.86	6,686.16	-1,177.13	-1,802.96	0.00	0.00	0.00	0.00	
7,978.77	89.98	272.36	7,186.00	-1,257.52	-2,492.90	8.00	7.57	3.87	37.31	
17,627.44	89.98	272.36	7,190.00	-859.71	-12,133.37	0.00	0.00	0.00	0.00	HARRIS FEDERAL 19

Corporate Planning Report

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Company:	US ROCKIES WATTENBERG PLANNING	TVD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Site:	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	North Reference:	True
Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	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	236.86	300.00	-0.18	-0.27	0.27	1.50	1.50	0.00
400.00	2.25	236.86	399.96	-1.61	-2.47	2.40	1.50	1.50	0.00
500.00	3.75	236.86	499.82	-4.47	-6.85	6.66	1.50	1.50	0.00
600.00	5.25	236.86	599.51	-8.76	-13.42	13.05	1.50	1.50	0.00
700.00	6.75	236.86	698.96	-14.47	-22.17	21.55	1.50	1.50	0.00
800.00	8.25	236.86	798.10	-21.61	-33.10	32.18	1.50	1.50	0.00
900.00	9.75	236.86	896.87	-30.16	-46.20	44.92	1.50	1.50	0.00
1,000.00	11.25	236.86	995.19	-40.12	-61.46	59.75	1.50	1.50	0.00
1,100.00	12.75	236.86	1,093.00	-51.49	-78.86	76.68	1.50	1.50	0.00
1,196.66	14.20	236.86	1,187.00	-63.80	-97.72	95.01	1.50	1.50	0.00
Fox Hills									
1,200.00	14.25	236.86	1,190.24	-64.25	-98.41	95.68	1.50	1.50	0.00
1,300.00	15.75	236.86	1,286.83	-78.40	-120.08	116.75	1.50	1.50	0.00
1,400.00	17.25	236.86	1,382.71	-93.93	-143.86	139.87	1.50	1.50	0.00
1,500.00	18.75	236.86	1,477.81	-110.82	-169.74	165.03	1.50	1.50	0.00
1,523.46	19.10	236.86	1,500.00	-114.98	-176.11	171.23	1.50	1.50	0.00
9 5/8" Csg									
1,600.00	20.25	236.86	1,572.07	-129.07	-197.69	192.21	1.50	1.50	0.00
1,620.00	20.55	236.86	1,590.82	-132.88	-203.53	197.88	1.50	1.50	0.00
Hold Tangent @ 1620.00ft									
1,700.00	20.55	236.86	1,665.72	-148.23	-227.04	220.74	0.00	0.00	0.00
1,800.00	20.55	236.86	1,759.36	-167.42	-256.43	249.32	0.00	0.00	0.00
1,900.00	20.55	236.86	1,853.00	-186.61	-285.83	277.90	0.00	0.00	0.00
2,000.00	20.55	236.86	1,946.63	-205.80	-315.22	306.48	0.00	0.00	0.00
2,100.00	20.55	236.86	2,040.27	-224.99	-344.61	335.05	0.00	0.00	0.00
2,200.00	20.55	236.86	2,133.91	-244.18	-374.00	363.63	0.00	0.00	0.00
2,300.00	20.55	236.86	2,227.54	-263.37	-403.40	392.21	0.00	0.00	0.00
2,400.00	20.55	236.86	2,321.18	-282.56	-432.79	420.79	0.00	0.00	0.00
2,500.00	20.55	236.86	2,414.82	-301.75	-462.18	449.36	0.00	0.00	0.00
2,600.00	20.55	236.86	2,508.45	-320.94	-491.57	477.94	0.00	0.00	0.00
2,700.00	20.55	236.86	2,602.09	-340.13	-520.97	506.52	0.00	0.00	0.00
2,800.00	20.55	236.86	2,695.73	-359.32	-550.36	535.10	0.00	0.00	0.00
2,900.00	20.55	236.86	2,789.36	-378.51	-579.75	563.67	0.00	0.00	0.00
3,000.00	20.55	236.86	2,883.00	-397.70	-609.14	592.25	0.00	0.00	0.00
3,100.00	20.55	236.86	2,976.64	-416.89	-638.54	620.83	0.00	0.00	0.00
3,200.00	20.55	236.86	3,070.27	-436.08	-667.93	649.41	0.00	0.00	0.00
3,300.00	20.55	236.86	3,163.91	-455.27	-697.32	677.98	0.00	0.00	0.00
3,400.00	20.55	236.86	3,257.55	-474.46	-726.71	706.56	0.00	0.00	0.00
3,500.00	20.55	236.86	3,351.18	-493.65	-756.11	735.14	0.00	0.00	0.00
3,600.00	20.55	236.86	3,444.82	-512.84	-785.50	763.72	0.00	0.00	0.00
3,700.00	20.55	236.86	3,538.46	-532.03	-814.89	792.29	0.00	0.00	0.00
3,800.00	20.55	236.86	3,632.09	-551.22	-844.28	820.87	0.00	0.00	0.00
3,900.00	20.55	236.86	3,725.73	-570.41	-873.68	849.45	0.00	0.00	0.00
4,000.00	20.55	236.86	3,819.37	-589.60	-903.07	878.03	0.00	0.00	0.00
4,100.00	20.55	236.86	3,913.00	-608.79	-932.46	906.60	0.00	0.00	0.00
4,200.00	20.55	236.86	4,006.64	-627.98	-961.85	935.18	0.00	0.00	0.00
4,300.00	20.55	236.86	4,100.28	-647.17	-991.25	963.76	0.00	0.00	0.00
4,400.00	20.55	236.86	4,193.91	-666.36	-1,020.64	992.33	0.00	0.00	0.00
4,494.07	20.55	236.86	4,282.00	-684.42	-1,048.29	1,019.22	0.00	0.00	0.00

Corporate Planning Report

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Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Site:	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	North Reference:	True
Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	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)
Parkman									
4,500.00	20.55	236.86	4,287.55	-685.55	-1,050.03	1,020.91	0.00	0.00	0.00
4,600.00	20.55	236.86	4,381.19	-704.74	-1,079.43	1,049.49	0.00	0.00	0.00
4,700.00	20.55	236.86	4,474.82	-723.93	-1,108.82	1,078.07	0.00	0.00	0.00
4,800.00	20.55	236.86	4,568.46	-743.12	-1,138.21	1,106.64	0.00	0.00	0.00
4,900.00	20.55	236.86	4,662.10	-762.31	-1,167.60	1,135.22	0.00	0.00	0.00
5,000.00	20.55	236.86	4,755.73	-781.50	-1,197.00	1,163.80	0.00	0.00	0.00
5,100.00	20.55	236.86	4,849.37	-800.69	-1,226.39	1,192.38	0.00	0.00	0.00
5,108.15	20.55	236.86	4,857.00	-802.26	-1,228.78	1,194.71	0.00	0.00	0.00
Sussex									
5,200.00	20.55	236.86	4,943.01	-819.88	-1,255.78	1,220.95	0.00	0.00	0.00
5,300.00	20.55	236.86	5,036.64	-839.07	-1,285.17	1,249.53	0.00	0.00	0.00
5,400.00	20.55	236.86	5,130.28	-858.26	-1,314.57	1,278.11	0.00	0.00	0.00
5,500.00	20.55	236.86	5,223.92	-877.45	-1,343.96	1,306.69	0.00	0.00	0.00
5,600.00	20.55	236.86	5,317.55	-896.64	-1,373.35	1,335.26	0.00	0.00	0.00
5,700.00	20.55	236.86	5,411.19	-915.83	-1,402.74	1,363.84	0.00	0.00	0.00
5,800.00	20.55	236.86	5,504.83	-935.02	-1,432.14	1,392.42	0.00	0.00	0.00
5,900.00	20.55	236.86	5,598.46	-954.21	-1,461.53	1,421.00	0.00	0.00	0.00
6,000.00	20.55	236.86	5,692.10	-973.40	-1,490.92	1,449.57	0.00	0.00	0.00
6,100.00	20.55	236.86	5,785.74	-992.59	-1,520.31	1,478.15	0.00	0.00	0.00
6,200.00	20.55	236.86	5,879.37	-1,011.78	-1,549.71	1,506.73	0.00	0.00	0.00
6,300.00	20.55	236.86	5,973.01	-1,030.97	-1,579.10	1,535.31	0.00	0.00	0.00
6,400.00	20.55	236.86	6,066.65	-1,050.16	-1,608.49	1,563.88	0.00	0.00	0.00
6,500.00	20.55	236.86	6,160.28	-1,069.35	-1,637.88	1,592.46	0.00	0.00	0.00
6,600.00	20.55	236.86	6,253.92	-1,088.54	-1,667.28	1,621.04	0.00	0.00	0.00
6,700.00	20.55	236.86	6,347.56	-1,107.73	-1,696.67	1,649.62	0.00	0.00	0.00
6,800.00	20.55	236.86	6,441.19	-1,126.92	-1,726.06	1,678.19	0.00	0.00	0.00
6,900.00	20.55	236.86	6,534.83	-1,146.11	-1,755.46	1,706.77	0.00	0.00	0.00
7,000.00	20.55	236.86	6,628.47	-1,165.30	-1,784.85	1,735.35	0.00	0.00	0.00
7,061.62	20.55	236.86	6,686.16	-1,177.13	-1,802.96	1,752.96	0.00	0.00	0.00
KOP @ 7061.62ft :: DLS = 8°/100'									
7,100.00	23.06	241.61	6,721.80	-1,184.39	-1,815.22	1,764.91	8.00	6.55	12.38
7,200.00	30.08	250.29	6,811.21	-1,202.18	-1,856.11	1,805.03	8.00	7.02	8.67
7,300.00	37.46	255.86	6,894.30	-1,218.09	-1,909.28	1,857.50	8.00	7.38	5.57
7,400.00	45.03	259.81	6,969.45	-1,231.80	-1,973.69	1,921.29	8.00	7.57	3.95
7,500.00	52.70	262.82	7,035.19	-1,243.05	-2,048.09	1,995.16	8.00	7.67	3.02
7,519.84	54.23	263.34	7,047.00	-1,244.97	-2,063.92	2,010.90	8.00	7.71	2.64
Sharon Springs									
7,600.00	60.44	265.27	7,090.24	-1,251.62	-2,131.03	2,077.68	8.00	7.74	2.41
7,642.19	63.71	266.19	7,110.00	-1,254.39	-2,168.20	2,114.71	8.00	7.76	2.18
Niobrara									
7,700.00	68.21	267.37	7,133.54	-1,257.34	-2,220.90	2,167.24	8.00	7.78	2.04
7,800.00	76.01	269.26	7,164.24	-1,260.10	-2,315.94	2,262.09	8.00	7.80	1.88
7,803.18	76.26	269.32	7,165.00	-1,260.14	-2,319.03	2,265.17	8.00	7.81	1.81
Nio B									
7,900.00	83.82	271.02	7,181.74	-1,259.84	-2,414.32	2,360.39	8.00	7.81	1.76
7,978.77	89.98	272.36	7,186.00	-1,257.52	-2,492.90	2,439.00	8.00	7.82	1.71
End Build @ 7978.77ft - Top of Production									
8,000.00	89.98	272.36	7,186.01	-1,256.65	-2,514.11	2,460.23	0.00	0.00	0.00
8,100.00	89.98	272.36	7,186.05	-1,252.52	-2,614.03	2,560.23	0.00	0.00	0.00
8,200.00	89.98	272.36	7,186.09	-1,248.40	-2,713.94	2,660.23	0.00	0.00	0.00
8,300.00	89.98	272.36	7,186.13	-1,244.28	-2,813.86	2,760.23	0.00	0.00	0.00
8,400.00	89.98	272.36	7,186.17	-1,240.15	-2,913.77	2,860.23	0.00	0.00	0.00

Corporate Planning Report

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Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
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Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	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)	
8,500.00	89.98	272.36	7,186.22	-1,236.03	-3,013.69	2,960.23	0.00	0.00	0.00	
8,600.00	89.98	272.36	7,186.26	-1,231.91	-3,113.60	3,060.23	0.00	0.00	0.00	
8,700.00	89.98	272.36	7,186.30	-1,227.79	-3,213.52	3,160.23	0.00	0.00	0.00	
8,800.00	89.98	272.36	7,186.34	-1,223.66	-3,313.43	3,260.23	0.00	0.00	0.00	
8,900.00	89.98	272.36	7,186.38	-1,219.54	-3,413.35	3,360.23	0.00	0.00	0.00	
9,000.00	89.98	272.36	7,186.42	-1,215.42	-3,513.26	3,460.23	0.00	0.00	0.00	
9,100.00	89.98	272.36	7,186.47	-1,211.29	-3,613.18	3,560.23	0.00	0.00	0.00	
9,200.00	89.98	272.36	7,186.51	-1,207.17	-3,713.09	3,660.23	0.00	0.00	0.00	
9,300.00	89.98	272.36	7,186.55	-1,203.05	-3,813.01	3,760.23	0.00	0.00	0.00	
9,400.00	89.98	272.36	7,186.59	-1,198.93	-3,912.92	3,860.23	0.00	0.00	0.00	
9,500.00	89.98	272.36	7,186.63	-1,194.80	-4,012.84	3,960.23	0.00	0.00	0.00	
9,600.00	89.98	272.36	7,186.67	-1,190.68	-4,112.75	4,060.23	0.00	0.00	0.00	
9,700.00	89.98	272.36	7,186.71	-1,186.56	-4,212.67	4,160.23	0.00	0.00	0.00	
9,800.00	89.98	272.36	7,186.76	-1,182.43	-4,312.58	4,260.23	0.00	0.00	0.00	
9,900.00	89.98	272.36	7,186.80	-1,178.31	-4,412.50	4,360.23	0.00	0.00	0.00	
10,000.00	89.98	272.36	7,186.84	-1,174.19	-4,512.41	4,460.23	0.00	0.00	0.00	
10,100.00	89.98	272.36	7,186.88	-1,170.06	-4,612.33	4,560.23	0.00	0.00	0.00	
10,200.00	89.98	272.36	7,186.92	-1,165.94	-4,712.24	4,660.23	0.00	0.00	0.00	
10,300.00	89.98	272.36	7,186.96	-1,161.82	-4,812.16	4,760.23	0.00	0.00	0.00	
10,400.00	89.98	272.36	7,187.00	-1,157.70	-4,912.07	4,860.23	0.00	0.00	0.00	
10,500.00	89.98	272.36	7,187.05	-1,153.57	-5,011.99	4,960.23	0.00	0.00	0.00	
10,600.00	89.98	272.36	7,187.09	-1,149.45	-5,111.90	5,060.23	0.00	0.00	0.00	
10,700.00	89.98	272.36	7,187.13	-1,145.33	-5,211.82	5,160.23	0.00	0.00	0.00	
10,800.00	89.98	272.36	7,187.17	-1,141.20	-5,311.73	5,260.23	0.00	0.00	0.00	
10,900.00	89.98	272.36	7,187.21	-1,137.08	-5,411.65	5,360.23	0.00	0.00	0.00	
11,000.00	89.98	272.36	7,187.25	-1,132.96	-5,511.56	5,460.23	0.00	0.00	0.00	
11,100.00	89.98	272.36	7,187.29	-1,128.83	-5,611.48	5,560.23	0.00	0.00	0.00	
11,200.00	89.98	272.36	7,187.34	-1,124.71	-5,711.39	5,660.23	0.00	0.00	0.00	
11,300.00	89.98	272.36	7,187.38	-1,120.59	-5,811.30	5,760.23	0.00	0.00	0.00	
11,400.00	89.98	272.36	7,187.42	-1,116.47	-5,911.22	5,860.23	0.00	0.00	0.00	
11,500.00	89.98	272.36	7,187.46	-1,112.34	-6,011.13	5,960.23	0.00	0.00	0.00	
11,600.00	89.98	272.36	7,187.50	-1,108.22	-6,111.05	6,060.23	0.00	0.00	0.00	
11,700.00	89.98	272.36	7,187.54	-1,104.10	-6,210.96	6,160.23	0.00	0.00	0.00	
11,800.00	89.98	272.36	7,187.58	-1,099.97	-6,310.88	6,260.23	0.00	0.00	0.00	
11,900.00	89.98	272.36	7,187.63	-1,095.85	-6,410.79	6,360.23	0.00	0.00	0.00	
12,000.00	89.98	272.36	7,187.67	-1,091.73	-6,510.71	6,460.23	0.00	0.00	0.00	
12,100.00	89.98	272.36	7,187.71	-1,087.60	-6,610.62	6,560.23	0.00	0.00	0.00	
12,200.00	89.98	272.36	7,187.75	-1,083.48	-6,710.54	6,660.23	0.00	0.00	0.00	
12,300.00	89.98	272.36	7,187.79	-1,079.36	-6,810.45	6,760.23	0.00	0.00	0.00	
12,400.00	89.98	272.36	7,187.83	-1,075.24	-6,910.37	6,860.23	0.00	0.00	0.00	
12,500.00	89.98	272.36	7,187.87	-1,071.11	-7,010.28	6,960.23	0.00	0.00	0.00	
12,600.00	89.98	272.36	7,187.92	-1,066.99	-7,110.20	7,060.23	0.00	0.00	0.00	
12,700.00	89.98	272.36	7,187.96	-1,062.87	-7,210.11	7,160.23	0.00	0.00	0.00	
12,800.00	89.98	272.36	7,188.00	-1,058.74	-7,310.03	7,260.23	0.00	0.00	0.00	
12,900.00	89.98	272.36	7,188.04	-1,054.62	-7,409.94	7,360.23	0.00	0.00	0.00	
13,000.00	89.98	272.36	7,188.08	-1,050.50	-7,509.86	7,460.23	0.00	0.00	0.00	
13,100.00	89.98	272.36	7,188.12	-1,046.37	-7,609.77	7,560.23	0.00	0.00	0.00	
13,200.00	89.98	272.36	7,188.16	-1,042.25	-7,709.69	7,660.23	0.00	0.00	0.00	
13,300.00	89.98	272.36	7,188.21	-1,038.13	-7,809.60	7,760.23	0.00	0.00	0.00	
13,400.00	89.98	272.36	7,188.25	-1,034.01	-7,909.52	7,860.23	0.00	0.00	0.00	
13,500.00	89.98	272.36	7,188.29	-1,029.88	-8,009.43	7,960.23	0.00	0.00	0.00	
13,600.00	89.98	272.36	7,188.33	-1,025.76	-8,109.35	8,060.23	0.00	0.00	0.00	
13,700.00	89.98	272.36	7,188.37	-1,021.64	-8,209.26	8,160.23	0.00	0.00	0.00	
13,800.00	89.98	272.36	7,188.41	-1,017.51	-8,309.18	8,260.23	0.00	0.00	0.00	

Corporate Planning Report

Database:	PLANNING	Local Co-ordinate Reference:	Well HARRIS FEDERAL 19-15HZ
Company:	US ROCKIES WATTENBERG PLANNING	TVD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Site:	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	North Reference:	True
Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	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)	
13,900.00	89.98	272.36	7,188.45	-1,013.39	-8,409.09	8,360.23	0.00	0.00	0.00	
14,000.00	89.98	272.36	7,188.50	-1,009.27	-8,509.01	8,460.23	0.00	0.00	0.00	
14,100.00	89.98	272.36	7,188.54	-1,005.14	-8,608.92	8,560.23	0.00	0.00	0.00	
14,200.00	89.98	272.36	7,188.58	-1,001.02	-8,708.84	8,660.23	0.00	0.00	0.00	
14,300.00	89.98	272.36	7,188.62	-996.90	-8,808.75	8,760.23	0.00	0.00	0.00	
14,400.00	89.98	272.36	7,188.66	-992.78	-8,908.67	8,860.23	0.00	0.00	0.00	
14,500.00	89.98	272.36	7,188.70	-988.65	-9,008.58	8,960.23	0.00	0.00	0.00	
14,600.00	89.98	272.36	7,188.75	-984.53	-9,108.50	9,060.23	0.00	0.00	0.00	
14,700.00	89.98	272.36	7,188.79	-980.41	-9,208.41	9,160.23	0.00	0.00	0.00	
14,800.00	89.98	272.36	7,188.83	-976.28	-9,308.33	9,260.23	0.00	0.00	0.00	
14,900.00	89.98	272.36	7,188.87	-972.16	-9,408.24	9,360.23	0.00	0.00	0.00	
15,000.00	89.98	272.36	7,188.91	-968.04	-9,508.16	9,460.23	0.00	0.00	0.00	
15,100.00	89.98	272.36	7,188.95	-963.92	-9,608.07	9,560.23	0.00	0.00	0.00	
15,200.00	89.98	272.36	7,188.99	-959.79	-9,707.99	9,660.23	0.00	0.00	0.00	
15,300.00	89.98	272.36	7,189.04	-955.67	-9,807.90	9,760.23	0.00	0.00	0.00	
15,400.00	89.98	272.36	7,189.08	-951.55	-9,907.82	9,860.23	0.00	0.00	0.00	
15,500.00	89.98	272.36	7,189.12	-947.42	-10,007.73	9,960.23	0.00	0.00	0.00	
15,600.00	89.98	272.36	7,189.16	-943.30	-10,107.65	10,060.23	0.00	0.00	0.00	
15,700.00	89.98	272.36	7,189.20	-939.18	-10,207.56	10,160.23	0.00	0.00	0.00	
15,800.00	89.98	272.36	7,189.24	-935.05	-10,307.48	10,260.23	0.00	0.00	0.00	
15,900.00	89.98	272.36	7,189.28	-930.93	-10,407.39	10,360.23	0.00	0.00	0.00	
16,000.00	89.98	272.36	7,189.33	-926.81	-10,507.31	10,460.23	0.00	0.00	0.00	
16,100.00	89.98	272.36	7,189.37	-922.69	-10,607.22	10,560.23	0.00	0.00	0.00	
16,200.00	89.98	272.36	7,189.41	-918.56	-10,707.14	10,660.23	0.00	0.00	0.00	
16,300.00	89.98	272.36	7,189.45	-914.44	-10,807.05	10,760.23	0.00	0.00	0.00	
16,400.00	89.98	272.36	7,189.49	-910.32	-10,906.97	10,860.23	0.00	0.00	0.00	
16,500.00	89.98	272.36	7,189.53	-906.19	-11,006.88	10,960.23	0.00	0.00	0.00	
16,600.00	89.98	272.36	7,189.57	-902.07	-11,106.80	11,060.23	0.00	0.00	0.00	
16,700.00	89.98	272.36	7,189.62	-897.95	-11,206.71	11,160.23	0.00	0.00	0.00	
16,800.00	89.98	272.36	7,189.66	-893.82	-11,306.63	11,260.23	0.00	0.00	0.00	
16,900.00	89.98	272.36	7,189.70	-889.70	-11,406.54	11,360.23	0.00	0.00	0.00	
17,000.00	89.98	272.36	7,189.74	-885.58	-11,506.46	11,460.23	0.00	0.00	0.00	
17,100.00	89.98	272.36	7,189.78	-881.46	-11,606.37	11,560.23	0.00	0.00	0.00	
17,200.00	89.98	272.36	7,189.82	-877.33	-11,706.29	11,660.23	0.00	0.00	0.00	
17,300.00	89.98	272.36	7,189.86	-873.21	-11,806.20	11,760.23	0.00	0.00	0.00	
17,400.00	89.98	272.36	7,189.91	-869.09	-11,906.12	11,860.23	0.00	0.00	0.00	
17,500.00	89.98	272.36	7,189.95	-864.96	-12,006.03	11,960.23	0.00	0.00	0.00	
17,600.00	89.98	272.36	7,189.99	-860.84	-12,105.95	12,060.23	0.00	0.00	0.00	
17,627.44	89.98	272.36	7,190.00	-859.71	-12,133.36	12,087.67	0.00	0.00	0.00	
TD Well @ 17627.44ft										

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	
7,978.77	7,186.00	Top of Production	5-1/2	7-7/8	

Corporate Planning Report

Database:	PLANNING	Local Co-ordinate Reference:	Well HARRIS FEDERAL 19-15HZ
Company:	US ROCKIES WATTENBERG PLANNING	TVD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Project:	WELD-NAD83-UTMFT13N	MD Reference:	RKB = 17' @ 4901.00usft (Drilling Rig)
Site:	3N-66W-19 HARRIS FEDERAL 20-19HZ PAD	North Reference:	True
Well:	HARRIS FEDERAL 19-15HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	Plan A		
Design:	Permit Rev-2		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,196.66	1,187.00	Fox Hills				
4,494.07	4,282.00	Parkman				
5,108.15	4,857.00	Sussex				
7,519.84	7,047.00	Sharon Springs				
7,642.19	7,110.00	Niobrara				
7,803.18	7,165.00	Nio B				

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	
1,620.00	1,590.82	-132.88	-203.53	Hold Tangent @ 1620.00ft	
7,061.62	6,686.16	-1,177.13	-1,802.96	KOP @ 7061.62ft :: DLS = 8°/100'	
7,978.77	7,186.00	-1,257.52	-2,492.90	End Build @ 7978.77ft	
17,627.44	7,190.00	-859.71	-12,133.36	TD Well @ 17627.44ft	