

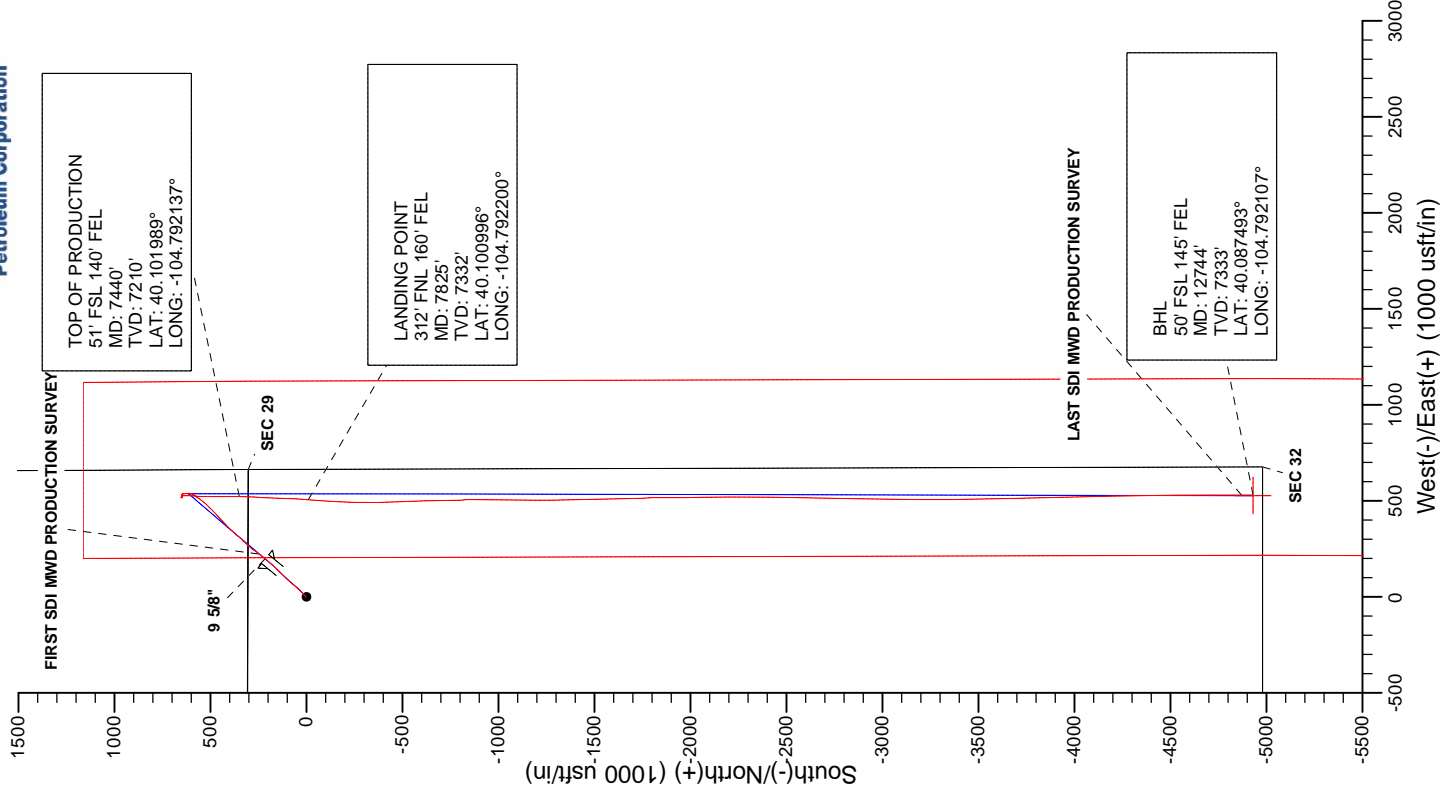
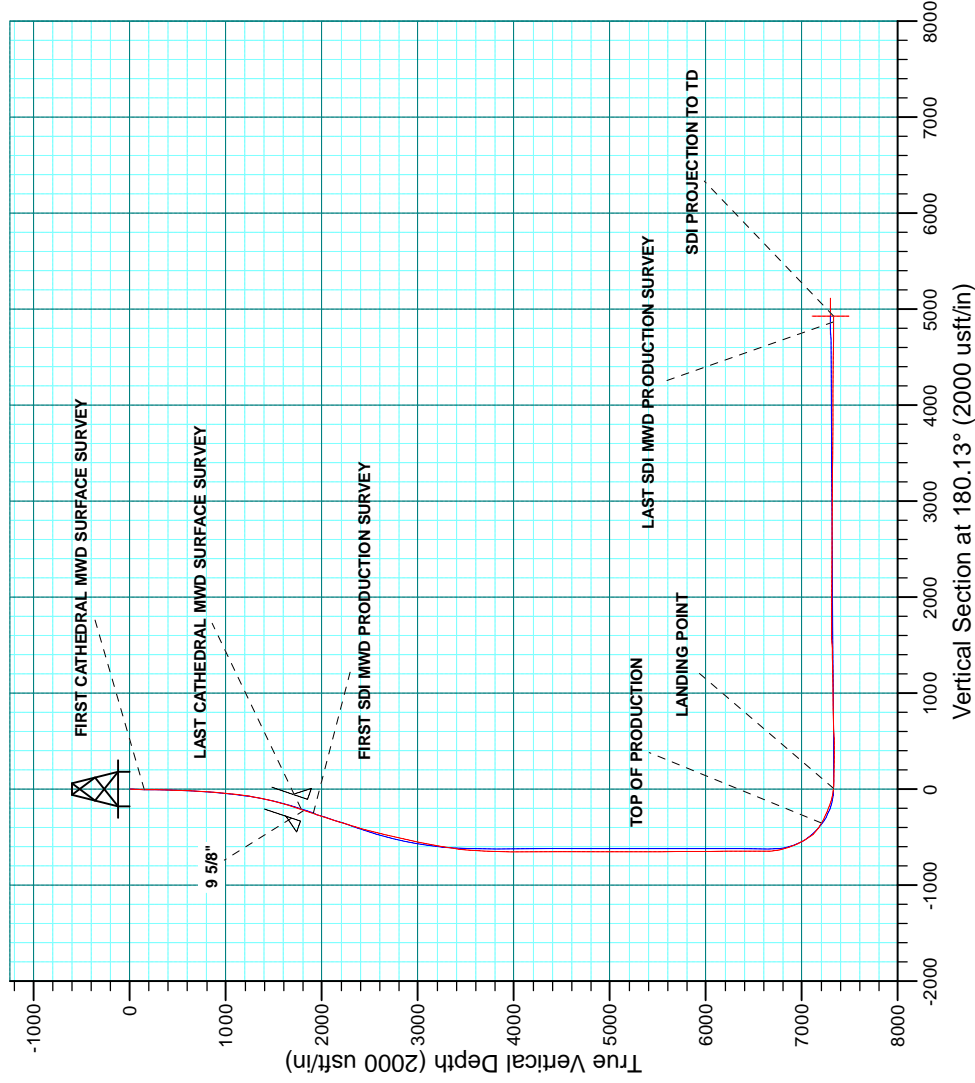


Project: WELD-NAD83-UTMFT13N
Site: 2N-66W-32 Fehrn Pad
Well: FEHRN 38N-32HZ
Wellbore: Plan A
Design: Plan A



WELL DETAILS: FEHRN 38N-32HZ				
GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)				
+N/-S 0.00	Northing 14563588.15	Eastings 1698019.84	Latitude 40.101026	Longitude -104.794008

PROJECT DETAILS: WELD-NAD83-UTMFT13N	
Geodetic System: Universal Transverse Mercator (US Survey Feet)	
Datum: North American Datum 1983	
Ellipsoid: GRS 1980	
Location: Zone 13N (108 W to 102 W)	
System Datum: Mean Sea Level	



Company:	US ROCKIES WATTENBERG PLANNING	Local Co-ordinate Reference:	Well FEHRN 38N-32HZ
Project:	WELD-NAD83-UTMFT13N	TVD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Site:	2N-66W-32 Fehr Pad	MD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Well:	FEHRN 38N-32HZ	North Reference:	True
Wellbore:	Plan A	Survey Calculation Method:	Minimum Curvature
Design:	Plan A	Database:	Denver Sales Office

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-66W-32 Fehr Pad				
Site Position:		Northing:	14,563,589.77 usft	Latitude:	40.101032
From:	Lat/Long	Easting:	1,697,779.90 usft	Longitude:	-104.794866
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence:	0.13 °

Well	FEHRN 38N-32HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,563,588.14 usft	Latitude:	40.101026
	+E/-W	0.00 usft	Easting:	1,698,019.83 usft	Longitude:	-104.794008
Position Uncertainty		2.68 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,926.00 usft

Wellbore	Plan A				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/20/2015	8.37	66.68	52,591

Design	Plan A				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	180.13	

Survey Program	Date	7/30/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
13.00	1,821.00	Survey #1 CATHEDRAL MWD SURFACE	APC_ISCWSA REV 2 MWD	Fixed:v2:standard declination	
1,962.00	12,744.00	Survey #2 SDI MWD PRODUCTION (Plan	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

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	
13.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	
155.00	0.50	29.00	155.00	0.54	0.30	-0.54	0.35	0.35	0.00	
FIRST CATHEDRAL MWD SURFACE SURVEY										
213.00	0.70	341.80	213.00	1.10	0.31	-1.10	0.89	0.34	-81.38	
274.00	1.10	9.80	273.99	2.03	0.30	-2.03	0.96	0.66	45.90	
334.00	1.90	43.40	333.97	3.32	1.08	-3.32	1.93	1.33	56.00	
394.00	2.60	48.50	393.92	4.95	2.78	-4.95	1.21	1.17	8.50	

Company:	US ROCKIES WATTENBERG PLANNING	Local Co-ordinate Reference:	Well FEHRN 38N-32HZ
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Site:	2N-66W-32 Fehr Pad	MD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Well:	FEHRN 38N-32HZ	North Reference:	True
Wellbore:	Plan A	Survey Calculation Method:	Minimum Curvature
Design:	Plan A	Database:	Denver Sales Office

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)
456.00	3.40	45.70	455.84	7.16	5.15	-7.17	1.31	1.29	-4.52
517.00	3.70	45.20	516.72	9.81	7.84	-9.83	0.49	0.49	-0.82
603.00	4.00	50.10	602.52	13.69	12.11	-13.72	0.52	0.35	5.70
688.00	4.80	53.30	687.27	17.72	17.24	-17.76	0.98	0.94	3.76
772.00	5.90	44.70	770.91	22.89	23.09	-22.94	1.62	1.31	-10.24
858.00	6.30	45.00	856.42	29.37	29.54	-29.43	0.47	0.47	0.35
942.00	6.50	45.80	939.90	35.94	36.20	-36.02	0.26	0.24	0.95
1,026.00	7.60	43.10	1,023.26	43.31	43.41	-43.41	1.37	1.31	-3.21
1,111.00	8.90	39.60	1,107.38	52.48	51.44	-52.60	1.64	1.53	-4.12
1,196.00	11.20	38.90	1,191.07	63.97	60.82	-64.11	2.71	2.71	-0.82
1,280.00	13.30	39.90	1,273.15	77.74	72.14	-77.90	2.51	2.50	1.19
1,364.00	14.50	42.70	1,354.69	92.88	85.47	-93.07	1.64	1.43	3.33
1,449.00	16.20	43.60	1,436.66	109.29	100.86	-109.51	2.02	2.00	1.06
1,532.00	18.00	44.70	1,515.99	126.79	117.87	-127.05	2.20	2.17	1.33
1,616.00	20.20	43.90	1,595.36	146.46	137.06	-146.78	2.64	2.62	-0.95
1,700.00	22.50	43.20	1,673.59	168.63	158.12	-168.99	2.75	2.74	-0.83
1,784.00	24.00	40.20	1,750.77	193.40	180.15	-193.81	2.27	1.79	-3.57
1,821.00	23.90	39.60	1,784.58	204.92	189.78	-205.35	0.71	-0.27	-1.62
LAST CATHEDRAL MWD SURFACE SURVEY									
1,856.00	23.80	38.96	1,816.59	215.88	198.74	-216.33	0.79	-0.29	-1.83
9 5/8"									
1,962.00	23.51	36.99	1,913.69	249.40	224.91	-249.90	0.79	-0.27	-1.86
FIRST SDI MWD PRODUCTION SURVEY									
2,057.00	24.40	40.12	2,000.51	279.54	248.96	-280.10	1.63	0.94	3.29
2,152.00	24.21	39.40	2,087.09	309.59	273.97	-310.22	0.37	-0.20	-0.76
2,248.00	23.17	43.80	2,175.00	338.44	299.54	-339.12	2.14	-1.08	4.58
2,343.00	22.51	43.58	2,262.55	365.10	325.01	-365.84	0.70	-0.69	-0.23
2,438.00	21.45	43.77	2,350.65	390.82	349.56	-391.61	1.12	-1.12	0.20
2,534.00	20.50	44.00	2,440.29	415.59	373.38	-416.43	0.99	-0.99	0.24
2,629.00	19.60	45.15	2,529.53	438.79	396.23	-439.69	1.03	-0.95	1.21
2,724.00	18.14	46.00	2,619.42	460.30	418.17	-461.25	1.56	-1.54	0.89
2,819.00	18.69	46.14	2,709.55	481.12	439.78	-482.12	0.58	0.58	0.15
2,914.00	17.00	47.84	2,799.98	500.99	461.05	-502.04	1.86	-1.78	1.79
3,104.00	16.16	39.20	2,982.11	540.13	498.36	-541.26	1.37	-0.44	-4.55
3,199.00	14.61	33.33	3,073.71	560.39	513.30	-561.55	2.31	-1.63	-6.18
3,294.00	13.50	31.94	3,165.86	579.81	525.75	-581.00	1.22	-1.17	-1.46
3,390.00	10.89	25.99	3,259.69	597.48	535.66	-598.69	3.01	-2.72	-6.20
3,485.00	8.03	9.81	3,353.40	612.09	540.72	-613.31	4.08	-3.01	-17.03
3,676.00	4.97	337.25	3,543.21	632.87	539.79	-634.10	2.45	-1.60	-17.05
3,771.00	2.94	357.38	3,637.99	639.10	538.09	-640.32	2.56	-2.14	21.19
3,867.00	1.92	344.39	3,733.90	643.11	537.55	-644.33	1.20	-1.06	-13.53
3,962.00	1.50	326.42	3,828.86	645.68	536.43	-646.90	0.71	-0.44	-18.92

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Site:	2N-66W-32 Fehr Pad	MD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Well:	FEHRN 38N-32HZ	North Reference:	True
Wellbore:	Plan A	Survey Calculation Method:	Minimum Curvature
Design:	Plan A	Database:	Denver Sales Office

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)
4,057.00	1.08	323.00	3,923.83	647.43	535.20	-648.64	0.45	-0.44	-3.60
4,152.00	0.99	307.29	4,018.82	648.64	534.01	-649.85	0.31	-0.09	-16.54
4,247.00	0.99	287.96	4,113.81	649.39	532.58	-650.60	0.35	0.00	-20.35
4,342.00	1.29	279.70	4,208.79	649.83	530.74	-651.03	0.36	0.32	-8.69
4,533.00	1.66	269.83	4,399.72	650.18	525.86	-651.37	0.23	0.19	-5.17
4,627.00	1.81	316.71	4,493.68	651.26	523.48	-652.44	1.48	0.16	49.87
4,722.00	0.68	292.21	4,588.66	652.56	521.93	-653.75	1.29	-1.19	-25.79
4,818.00	0.84	194.40	4,684.66	652.10	521.22	-653.28	1.20	0.17	-101.89
4,913.00	1.27	217.18	4,779.64	650.58	520.41	-651.76	0.62	0.45	23.98
5,008.00	1.30	215.45	4,874.62	648.87	519.15	-650.04	0.05	0.03	-1.82
5,104.00	0.26	77.88	4,970.61	648.03	518.74	-649.20	1.56	-1.08	-143.30
5,199.00	0.90	344.54	5,065.60	648.79	518.75	-649.96	1.00	0.67	-98.25
5,294.00	0.73	316.74	5,160.60	649.95	518.13	-651.12	0.45	-0.18	-29.26
5,389.00	0.79	326.65	5,255.59	650.94	517.36	-652.11	0.15	0.06	10.43
5,484.00	1.22	319.12	5,350.57	652.25	516.34	-653.42	0.47	0.45	-7.93
5,580.00	1.61	112.59	5,446.56	652.50	516.91	-653.67	2.87	0.41	159.86
5,675.00	2.30	141.24	5,541.51	650.50	519.34	-651.68	1.24	0.73	30.16
5,771.00	2.11	133.53	5,637.44	647.79	521.83	-648.97	0.37	-0.20	-8.03
5,866.00	1.80	114.25	5,732.38	645.97	524.45	-647.16	0.76	-0.33	-20.29
5,961.00	1.38	101.96	5,827.35	645.12	526.93	-646.31	0.57	-0.44	-12.94
6,056.00	1.53	97.11	5,922.31	644.72	529.31	-645.92	0.20	0.16	-5.11
6,151.00	0.64	179.28	6,017.30	644.04	530.58	-645.24	1.66	-0.94	86.49
6,246.00	0.84	234.92	6,112.29	643.11	530.01	-644.31	0.75	0.21	58.57
6,341.00	0.68	218.94	6,207.29	642.27	529.09	-643.47	0.28	-0.17	-16.82
6,436.00	0.19	196.52	6,302.28	641.68	528.69	-642.88	0.54	-0.52	-23.60
6,531.00	0.07	24.08	6,397.28	641.58	528.67	-642.78	0.27	-0.13	-181.52
6,625.00	0.51	18.23	6,491.28	642.03	528.82	-643.23	0.47	0.47	-6.22
6,719.00	0.98	3.62	6,585.27	643.23	529.00	-644.43	0.54	0.50	-15.54
6,814.00	4.57	187.32	6,680.19	640.28	528.57	-641.48	5.84	3.78	-185.58
6,910.00	13.25	182.42	6,774.94	625.47	527.62	-626.67	9.07	9.04	-5.10
7,004.00	19.28	181.86	6,865.14	599.17	526.66	-600.37	6.42	6.41	-0.60
7,100.00	22.07	186.00	6,954.95	565.39	524.26	-566.57	3.28	2.91	4.31
7,195.00	29.90	180.96	7,040.29	523.89	521.99	-525.08	8.56	8.24	-5.31
7,290.00	43.39	176.59	7,116.35	467.37	523.55	-468.56	14.46	14.20	-4.60
7,385.00	53.57	181.19	7,179.26	396.38	524.70	-397.57	11.31	10.72	4.84
7,440.00	58.48	182.24	7,209.99	350.81	523.32	-352.00	9.06	8.92	1.91
TOP OF PRODUCTION									
7,480.00	62.05	182.94	7,229.83	316.12	521.75	-317.30	9.06	8.93	1.74
7,575.00	68.65	182.29	7,269.43	229.91	517.82	-231.09	6.98	6.95	-0.68
7,671.00	72.88	182.35	7,301.05	139.37	514.15	-140.53	4.41	4.41	0.06
7,766.00	79.43	183.26	7,323.77	47.29	509.63	-48.45	6.96	6.89	0.96
7,825.00	84.78	184.57	7,331.87	-10.99	505.64	9.85	9.33	9.07	2.21

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Site:	2N-66W-32 Fehr Pad	MD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Well:	FEHRN 38N-32HZ	North Reference:	True
Wellbore:	Plan A	Survey Calculation Method:	Minimum Curvature
Design:	Plan A	Database:	Denver Sales Office

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)
LANDING POINT									
7,861.00	88.05	185.35	7,334.12	-46.78	502.53	45.64	9.33	9.08	2.18
7,956.00	89.20	182.01	7,336.40	-141.54	496.44	140.42	3.72	1.21	-3.52
8,051.00	90.60	181.57	7,336.56	-236.50	493.47	235.37	1.54	1.47	-0.46
8,146.00	89.46	179.33	7,336.51	-331.48	492.73	330.37	2.65	-1.20	-2.36
8,240.00	90.10	178.48	7,336.88	-425.47	494.52	424.34	1.13	0.68	-0.90
8,336.00	90.74	177.78	7,336.17	-521.41	497.66	520.28	0.99	0.67	-0.73
8,431.00	92.75	178.60	7,333.28	-616.31	500.66	615.18	2.28	2.12	0.86
8,621.00	91.21	178.94	7,326.71	-806.15	504.73	805.00	0.83	-0.81	0.18
8,716.00	89.46	180.03	7,326.16	-901.14	505.58	899.99	2.17	-1.84	1.15
8,810.00	89.97	180.62	7,326.63	-995.14	505.05	993.99	0.83	0.54	0.63
8,906.00	90.47	180.62	7,326.26	-1,091.13	504.01	1,089.98	0.52	0.52	0.00
9,001.00	91.81	180.02	7,324.37	-1,186.11	503.48	1,184.96	1.55	1.41	-0.63
9,094.00	91.78	178.85	7,321.45	-1,279.05	504.40	1,277.91	1.26	-0.03	-1.26
9,187.00	91.04	178.52	7,319.17	-1,372.00	506.53	1,370.85	0.87	-0.80	-0.35
9,283.00	92.25	178.13	7,316.41	-1,467.92	509.34	1,466.76	1.32	1.26	-0.41
9,378.00	91.11	178.98	7,313.63	-1,562.85	511.73	1,561.68	1.50	-1.20	0.89
9,471.00	89.10	179.16	7,313.46	-1,655.83	513.24	1,654.66	2.17	-2.16	0.19
9,566.00	90.47	178.30	7,313.81	-1,750.80	515.35	1,749.63	1.70	1.44	-0.91
9,661.00	89.46	179.71	7,313.87	-1,845.78	517.00	1,844.61	1.83	-1.06	1.48
9,757.00	90.70	178.44	7,313.74	-1,941.77	518.55	1,940.59	1.85	1.29	-1.32
9,852.00	88.93	179.63	7,314.04	-2,036.75	520.15	2,035.56	2.25	-1.86	1.25
9,947.00	90.40	178.94	7,314.60	-2,131.74	521.33	2,130.55	1.71	1.55	-0.73
10,042.00	90.10	180.47	7,314.18	-2,226.73	521.82	2,225.54	1.64	-0.32	1.61
10,138.00	88.76	180.74	7,315.14	-2,322.72	520.81	2,321.53	1.42	-1.40	0.28
10,233.00	88.39	180.86	7,317.50	-2,417.68	519.48	2,416.49	0.41	-0.39	0.13
10,328.00	89.93	180.51	7,318.89	-2,512.66	518.34	2,511.48	1.66	1.62	-0.37
10,421.00	89.46	181.01	7,319.39	-2,605.65	517.11	2,604.47	0.74	-0.51	0.54
10,552.00	89.80	181.27	7,320.23	-2,736.62	514.51	2,735.45	0.33	0.26	0.20
10,610.00	91.11	180.93	7,319.77	-2,794.61	513.39	2,793.43	2.33	2.26	-0.59
10,705.00	90.94	180.84	7,318.07	-2,889.58	511.92	2,888.41	0.20	-0.18	-0.09
10,800.00	89.23	181.14	7,317.93	-2,984.56	510.28	2,983.40	1.83	-1.80	0.32
10,894.00	89.46	180.59	7,319.01	-3,078.54	508.86	3,077.38	0.63	0.24	-0.59
10,988.00	91.07	180.64	7,318.57	-3,172.53	507.86	3,171.37	1.71	1.71	0.05
11,083.00	88.02	179.70	7,319.33	-3,267.52	507.57	3,266.36	3.36	-3.21	-0.99
11,178.00	89.23	179.91	7,321.61	-3,362.49	507.90	3,361.33	1.29	1.27	0.22
11,273.00	90.60	179.45	7,321.75	-3,457.49	508.43	3,456.32	1.52	1.44	-0.48
11,367.00	89.73	178.50	7,321.48	-3,551.47	510.11	3,550.30	1.37	-0.93	-1.01
11,462.00	89.06	178.84	7,322.48	-3,646.44	512.31	3,645.26	0.79	-0.71	0.36
11,556.00	90.23	178.82	7,323.06	-3,740.41	514.23	3,739.24	1.24	1.24	-0.02
11,651.00	89.56	178.15	7,323.24	-3,835.38	516.74	3,834.20	1.00	-0.71	-0.71
11,745.00	89.93	178.38	7,323.66	-3,929.33	519.59	3,928.15	0.46	0.39	0.24

Company:	US ROCKIES WATTENBERG PLANNING	Local Co-ordinate Reference:	Well FEHRN 38N-32HZ
Project:	WELD-NAD83-UTMFT13N	TVD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Site:	2N-66W-32 Fehr Pad	MD Reference:	GL 4926 & KB 20 @ 4946.00usft (PRECISION 461)
Well:	FEHRN 38N-32HZ	North Reference:	True
Wellbore:	Plan A	Survey Calculation Method:	Minimum Curvature
Design:	Plan A	Database:	Denver Sales Office

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)	
11,839.00	89.56	178.47	7,324.07	-4,023.30	522.17	4,022.10	0.41	-0.39	0.10	
11,934.00	90.10	178.54	7,324.36	-4,118.26	524.65	4,117.06	0.57	0.57	0.07	
12,028.00	89.66	179.94	7,324.55	-4,212.25	525.90	4,211.05	1.56	-0.47	1.49	
12,123.00	89.87	178.99	7,324.94	-4,307.25	526.79	4,306.04	1.02	0.22	-1.00	
12,218.00	88.39	179.53	7,326.38	-4,402.23	528.01	4,401.02	1.66	-1.56	0.57	
12,313.00	89.06	179.25	7,328.50	-4,497.20	529.02	4,495.98	0.76	0.71	-0.29	
12,407.00	90.10	179.45	7,329.19	-4,591.19	530.09	4,589.97	1.13	1.11	0.21	
12,502.00	88.59	179.98	7,330.27	-4,686.18	530.56	4,684.96	1.68	-1.59	0.56	
12,598.00	88.93	179.73	7,332.35	-4,782.15	530.81	4,780.94	0.44	0.35	-0.26	
12,685.00	89.93	179.56	7,333.22	-4,869.15	531.35	4,867.93	1.17	1.15	-0.20	
LAST SDI MWD PRODUCTION SURVEY										
12,744.00	89.93	179.56	7,333.29	-4,928.14	531.80	4,926.92	0.00	0.00	0.00	
SDI PROJECTION TO TD										

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,856.00	1,816.59	9 5/8"	9.625	13.500	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
155.00	155.00	0.54	0.30	FIRST CATHEDRAL MWD SURFACE SURVEY	
1,821.00	1,784.58	204.92	189.78	LAST CATHEDRAL MWD SURFACE SURVEY	
1,962.00	1,913.69	249.40	224.91	FIRST SDI MWD PRODUCTION SURVEY	
7,440.00	7,209.99	350.81	523.32	TOP OF PRODUCTION	
7,825.00	7,331.87	-10.99	505.64	LANDING POINT	
12,685.00	7,333.22	-4,869.15	531.35	LAST SDI MWD PRODUCTION SURVEY	
12,744.00	7,333.29	-4,928.14	531.80	SDI PROJECTION TO TD	

Checked By: _____	Approved By: _____	Date: _____
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