

Wellbore: OH
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 22N1-4HZ

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Zone 13N (108 W to 102 W)

GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)

Northing	Easting	Latitude	Longitude
14595425.98	1636573.51	40.1886390	-105.0137610

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
125.00	125.00	0.53	139.49	-0.44	0.38	First Total MWD Survey
2214.14	2231.00	4.22	16.00	219.22	33.95	Last Total MWD Survey
2293.90	2311.00	4.66	15.69	225.18	35.64	First SDI MWD Survey
6161.22	6180.00	1.82	230.37	235.02	-24.80	Curve KOP
6281.70	6301.00	7.84	220.83	226.73	-31.20	First SDI MWD Curve Survey
6896.21	7114.49	81.94	166.34	-173.10	-98.77	Enter Land Box : 7114.49' MD & 6896.21' TVD
6926.17	7456.00	86.02	166.85	-502.16	-12.63	Landing Point : 794' FNL 988' FWL Sec 33
6926.17	7456.00	86.02	166.85	-502.16	-12.63	Last SDI MWD Curve Survey
6932.23	7545.00	86.18	169.00	-589.02	5.77	First SDI MWD Lateral Survey
6980.12	8354.83	88.06	181.67	-1394.81	41.16	Exit 460' Circle : 8354.83' MD & 6980.12' TVD 1761' FNL 1042' FWL
7225.01	12915.87	90.69	179.86	-5946.69	36.8	Enter 460' Circle : 12915.87' MD & 7225.01' TVD 941' FNL 1055' FWL
7214.36	13939.00	94.13	177.94	-6969.41	40.19	Last SDI MWD Survey
7210.33	13995.00	94.13	177.94	-7025.23	42.20	Projection to TD : 2020' FNL 1061' FWL Sec 4

Surface Location:
 291' FNL 1002' FWL
 Sec 33 T3N R68W

Landing Point:
 794' FNL 988' FWL Sec 33
 MD: 7,456.00

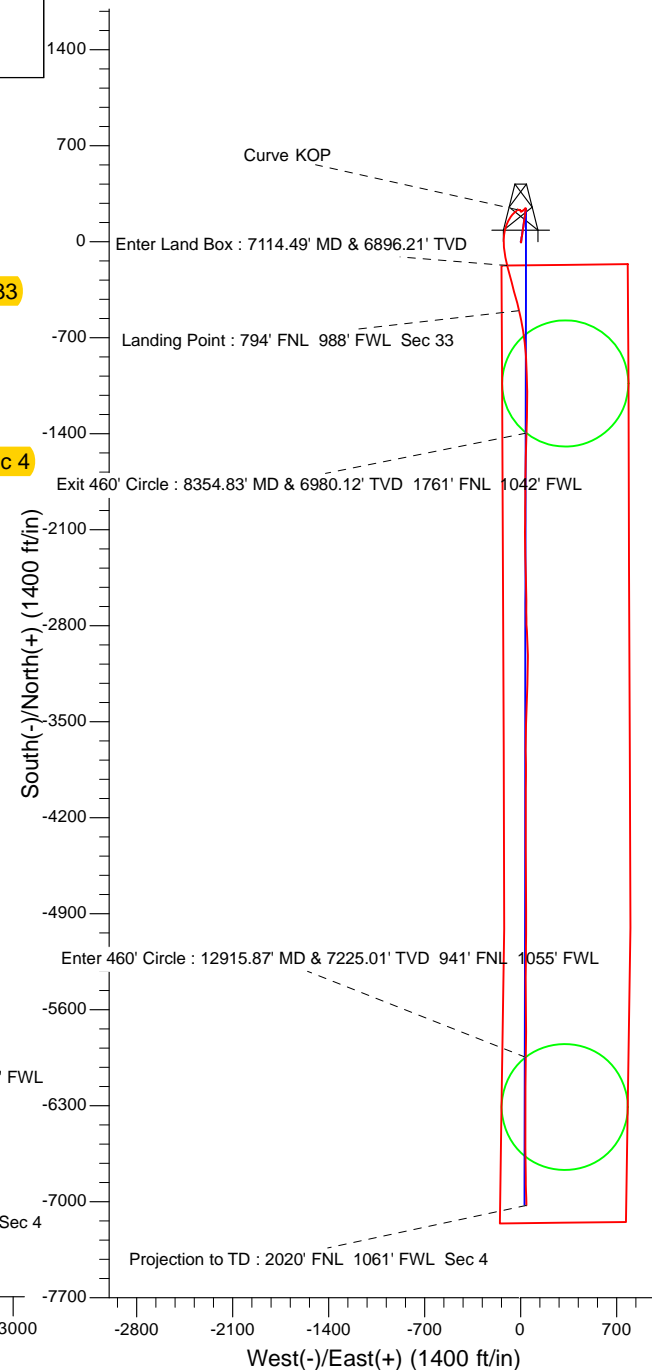
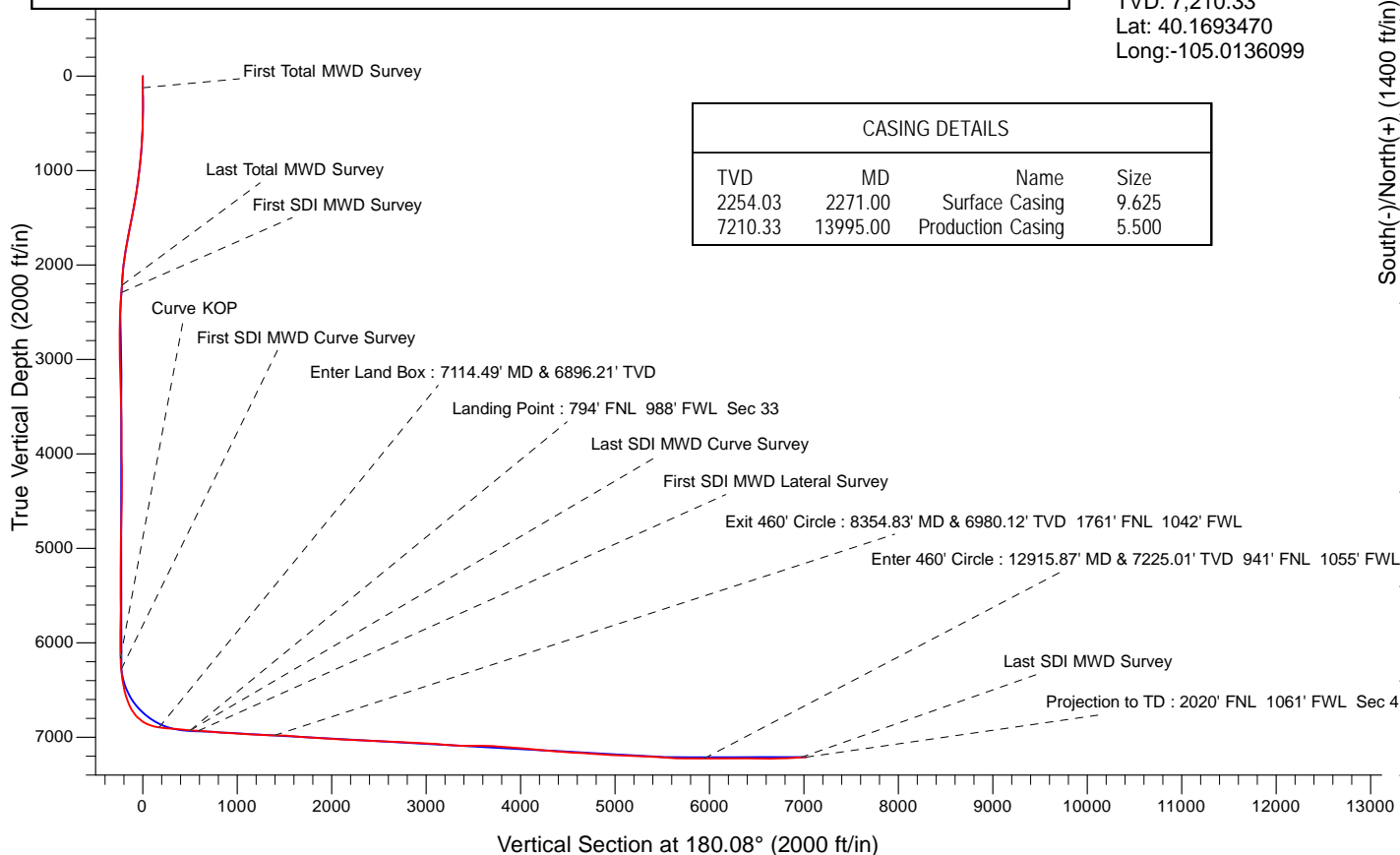
TVD: 6,926.17
 Lat: 40.1872600
 Long: -105.0138062

BHL:
 2020' FNL 1061' FWL Sec 4

MD: 13,995.00
 TVD: 7,210.33
 Lat: 40.1693470
 Long: -105.0136099

CASING DETAILS

TVD	MD	Name	Size
2254.03	2271.00	Surface Casing	9.625
7210.33	13995.00	Production Casing	5.500





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

3N-68W-33 Hergenreder 4-33H Pad

Hergenreder 22N1-4HZ

OH

Design: OH

Survey Report - Geographic

15 February, 2018



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Project	US Rockies Wattenberg Planning UTM83		
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-68W-33 Hergenreder 4-33H Pad, Site Center : Hergenreder 32N-4HZ											
Site Position:			Northing:			14,595,483.88 usft			Latitude:			40.1887980					
From:			Lat/Long			Easting:			1,636,558.44 usft			Longitude:			-105.0138150		
Position Uncertainty:			0.00 ft			Slot Radius:			13.200 in			Grid Convergence:			-0.01 °		

Well	Hergenreder 22N1-4HZ, 291' FNL 1002' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,425.97 usft	Latitude:	40.1886390
	+E/-W	0.00 ft	Easting:	1,636,573.51 usft	Longitude:	-105.0137610
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,944.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2016	1/3/2018	8.44	66.65	52,191

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	180.08	

Survey Program	Date	2/15/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	2,231.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,231.00	13,995.00	Survey #2 - Production (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,595,425.97	1,636,573.51	40.1886390	-105.0137610	
125.00	0.53	139.49	125.00	-0.44	0.38	14,595,425.53	1,636,573.88	40.1886378	-105.0137596	
First Total MWD Survey										
157.00	1.10	150.56	156.99	-0.82	0.62	14,595,425.15	1,636,574.13	40.1886368	-105.0137587	
188.00	1.45	156.72	187.99	-1.44	0.92	14,595,424.53	1,636,574.43	40.1886351	-105.0137577	
220.00	1.36	149.51	219.98	-2.14	1.28	14,595,423.83	1,636,574.78	40.1886332	-105.0137564	
251.00	1.05	156.98	250.97	-2.72	1.57	14,595,423.26	1,636,575.08	40.1886316	-105.0137553	
283.00	0.75	174.47	282.97	-3.19	1.71	14,595,422.78	1,636,575.22	40.1886303	-105.0137549	
314.00	0.70	183.70	313.96	-3.59	1.72	14,595,422.39	1,636,575.22	40.1886292	-105.0137548	
346.00	0.18	175.09	345.96	-3.83	1.71	14,595,422.14	1,636,575.22	40.1886285	-105.0137549	
377.00	0.70	12.93	376.96	-3.69	1.75	14,595,422.28	1,636,575.26	40.1886289	-105.0137547	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
409.00	1.14	9.59	408.96	-3.19	1.85	14,595,422.78	1,636,575.36	40.1886303	-105.0137543
441.00	1.41	13.63	440.95	-2.49	2.00	14,595,423.48	1,636,575.50	40.1886322	-105.0137538
472.00	1.67	6.42	471.94	-1.67	2.14	14,595,424.30	1,636,575.65	40.1886344	-105.0137533
504.00	1.67	11.43	503.93	-0.75	2.28	14,595,425.22	1,636,575.79	40.1886370	-105.0137528
535.00	1.89	5.72	534.91	0.20	2.42	14,595,426.17	1,636,575.93	40.1886396	-105.0137523
567.00	1.98	11.08	566.89	1.26	2.58	14,595,427.24	1,636,576.09	40.1886425	-105.0137517
599.00	2.42	7.30	598.87	2.48	2.77	14,595,428.45	1,636,576.28	40.1886458	-105.0137510
631.00	2.59	8.09	630.84	3.86	2.96	14,595,429.84	1,636,576.47	40.1886496	-105.0137504
663.00	3.16	5.46	662.80	5.46	3.15	14,595,431.43	1,636,576.66	40.1886540	-105.0137497
694.00	3.43	7.65	693.75	7.23	3.35	14,595,433.20	1,636,576.86	40.1886589	-105.0137490
726.00	3.78	6.25	725.68	9.22	3.59	14,595,435.20	1,636,577.10	40.1886644	-105.0137481
758.00	3.91	8.53	757.61	11.35	3.87	14,595,437.32	1,636,577.38	40.1886702	-105.0137471
790.00	4.44	8.36	789.53	13.66	4.21	14,595,439.63	1,636,577.72	40.1886765	-105.0137459
822.00	4.88	5.98	821.42	16.24	4.53	14,595,442.21	1,636,578.04	40.1886836	-105.0137447
853.00	5.23	5.19	852.30	18.95	4.80	14,595,444.93	1,636,578.31	40.1886911	-105.0137438
885.00	5.71	4.31	884.15	21.99	5.05	14,595,447.97	1,636,578.56	40.1886994	-105.0137429
917.00	6.06	7.48	915.99	25.26	5.39	14,595,451.23	1,636,578.90	40.1887084	-105.0137417
948.00	6.72	9.59	946.79	28.67	5.91	14,595,454.64	1,636,579.42	40.1887178	-105.0137398
980.00	7.03	10.20	978.56	32.44	6.56	14,595,458.41	1,636,580.08	40.1887281	-105.0137375
1,012.00	7.21	10.12	1,010.32	36.34	7.26	14,595,462.32	1,636,580.78	40.1887388	-105.0137350
1,044.00	7.60	9.06	1,042.05	40.41	7.95	14,595,466.38	1,636,581.46	40.1887500	-105.0137325
1,075.00	7.56	7.74	1,072.78	44.46	8.55	14,595,470.43	1,636,582.06	40.1887611	-105.0137304
1,107.00	7.60	7.65	1,104.50	48.64	9.11	14,595,474.61	1,636,582.63	40.1887726	-105.0137283
1,139.00	7.56	7.65	1,136.22	52.82	9.67	14,595,478.79	1,636,583.19	40.1887841	-105.0137263
1,170.00	8.04	7.83	1,166.93	56.99	10.24	14,595,482.96	1,636,583.76	40.1887955	-105.0137243
1,202.00	9.01	8.97	1,198.58	61.68	10.94	14,595,487.66	1,636,584.45	40.1888084	-105.0137218
1,234.00	9.27	8.53	1,230.17	66.71	11.71	14,595,492.68	1,636,585.23	40.1888222	-105.0137190
1,266.00	9.58	7.92	1,261.74	71.89	12.46	14,595,497.87	1,636,585.98	40.1888365	-105.0137164
1,298.00	9.89	8.09	1,293.28	77.25	13.21	14,595,503.22	1,636,586.73	40.1888512	-105.0137137
1,329.00	9.49	8.27	1,323.84	82.42	13.96	14,595,508.39	1,636,587.48	40.1888654	-105.0137110
1,361.00	9.23	8.09	1,355.41	87.57	14.70	14,595,513.54	1,636,588.22	40.1888795	-105.0137084
1,393.00	10.28	9.94	1,386.95	92.92	15.55	14,595,518.89	1,636,589.07	40.1888942	-105.0137053
1,425.00	10.72	10.29	1,418.41	98.66	16.57	14,595,524.63	1,636,590.10	40.1889100	-105.0137016
1,456.00	11.03	10.56	1,448.85	104.41	17.63	14,595,530.38	1,636,591.16	40.1889258	-105.0136978
1,488.00	10.63	9.50	1,480.28	110.33	18.68	14,595,536.31	1,636,592.21	40.1889420	-105.0136941
1,519.00	10.59	7.13	1,510.75	115.98	19.51	14,595,541.95	1,636,593.03	40.1889575	-105.0136911
1,551.00	10.81	7.22	1,542.20	121.88	20.25	14,595,547.85	1,636,593.78	40.1889737	-105.0136885
1,583.00	11.25	7.30	1,573.61	127.95	21.02	14,595,553.92	1,636,594.55	40.1889904	-105.0136857
1,615.00	11.25	7.22	1,604.99	134.14	21.81	14,595,560.11	1,636,595.34	40.1890074	-105.0136829
1,646.00	11.21	7.57	1,635.40	140.13	22.59	14,595,566.10	1,636,596.12	40.1890238	-105.0136801
1,678.00	11.51	8.62	1,666.77	146.37	23.48	14,595,572.34	1,636,597.01	40.1890410	-105.0136769
1,710.00	12.00	8.89	1,698.10	152.81	24.47	14,595,578.78	1,636,598.00	40.1890587	-105.0136734
1,742.00	11.25	7.22	1,729.44	159.20	25.38	14,595,585.16	1,636,598.91	40.1890762	-105.0136701
1,773.00	10.99	7.30	1,759.86	165.13	26.13	14,595,591.10	1,636,599.66	40.1890925	-105.0136674
1,805.00	11.07	7.92	1,791.27	171.20	26.94	14,595,597.16	1,636,600.48	40.1891091	-105.0136645
1,837.00	10.28	6.69	1,822.72	177.07	27.70	14,595,603.04	1,636,601.23	40.1891253	-105.0136618
1,869.00	9.76	7.92	1,854.23	182.60	28.40	14,595,608.56	1,636,601.94	40.1891405	-105.0136593
1,900.00	8.79	10.73	1,884.82	187.53	29.21	14,595,613.49	1,636,602.74	40.1891540	-105.0136564
1,932.00	8.13	13.28	1,916.47	192.13	30.18	14,595,618.10	1,636,603.72	40.1891666	-105.0136529
1,964.00	7.25	14.69	1,948.19	196.29	31.21	14,595,622.25	1,636,604.75	40.1891781	-105.0136492
1,995.00	6.42	12.84	1,978.97	199.87	32.10	14,595,625.84	1,636,605.63	40.1891879	-105.0136460
2,027.00	5.41	7.48	2,010.80	203.11	32.69	14,595,629.08	1,636,606.23	40.1891968	-105.0136439
2,059.00	4.88	0.10	2,042.67	205.97	32.89	14,595,631.93	1,636,606.43	40.1892046	-105.0136432
2,091.00	4.88	357.11	2,074.55	208.69	32.82	14,595,634.65	1,636,606.36	40.1892121	-105.0136434
2,122.00	4.66	359.39	2,105.44	211.26	32.74	14,595,637.23	1,636,606.28	40.1892192	-105.0136437

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,154.00	4.35	6.78	2,137.35	213.77	32.87	14,595,639.73	1,636,606.41	40.1892261	-105.0136433
2,185.00	3.96	8.89	2,168.26	215.99	33.18	14,595,641.96	1,636,606.72	40.1892322	-105.0136422
2,217.00	4.26	15.74	2,200.18	218.23	33.67	14,595,644.19	1,636,607.21	40.1892383	-105.0136404
2,231.00	4.22	16.00	2,214.14	219.22	33.95	14,595,645.19	1,636,607.49	40.1892410	-105.0136394
Last Total MWD Survey									
2,311.00	4.66	15.69	2,293.90	225.18	35.64	14,595,651.15	1,636,609.18	40.1892574	-105.0136333
First SDI MWD Survey									
2,489.00	3.01	358.54	2,471.50	236.82	37.48	14,595,662.78	1,636,611.02	40.1892893	-105.0136268
2,667.00	2.05	329.47	2,649.34	244.23	35.74	14,595,670.20	1,636,609.29	40.1893097	-105.0136330
2,780.00	1.23	241.30	2,762.30	245.39	33.65	14,595,671.36	1,636,607.20	40.1893129	-105.0136405
2,869.00	2.04	202.78	2,851.27	243.47	32.20	14,595,669.44	1,636,605.75	40.1893076	-105.0136457
2,958.00	1.73	218.41	2,940.22	240.96	30.75	14,595,666.92	1,636,604.30	40.1893007	-105.0136509
3,135.00	1.61	222.46	3,117.14	237.03	27.41	14,595,663.00	1,636,600.96	40.1892899	-105.0136628
3,224.00	1.61	235.52	3,206.11	235.40	25.54	14,595,661.37	1,636,599.08	40.1892855	-105.0136695
3,313.00	2.16	235.83	3,295.06	233.75	23.12	14,595,659.72	1,636,596.66	40.1892809	-105.0136782
3,402.00	2.16	234.64	3,384.00	231.84	20.37	14,595,657.81	1,636,593.91	40.1892757	-105.0136881
3,491.00	2.32	236.45	3,472.93	229.87	17.50	14,595,655.84	1,636,591.04	40.1892703	-105.0136983
3,580.00	2.51	232.04	3,561.85	227.67	14.46	14,595,653.65	1,636,588.00	40.1892642	-105.0137092
3,669.00	0.98	203.80	3,650.81	225.78	12.61	14,595,651.75	1,636,586.16	40.1892590	-105.0137158
3,758.00	1.35	220.66	3,739.79	224.29	11.62	14,595,650.26	1,636,585.17	40.1892549	-105.0137194
3,847.00	1.31	233.08	3,828.77	222.88	10.13	14,595,648.85	1,636,583.67	40.1892511	-105.0137247
3,936.00	0.07	146.88	3,917.76	222.22	9.34	14,595,648.20	1,636,582.89	40.1892493	-105.0137275
4,025.00	0.88	262.50	4,006.76	222.09	8.70	14,595,648.06	1,636,582.24	40.1892489	-105.0137298
4,114.00	1.81	252.41	4,095.73	221.58	6.68	14,595,647.55	1,636,580.22	40.1892475	-105.0137371
4,202.00	1.85	244.23	4,183.69	220.54	4.07	14,595,646.51	1,636,577.62	40.1892447	-105.0137464
4,291.00	0.54	261.26	4,272.66	219.85	2.37	14,595,645.82	1,636,575.91	40.1892428	-105.0137525
4,380.00	1.35	265.77	4,361.65	219.71	0.91	14,595,645.68	1,636,574.45	40.1892424	-105.0137577
4,468.00	0.76	347.78	4,449.64	220.20	-0.25	14,595,646.18	1,636,573.29	40.1892437	-105.0137619
4,557.00	0.91	9.03	4,538.63	221.48	-0.27	14,595,647.45	1,636,573.28	40.1892472	-105.0137619
4,646.00	1.29	320.00	4,627.62	222.94	-0.80	14,595,648.92	1,636,572.74	40.1892513	-105.0137638
4,735.00	1.22	353.62	4,716.60	224.65	-1.55	14,595,650.63	1,636,571.99	40.1892559	-105.0137665
4,823.00	1.66	349.90	4,804.57	226.84	-1.88	14,595,652.81	1,636,571.67	40.1892620	-105.0137677
4,912.00	2.25	329.08	4,893.52	229.61	-3.00	14,595,655.58	1,636,570.54	40.1892696	-105.0137717
5,001.00	1.40	309.04	4,982.47	231.79	-4.74	14,595,657.76	1,636,568.80	40.1892755	-105.0137779
5,090.00	1.53	272.95	5,071.44	232.54	-6.77	14,595,658.51	1,636,566.77	40.1892776	-105.0137852
5,179.00	2.12	280.87	5,160.40	232.91	-9.58	14,595,658.88	1,636,563.97	40.1892786	-105.0137953
5,268.00	1.87	248.62	5,249.35	232.69	-12.54	14,595,658.66	1,636,561.00	40.1892780	-105.0138059
5,356.00	1.61	269.82	5,337.31	232.16	-15.12	14,595,658.14	1,636,558.43	40.1892766	-105.0138151
5,445.00	0.24	292.87	5,426.29	232.23	-16.54	14,595,658.21	1,636,557.00	40.1892768	-105.0138202
5,534.00	0.11	335.44	5,515.29	232.38	-16.75	14,595,658.36	1,636,556.80	40.1892772	-105.0138209
5,623.00	0.82	299.25	5,604.29	232.77	-17.34	14,595,658.74	1,636,556.21	40.1892782	-105.0138231
5,712.00	1.00	300.27	5,693.28	233.47	-18.56	14,595,659.45	1,636,554.98	40.1892802	-105.0138274
5,800.00	1.25	295.70	5,781.26	234.27	-20.09	14,595,660.25	1,636,553.45	40.1892824	-105.0138329
5,889.00	1.47	281.94	5,870.24	234.93	-22.08	14,595,660.91	1,636,551.46	40.1892842	-105.0138400
5,978.00	0.03	46.71	5,959.23	235.18	-23.18	14,595,661.16	1,636,550.36	40.1892849	-105.0138440
6,067.00	0.33	269.74	6,048.23	235.20	-23.42	14,595,661.18	1,636,550.12	40.1892849	-105.0138448
6,156.00	0.84	274.42	6,137.22	235.25	-24.33	14,595,661.22	1,636,549.21	40.1892850	-105.0138481
6,180.00	1.82	230.37	6,161.22	235.02	-24.80	14,595,660.99	1,636,548.74	40.1892844	-105.0138498
Curve KOP									
6,245.00	5.37	213.22	6,226.08	231.81	-27.26	14,595,657.79	1,636,546.28	40.1892756	-105.0138586
6,301.00	7.84	220.83	6,281.70	226.73	-31.20	14,595,652.71	1,636,542.34	40.1892616	-105.0138727
First SDI MWD Curve Survey									
6,333.00	9.29	223.35	6,313.35	223.20	-34.40	14,595,649.18	1,636,539.14	40.1892520	-105.0138841
6,422.00	11.78	236.01	6,400.85	212.89	-46.87	14,595,638.87	1,636,526.67	40.1892237	-105.0139288

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,511.00	16.45	219.77	6,487.17	198.11	-62.48	14,595,624.10	1,636,511.06	40.1891831	-105.0139847
6,600.00	19.96	211.11	6,571.72	175.41	-78.39	14,595,601.40	1,636,495.14	40.1891207	-105.0140417
6,689.00	25.31	204.21	6,653.85	145.03	-94.06	14,595,571.01	1,636,479.47	40.1890373	-105.0140978
6,753.00	30.02	200.61	6,710.52	117.55	-105.31	14,595,543.54	1,636,468.22	40.1889618	-105.0141381
6,842.00	44.67	189.88	6,781.16	65.55	-118.60	14,595,491.54	1,636,454.92	40.1888190	-105.0141856
6,931.00	57.68	180.51	6,836.91	-3.26	-124.34	14,595,422.73	1,636,449.17	40.1886301	-105.0142062
7,020.00	71.87	170.26	6,874.83	-83.13	-117.47	14,595,342.86	1,636,456.03	40.1884107	-105.0141816
7,114.49	81.94	166.34	6,896.21	-173.10	-98.77	14,595,252.89	1,636,474.71	40.1881637	-105.0141146
Enter Land Box : 7114.49' MD & 6896.21' TVD									
7,133.00	83.92	165.60	6,898.49	-190.92	-94.31	14,595,235.07	1,636,479.17	40.1881147	-105.0140987
7,222.00	84.46	165.07	6,907.50	-276.58	-71.90	14,595,149.41	1,636,501.57	40.1878795	-105.0140184
7,311.00	85.30	165.03	6,915.44	-362.22	-49.03	14,595,063.76	1,636,524.42	40.1876443	-105.0139365
7,400.00	85.94	165.11	6,922.24	-447.97	-26.17	14,594,978.01	1,636,547.27	40.1874089	-105.0138547
7,456.00	86.02	166.85	6,926.17	-502.16	-12.63	14,594,923.81	1,636,560.80	40.1872600	-105.0138062
Landing Point : 794' FNL 988' FWL Sec 33 - Last SDI MWD Curve Survey									
7,489.00	86.07	167.87	6,928.44	-534.29	-5.43	14,594,891.69	1,636,568.00	40.1871718	-105.0137804
7,545.00	86.18	169.00	6,932.23	-589.02	5.77	14,594,836.95	1,636,579.19	40.1870215	-105.0137403
First SDI MWD Lateral Survey									
7,578.00	86.24	169.67	6,934.41	-621.38	11.87	14,594,804.59	1,636,585.28	40.1869327	-105.0137185
7,667.00	85.16	172.78	6,941.09	-709.08	25.40	14,594,716.89	1,636,598.80	40.1866918	-105.0136700
7,755.00	85.06	175.25	6,948.59	-796.27	34.55	14,594,629.69	1,636,607.93	40.1864524	-105.0136373
7,844.00	86.07	177.85	6,955.47	-884.84	39.88	14,594,541.13	1,636,613.25	40.1862092	-105.0136182
7,933.00	86.74	178.36	6,961.05	-973.61	42.82	14,594,452.35	1,636,616.18	40.1859654	-105.0136077
8,022.00	87.01	177.75	6,965.90	-1,062.43	45.84	14,594,363.54	1,636,619.18	40.1857215	-105.0135969
8,110.00	86.64	179.97	6,970.78	-1,150.27	47.59	14,594,275.70	1,636,620.91	40.1854803	-105.0135906
8,199.00	87.45	181.91	6,975.37	-1,239.14	46.13	14,594,186.83	1,636,619.44	40.1852362	-105.0135958
8,288.00	88.79	181.85	6,978.29	-1,328.04	43.21	14,594,097.93	1,636,616.51	40.1849921	-105.0136063
8,354.83	88.06	181.67	6,980.12	-1,394.81	41.16	14,594,031.16	1,636,614.45	40.1848087	-105.0136136
Exit 460' Circle : 8354.83' MD & 6980.12' TVD 1761' FNL 1042' FWL									
8,377.00	87.82	181.61	6,980.92	-1,416.96	40.52	14,594,009.01	1,636,613.81	40.1847479	-105.0136159
8,465.00	88.96	181.72	6,983.39	-1,504.88	37.97	14,593,921.09	1,636,611.24	40.1845065	-105.0136250
8,554.00	84.89	181.17	6,988.16	-1,593.71	35.73	14,593,832.26	1,636,608.99	40.1842625	-105.0136331
8,643.00	84.42	180.34	6,996.46	-1,682.31	34.56	14,593,743.66	1,636,607.80	40.1840192	-105.0136372
8,732.00	85.37	180.53	7,004.37	-1,770.96	33.88	14,593,655.01	1,636,607.12	40.1837758	-105.0136397
8,820.00	85.23	180.40	7,011.58	-1,858.66	33.17	14,593,567.31	1,636,606.39	40.1835350	-105.0136422
8,909.00	87.31	180.34	7,017.37	-1,947.46	32.60	14,593,478.51	1,636,605.81	40.1832911	-105.0136443
8,998.00	87.99	180.39	7,021.02	-2,036.39	32.03	14,593,389.59	1,636,605.23	40.1830469	-105.0136463
9,087.00	88.86	180.34	7,023.47	-2,125.35	31.47	14,593,300.62	1,636,604.64	40.1828026	-105.0136483
9,176.00	87.25	179.64	7,026.49	-2,214.29	31.48	14,593,211.68	1,636,604.65	40.1825584	-105.0136483
9,265.00	86.74	178.98	7,031.16	-2,303.17	32.55	14,593,122.81	1,636,605.70	40.1823143	-105.0136444
9,354.00	86.57	178.06	7,036.35	-2,391.98	34.85	14,593,033.99	1,636,607.98	40.1820704	-105.0136362
9,443.00	86.47	177.61	7,041.75	-2,480.76	38.20	14,592,945.22	1,636,611.33	40.1818266	-105.0136242
9,531.00	87.01	179.97	7,046.76	-2,568.59	40.06	14,592,857.39	1,636,613.17	40.1815854	-105.0136176
9,620.00	87.48	180.01	7,051.03	-2,657.48	40.07	14,592,768.49	1,636,613.17	40.1813413	-105.0136175
9,709.00	87.85	178.70	7,054.66	-2,746.40	41.07	14,592,679.57	1,636,614.16	40.1810971	-105.0136139
9,798.00	89.09	177.16	7,057.04	-2,835.31	44.29	14,592,590.66	1,636,617.36	40.1808530	-105.0136024
9,886.00	86.88	177.72	7,060.13	-2,923.16	48.22	14,592,502.81	1,636,621.27	40.1806117	-105.0135883
9,975.00	87.15	178.03	7,064.77	-3,011.98	51.51	14,592,413.99	1,636,624.55	40.1803678	-105.0135766
10,064.00	85.13	180.52	7,070.76	-3,100.76	52.64	14,592,325.21	1,636,625.66	40.1801240	-105.0135725
10,153.00	84.56	182.24	7,078.75	-3,189.37	50.50	14,592,236.60	1,636,623.52	40.1798807	-105.0135802
10,242.00	86.41	183.42	7,085.76	-3,277.98	46.12	14,592,148.00	1,636,619.12	40.1796374	-105.0135958
10,331.00	88.12	182.37	7,090.01	-3,366.76	41.63	14,592,059.22	1,636,614.62	40.1793936	-105.0136119
10,420.00	89.87	181.32	7,091.57	-3,455.69	38.77	14,591,970.28	1,636,611.74	40.1791493	-105.0136222
10,509.00	90.54	180.47	7,091.25	-3,544.68	37.38	14,591,881.29	1,636,610.34	40.1789050	-105.0136272

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,598.00	88.56	179.84	7,091.95	-3,633.67	37.14	14,591,792.30	1,636,610.08	40.1786606	-105.0136280
10,686.00	86.30	179.98	7,095.89	-3,721.58	37.28	14,591,704.40	1,636,610.21	40.1784192	-105.0136275
10,775.00	85.07	180.12	7,102.59	-3,810.32	37.20	14,591,615.65	1,636,610.11	40.1781755	-105.0136278
10,864.00	87.59	179.98	7,108.29	-3,899.13	37.12	14,591,526.84	1,636,610.02	40.1779316	-105.0136281
10,953.00	84.49	180.55	7,114.43	-3,987.91	36.71	14,591,438.07	1,636,609.60	40.1776878	-105.0136295
11,042.00	83.75	180.09	7,123.55	-4,076.44	36.22	14,591,349.54	1,636,609.09	40.1774447	-105.0136313
11,131.00	84.39	180.07	7,132.75	-4,164.96	36.09	14,591,261.01	1,636,608.95	40.1772016	-105.0136318
11,220.00	84.86	179.98	7,141.08	-4,253.57	36.05	14,591,172.40	1,636,608.90	40.1769583	-105.0136319
11,309.00	85.84	179.97	7,148.30	-4,342.28	36.09	14,591,083.70	1,636,608.93	40.1767147	-105.0136318
11,398.00	86.55	179.94	7,154.20	-4,431.08	36.16	14,590,994.90	1,636,608.98	40.1764708	-105.0136315
11,487.00	86.68	179.71	7,159.46	-4,519.92	36.43	14,590,906.05	1,636,609.24	40.1762269	-105.0136305
11,576.00	86.61	179.35	7,164.67	-4,608.77	37.16	14,590,817.21	1,636,609.96	40.1759829	-105.0136279
11,665.00	85.47	179.97	7,170.81	-4,697.55	37.69	14,590,728.42	1,636,610.47	40.1757391	-105.0136260
11,754.00	86.11	179.23	7,177.35	-4,786.31	38.31	14,590,639.67	1,636,611.08	40.1754953	-105.0136238
11,843.00	86.55	180.31	7,183.04	-4,875.12	38.67	14,590,550.85	1,636,611.42	40.1752514	-105.0136226
11,931.00	86.91	179.34	7,188.06	-4,962.98	38.93	14,590,463.00	1,636,611.67	40.1750102	-105.0136216
12,020.00	87.28	180.65	7,192.57	-5,051.86	38.94	14,590,374.11	1,636,611.67	40.1747661	-105.0136216
12,109.00	87.75	180.70	7,196.43	-5,140.77	37.89	14,590,285.20	1,636,610.61	40.1745219	-105.0136253
12,198.00	88.73	180.07	7,199.17	-5,229.73	37.30	14,590,196.25	1,636,609.99	40.1742777	-105.0136275
12,287.00	86.37	180.22	7,202.97	-5,318.64	37.07	14,590,107.34	1,636,609.76	40.1740335	-105.0136283
12,375.00	86.98	181.58	7,208.08	-5,406.48	35.69	14,590,019.50	1,636,608.36	40.1737923	-105.0136332
12,464.00	85.40	179.59	7,213.99	-5,495.27	34.78	14,589,930.71	1,636,607.44	40.1735485	-105.0136365
12,553.00	85.80	177.95	7,220.82	-5,583.98	36.69	14,589,841.99	1,636,609.33	40.1733048	-105.0136296
12,642.00	88.79	179.42	7,225.02	-5,672.85	38.73	14,589,753.13	1,636,611.36	40.1730608	-105.0136223
12,730.00	89.87	180.91	7,226.05	-5,760.84	38.47	14,589,665.14	1,636,611.09	40.1728192	-105.0136232
12,819.00	90.27	180.74	7,225.94	-5,849.83	37.19	14,589,576.15	1,636,609.79	40.1725748	-105.0136278
12,908.00	90.80	179.78	7,225.11	-5,938.82	36.79	14,589,487.16	1,636,609.38	40.1723304	-105.0136293
12,915.87	90.69	179.86	7,225.01	-5,946.69	36.81	14,589,479.29	1,636,609.40	40.1723088	-105.0136292
Enter 460' Circle : 12915.87' MD & 7225.01' TVD 941' FNL 1055' FWL									
12,997.00	89.50	180.63	7,224.87	-6,027.82	36.47	14,589,398.16	1,636,609.04	40.1720860	-105.0136304
13,085.00	89.36	181.23	7,225.75	-6,115.80	35.04	14,589,310.18	1,636,607.60	40.1718444	-105.0136355
13,174.00	90.03	180.27	7,226.22	-6,204.79	33.88	14,589,221.19	1,636,606.42	40.1716000	-105.0136397
13,264.00	90.47	179.87	7,225.83	-6,294.79	33.77	14,589,131.19	1,636,606.30	40.1713529	-105.0136401
13,353.00	90.57	178.98	7,225.02	-6,383.78	34.66	14,589,042.20	1,636,607.18	40.1711085	-105.0136369
13,441.00	89.20	180.52	7,225.20	-6,471.78	35.04	14,588,954.20	1,636,607.55	40.1708669	-105.0136355
13,530.00	89.60	180.36	7,226.13	-6,560.77	34.36	14,588,865.21	1,636,606.85	40.1706225	-105.0136380
13,619.00	90.44	180.13	7,226.10	-6,649.77	33.98	14,588,776.21	1,636,606.46	40.1703781	-105.0136393
13,707.00	91.27	179.51	7,224.79	-6,737.76	34.26	14,588,688.23	1,636,606.72	40.1701365	-105.0136383
13,796.00	92.24	178.82	7,222.06	-6,826.70	35.55	14,588,599.28	1,636,608.00	40.1698922	-105.0136337
13,885.00	93.22	177.79	7,217.82	-6,915.56	38.18	14,588,510.42	1,636,610.62	40.1696482	-105.0136243
13,939.00	94.13	177.94	7,214.36	-6,969.41	40.19	14,588,456.57	1,636,612.62	40.1695003	-105.0136171
Last SDI MWD Survey									
13,995.00	94.13	177.94	7,210.33	-7,025.23	42.20	14,588,400.75	1,636,614.62	40.1693470	-105.0136099
Projection to TD : 2020' FNL 1061' FWL Sec 4									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,271.00	2,254.03	Surface Casing	9.625	12.250	
13,995.00	7,210.33	Production Casing	5.500	8.500	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N1-4HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Site:	3N-68W-33 Hergenreder 4-33H Pad	MD Reference:	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
Well:	Hergenreder 22N1-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
125.00	125.00	-0.44	0.38	First Total MWD Survey
2,231.00	2,214.14	219.22	33.95	Last Total MWD Survey
2,311.00	2,293.90	225.18	35.64	First SDI MWD Survey
6,180.00	6,161.22	235.02	-24.80	Curve KOP
6,301.00	6,281.70	226.73	-31.20	First SDI MWD Curve Survey
7,114.49	6,896.21	-173.10	-98.77	Enter Land Box : 7114.49' MD & 6896.21' TVD
7,456.00	6,926.17	-502.16	-12.63	Landing Point : 794' FNL 988' FWL Sec 33
7,456.00	6,926.17	-502.16	-12.63	Last SDI MWD Curve Survey
7,545.00	6,932.23	-589.02	5.77	First SDI MWD Lateral Survey
8,354.83	6,980.12	-1,394.81	41.16	Exit 460' Circle : 8354.83' MD & 6980.12' TVD 1761' FNL 1042' FWL
12,915.87	7,225.01	-5,946.69	36.81	Enter 460' Circle : 12915.87' MD & 7225.01' TVD 941' FNL 1055' FWL
13,939.00	7,214.36	-6,969.41	40.19	Last SDI MWD Survey
13,995.00	7,210.33	-7,025.23	42.20	Projection to TD : 2020' FNL 1061' FWL Sec 4

Checked By: _____	Approved By: _____	Date: _____
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