

Wellbore: OH
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 5N-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
14595469.31	1636562.35	40.1887580	-105.0138010

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
124.99	125.00	1.10	157.33	-1.11	0.46	First Total MWD Survey
2218.93	2243.00	3.38	320.28	178.62	-203.75	Last Total MWD Survey
2284.82	2309.00	3.24	318.03	181.50	-206.24	First SDI MWD Survey
6219.02	6244.00	1.24	202.69	170.49	-220.21	Curve KOP
6273.89	6299.00	6.05	184.85	167.05	-220.69	First SDI MWD Curve Survey
6847.49	7013.91	56.82	178.52	-217.88	-210.03	Enter Land Box : 7013.91' MD & 6847.49' TVD
6967.99	7400.00	86.23	181.01	-579.65	-208.26	Landing Point : 824' FNL 782' FWL Sec 33
6971.18	7455.00	87.12	180.77	-634.55	-209.11	Last SDI MWD Curve Survey
6975.74	7544.00	86.09	180.22	-723.42	-209.93	First SDI MWD Lateral Survey
7023.40	8364.19	86.68	181.02	-1541.94	-221.74	Cross 460' Line : 8364.19' MD & 7023.40' TVD 1786' FNL 768' FWL
7224.12	12725.96	89.29	180.44	-5897.37	-205.33	Cross 460' Line : 12725.96' MD & 7224.12' TVD 847' FNL 799' FWL
7273.50	13816.00	89.09	181.31	-6985.82	-227.86	Last SDI MWD Survey
7274.39	13872.00	89.09	181.31	-7041.80	-229.14	Projection to TD : 1991' FNL 778' FWL Sec 4

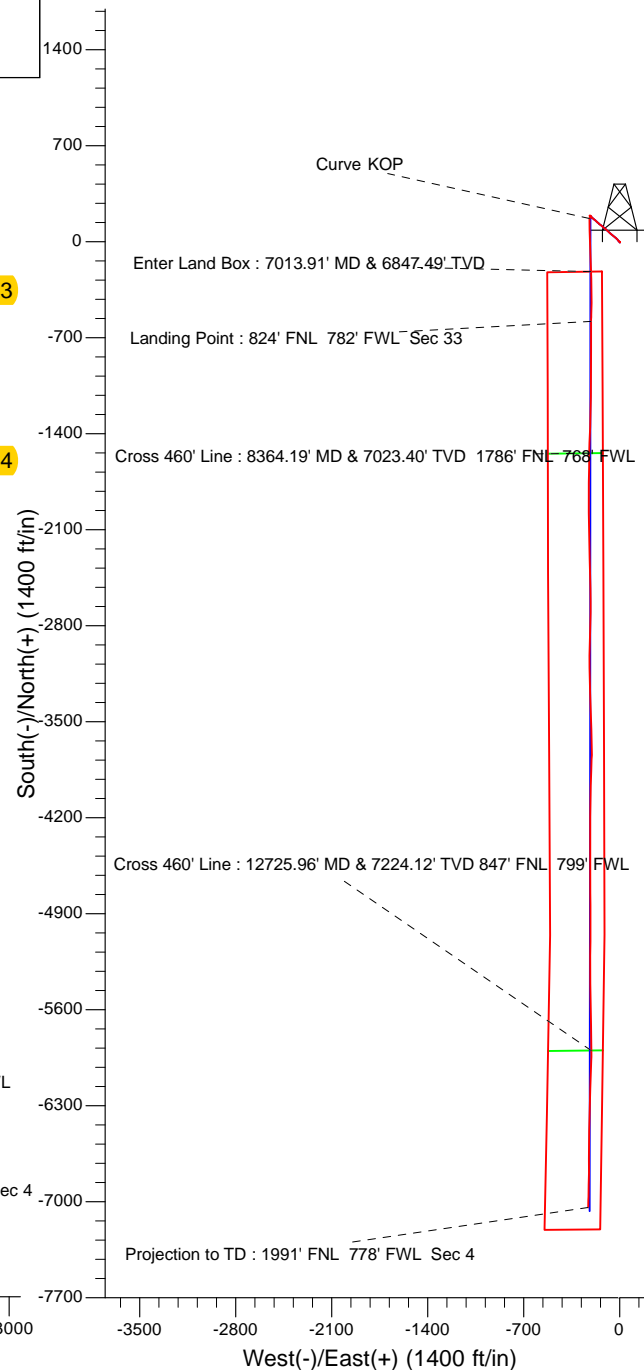
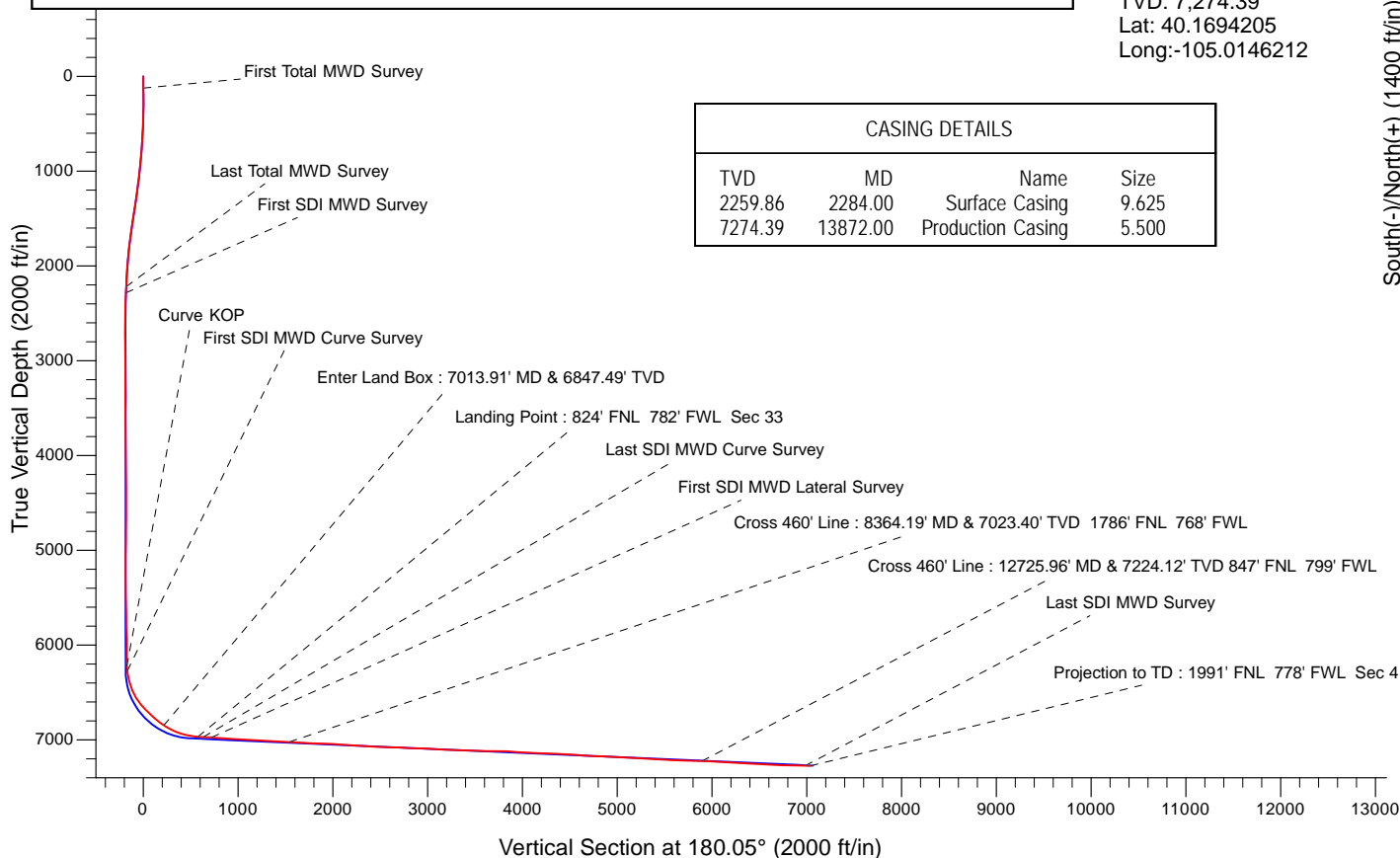
Surface Location:
 247' FNL 991' FWL
 Sec 33 T3N R68W

Landing Point:
 824' FNL 782' FWL Sec 33
 MD: 7,400.00
 TVD: 6,967.99
 Lat: 40.1871663
 Long: -105.0145466

BHL:
 1991' FNL 778' FWL Sec 4
 MD: 13,872.00
 TVD: 7,274.39
 Lat: 40.1694205
 Long: -105.0146212

CASING DETAILS

TVD	MD	Name	Size
2259.86	2284.00	Surface Casing	9.625
7274.39	13872.00	Production Casing	5.500





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

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

Hergenreder 5N-4HZ

OH

Design: OH

Survey Report - Geographic

23 February, 2018



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-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 5N-4HZ, 247' FNL 991' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,469.31 usft	Latitude:	40.1887580
	+E/-W	0.00 ft	Easting:	1,636,562.34 usft	Longitude:	-105.0138010
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	180.05	

Survey Program	Date	2/23/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	2,243.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,309.00	13,872.00	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	14,595,469.31	1,636,562.34	40.1887580	-105.0138010	
125.00	1.10	157.33	124.99	-1.11	0.46	14,595,468.20	1,636,562.81	40.1887550	-105.0137993	
First Total MWD Survey										
156.00	1.71	146.61	155.98	-1.77	0.83	14,595,467.54	1,636,563.17	40.1887532	-105.0137980	
188.00	1.71	148.46	187.97	-2.57	1.34	14,595,466.74	1,636,563.69	40.1887510	-105.0137962	
220.00	0.75	125.08	219.96	-3.10	1.77	14,595,466.21	1,636,564.11	40.1887495	-105.0137947	
251.00	0.35	125.52	250.96	-3.27	2.01	14,595,466.04	1,636,564.35	40.1887490	-105.0137938	
283.00	0.53	121.30	282.96	-3.41	2.21	14,595,465.90	1,636,564.56	40.1887487	-105.0137930	
314.00	0.44	345.24	313.96	-3.37	2.31	14,595,465.94	1,636,564.65	40.1887488	-105.0137927	
346.00	1.19	307.71	345.95	-3.04	2.01	14,595,466.27	1,636,564.36	40.1887497	-105.0137938	
377.00	2.07	317.47	376.94	-2.43	1.38	14,595,466.88	1,636,563.72	40.1887513	-105.0137960	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-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	2.07	312.46	408.92	-1.62	0.56	14,595,467.69	1,636,562.91	40.1887536	-105.0137990	
441.00	2.37	316.24	440.90	-0.75	-0.32	14,595,468.56	1,636,562.02	40.1887560	-105.0138021	
504.00	2.68	310.26	503.84	1.14	-2.35	14,595,470.45	1,636,560.00	40.1887612	-105.0138094	
535.00	3.08	311.49	534.80	2.16	-3.52	14,595,471.47	1,636,558.82	40.1887640	-105.0138136	
567.00	3.16	312.20	566.75	3.32	-4.82	14,595,472.63	1,636,557.52	40.1887672	-105.0138182	
599.00	3.52	313.16	598.70	4.59	-6.19	14,595,473.90	1,636,556.15	40.1887706	-105.0138231	
631.00	4.09	318.88	630.62	6.12	-7.66	14,595,475.43	1,636,554.69	40.1887748	-105.0138284	
663.00	4.44	316.94	662.54	7.89	-9.25	14,595,477.20	1,636,553.09	40.1887797	-105.0138341	
694.00	4.97	324.94	693.43	9.86	-10.84	14,595,479.17	1,636,551.50	40.1887851	-105.0138398	
726.00	5.41	323.80	725.30	12.21	-12.53	14,595,481.52	1,636,549.81	40.1887916	-105.0138458	
758.00	5.93	321.25	757.14	14.72	-14.46	14,595,484.03	1,636,547.89	40.1887985	-105.0138527	
790.00	6.50	318.79	788.96	17.37	-16.69	14,595,486.68	1,636,545.66	40.1888057	-105.0138607	
821.00	6.77	319.14	819.75	20.07	-19.04	14,595,489.39	1,636,543.31	40.1888132	-105.0138691	
853.00	7.34	316.15	851.51	22.97	-21.69	14,595,492.29	1,636,540.66	40.1888211	-105.0138786	
885.00	8.22	312.55	883.21	26.00	-24.79	14,595,495.31	1,636,537.56	40.1888294	-105.0138897	
917.00	8.57	309.12	914.87	29.05	-28.32	14,595,498.36	1,636,534.02	40.1888378	-105.0139024	
948.00	9.10	308.06	945.50	32.02	-32.05	14,595,501.33	1,636,530.30	40.1888459	-105.0139157	
980.00	9.14	308.50	977.10	35.16	-36.03	14,595,504.47	1,636,526.32	40.1888546	-105.0139300	
1,012.00	9.10	307.27	1,008.69	38.27	-40.03	14,595,507.59	1,636,522.32	40.1888631	-105.0139443	
1,044.00	9.89	308.06	1,040.25	41.50	-44.21	14,595,510.81	1,636,518.14	40.1888720	-105.0139593	
1,075.00	10.59	308.59	1,070.76	44.92	-48.53	14,595,514.23	1,636,513.82	40.1888814	-105.0139747	
1,139.00	11.82	311.23	1,133.54	52.91	-58.06	14,595,522.22	1,636,504.29	40.1889033	-105.0140089	
1,170.00	11.21	307.98	1,163.91	56.85	-62.82	14,595,526.17	1,636,499.53	40.1889142	-105.0140259	
1,202.00	10.98	309.65	1,195.32	60.71	-67.62	14,595,530.03	1,636,494.73	40.1889247	-105.0140431	
1,234.00	11.60	311.40	1,226.70	64.78	-72.38	14,595,534.10	1,636,489.98	40.1889359	-105.0140601	
1,266.00	11.87	312.37	1,258.03	69.13	-77.22	14,595,538.45	1,636,485.13	40.1889479	-105.0140775	
1,298.00	12.48	313.78	1,289.31	73.74	-82.15	14,595,543.06	1,636,480.20	40.1889605	-105.0140951	
1,329.00	12.66	314.22	1,319.57	78.43	-87.00	14,595,547.75	1,636,475.35	40.1889734	-105.0141125	
1,361.00	12.48	313.60	1,350.80	83.26	-92.02	14,595,552.58	1,636,470.34	40.1889867	-105.0141305	
1,393.00	12.70	312.72	1,382.03	88.03	-97.11	14,595,557.35	1,636,465.25	40.1889998	-105.0141487	
1,424.00	13.54	309.91	1,412.22	92.67	-102.40	14,595,561.99	1,636,459.96	40.1890125	-105.0141676	
1,456.00	13.97	310.17	1,443.30	97.56	-108.22	14,595,566.89	1,636,454.14	40.1890259	-105.0141885	
1,488.00	13.84	309.73	1,474.36	102.50	-114.12	14,595,571.83	1,636,448.24	40.1890395	-105.0142096	
1,519.00	13.45	308.24	1,504.49	107.10	-119.80	14,595,576.43	1,636,442.56	40.1890521	-105.0142299	
1,551.00	13.54	308.86	1,535.61	111.76	-125.64	14,595,581.08	1,636,436.72	40.1890649	-105.0142508	
1,583.00	14.11	309.65	1,566.68	116.59	-131.56	14,595,585.92	1,636,430.80	40.1890782	-105.0142720	
1,615.00	12.96	307.80	1,597.79	121.28	-137.40	14,595,590.61	1,636,424.96	40.1890911	-105.0142930	
1,646.00	12.74	309.38	1,628.01	125.58	-142.79	14,595,594.91	1,636,419.58	40.1891029	-105.0143122	
1,678.00	11.38	310.61	1,659.31	129.88	-147.91	14,595,599.21	1,636,414.45	40.1891147	-105.0143306	
1,710.00	11.51	310.97	1,690.67	134.02	-152.72	14,595,603.36	1,636,409.65	40.1891261	-105.0143478	
1,741.00	11.60	311.76	1,721.04	138.13	-157.38	14,595,607.46	1,636,404.99	40.1891373	-105.0143645	
1,773.00	10.28	311.58	1,752.46	142.17	-161.91	14,595,611.50	1,636,400.45	40.1891484	-105.0143807	
1,805.00	9.93	312.55	1,783.96	145.93	-166.08	14,595,615.26	1,636,396.28	40.1891588	-105.0143957	
1,837.00	8.57	312.46	1,815.55	149.40	-169.88	14,595,618.74	1,636,392.49	40.1891683	-105.0144092	
1,869.00	8.17	312.11	1,847.21	152.54	-173.32	14,595,621.87	1,636,389.05	40.1891769	-105.0144216	
1,900.00	8.13	310.79	1,877.89	155.45	-176.61	14,595,624.78	1,636,385.75	40.1891849	-105.0144334	
1,932.00	7.95	310.53	1,909.58	158.36	-180.01	14,595,627.70	1,636,382.36	40.1891929	-105.0144455	
1,963.00	7.03	310.35	1,940.31	160.98	-183.09	14,595,630.32	1,636,379.28	40.1892001	-105.0144565	
1,995.00	6.99	311.49	1,972.07	163.54	-186.04	14,595,632.88	1,636,376.33	40.1892071	-105.0144671	
2,027.00	6.86	311.40	2,003.84	166.09	-188.93	14,595,635.43	1,636,373.44	40.1892141	-105.0144775	
2,059.00	5.93	307.80	2,035.64	168.37	-191.67	14,595,637.71	1,636,370.70	40.1892204	-105.0144873	
2,091.00	5.58	304.99	2,067.48	170.28	-194.25	14,595,639.62	1,636,368.12	40.1892256	-105.0144965	
2,122.00	5.76	308.24	2,098.33	172.10	-196.71	14,595,641.44	1,636,365.67	40.1892306	-105.0145053	
2,153.00	5.27	308.68	2,129.18	173.96	-199.04	14,595,643.30	1,636,363.33	40.1892357	-105.0145137	
2,185.00	4.70	314.48	2,161.06	175.79	-201.12	14,595,645.13	1,636,361.25	40.1892408	-105.0145211	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey										
Measured			Vertical			Map	Map			
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Northing	Easting			
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)	Latitude		Longitude
2,217.00	3.52	317.56	2,192.98	177.44	-202.72	14,595,646.78	1,636,359.65	40.1892453		-105.0145268
2,243.00	3.38	320.28	2,218.93	178.62	-203.75	14,595,647.96	1,636,358.62	40.1892485		-105.0145305
Last Total MWD Survey										
2,309.00	3.24	318.03	2,284.82	181.50	-206.24	14,595,650.84	1,636,356.13	40.1892564		-105.0145394
First SDI MWD Survey										
2,398.00	3.50	314.17	2,373.67	185.26	-209.87	14,595,654.60	1,636,352.50	40.1892668		-105.0145524
2,487.00	3.18	310.83	2,462.52	188.77	-213.69	14,595,658.11	1,636,348.69	40.1892764		-105.0145661
2,575.00	0.67	278.88	2,550.46	190.44	-216.04	14,595,659.79	1,636,346.33	40.1892810		-105.0145745
2,690.00	0.90	265.12	2,665.45	190.47	-217.61	14,595,659.81	1,636,344.77	40.1892811		-105.0145801
2,779.00	1.01	263.80	2,754.44	190.33	-219.08	14,595,659.67	1,636,343.29	40.1892807		-105.0145854
2,868.00	1.27	105.53	2,843.43	189.98	-218.91	14,595,659.32	1,636,343.46	40.1892797		-105.0145848
2,957.00	0.89	137.48	2,932.42	189.21	-217.49	14,595,658.55	1,636,344.88	40.1892776		-105.0145797
3,045.00	0.66	109.64	3,020.41	188.53	-216.55	14,595,657.87	1,636,345.82	40.1892758		-105.0145764
3,134.00	0.46	98.09	3,109.41	188.31	-215.72	14,595,657.65	1,636,346.66	40.1892751		-105.0145734
3,223.00	0.47	29.31	3,198.40	188.58	-215.19	14,595,657.92	1,636,347.19	40.1892759		-105.0145715
3,312.00	0.37	322.25	3,287.40	189.12	-215.18	14,595,658.46	1,636,347.19	40.1892774		-105.0145715
3,401.00	0.51	311.07	3,376.40	189.61	-215.66	14,595,658.95	1,636,346.72	40.1892787		-105.0145732
3,490.00	1.61	118.13	3,465.39	189.28	-214.85	14,595,658.62	1,636,347.52	40.1892778		-105.0145703
3,579.00	1.51	116.89	3,554.36	188.16	-212.70	14,595,657.50	1,636,349.67	40.1892747		-105.0145626
3,667.00	1.06	123.82	3,642.33	187.18	-210.99	14,595,656.52	1,636,351.38	40.1892721		-105.0145565
3,756.00	0.96	141.84	3,731.32	186.14	-209.85	14,595,655.48	1,636,352.52	40.1892692		-105.0145524
3,845.00	0.90	152.22	3,820.31	184.93	-209.06	14,595,654.28	1,636,353.31	40.1892659		-105.0145496
3,934.00	0.67	177.61	3,909.30	183.80	-208.72	14,595,653.14	1,636,353.66	40.1892627		-105.0145483
4,023.00	0.63	220.83	3,998.30	182.91	-209.01	14,595,652.25	1,636,353.36	40.1892603		-105.0145494
4,112.00	0.66	215.85	4,087.29	182.12	-209.63	14,595,651.46	1,636,352.74	40.1892581		-105.0145516
4,201.00	0.84	238.29	4,176.28	181.36	-210.49	14,595,650.70	1,636,351.88	40.1892561		-105.0145547
4,289.00	1.02	237.26	4,264.27	180.60	-211.70	14,595,649.94	1,636,350.67	40.1892540		-105.0145590
4,378.00	1.21	252.14	4,353.25	179.88	-213.26	14,595,649.22	1,636,349.11	40.1892520		-105.0145646
4,467.00	0.82	272.63	4,442.24	179.62	-214.79	14,595,648.97	1,636,347.58	40.1892513		-105.0145701
4,555.00	0.51	38.42	4,530.24	179.96	-215.17	14,595,649.30	1,636,347.20	40.1892522		-105.0145714
4,644.00	0.31	292.64	4,619.24	180.36	-215.15	14,595,649.70	1,636,347.22	40.1892533		-105.0145714
4,733.00	0.50	292.64	4,708.23	180.60	-215.73	14,595,649.95	1,636,346.64	40.1892540		-105.0145734
4,822.00	0.84	302.89	4,797.23	181.11	-216.64	14,595,650.45	1,636,345.74	40.1892554		-105.0145767
4,911.00	0.50	4.26	4,886.22	181.85	-217.16	14,595,651.19	1,636,345.22	40.1892574		-105.0145785
4,999.00	0.96	23.10	4,974.22	182.91	-216.84	14,595,652.25	1,636,345.53	40.1892603		-105.0145774
5,088.00	0.84	8.23	5,063.20	184.24	-216.45	14,595,653.58	1,636,345.92	40.1892640		-105.0145760
5,177.00	0.63	342.45	5,152.20	185.35	-216.51	14,595,654.70	1,636,345.87	40.1892670		-105.0145762
5,266.00	0.64	117.80	5,241.19	185.59	-216.21	14,595,654.93	1,636,346.16	40.1892677		-105.0145752
5,354.00	1.14	137.77	5,329.18	184.71	-215.19	14,595,654.05	1,636,347.18	40.1892653		-105.0145715
5,443.00	0.88	157.07	5,418.17	183.43	-214.33	14,595,652.77	1,636,348.04	40.1892617		-105.0145684
5,532.00	0.94	195.74	5,507.16	182.09	-214.26	14,595,651.44	1,636,348.11	40.1892581		-105.0145682
5,621.00	1.04	220.22	5,596.15	180.77	-214.98	14,595,650.12	1,636,347.39	40.1892545		-105.0145708
5,710.00	0.88	245.37	5,685.14	179.87	-216.12	14,595,649.22	1,636,346.25	40.1892520		-105.0145748
5,799.00	1.07	247.09	5,774.12	179.26	-217.51	14,595,648.61	1,636,344.86	40.1892503		-105.0145798
5,888.00	1.56	181.02	5,863.10	177.73	-218.30	14,595,647.07	1,636,344.07	40.1892461		-105.0145826
6,065.00	1.19	193.55	6,040.05	173.53	-218.77	14,595,642.88	1,636,343.60	40.1892346		-105.0145843
6,154.00	1.00	212.95	6,129.04	171.98	-219.41	14,595,641.33	1,636,342.96	40.1892303		-105.0145866
6,243.00	1.16	204.35	6,218.02	170.51	-220.20	14,595,639.85	1,636,342.17	40.1892263		-105.0145895
6,244.00	1.24	202.69	6,219.02	170.49	-220.21	14,595,639.84	1,636,342.16	40.1892262		-105.0145895
Curve KOP										
6,299.00	6.05	184.85	6,273.89	167.05	-220.69	14,595,636.40	1,636,341.68	40.1892168		-105.0145912
First SDI MWD Curve Survey										
6,332.00	8.97	183.38	6,306.61	162.75	-220.99	14,595,632.10	1,636,341.38	40.1892050		-105.0145923
6,421.00	15.92	180.17	6,393.46	143.60	-221.43	14,595,612.94	1,636,340.93	40.1891524		-105.0145938

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-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
6,510.00	22.46	178.97	6,477.47	114.36	-221.16	14,595,583.70	1,636,341.20	40.1890721	-105.0145929
6,599.00	31.12	175.96	6,556.85	74.34	-219.23	14,595,543.69	1,636,343.12	40.1889622	-105.0145860
6,688.00	39.94	177.58	6,629.21	22.75	-216.40	14,595,492.10	1,636,345.95	40.1888205	-105.0145758
6,776.00	44.86	177.96	6,694.17	-36.52	-214.10	14,595,432.82	1,636,348.24	40.1886577	-105.0145676
6,865.00	48.19	177.71	6,755.40	-101.05	-211.66	14,595,368.29	1,636,350.67	40.1884805	-105.0145588
6,954.00	51.86	180.34	6,812.57	-169.22	-210.54	14,595,300.12	1,636,351.78	40.1882933	-105.0145548
7,013.91	56.82	178.52	6,847.49	-217.88	-210.03	14,595,251.46	1,636,352.28	40.1881597	-105.0145530
Enter Land Box : 7013.91' MD & 6847.49' TVD									
7,043.00	59.24	177.71	6,862.89	-242.54	-209.22	14,595,226.80	1,636,353.09	40.1880920	-105.0145501
7,132.00	64.71	177.78	6,904.69	-321.01	-206.13	14,595,148.33	1,636,356.17	40.1878765	-105.0145390
7,221.00	72.67	179.58	6,937.01	-403.84	-204.26	14,595,065.51	1,636,358.03	40.1876491	-105.0145323
7,310.00	80.51	182.29	6,957.64	-490.32	-205.70	14,594,979.02	1,636,356.57	40.1874116	-105.0145375
7,399.00	86.21	181.01	6,967.93	-578.65	-208.24	14,594,890.69	1,636,354.02	40.1871690	-105.0145466
7,400.00	86.23	181.01	6,967.99	-579.65	-208.26	14,594,889.70	1,636,354.00	40.1871663	-105.0145466
Landing Point : 824' FNL 782' FWL Sec 33									
7,455.00	87.12	180.77	6,971.18	-634.55	-209.11	14,594,834.80	1,636,353.14	40.1870155	-105.0145497
Last SDI MWD Curve Survey									
7,488.00	87.66	180.63	6,972.69	-667.51	-209.51	14,594,801.83	1,636,352.73	40.1869250	-105.0145511
7,544.00	86.09	180.22	6,975.74	-723.42	-209.93	14,594,745.92	1,636,352.31	40.1867714	-105.0145526
First SDI MWD Lateral Survey									
7,577.00	85.17	179.98	6,978.25	-756.33	-209.98	14,594,713.02	1,636,352.24	40.1866811	-105.0145528
7,666.00	85.88	179.05	6,985.20	-845.05	-209.23	14,594,624.29	1,636,352.98	40.1864374	-105.0145501
7,754.00	86.74	178.80	6,990.86	-932.85	-207.58	14,594,536.49	1,636,354.61	40.1861963	-105.0145442
7,843.00	86.68	181.21	6,995.97	-1,021.70	-207.59	14,594,447.64	1,636,354.59	40.1859523	-105.0145443
7,932.00	87.58	181.37	7,000.42	-1,110.56	-209.59	14,594,358.78	1,636,352.58	40.1857083	-105.0145514
8,020.00	85.75	181.66	7,005.54	-1,198.38	-211.92	14,594,270.96	1,636,350.24	40.1854672	-105.0145597
8,109.00	86.51	181.89	7,011.55	-1,287.13	-214.67	14,594,182.21	1,636,347.48	40.1852234	-105.0145696
8,198.00	87.15	181.66	7,016.47	-1,375.95	-217.42	14,594,093.39	1,636,344.71	40.1849795	-105.0145794
8,287.00	88.29	181.62	7,020.01	-1,464.85	-219.96	14,594,004.50	1,636,342.15	40.1847354	-105.0145885
8,364.19	86.68	181.02	7,023.40	-1,541.94	-221.74	14,593,927.41	1,636,340.36	40.1845237	-105.0145949
Cross 460' Line : 8364.19' MD & 7023.40' TVD 1786' FNL 768' FWL									
8,375.00	86.45	180.94	7,024.05	-1,552.73	-221.93	14,593,916.62	1,636,340.17	40.1844941	-105.0145956
8,464.00	86.55	180.53	7,029.48	-1,641.55	-223.07	14,593,827.79	1,636,339.02	40.1842502	-105.0145996
8,553.00	86.92	180.15	7,034.55	-1,730.41	-223.59	14,593,738.94	1,636,338.48	40.1840062	-105.0146015
8,642.00	88.22	180.18	7,038.32	-1,819.33	-223.85	14,593,650.02	1,636,338.21	40.1837620	-105.0146024
8,731.00	87.89	180.80	7,041.35	-1,908.27	-224.61	14,593,561.08	1,636,337.44	40.1835177	-105.0146052
8,819.00	88.06	179.85	7,044.46	-1,996.21	-225.11	14,593,473.14	1,636,336.92	40.1832762	-105.0146069
8,908.00	85.44	179.26	7,049.50	-2,085.06	-224.42	14,593,384.29	1,636,337.60	40.1830322	-105.0146045
8,997.00	85.44	178.64	7,056.58	-2,173.76	-222.79	14,593,295.59	1,636,339.21	40.1827887	-105.0145987
9,086.00	86.07	177.99	7,063.16	-2,262.48	-220.18	14,593,206.87	1,636,341.81	40.1825450	-105.0145893
9,175.00	86.85	177.48	7,068.66	-2,351.24	-216.67	14,593,118.11	1,636,345.30	40.1823013	-105.0145767
9,264.00	87.19	179.26	7,073.29	-2,440.08	-214.15	14,593,029.27	1,636,347.82	40.1820573	-105.0145677
9,353.00	88.02	179.46	7,077.01	-2,528.99	-213.15	14,592,940.35	1,636,348.80	40.1818132	-105.0145641
9,442.00	89.77	178.85	7,078.72	-2,617.96	-211.84	14,592,851.38	1,636,350.10	40.1815688	-105.0145594
9,530.00	86.75	181.34	7,081.39	-2,705.91	-211.98	14,592,763.44	1,636,349.94	40.1813273	-105.0145599
9,619.00	87.15	181.66	7,086.13	-2,794.75	-214.31	14,592,674.60	1,636,347.60	40.1810834	-105.0145683
9,708.00	88.56	181.09	7,089.46	-2,883.66	-216.45	14,592,585.69	1,636,345.45	40.1808392	-105.0145759
9,797.00	86.34	181.32	7,093.42	-2,972.55	-218.31	14,592,496.80	1,636,343.57	40.1805951	-105.0145826
9,885.00	86.95	179.79	7,098.57	-3,060.39	-219.17	14,592,408.96	1,636,342.70	40.1803539	-105.0145856
9,974.00	88.29	178.66	7,102.27	-3,149.30	-217.96	14,592,320.05	1,636,343.89	40.1801097	-105.0145813
10,063.00	87.45	178.79	7,105.57	-3,238.21	-215.98	14,592,231.13	1,636,345.86	40.1798656	-105.0145742
10,152.00	86.68	179.38	7,110.13	-3,327.09	-214.56	14,592,142.26	1,636,347.26	40.1796215	-105.0145691
10,241.00	87.78	178.01	7,114.43	-3,415.95	-212.54	14,592,053.39	1,636,349.27	40.1793775	-105.0145619
10,330.00	89.30	176.90	7,116.70	-3,504.83	-208.59	14,591,964.51	1,636,353.21	40.1791334	-105.0145477

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-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
10,419.00	88.99	177.65	7,118.03	-3,593.72	-204.36	14,591,875.63	1,636,357.43	40.1788893	-105.0145326
10,508.00	89.90	179.93	7,118.89	-3,682.69	-202.48	14,591,786.66	1,636,359.29	40.1786450	-105.0145259
10,597.00	89.67	181.97	7,119.22	-3,771.67	-203.95	14,591,697.67	1,636,357.80	40.1784006	-105.0145311
10,685.00	86.58	182.43	7,122.10	-3,859.55	-207.33	14,591,609.80	1,636,354.41	40.1781593	-105.0145432
10,774.00	85.37	182.06	7,128.35	-3,948.26	-210.81	14,591,521.09	1,636,350.92	40.1779157	-105.0145557
10,863.00	86.04	181.13	7,135.02	-4,036.98	-213.28	14,591,432.37	1,636,348.44	40.1776721	-105.0145645
10,952.00	87.38	180.20	7,140.12	-4,125.82	-214.31	14,591,343.53	1,636,347.39	40.1774281	-105.0145682
11,041.00	88.09	178.86	7,143.64	-4,214.75	-213.58	14,591,254.61	1,636,348.11	40.1771839	-105.0145656
11,130.00	88.32	180.19	7,146.43	-4,303.70	-212.84	14,591,165.65	1,636,348.83	40.1769396	-105.0145629
11,219.00	87.78	180.87	7,149.46	-4,392.64	-213.66	14,591,076.71	1,636,348.00	40.1766954	-105.0145659
11,308.00	86.94	181.01	7,153.56	-4,481.53	-215.12	14,590,987.82	1,636,346.53	40.1764513	-105.0145711
11,397.00	84.66	180.09	7,160.07	-4,570.28	-215.97	14,590,899.07	1,636,345.66	40.1762076	-105.0145742
11,486.00	86.14	179.54	7,167.21	-4,658.99	-215.69	14,590,810.36	1,636,345.93	40.1759640	-105.0145731
11,575.00	87.45	178.88	7,172.19	-4,747.84	-214.46	14,590,721.51	1,636,347.14	40.1757200	-105.0145687
11,664.00	87.82	179.09	7,175.86	-4,836.75	-212.89	14,590,632.60	1,636,348.70	40.1754758	-105.0145631
11,753.00	87.59	179.88	7,179.42	-4,925.68	-212.09	14,590,543.67	1,636,349.49	40.1752316	-105.0145602
11,841.00	86.48	180.85	7,183.98	-5,013.56	-212.65	14,590,455.80	1,636,348.92	40.1749903	-105.0145622
11,930.00	87.35	180.07	7,188.77	-5,102.42	-213.36	14,590,366.93	1,636,348.19	40.1747463	-105.0145648
12,019.00	86.07	180.62	7,193.87	-5,191.27	-213.90	14,590,278.08	1,636,347.64	40.1745023	-105.0145667
12,108.00	86.98	180.17	7,199.27	-5,280.11	-214.51	14,590,189.25	1,636,347.02	40.1742583	-105.0145689
12,197.00	88.19	179.35	7,203.02	-5,369.02	-214.13	14,590,100.33	1,636,347.37	40.1740141	-105.0145675
12,286.00	86.28	179.64	7,207.31	-5,457.91	-213.35	14,590,011.44	1,636,348.14	40.1737700	-105.0145647
12,374.00	86.71	179.38	7,212.69	-5,545.74	-212.60	14,589,923.61	1,636,348.88	40.1735289	-105.0145620
12,463.00	87.42	178.31	7,217.25	-5,634.61	-210.81	14,589,834.75	1,636,350.66	40.1732848	-105.0145556
12,552.00	88.29	177.38	7,220.58	-5,723.48	-207.46	14,589,745.87	1,636,353.99	40.1730408	-105.0145437
12,641.00	88.89	179.72	7,222.77	-5,812.42	-205.21	14,589,656.94	1,636,356.23	40.1727965	-105.0145356
12,725.96	89.29	180.44	7,224.12	-5,897.37	-205.33	14,589,571.99	1,636,356.09	40.1725633	-105.0145360
Cross 460' Line : 12725.96' MD & 7224.12' TVD 847' FNL 799' FWL									
12,729.00	89.30	180.47	7,224.16	-5,900.41	-205.36	14,589,568.95	1,636,356.07	40.1725549	-105.0145361
12,818.00	86.58	182.14	7,227.36	-5,989.31	-207.38	14,589,480.04	1,636,354.03	40.1723108	-105.0145434
12,907.00	85.77	181.98	7,233.30	-6,078.06	-210.58	14,589,391.30	1,636,350.82	40.1720671	-105.0145548
12,996.00	86.68	181.85	7,239.16	-6,166.81	-213.54	14,589,302.54	1,636,347.84	40.1718233	-105.0145654
13,084.00	87.95	181.88	7,243.28	-6,254.67	-216.40	14,589,214.69	1,636,344.97	40.1715821	-105.0145756
13,173.00	86.05	181.97	7,247.94	-6,343.49	-219.39	14,589,125.86	1,636,341.97	40.1713381	-105.0145863
13,262.00	86.38	181.09	7,253.81	-6,432.27	-221.76	14,589,037.09	1,636,339.58	40.1710944	-105.0145948
13,351.00	86.95	180.42	7,258.99	-6,521.11	-222.93	14,588,948.25	1,636,338.40	40.1708504	-105.0145990
13,440.00	87.82	180.09	7,263.05	-6,610.01	-223.33	14,588,859.35	1,636,337.99	40.1706063	-105.0146004
13,529.00	87.66	180.53	7,266.56	-6,698.94	-223.81	14,588,770.42	1,636,337.50	40.1703620	-105.0146021
13,618.00	89.06	180.44	7,269.11	-6,787.90	-224.56	14,588,681.46	1,636,336.73	40.1701178	-105.0146048
13,706.00	88.69	180.85	7,270.83	-6,875.88	-225.55	14,588,593.48	1,636,335.72	40.1698762	-105.0146084
13,795.00	88.46	181.47	7,273.05	-6,964.83	-227.35	14,588,504.53	1,636,333.91	40.1696319	-105.0146148
13,816.00	89.09	181.31	7,273.50	-6,985.82	-227.86	14,588,483.54	1,636,333.40	40.1695743	-105.0146166
Last SDI MWD Survey									
13,872.00	89.09	181.31	7,274.39	-7,041.80	-229.14	14,588,427.56	1,636,332.11	40.1694205	-105.0146212
Projection to TD : 1991' FNL 778' FWL Sec 4									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,284.00	2,259.86	Surface Casing	9.625	12.250	
13,872.00	7,274.39	Production Casing	5.500	8.500	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 5N-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 5N-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	124.99	-1.11	0.46	First Total MWD Survey
2,243.00	2,218.93	178.62	-203.75	Last Total MWD Survey
2,309.00	2,284.82	181.50	-206.24	First SDI MWD Survey
6,244.00	6,219.02	170.49	-220.21	Curve KOP
6,299.00	6,273.89	167.05	-220.69	First SDI MWD Curve Survey
7,013.91	6,847.49	-217.88	-210.03	Enter Land Box : 7013.91' MD & 6847.49' TVD
7,400.00	6,967.99	-579.65	-208.26	Landing Point : 824' FNL 782' FWL Sec 33
7,455.00	6,971.18	-634.55	-209.11	Last SDI MWD Curve Survey
7,544.00	6,975.74	-723.42	-209.93	First SDI MWD Lateral Survey
8,364.19	7,023.40	-1,541.94	-221.74	Cross 460' Line : 8364.19' MD & 7023.40' TVD 1786' FNL 768' FWL
12,725.96	7,224.12	-5,897.37	-205.33	Cross 460' Line : 12725.96' MD & 7224.12' TVD 847' FNL 799' FWL
13,816.00	7,273.50	-6,985.82	-227.86	Last SDI MWD Survey
13,872.00	7,274.39	-7,041.80	-229.14	Projection to TD : 1991' FNL 778' FWL Sec 4

Checked By: _____	Approved By: _____	Date: _____
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