

Wellbore: OH
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 6N-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
14595396.84	1636581.05	40.1885590	-105.0137340

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
124.99	125.00	0.92	201.37	-0.93	-0.37	First Total MWD Survey
2177.58	2237.00	18.63	73.84	112.16	394.88	Last Total MWD Survey
2247.57	2311.00	19.26	73.19	118.98	417.92	First SDI MWD Survey
6186.65	6325.00	1.71	233.94	249.41	889.39	Curve KOP
6281.85	6421.00	12.57	184.42	238.73	887.39	First SDI MWD Curve Survey
6765.30	7042.32	53.49	175.39	-132.02	909.17	Enter Land Box : 7042.32' MD & 6765.30' TVD
6953.41	7577.00	85.09	179.99	-624.76	920.48	Last SDI MWD Curve Survey
6957.22	7625.00	85.82	179.62	-672.61	920.64	Landing Point : 1003' FNL 1929' FWL Sec 33
6959.99	7666.00	86.44	179.31	-713.51	921.02	First SDI MWD Lateral Survey
6995.39	8411.47	86.31	181.55	-1457.84	903.22	Cross 460' Line : 8411.47' MD & 6995.39' TVD 1778' FNL 1912' FWL
7186.03	12773.21	88.49	180.06	-5814.00	873.39	Cross 460' Line : 12773.21' MD & 7186.03' TVD 847' FNL 1900' FWL
7213.54	13900.00	91.07	179.89	-6940.15	864.58	Last SDI MWD Survey
7212.49	13956.00	91.07	179.89	-6996.14	864.68	Projection to TD : 2027' FNL 1891' FWL Sec 4

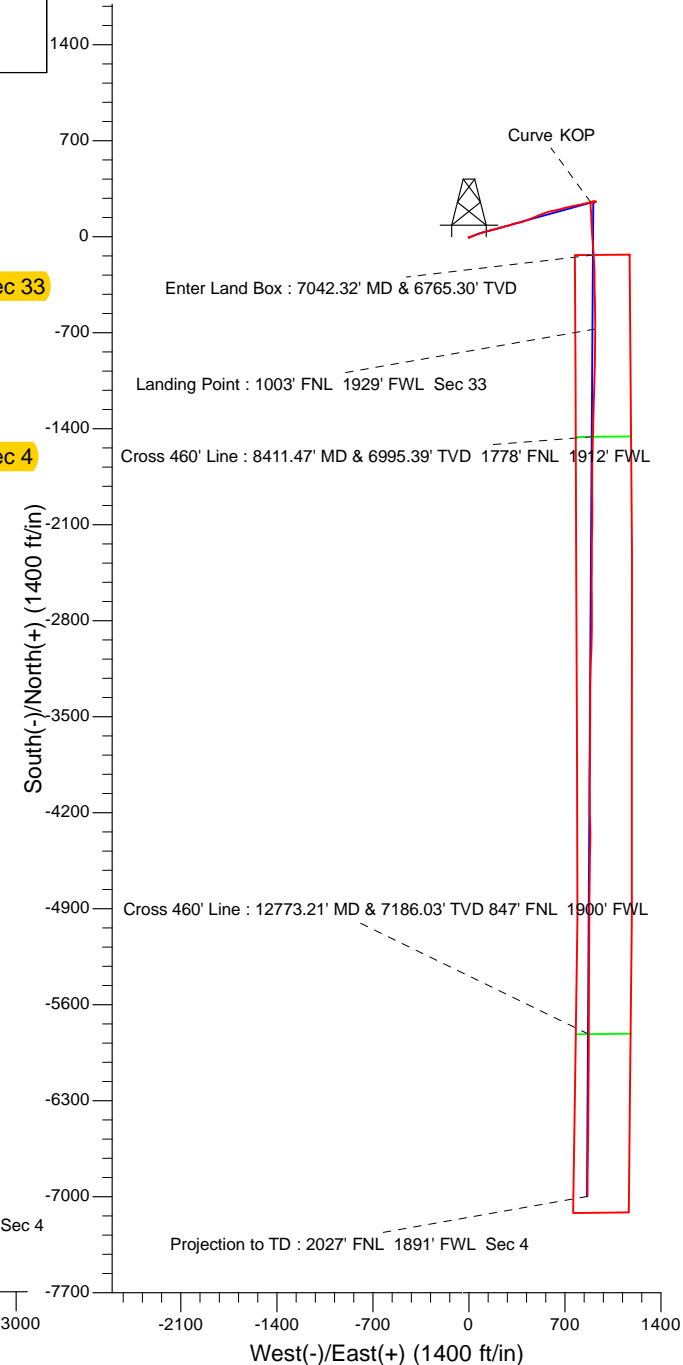
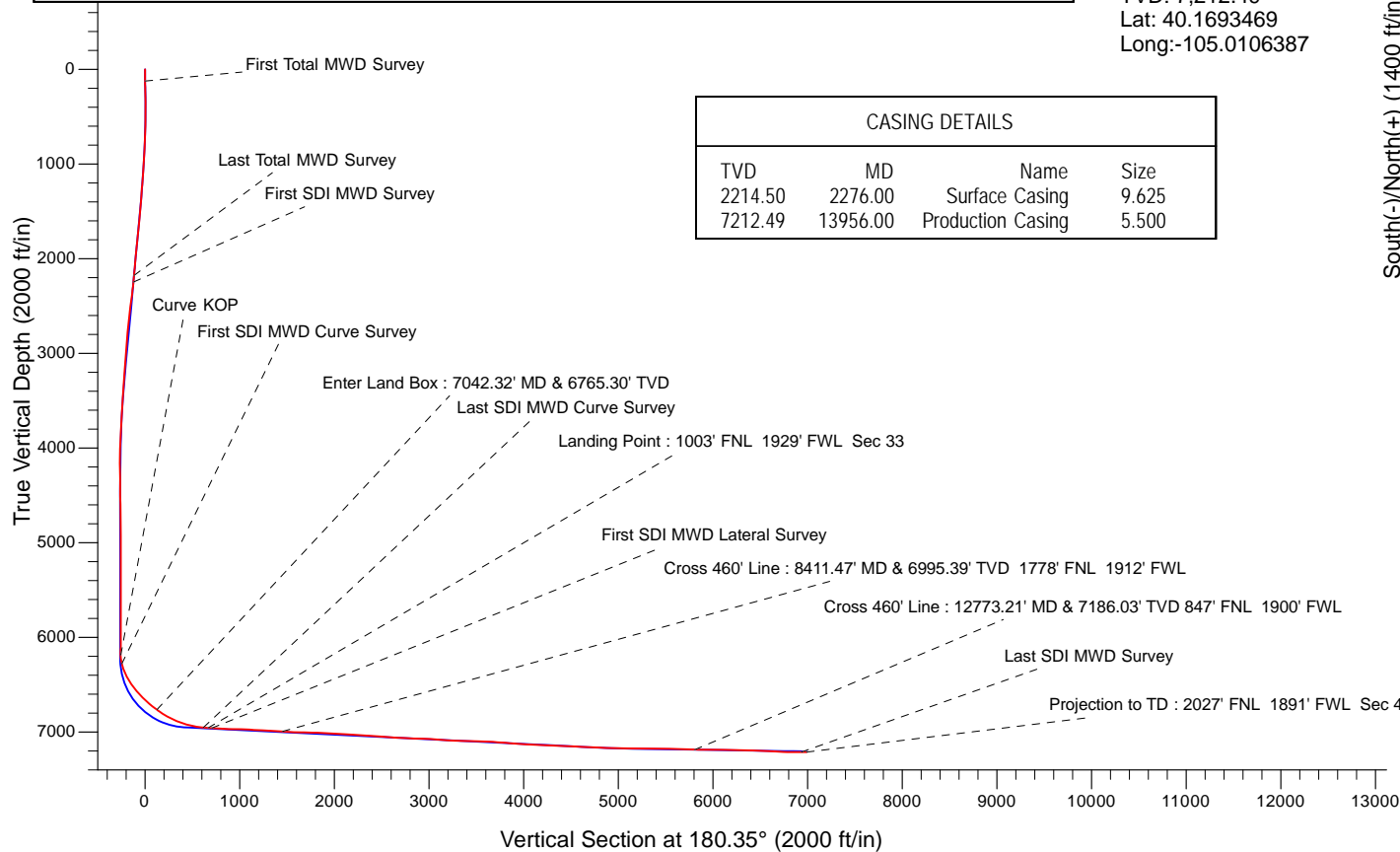
Surface Location:
 320' FNL 1009' FWL
 Sec 33 T3N R68W

Landing Point:
 1003' FNL 1929' FWL Sec 33
 MD: 7,625.00
 TVD: 6,957.22
 Lat: 40.1867119
 Long: -105.0104376

BHL:
 2027' FNL 1891' FWL Sec 4
 MD: 13,956.00
 TVD: 7,212.49
 Lat: 40.1693469
 Long: -105.0106387

CASING DETAILS

TVD	MD	Name	Size
2214.50	2276.00	Surface Casing	9.625
7212.49	13956.00	Production Casing	5.500





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

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

Hergenreder 6N-4HZ

OH

Design: OH

Survey Report - Geographic

12 February, 2018



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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 6N-4HZ, 320' FNL 1009' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,396.84 usft	Latitude:	40.1885590
	+E/-W	0.00 ft	Easting:	1,636,581.04 usft	Longitude:	-105.0137340
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	180.35	

Survey Program	Date	2/12/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	2,237.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,311.00	13,956.00	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	14,595,396.84	1,636,581.04	40.1885590	-105.0137340
125.00	0.92	201.37	124.99	-0.93	-0.37	14,595,395.91	1,636,580.68	40.1885565	-105.0137353
First Total MWD Survey									
157.00	1.45	200.66	156.99	-1.55	-0.60	14,595,395.29	1,636,580.44	40.1885548	-105.0137361
188.00	1.27	201.98	187.98	-2.24	-0.87	14,595,394.60	1,636,580.17	40.1885529	-105.0137371
220.00	1.14	192.66	219.97	-2.88	-1.07	14,595,393.96	1,636,579.97	40.1885511	-105.0137378
251.00	1.05	185.28	250.97	-3.46	-1.17	14,595,393.38	1,636,579.88	40.1885495	-105.0137381
283.00	0.83	157.51	282.96	-3.97	-1.10	14,595,392.87	1,636,579.94	40.1885481	-105.0137379
314.00	1.32	176.76	313.96	-4.53	-1.00	14,595,392.31	1,636,580.05	40.1885466	-105.0137375
346.00	1.23	182.82	345.95	-5.24	-0.99	14,595,391.60	1,636,580.05	40.1885446	-105.0137375
377.00	0.75	130.00	376.94	-5.71	-0.85	14,595,391.13	1,636,580.19	40.1885434	-105.0137370

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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	0.88	116.90	408.94	-5.95	-0.48	14,595,390.89	1,636,580.57	40.1885427	-105.0137357
441.00	0.70	92.38	440.94	-6.07	-0.06	14,595,390.77	1,636,580.98	40.1885424	-105.0137342
472.00	0.92	93.17	471.94	-6.09	0.38	14,595,390.75	1,636,581.42	40.1885423	-105.0137326
504.00	1.19	85.44	503.93	-6.08	0.96	14,595,390.76	1,636,582.01	40.1885423	-105.0137305
535.00	1.63	63.55	534.92	-5.86	1.68	14,595,390.98	1,636,582.72	40.1885429	-105.0137280
567.00	1.85	57.84	566.91	-5.38	2.53	14,595,391.46	1,636,583.57	40.1885443	-105.0137249
599.00	1.98	57.40	598.89	-4.81	3.43	14,595,392.03	1,636,584.47	40.1885458	-105.0137217
631.00	2.29	58.10	630.87	-4.17	4.44	14,595,392.67	1,636,585.48	40.1885476	-105.0137181
663.00	3.03	59.60	662.83	-3.41	5.71	14,595,393.43	1,636,586.75	40.1885497	-105.0137135
694.00	3.74	63.64	693.78	-2.54	7.32	14,595,394.30	1,636,588.36	40.1885520	-105.0137078
726.00	5.10	66.01	725.68	-1.50	9.56	14,595,395.34	1,636,590.60	40.1885549	-105.0136998
758.00	5.98	66.19	757.53	-0.25	12.38	14,595,396.59	1,636,593.42	40.1885583	-105.0136896
790.00	6.86	66.63	789.33	1.18	15.66	14,595,398.02	1,636,596.70	40.1885623	-105.0136779
822.00	7.21	68.56	821.09	2.67	19.28	14,595,399.51	1,636,600.33	40.1885664	-105.0136649
853.00	7.65	67.86	851.83	4.16	23.01	14,595,401.00	1,636,604.05	40.1885705	-105.0136516
885.00	8.44	66.98	883.51	5.88	27.14	14,595,402.72	1,636,608.18	40.1885752	-105.0136368
917.00	9.23	68.39	915.13	7.75	31.69	14,595,404.58	1,636,612.73	40.1885803	-105.0136205
948.00	10.15	68.83	945.69	9.65	36.55	14,595,406.48	1,636,617.59	40.1885855	-105.0136031
1,012.00	11.03	68.30	1,008.60	13.95	47.49	14,595,410.78	1,636,628.54	40.1885973	-105.0135639
1,044.00	11.25	68.91	1,040.00	16.20	53.25	14,595,413.04	1,636,634.30	40.1886035	-105.0135433
1,075.00	11.56	70.23	1,070.39	18.34	58.99	14,595,415.17	1,636,640.04	40.1886094	-105.0135227
1,107.00	12.13	70.41	1,101.70	20.56	65.18	14,595,417.39	1,636,646.23	40.1886155	-105.0135006
1,139.00	12.26	69.79	1,132.98	22.86	71.54	14,595,419.69	1,636,652.58	40.1886218	-105.0134778
1,170.00	12.35	70.41	1,163.27	25.10	77.75	14,595,421.93	1,636,658.79	40.1886280	-105.0134556
1,202.00	13.14	73.31	1,194.48	27.30	84.46	14,595,424.12	1,636,665.50	40.1886340	-105.0134316
1,234.00	13.54	74.28	1,225.62	29.36	91.55	14,595,426.18	1,636,672.59	40.1886396	-105.0134062
1,266.00	14.37	74.28	1,256.67	31.45	98.97	14,595,428.27	1,636,680.02	40.1886454	-105.0133796
1,298.00	15.47	74.63	1,287.59	33.65	106.91	14,595,430.48	1,636,687.96	40.1886514	-105.0133512
1,329.00	16.30	75.07	1,317.41	35.87	115.10	14,595,432.69	1,636,696.15	40.1886575	-105.0133218
1,361.00	17.14	74.98	1,348.06	38.25	124.00	14,595,435.07	1,636,705.04	40.1886641	-105.0132900
1,393.00	17.67	74.80	1,378.59	40.75	133.24	14,595,437.56	1,636,714.29	40.1886709	-105.0132569
1,425.00	17.71	76.47	1,409.08	43.16	142.66	14,595,439.98	1,636,723.71	40.1886775	-105.0132232
1,456.00	16.83	77.88	1,438.68	45.20	151.63	14,595,442.02	1,636,732.68	40.1886832	-105.0131910
1,488.00	16.17	78.23	1,469.36	47.08	160.52	14,595,443.90	1,636,741.57	40.1886883	-105.0131592
1,519.00	16.70	77.00	1,499.10	48.97	169.08	14,595,445.78	1,636,750.14	40.1886935	-105.0131285
1,551.00	17.23	75.24	1,529.70	51.21	178.15	14,595,448.02	1,636,759.20	40.1886997	-105.0130961
1,583.00	17.84	73.92	1,560.22	53.77	187.44	14,595,450.58	1,636,768.49	40.1887067	-105.0130628
1,615.00	18.81	72.69	1,590.59	56.67	197.08	14,595,453.48	1,636,778.13	40.1887146	-105.0130283
1,646.00	20.08	72.87	1,619.82	59.72	206.93	14,595,456.53	1,636,787.99	40.1887230	-105.0129930
1,678.00	20.92	72.96	1,649.80	63.01	217.65	14,595,459.82	1,636,798.70	40.1887321	-105.0129547
1,710.00	21.18	72.78	1,679.66	66.40	228.63	14,595,463.20	1,636,809.68	40.1887414	-105.0129153
1,742.00	20.08	74.28	1,709.61	69.60	239.44	14,595,466.40	1,636,820.49	40.1887502	-105.0128766
1,773.00	19.82	74.45	1,738.75	72.45	249.62	14,595,469.25	1,636,830.68	40.1887580	-105.0128402
1,805.00	20.13	74.98	1,768.83	75.33	260.17	14,595,472.13	1,636,841.22	40.1887659	-105.0128024
1,837.00	20.43	75.33	1,798.84	78.17	270.89	14,595,474.97	1,636,851.95	40.1887737	-105.0127640
1,869.00	19.95	73.22	1,828.88	81.16	281.52	14,595,477.96	1,636,862.58	40.1887819	-105.0127259
1,900.00	19.69	72.87	1,858.04	84.23	291.58	14,595,481.02	1,636,872.63	40.1887903	-105.0126899
1,932.00	18.81	73.48	1,888.25	87.28	301.67	14,595,484.08	1,636,882.73	40.1887987	-105.0126538
1,964.00	18.98	72.61	1,918.53	90.30	311.58	14,595,487.10	1,636,892.64	40.1888070	-105.0126183
1,995.00	18.98	74.54	1,947.84	93.16	321.25	14,595,489.95	1,636,902.31	40.1888148	-105.0125837
2,027.00	18.33	74.80	1,978.16	95.86	331.13	14,595,492.65	1,636,912.18	40.1888223	-105.0125483
2,059.00	18.06	75.33	2,008.56	98.44	340.78	14,595,495.22	1,636,921.84	40.1888293	-105.0125138
2,091.00	18.33	76.30	2,038.96	100.89	350.47	14,595,497.67	1,636,931.53	40.1888361	-105.0124791
2,122.00	18.19	76.56	2,068.40	103.16	359.91	14,595,499.95	1,636,940.97	40.1888423	-105.0124453
2,154.00	18.33	77.00	2,098.79	105.46	369.67	14,595,502.24	1,636,950.73	40.1888486	-105.0124103

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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
2,185.00	18.11	75.59	2,128.23	107.75	379.09	14,595,504.53	1,636,960.15	40.1888549	-105.0123766
2,217.00	18.46	73.92	2,158.62	110.39	388.77	14,595,507.17	1,636,969.83	40.1888622	-105.0123419
2,237.00	18.63	73.84	2,177.58	112.16	394.88	14,595,508.94	1,636,975.94	40.1888670	-105.0123200
Last Total MWD Survey									
2,311.00	19.26	73.19	2,247.57	118.98	417.92	14,595,515.75	1,636,998.98	40.1888857	-105.0122375
First SDI MWD Survey									
2,400.00	17.92	69.73	2,331.93	127.97	444.82	14,595,524.74	1,637,025.88	40.1889104	-105.0121412
2,489.00	16.38	66.85	2,416.97	137.65	469.20	14,595,534.41	1,637,050.27	40.1889370	-105.0120539
2,578.00	17.36	63.14	2,502.14	148.58	492.59	14,595,545.34	1,637,073.65	40.1889670	-105.0119702
2,778.00	18.03	70.35	2,692.70	172.47	548.36	14,595,569.23	1,637,129.43	40.1890326	-105.0117705
2,867.00	17.92	73.41	2,777.36	181.01	574.46	14,595,577.76	1,637,155.53	40.1890561	-105.0116770
2,956.00	18.44	78.43	2,861.92	187.75	601.37	14,595,584.49	1,637,182.44	40.1890746	-105.0115807
3,045.00	18.22	79.11	2,946.40	193.20	628.82	14,595,589.94	1,637,209.89	40.1890895	-105.0114824
3,134.00	17.11	77.84	3,031.21	198.58	655.28	14,595,595.32	1,637,236.36	40.1891043	-105.0113876
3,223.00	16.49	74.70	3,116.41	204.68	680.27	14,595,601.41	1,637,261.34	40.1891211	-105.0112982
3,312.00	16.29	75.07	3,201.79	211.22	704.51	14,595,607.95	1,637,285.59	40.1891390	-105.0112113
3,401.00	15.60	74.49	3,287.37	217.64	728.10	14,595,614.37	1,637,309.18	40.1891567	-105.0111269
3,490.00	16.74	77.38	3,372.85	223.64	752.14	14,595,620.36	1,637,333.22	40.1891731	-105.0110408
3,579.00	17.05	78.71	3,458.01	229.00	777.45	14,595,625.72	1,637,358.52	40.1891878	-105.0109502
3,670.00	16.68	79.44	3,545.09	234.00	803.37	14,595,630.72	1,637,384.45	40.1892016	-105.0108574
3,756.00	15.75	78.32	3,627.67	238.63	826.93	14,595,635.34	1,637,408.01	40.1892143	-105.0107730
3,845.00	13.77	78.85	3,713.73	243.12	849.16	14,595,639.83	1,637,430.24	40.1892266	-105.0106934
3,934.00	11.62	74.79	3,800.55	247.52	868.20	14,595,644.23	1,637,449.28	40.1892387	-105.0106252
4,023.00	9.60	72.88	3,888.02	252.06	883.94	14,595,648.76	1,637,465.02	40.1892512	-105.0105689
4,112.00	8.33	71.88	3,975.93	256.25	897.16	14,595,652.95	1,637,478.24	40.1892627	-105.0105215
4,201.00	7.25	76.64	4,064.11	259.55	908.75	14,595,656.25	1,637,489.84	40.1892717	-105.0104800
4,289.00	6.81	109.11	4,151.49	259.12	919.09	14,595,655.82	1,637,500.17	40.1892706	-105.0104430
4,378.00	2.23	118.09	4,240.19	256.58	925.61	14,595,653.28	1,637,506.69	40.1892636	-105.0104197
4,467.00	0.74	248.61	4,329.17	255.56	926.60	14,595,652.25	1,637,507.68	40.1892608	-105.0104161
4,556.00	1.09	270.52	4,418.15	255.35	925.22	14,595,652.05	1,637,506.30	40.1892602	-105.0104211
4,644.00	1.50	241.25	4,506.13	254.81	923.37	14,595,651.50	1,637,504.45	40.1892587	-105.0104277
4,733.00	1.78	246.52	4,595.10	253.70	921.08	14,595,650.39	1,637,502.16	40.1892557	-105.0104359
4,822.00	1.81	266.62	4,684.05	253.06	918.41	14,595,649.76	1,637,499.49	40.1892539	-105.0104454
4,910.00	1.44	243.61	4,772.02	252.49	916.03	14,595,649.19	1,637,497.12	40.1892523	-105.0104539
4,999.00	1.87	190.52	4,860.99	250.56	914.77	14,595,647.26	1,637,495.85	40.1892471	-105.0104585
5,177.00	0.87	232.05	5,038.94	246.88	913.17	14,595,643.58	1,637,494.25	40.1892369	-105.0104642
5,266.00	0.89	303.04	5,127.93	246.84	912.06	14,595,643.54	1,637,493.14	40.1892368	-105.0104682
5,355.00	0.99	304.08	5,216.92	247.65	910.84	14,595,644.35	1,637,491.92	40.1892390	-105.0104725
5,443.00	1.48	300.49	5,304.90	248.65	909.23	14,595,645.35	1,637,490.31	40.1892418	-105.0104783
5,532.00	1.82	276.99	5,393.86	249.40	906.84	14,595,646.10	1,637,487.92	40.1892439	-105.0104869
5,621.00	1.71	267.79	5,482.82	249.53	904.11	14,595,646.22	1,637,485.19	40.1892442	-105.0104966
5,710.00	0.93	264.16	5,571.79	249.40	902.07	14,595,646.10	1,637,483.15	40.1892439	-105.0105040
5,799.00	0.87	252.47	5,660.78	249.12	900.70	14,595,645.82	1,637,481.78	40.1892431	-105.0105088
5,888.00	1.27	268.61	5,749.77	248.90	899.07	14,595,645.60	1,637,480.15	40.1892425	-105.0105147
5,977.00	1.09	269.80	5,838.75	248.87	897.24	14,595,645.57	1,637,478.32	40.1892424	-105.0105212
6,065.00	0.89	301.77	5,926.74	249.23	895.82	14,595,645.93	1,637,476.90	40.1892434	-105.0105263
6,154.00	1.81	273.49	6,015.71	249.68	893.83	14,595,646.38	1,637,474.91	40.1892446	-105.0105335
6,243.00	1.40	280.16	6,104.68	249.95	891.36	14,595,646.65	1,637,472.44	40.1892454	-105.0105423
6,325.00	1.71	233.94	6,186.65	249.41	889.39	14,595,646.11	1,637,470.47	40.1892439	-105.0105494
Curve KOP									
6,332.00	1.77	231.15	6,193.65	249.28	889.22	14,595,645.98	1,637,470.30	40.1892435	-105.0105500
6,421.00	12.57	184.42	6,281.85	238.73	887.39	14,595,635.43	1,637,468.47	40.1892146	-105.0105565
First SDI MWD Curve Survey									
6,510.00	23.72	176.39	6,366.30	211.12	887.78	14,595,607.82	1,637,468.85	40.1891387	-105.0105551

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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
6,599.00	32.27	174.37	6,444.82	169.53	891.24	14,595,566.23	1,637,472.31	40.1890245	-105.0105427
6,687.00	36.25	178.69	6,517.55	120.11	894.14	14,595,516.81	1,637,475.20	40.1888888	-105.0105324
6,776.00	41.26	177.90	6,586.93	64.44	895.82	14,595,461.14	1,637,476.87	40.1887360	-105.0105264
6,865.00	45.13	174.94	6,651.81	3.67	899.68	14,595,400.37	1,637,480.72	40.1885691	-105.0105125
6,954.00	51.03	176.80	6,711.24	-62.35	904.40	14,595,334.35	1,637,485.43	40.1883878	-105.0104957
7,042.32	53.49	175.39	6,765.30	-132.02	909.17	14,595,264.68	1,637,490.19	40.1881964	-105.0104786
Enter Land Box : 7042.32' MD & 6765.30' TVD									
7,043.00	53.51	175.38	6,765.70	-132.56	909.21	14,595,264.13	1,637,490.23	40.1881949	-105.0104784
7,132.00	58.47	176.73	6,815.47	-206.14	914.26	14,595,190.56	1,637,495.27	40.1879929	-105.0104604
7,221.00	63.22	179.54	6,858.82	-283.79	916.74	14,595,112.91	1,637,497.74	40.1877797	-105.0104515
7,310.00	69.29	180.31	6,894.64	-365.22	916.84	14,595,031.48	1,637,497.82	40.1875561	-105.0104512
7,399.00	74.57	179.11	6,922.24	-449.80	917.28	14,594,946.90	1,637,498.25	40.1873238	-105.0104496
7,488.00	79.97	178.35	6,941.85	-536.55	919.21	14,594,860.14	1,637,500.17	40.1870856	-105.0104427
7,577.00	85.09	179.99	6,953.41	-624.76	920.48	14,594,771.94	1,637,501.42	40.1868433	-105.0104382
Last SDI MWD Curve Survey									
7,625.00	85.82	179.62	6,957.22	-672.61	920.64	14,594,724.09	1,637,501.58	40.1867119	-105.0104376
Landing Point : 1003' FNL 1929' FWL Sec 33									
7,666.00	86.44	179.31	6,959.99	-713.51	921.02	14,594,683.19	1,637,501.95	40.1865996	-105.0104362
First SDI MWD Lateral Survey									
7,754.00	87.38	180.91	6,964.73	-801.38	920.85	14,594,595.32	1,637,501.77	40.1863583	-105.0104368
7,843.00	88.19	181.03	6,968.17	-890.30	919.35	14,594,506.40	1,637,500.25	40.1861141	-105.0104422
7,932.00	88.66	181.53	6,970.62	-979.24	917.36	14,594,417.46	1,637,498.25	40.1858699	-105.0104494
8,020.00	87.15	182.12	6,973.83	-1,067.14	914.56	14,594,329.56	1,637,495.44	40.1856285	-105.0104594
8,109.00	87.41	181.74	6,978.06	-1,155.98	911.56	14,594,240.72	1,637,492.43	40.1853845	-105.0104701
8,198.00	86.64	181.47	6,982.68	-1,244.83	909.08	14,594,151.87	1,637,489.92	40.1851406	-105.0104791
8,287.00	86.91	181.51	6,987.68	-1,333.66	906.76	14,594,063.04	1,637,487.60	40.1848966	-105.0104874
8,375.00	86.17	181.75	6,992.99	-1,421.46	904.27	14,593,975.24	1,637,485.09	40.1846555	-105.0104963
8,411.47	86.31	181.55	6,995.39	-1,457.84	903.22	14,593,938.87	1,637,484.03	40.1845556	-105.0105001
Cross 460' Line : 8411.47' MD & 6995.39' TVD 1778' FNL 1912' FWL									
8,464.00	86.50	181.26	6,998.68	-1,510.25	901.93	14,593,886.45	1,637,482.74	40.1844117	-105.0105047
8,553.00	87.45	180.61	7,003.38	-1,599.11	900.48	14,593,797.59	1,637,481.28	40.1841677	-105.0105099
8,642.00	89.87	180.41	7,005.46	-1,688.08	899.69	14,593,708.63	1,637,480.47	40.1839234	-105.0105127
8,731.00	88.96	180.34	7,006.37	-1,777.07	899.11	14,593,619.64	1,637,479.88	40.1836790	-105.0105148
8,819.00	87.28	180.20	7,009.26	-1,865.02	898.69	14,593,531.69	1,637,479.45	40.1834375	-105.0105163
8,908.00	86.68	179.61	7,013.95	-1,953.89	898.84	14,593,442.81	1,637,479.58	40.1831934	-105.0105158
8,997.00	86.57	180.35	7,019.18	-2,042.74	898.87	14,593,353.97	1,637,479.60	40.1829494	-105.0105157
9,086.00	85.20	180.99	7,025.57	-2,131.50	897.84	14,593,265.21	1,637,478.55	40.1827057	-105.0105194
9,175.00	86.31	180.54	7,032.16	-2,220.25	896.65	14,593,176.46	1,637,477.35	40.1824620	-105.0105237
9,264.00	88.25	179.66	7,036.38	-2,309.14	896.50	14,593,087.56	1,637,477.18	40.1822179	-105.0105242
9,352.00	85.77	180.47	7,040.97	-2,397.01	896.40	14,592,999.69	1,637,477.07	40.1819765	-105.0105246
9,441.00	85.97	180.36	7,047.38	-2,485.78	895.75	14,592,910.93	1,637,476.41	40.1817328	-105.0105269
9,530.00	85.36	179.85	7,054.11	-2,574.52	895.59	14,592,822.18	1,637,476.23	40.1814891	-105.0105275
9,619.00	86.44	179.14	7,060.47	-2,663.29	896.37	14,592,733.42	1,637,477.00	40.1812453	-105.0105247
9,708.00	87.68	179.62	7,065.04	-2,752.17	897.34	14,592,644.54	1,637,477.95	40.1810013	-105.0105213
9,797.00	88.15	181.38	7,068.28	-2,841.10	896.56	14,592,555.61	1,637,477.16	40.1807570	-105.0105241
9,885.00	87.88	181.08	7,071.32	-2,929.03	894.67	14,592,467.68	1,637,475.26	40.1805156	-105.0105309
9,974.00	86.50	182.48	7,075.69	-3,017.87	891.91	14,592,378.83	1,637,472.49	40.1802716	-105.0105407
10,063.00	86.68	181.93	7,080.98	-3,106.65	888.49	14,592,290.06	1,637,469.05	40.1800278	-105.0105530
10,152.00	86.21	181.23	7,086.50	-3,195.44	886.04	14,592,201.27	1,637,466.59	40.1797840	-105.0105618
10,241.00	86.58	180.43	7,092.10	-3,284.26	884.76	14,592,112.45	1,637,465.29	40.1795401	-105.0105664
10,330.00	89.09	180.07	7,095.46	-3,373.19	884.37	14,592,023.52	1,637,464.89	40.1792959	-105.0105678
10,419.00	88.79	179.88	7,097.10	-3,462.17	884.41	14,591,934.54	1,637,464.91	40.1790515	-105.0105677
10,508.00	87.89	179.93	7,099.68	-3,551.13	884.56	14,591,845.58	1,637,465.05	40.1788072	-105.0105672
10,596.00	87.18	180.56	7,103.47	-3,639.05	884.18	14,591,757.66	1,637,464.66	40.1785658	-105.0105685

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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
10,685.00	85.67	181.05	7,109.02	-3,727.86	882.93	14,591,668.85	1,637,463.40	40.1783219	-105.0105730
10,774.00	85.67	180.60	7,115.74	-3,816.60	881.65	14,591,580.11	1,637,462.11	40.1780782	-105.0105776
10,863.00	86.98	180.71	7,121.44	-3,905.41	880.64	14,591,491.30	1,637,461.08	40.1778343	-105.0105812
10,952.00	85.74	180.28	7,127.09	-3,994.23	879.87	14,591,402.49	1,637,460.30	40.1775904	-105.0105840
11,041.00	86.14	179.12	7,133.39	-4,083.00	880.34	14,591,313.71	1,637,460.75	40.1773467	-105.0105823
11,130.00	87.32	178.67	7,138.47	-4,171.84	882.05	14,591,224.88	1,637,462.45	40.1771027	-105.0105762
11,219.00	88.39	178.75	7,141.80	-4,260.75	884.05	14,591,135.96	1,637,464.43	40.1768585	-105.0105690
11,308.00	87.08	180.20	7,145.32	-4,349.67	884.87	14,591,047.04	1,637,465.24	40.1766143	-105.0105661
11,397.00	87.08	180.85	7,149.85	-4,438.55	884.05	14,590,958.16	1,637,464.41	40.1763703	-105.0105691
11,486.00	88.29	180.71	7,153.45	-4,527.47	882.84	14,590,869.24	1,637,463.18	40.1761261	-105.0105734
11,575.00	86.88	180.69	7,157.20	-4,616.38	881.76	14,590,780.33	1,637,462.08	40.1758819	-105.0105773
11,664.00	87.15	180.38	7,161.83	-4,705.26	880.93	14,590,691.46	1,637,461.24	40.1756379	-105.0105803
11,753.00	88.12	180.10	7,165.50	-4,794.18	880.55	14,590,602.53	1,637,460.85	40.1753937	-105.0105816
11,842.00	88.12	181.09	7,168.42	-4,883.13	879.63	14,590,513.59	1,637,459.92	40.1751494	-105.0105850
11,930.00	87.72	181.15	7,171.62	-4,971.05	877.91	14,590,425.66	1,637,458.18	40.1749080	-105.0105911
12,019.00	88.56	180.61	7,174.51	-5,059.99	876.55	14,590,336.72	1,637,456.80	40.1746637	-105.0105960
12,108.00	89.66	180.14	7,175.89	-5,148.98	875.96	14,590,247.74	1,637,456.21	40.1744194	-105.0105981
12,197.00	91.38	179.97	7,175.08	-5,237.97	875.88	14,590,158.74	1,637,456.11	40.1741750	-105.0105984
12,286.00	89.87	179.42	7,174.11	-5,326.96	876.35	14,590,069.75	1,637,456.57	40.1739306	-105.0105967
12,374.00	88.39	180.64	7,175.45	-5,414.95	876.31	14,589,981.77	1,637,456.51	40.1736890	-105.0105969
12,463.00	88.19	180.66	7,178.10	-5,503.90	875.30	14,589,892.81	1,637,455.49	40.1734447	-105.0106005
12,552.00	89.33	180.44	7,180.03	-5,592.87	874.44	14,589,803.84	1,637,454.62	40.1732004	-105.0106036
12,641.00	88.16	180.35	7,181.98	-5,681.85	873.83	14,589,714.87	1,637,453.99	40.1729560	-105.0106058
12,730.00	88.22	180.13	7,184.79	-5,770.80	873.46	14,589,625.91	1,637,453.61	40.1727118	-105.0106072
12,773.21	88.49	180.06	7,186.03	-5,814.00	873.39	14,589,582.72	1,637,453.53	40.1725932	-105.0106074
Cross 460' Line : 12773.21' MD & 7186.03' TVD 847' FNL 1900' FWL									
12,818.00	88.76	179.98	7,187.11	-5,858.77	873.37	14,589,537.94	1,637,453.51	40.1724702	-105.0106075
12,907.00	90.07	179.75	7,188.02	-5,947.77	873.58	14,589,448.95	1,637,453.70	40.1722258	-105.0106067
12,995.00	90.00	179.86	7,187.96	-6,035.77	873.88	14,589,360.95	1,637,453.99	40.1719842	-105.0106057
13,084.00	88.29	180.36	7,189.29	-6,124.75	873.71	14,589,271.96	1,637,453.80	40.1717398	-105.0106063
13,174.00	88.79	179.92	7,191.58	-6,214.72	873.49	14,589,181.99	1,637,453.57	40.1714927	-105.0106071
13,262.00	88.59	180.64	7,193.60	-6,302.70	873.06	14,589,094.02	1,637,453.13	40.1712511	-105.0106087
13,351.00	89.43	180.95	7,195.13	-6,391.68	871.83	14,589,005.04	1,637,451.88	40.1710068	-105.0106131
13,440.00	88.05	181.67	7,197.09	-6,480.63	869.79	14,588,916.09	1,637,449.83	40.1707625	-105.0106204
13,529.00	86.24	181.10	7,201.52	-6,569.49	867.64	14,588,827.23	1,637,447.67	40.1705185	-105.0106281
13,618.00	86.64	180.82	7,207.05	-6,658.30	866.15	14,588,738.42	1,637,446.17	40.1702746	-105.0106334
13,706.00	87.72	180.41	7,211.38	-6,746.19	865.21	14,588,650.53	1,637,445.21	40.1700333	-105.0106368
13,795.00	89.20	180.19	7,213.77	-6,835.15	864.75	14,588,561.57	1,637,444.73	40.1697890	-105.0106385
13,884.00	90.77	180.04	7,213.79	-6,924.15	864.57	14,588,472.57	1,637,444.54	40.1695446	-105.0106391
13,900.00	91.07	179.89	7,213.54	-6,940.15	864.58	14,588,456.57	1,637,444.55	40.1695006	-105.0106391
Last SDI MWD Survey									
13,956.00	91.07	179.89	7,212.49	-6,996.14	864.68	14,588,400.58	1,637,444.64	40.1693469	-105.0106387
Projection to TD : 2027' FNL 1891' FWL Sec 4									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,276.00	2,214.50	Surface Casing	9.625	12.250	
13,956.00	7,212.49	Production Casing	5.500	8.500	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 6N-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 6N-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	-0.93	-0.37	First Total MWD Survey
2,237.00	2,177.58	112.16	394.88	Last Total MWD Survey
2,311.00	2,247.57	118.98	417.92	First SDI MWD Survey
6,325.00	6,186.65	249.41	889.39	Curve KOP
6,421.00	6,281.85	238.73	887.39	First SDI MWD Curve Survey
7,042.32	6,765.30	-132.02	909.17	Enter Land Box : 7042.32' MD & 6765.30' TVD
7,577.00	6,953.41	-624.76	920.48	Last SDI MWD Curve Survey
7,625.00	6,957.22	-672.61	920.64	Landing Point : 1003' FNL 1929' FWL Sec 33
7,666.00	6,959.99	-713.51	921.02	First SDI MWD Lateral Survey
8,411.47	6,995.39	-1,457.84	903.22	Cross 460' Line : 8411.47' MD & 6995.39' TVD 1778' FNL 1912' FWL
12,773.21	7,186.03	-5,814.00	873.39	Cross 460' Line : 12773.21' MD & 7186.03' TVD 847' FNL 1900' FWL
13,900.00	7,213.54	-6,940.15	864.58	Last SDI MWD Survey
13,956.00	7,212.49	-6,996.14	864.68	Projection to TD : 2027' FNL 1891' FWL Sec 4

Checked By: _____	Approved By: _____	Date: _____
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