

Wellbore: OH
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 22N2-4HZ

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
14595440.54	1636569.88	40.1886790	-105.0137740

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
125.00	125.00	0.62	220.35	-0.52	-0.44	First Total MWD Survey
2193.67	2249.00	18.54	62.23	169.85	370.26	Last Total MWD Survey
2335.95	2398.00	16.00	56.99	192.07	408.45	First SDI MWD Survey
6236.50	6310.00	3.42	185.05	217.32	459.27	Curve KOP
6314.76	6389.00	12.56	184.49	207.30	458.53	First SDI MWD Curve Survey
6817.56	7035.41	54.61	177.99	-180.98	470.10	Enter Land Box : 7035.41' MD & 6817.56' TVD
7005.48	7525.00	83.29	179.60	-627.05	492.63	Landing Point : 903' FNL 1491' FWL Sec 33
7007.48	7544.00	84.64	179.85	-645.94	492.72	Last SDI MWD Curve Survey
7012.54	7633.00	87.59	179.88	-734.79	492.61	First SDI MWD Lateral Survey
7052.58	8378.69	86.64	180.45	-1479.28	485.19	Exit 460' Circle : 8378.69' MD & 7052.58' TVD 1755' FNL 1483' FWL
7262.57	12802.91	86.59	181.19	-5896.53	494.5	Enter 460' Circle : 12802.91' MD & 7262.57' TVD 881' FNL 1508' FWL
7304.88	13885.00	88.09	179.60	-6977.46	485.44	Last SDI MWD Lateral Survey
7306.75	13941.00	88.09	179.60	-7033.43	485.83	Projection to TD : 2018' FNL 1500' FWL Sec 4

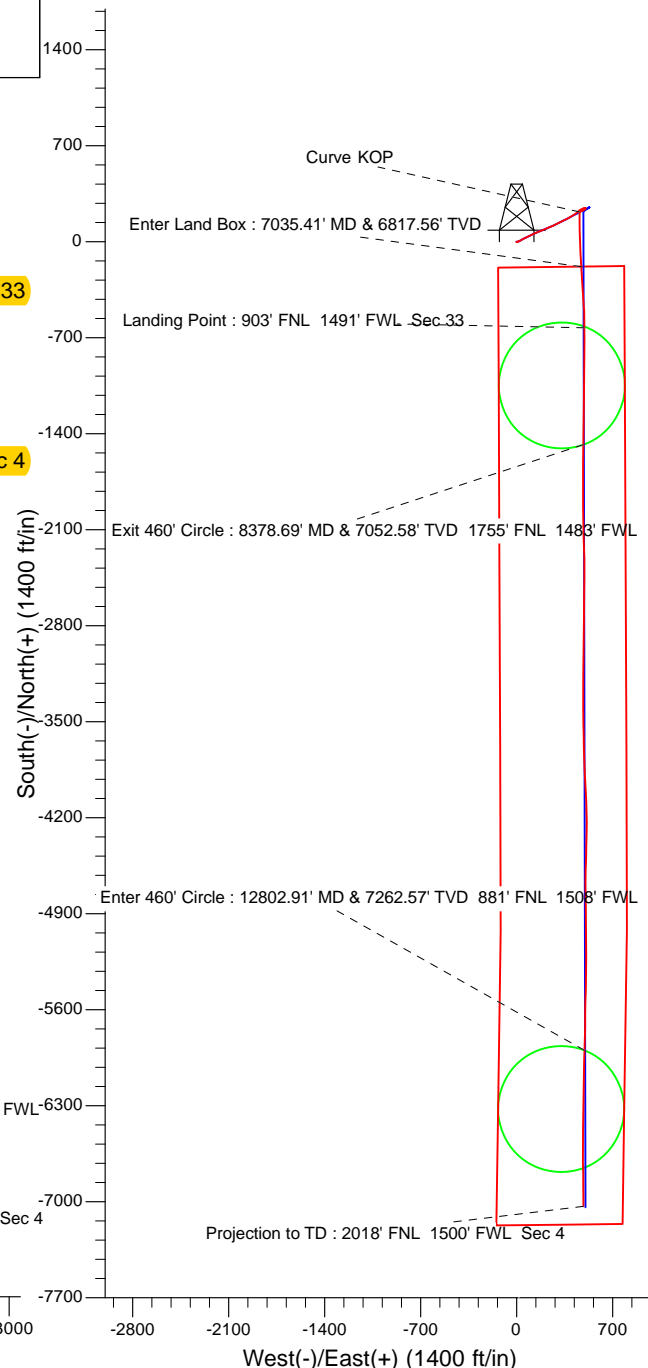
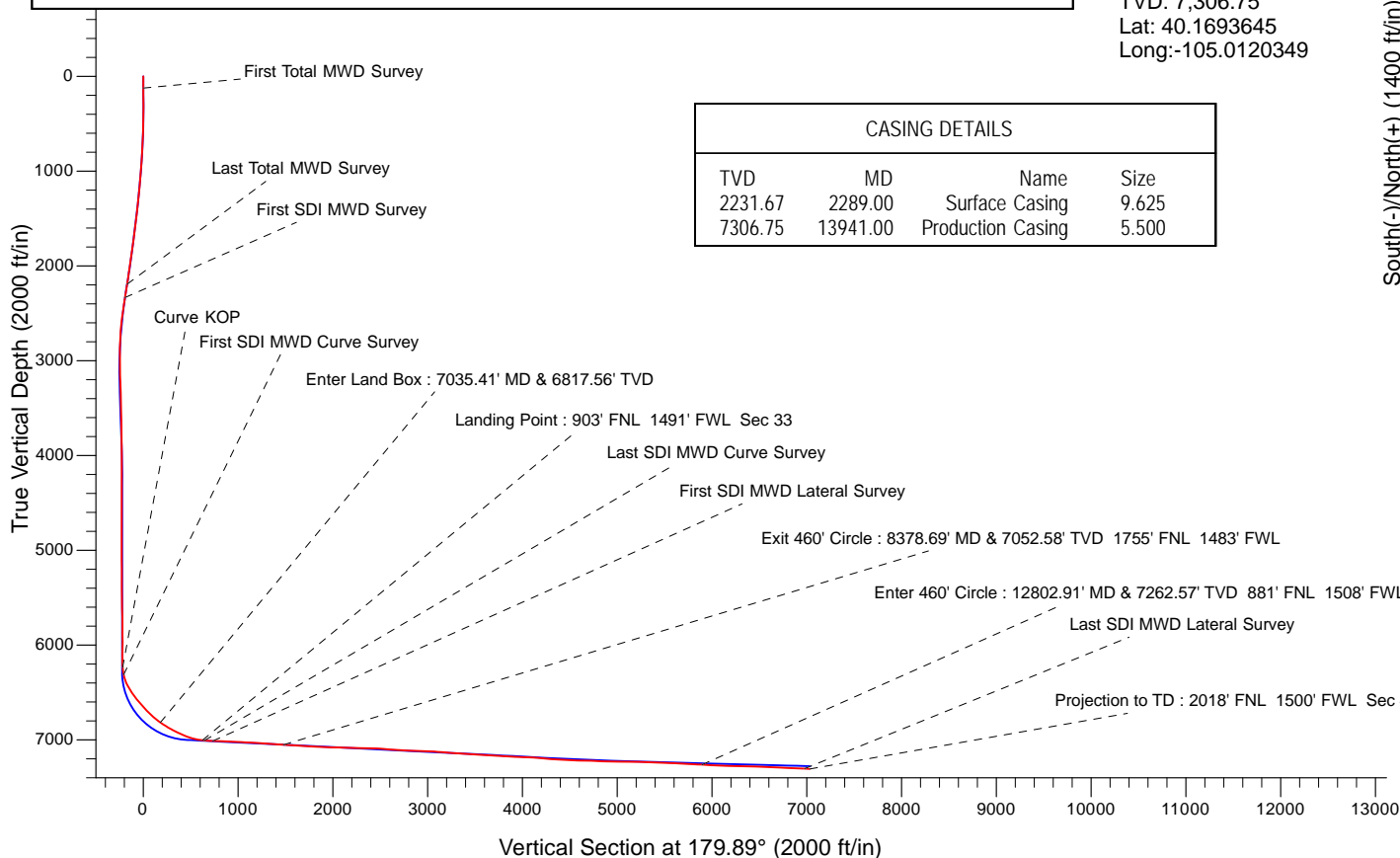
Surface Location:
 276' FNL 998' FWL
 Sec 33 T3N R68W

Landing Point:
 903' FNL 1491' FWL Sec 33
 MD: 7,525.00
 TVD: 7,005.48
 Lat: 40.1869571
 Long: -105.0120101

BHL:
 2018' FNL 1500' FWL Sec 4
 MD: 13,941.00
 TVD: 7,306.75
 Lat: 40.1693645
 Long: -105.0120349

CASING DETAILS

TVD	MD	Name	Size
2231.67	2289.00	Surface Casing	9.625
7306.75	13941.00	Production Casing	5.500





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

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

Hergenreder 22N2-4HZ

OH

Design: OH

Survey Report - Geographic

20 February, 2018



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	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 22N2-4HZ, 276' FNL 998' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,440.54 usft	Latitude:	40.1886790
	+E/-W	0.00 ft	Easting:	1,636,569.88 usft	Longitude:	-105.0137740
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	179.89	

Survey Program	Date	2/20/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	2,249.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,398.00	13,941.00	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	14,595,440.54	1,636,569.88	40.1886790	-105.0137740
125.00	0.62	220.35	125.00	-0.52	-0.44	14,595,440.02	1,636,569.44	40.1886776	-105.0137755
First Total MWD Survey									
157.00	0.88	233.27	156.99	-0.79	-0.75	14,595,439.75	1,636,569.13	40.1886768	-105.0137766
188.00	0.57	227.65	187.99	-1.04	-1.05	14,595,439.50	1,636,568.83	40.1886762	-105.0137777
220.00	0.70	231.95	219.99	-1.27	-1.32	14,595,439.27	1,636,568.56	40.1886755	-105.0137787
251.00	0.62	233.27	250.99	-1.49	-1.61	14,595,439.05	1,636,568.27	40.1886750	-105.0137797
283.00	0.26	220.79	282.99	-1.64	-1.79	14,595,438.90	1,636,568.09	40.1886745	-105.0137804
314.00	0.04	98.27	313.99	-1.70	-1.83	14,595,438.84	1,636,568.05	40.1886744	-105.0137805
346.00	0.83	76.12	345.99	-1.64	-1.59	14,595,438.90	1,636,568.29	40.1886745	-105.0137797
377.00	1.10	70.41	376.98	-1.49	-1.09	14,595,439.05	1,636,568.79	40.1886749	-105.0137779

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	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	1.27	80.16	408.97	-1.33	-0.46	14,595,439.21	1,636,569.42	40.1886754	-105.0137756	
441.00	1.67	74.28	440.96	-1.14	0.34	14,595,439.40	1,636,570.22	40.1886759	-105.0137727	
472.00	2.33	72.96	471.95	-0.83	1.38	14,595,439.71	1,636,571.26	40.1886767	-105.0137690	
504.00	2.81	71.46	503.91	-0.39	2.75	14,595,440.15	1,636,572.63	40.1886780	-105.0137641	
535.00	3.34	73.48	534.87	0.11	4.33	14,595,440.64	1,636,574.21	40.1886793	-105.0137585	
567.00	3.82	71.55	566.81	0.71	6.24	14,595,441.25	1,636,576.12	40.1886810	-105.0137516	
599.00	4.26	71.20	598.73	1.43	8.37	14,595,441.97	1,636,578.25	40.1886830	-105.0137440	
631.00	4.57	74.63	630.63	2.15	10.73	14,595,442.69	1,636,580.61	40.1886849	-105.0137356	
663.00	5.27	68.39	662.51	3.03	13.32	14,595,443.57	1,636,583.20	40.1886873	-105.0137263	
694.00	5.58	65.22	693.37	4.18	16.02	14,595,444.72	1,636,585.90	40.1886905	-105.0137166	
726.00	6.37	61.00	725.20	5.70	18.98	14,595,446.23	1,636,588.86	40.1886947	-105.0137060	
758.00	6.90	59.77	756.99	7.53	22.19	14,595,448.06	1,636,592.07	40.1886997	-105.0136945	
790.00	7.51	59.16	788.73	9.56	25.65	14,595,450.10	1,636,595.53	40.1887053	-105.0136821	
822.00	7.87	60.39	820.45	11.72	29.35	14,595,452.25	1,636,599.23	40.1887112	-105.0136689	
853.00	7.60	61.35	851.16	13.75	32.99	14,595,454.29	1,636,602.88	40.1887168	-105.0136558	
885.00	7.60	62.76	882.88	15.73	36.73	14,595,456.27	1,636,606.61	40.1887222	-105.0136424	
917.00	7.78	62.94	914.59	17.69	40.54	14,595,458.22	1,636,610.43	40.1887276	-105.0136288	
948.00	8.31	63.82	945.29	19.63	44.42	14,595,460.16	1,636,614.30	40.1887329	-105.0136149	
980.00	8.57	63.90	976.94	21.70	48.64	14,595,462.23	1,636,618.52	40.1887386	-105.0135998	
1,012.00	9.10	64.34	1,008.56	23.84	53.06	14,595,464.38	1,636,622.94	40.1887445	-105.0135840	
1,044.00	9.71	64.70	1,040.13	26.09	57.78	14,595,466.62	1,636,627.66	40.1887507	-105.0135671	
1,075.00	9.98	63.73	1,070.68	28.40	62.55	14,595,468.93	1,636,632.44	40.1887570	-105.0135500	
1,107.00	10.77	63.11	1,102.15	30.98	67.71	14,595,471.51	1,636,637.59	40.1887641	-105.0135315	
1,139.00	11.69	64.26	1,133.54	33.74	73.29	14,595,474.27	1,636,643.18	40.1887717	-105.0135115	
1,170.00	12.35	63.55	1,163.86	36.58	79.09	14,595,477.11	1,636,648.98	40.1887795	-105.0134908	
1,202.00	13.01	63.20	1,195.08	39.73	85.37	14,595,480.26	1,636,655.26	40.1887881	-105.0134683	
1,234.00	13.93	63.38	1,226.20	43.08	92.03	14,595,483.60	1,636,661.91	40.1887973	-105.0134444	
1,266.00	14.59	63.47	1,257.21	46.60	99.08	14,595,487.13	1,636,668.96	40.1888070	-105.0134192	
1,298.00	15.64	64.26	1,288.10	50.28	106.57	14,595,490.80	1,636,676.46	40.1888171	-105.0133924	
1,329.00	15.51	64.34	1,317.97	53.89	114.07	14,595,494.41	1,636,683.96	40.1888270	-105.0133655	
1,361.00	15.78	65.05	1,348.78	57.58	121.87	14,595,498.10	1,636,691.76	40.1888371	-105.0133376	
1,393.00	16.70	66.89	1,379.50	61.22	130.05	14,595,501.74	1,636,699.93	40.1888471	-105.0133083	
1,425.00	16.96	66.81	1,410.13	64.86	138.56	14,595,505.38	1,636,708.45	40.1888571	-105.0132778	
1,456.00	17.40	66.89	1,439.75	68.46	146.98	14,595,508.98	1,636,716.87	40.1888670	-105.0132477	
1,488.00	17.93	67.33	1,470.24	72.24	155.93	14,595,512.75	1,636,725.82	40.1888774	-105.0132156	
1,519.00	17.67	68.04	1,499.76	75.83	164.70	14,595,516.35	1,636,734.59	40.1888873	-105.0131843	
1,551.00	17.67	67.68	1,530.25	79.49	173.69	14,595,520.01	1,636,743.58	40.1888973	-105.0131520	
1,583.00	17.49	68.30	1,560.75	83.12	182.65	14,595,523.63	1,636,752.55	40.1889073	-105.0131200	
1,615.00	17.80	69.18	1,591.25	86.63	191.69	14,595,527.14	1,636,761.59	40.1889169	-105.0130876	
1,646.00	17.84	68.30	1,620.76	90.07	200.53	14,595,530.58	1,636,770.43	40.1889264	-105.0130559	
1,678.00	17.97	65.40	1,651.21	93.94	209.58	14,595,534.45	1,636,779.47	40.1889370	-105.0130235	
1,710.00	17.23	65.22	1,681.71	97.98	218.37	14,595,538.49	1,636,788.26	40.1889481	-105.0129921	
1,742.00	16.00	65.57	1,712.38	101.79	226.69	14,595,542.30	1,636,796.58	40.1889586	-105.0129623	
1,773.00	15.64	67.51	1,742.20	105.16	234.44	14,595,545.66	1,636,804.33	40.1889678	-105.0129345	
1,805.00	16.44	68.83	1,772.96	108.44	242.65	14,595,548.95	1,636,812.54	40.1889768	-105.0129051	
1,837.00	17.05	68.74	1,803.60	111.78	251.24	14,595,552.28	1,636,821.14	40.1889860	-105.0128744	
1,869.00	17.53	65.75	1,834.15	115.46	260.01	14,595,555.96	1,636,829.90	40.1889961	-105.0128430	
1,900.00	17.40	65.93	1,863.72	119.27	268.50	14,595,559.77	1,636,838.39	40.1890065	-105.0128126	
1,932.00	17.71	64.52	1,894.23	123.31	277.26	14,595,563.81	1,636,847.16	40.1890177	-105.0127812	
1,964.00	18.59	63.11	1,924.64	127.71	286.20	14,595,568.21	1,636,856.10	40.1890297	-105.0127492	
1,995.00	19.16	63.04	1,953.98	132.26	295.14	14,595,572.75	1,636,865.04	40.1890422	-105.0127172	
2,027.00	19.78	63.99	1,984.15	137.01	304.69	14,595,577.50	1,636,874.59	40.1890553	-105.0126830	
2,059.00	19.86	63.64	2,014.25	141.80	314.43	14,595,582.29	1,636,884.33	40.1890684	-105.0126481	
2,091.00	19.51	63.64	2,044.38	146.58	324.09	14,595,587.07	1,636,893.99	40.1890816	-105.0126135	
2,122.00	19.73	63.38	2,073.58	151.23	333.40	14,595,591.72	1,636,903.30	40.1890943	-105.0125802	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	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	19.64	64.08	2,103.71	156.00	343.07	14,595,596.48	1,636,912.97	40.1891074	-105.0125456
2,185.00	18.63	63.20	2,133.00	160.51	352.17	14,595,600.99	1,636,922.08	40.1891198	-105.0125130
2,217.00	18.50	62.67	2,163.33	165.14	361.25	14,595,605.63	1,636,931.15	40.1891325	-105.0124805
2,249.00	18.54	62.23	2,193.67	169.85	370.26	14,595,610.33	1,636,940.16	40.1891454	-105.0124482
Last Total MWD Survey									
2,398.00	16.00	56.99	2,335.95	192.07	408.45	14,595,632.55	1,636,978.35	40.1892065	-105.0123115
First SDI MWD Survey									
2,487.00	14.44	53.09	2,421.83	205.42	427.61	14,595,645.90	1,636,997.52	40.1892431	-105.0122429
2,576.00	13.59	50.91	2,508.18	218.68	444.59	14,595,659.15	1,637,014.51	40.1892795	-105.0121820
2,664.00	10.89	55.56	2,594.18	229.90	459.48	14,595,670.37	1,637,029.39	40.1893104	-105.0121287
2,779.00	7.68	65.24	2,707.66	239.27	475.42	14,595,679.73	1,637,045.34	40.1893361	-105.0120716
2,868.00	6.64	60.07	2,795.97	244.33	485.28	14,595,684.79	1,637,055.20	40.1893500	-105.0120363
2,957.00	4.03	90.21	2,884.59	246.88	492.87	14,595,687.35	1,637,062.79	40.1893570	-105.0120092
3,046.00	3.13	99.52	2,973.42	246.47	498.39	14,595,686.93	1,637,068.31	40.1893558	-105.0119894
3,135.00	2.29	113.54	3,062.32	245.36	502.42	14,595,685.82	1,637,072.34	40.1893528	-105.0119750
3,223.00	1.73	214.69	3,150.28	243.56	503.28	14,595,684.02	1,637,073.19	40.1893479	-105.0119719
3,313.00	2.33	221.15	3,240.23	241.07	501.30	14,595,681.53	1,637,071.21	40.1893410	-105.0119790
3,402.00	2.18	227.58	3,329.16	238.56	498.86	14,595,679.03	1,637,068.77	40.1893341	-105.0119877
3,490.00	2.08	236.03	3,417.10	236.54	496.30	14,595,677.00	1,637,066.21	40.1893286	-105.0119969
3,579.00	2.17	236.71	3,506.04	234.71	493.55	14,595,675.18	1,637,063.47	40.1893236	-105.0120067
3,668.00	2.25	239.92	3,594.97	232.91	490.63	14,595,673.38	1,637,060.55	40.1893186	-105.0120172
3,757.00	1.98	238.30	3,683.91	231.23	487.81	14,595,671.69	1,637,057.73	40.1893140	-105.0120273
3,846.00	1.84	231.84	3,772.86	229.54	485.38	14,595,670.00	1,637,055.29	40.1893094	-105.0120360
3,935.00	1.92	240.22	3,861.81	227.92	482.96	14,595,668.38	1,637,052.88	40.1893049	-105.0120446
4,024.00	1.91	243.73	3,950.76	226.52	480.34	14,595,666.98	1,637,050.25	40.1893011	-105.0120540
4,113.00	0.07	248.86	4,039.75	225.84	478.96	14,595,666.31	1,637,048.87	40.1892992	-105.0120590
4,201.00	0.17	261.93	4,127.74	225.81	478.78	14,595,666.27	1,637,048.69	40.1892991	-105.0120596
4,290.00	0.83	296.63	4,216.74	226.08	478.07	14,595,666.54	1,637,047.98	40.1892998	-105.0120622
4,379.00	1.22	303.08	4,305.73	226.88	476.70	14,595,667.35	1,637,046.61	40.1893021	-105.0120671
4,468.00	0.41	303.15	4,394.72	227.57	475.64	14,595,668.04	1,637,045.55	40.1893040	-105.0120709
4,556.00	0.36	247.51	4,482.72	227.64	475.12	14,595,668.11	1,637,045.03	40.1893041	-105.0120727
4,645.00	0.64	277.18	4,571.71	227.60	474.37	14,595,668.06	1,637,044.28	40.1893040	-105.0120754
4,734.00	1.01	295.65	4,660.70	228.00	473.17	14,595,668.46	1,637,043.08	40.1893051	-105.0120797
4,822.00	0.40	256.41	4,748.70	228.26	472.17	14,595,668.73	1,637,042.09	40.1893058	-105.0120833
4,911.00	0.42	248.25	4,837.69	228.07	471.57	14,595,668.53	1,637,041.48	40.1893053	-105.0120854
5,000.00	1.05	289.15	4,926.69	228.21	470.49	14,595,668.68	1,637,040.41	40.1893057	-105.0120893
5,089.00	0.63	192.54	5,015.68	228.00	469.62	14,595,668.47	1,637,039.53	40.1893051	-105.0120924
5,178.00	0.75	209.40	5,104.67	227.02	469.22	14,595,667.48	1,637,039.14	40.1893024	-105.0120938
5,267.00	0.68	249.50	5,193.67	226.33	468.44	14,595,666.79	1,637,038.36	40.1893005	-105.0120966
5,355.00	0.89	277.01	5,281.66	226.23	467.28	14,595,666.69	1,637,037.19	40.1893003	-105.0121008
5,444.00	1.04	272.85	5,370.65	226.35	465.78	14,595,666.82	1,637,035.70	40.1893006	-105.0121062
5,533.00	1.43	183.75	5,459.63	225.28	464.90	14,595,665.75	1,637,034.82	40.1892977	-105.0121093
5,622.00	1.21	194.03	5,548.61	223.26	464.60	14,595,663.73	1,637,034.52	40.1892921	-105.0121104
5,711.00	1.05	211.87	5,637.59	221.66	463.95	14,595,662.13	1,637,033.86	40.1892877	-105.0121127
5,800.00	1.08	223.97	5,726.58	220.36	462.93	14,595,660.83	1,637,032.84	40.1892842	-105.0121164
5,888.00	1.05	253.53	5,814.56	219.54	461.58	14,595,660.00	1,637,031.50	40.1892819	-105.0121212
5,977.00	1.30	263.26	5,903.54	219.19	459.80	14,595,659.66	1,637,029.71	40.1892809	-105.0121276
6,066.00	0.57	94.54	5,992.54	219.03	459.24	14,595,659.50	1,637,029.15	40.1892805	-105.0121296
6,155.00	0.20	128.83	6,081.54	218.90	459.80	14,595,659.37	1,637,029.71	40.1892801	-105.0121276
6,244.00	0.50	314.91	6,170.53	219.08	459.65	14,595,659.55	1,637,029.56	40.1892806	-105.0121281
6,310.00	3.42	185.05	6,236.50	217.32	459.27	14,595,657.79	1,637,029.18	40.1892758	-105.0121295
Curve KOP									
6,333.00	4.73	183.43	6,259.44	215.69	459.15	14,595,656.16	1,637,029.06	40.1892713	-105.0121299

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	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
6,389.00	12.56	184.49	6,314.76	207.30	458.53	14,595,647.77	1,637,028.44	40.1892483	-105.0121321
First SDI MWD Curve Survey									
6,422.00	17.18	184.67	6,346.65	198.86	457.86	14,595,639.33	1,637,027.77	40.1892251	-105.0121345
6,511.00	28.88	178.36	6,428.42	164.15	457.40	14,595,604.62	1,637,027.30	40.1891298	-105.0121362
6,599.00	31.62	179.07	6,504.43	119.83	458.38	14,595,560.30	1,637,028.28	40.1890081	-105.0121327
6,688.00	41.29	179.86	6,575.93	67.01	458.83	14,595,507.48	1,637,028.72	40.1888630	-105.0121310
6,777.00	41.52	178.56	6,642.69	8.16	459.65	14,595,448.63	1,637,029.53	40.1887014	-105.0121281
6,866.00	44.70	174.96	6,707.66	-52.53	463.14	14,595,387.93	1,637,033.01	40.1885348	-105.0121156
6,955.00	49.59	177.28	6,768.18	-117.60	467.50	14,595,322.86	1,637,037.36	40.1883561	-105.0121000
7,035.41	54.61	177.99	6,817.56	-180.98	470.10	14,595,259.49	1,637,039.95	40.1881820	-105.0120907
Enter Land Box : 7035.41' MD & 6817.56' TVD									
7,044.00	55.15	178.06	6,822.50	-188.00	470.35	14,595,252.46	1,637,040.20	40.1881627	-105.0120898
7,133.00	59.75	177.09	6,870.38	-262.93	473.54	14,595,177.53	1,637,043.37	40.1879570	-105.0120784
7,222.00	63.20	174.46	6,912.88	-340.89	479.32	14,595,099.57	1,637,049.15	40.1877429	-105.0120577
7,311.00	66.50	175.18	6,950.70	-421.12	486.59	14,595,019.35	1,637,056.40	40.1875226	-105.0120317
7,399.00	73.74	178.95	6,980.61	-503.69	490.76	14,594,936.77	1,637,060.56	40.1872958	-105.0120168
7,488.00	80.66	179.12	7,000.32	-590.42	492.22	14,594,850.05	1,637,062.01	40.1870577	-105.0120115
7,525.00	83.29	179.60	7,005.48	-627.05	492.63	14,594,813.42	1,637,062.41	40.1869571	-105.0120101
Landing Point : 903' FNL 1491' FWL Sec 33									
7,544.00	84.64	179.85	7,007.48	-645.94	492.72	14,594,794.52	1,637,062.50	40.1869052	-105.0120098
Last SDI MWD Curve Survey									
7,577.00	86.98	180.27	7,009.89	-678.85	492.69	14,594,761.61	1,637,062.46	40.1868148	-105.0120099
7,633.00	87.59	179.88	7,012.54	-734.79	492.61	14,594,705.68	1,637,062.38	40.1866612	-105.0120102
First SDI MWD Lateral Survey									
7,666.00	87.95	179.65	7,013.83	-767.76	492.75	14,594,672.70	1,637,062.51	40.1865707	-105.0120097
7,755.00	87.25	180.26	7,017.56	-856.68	492.82	14,594,583.78	1,637,062.56	40.1863265	-105.0120094
7,844.00	87.35	180.64	7,021.75	-945.58	492.12	14,594,494.88	1,637,061.85	40.1860824	-105.0120119
7,932.00	88.22	180.53	7,025.15	-1,033.51	491.22	14,594,406.95	1,637,060.94	40.1858409	-105.0120152
8,021.00	86.61	181.28	7,029.16	-1,122.41	489.82	14,594,318.06	1,637,059.52	40.1855968	-105.0120202
8,110.00	86.95	180.56	7,034.16	-1,211.25	488.39	14,594,229.21	1,637,058.08	40.1853528	-105.0120253
8,199.00	85.44	181.05	7,040.07	-1,300.05	487.14	14,594,140.42	1,637,056.82	40.1851090	-105.0120298
8,287.00	85.97	180.50	7,046.66	-1,387.79	485.96	14,594,052.68	1,637,055.62	40.1848680	-105.0120340
8,376.00	86.61	180.46	7,052.42	-1,476.60	485.21	14,593,963.87	1,637,054.86	40.1846241	-105.0120367
8,378.69	86.64	180.45	7,052.58	-1,479.28	485.19	14,593,961.18	1,637,054.84	40.1846168	-105.0120368
Exit 460' Circle : 8378.69' MD & 7052.58' TVD 1755' FNL 1483' FWL									
8,465.00	87.59	180.09	7,056.92	-1,565.48	484.79	14,593,874.98	1,637,054.42	40.1843800	-105.0120382
8,554.00	85.34	180.90	7,062.41	-1,654.30	484.02	14,593,786.16	1,637,053.64	40.1841361	-105.0120410
8,642.00	86.01	180.58	7,069.04	-1,742.05	482.89	14,593,698.42	1,637,052.50	40.1838952	-105.0120450
8,731.00	87.58	179.95	7,074.02	-1,830.90	482.48	14,593,609.57	1,637,052.07	40.1836512	-105.0120465
8,820.00	87.52	178.68	7,077.82	-1,919.81	483.54	14,593,520.66	1,637,053.12	40.1834070	-105.0120427
8,909.00	89.60	179.95	7,080.06	-2,008.77	484.60	14,593,431.70	1,637,054.17	40.1831627	-105.0120389
8,998.00	87.52	178.66	7,082.30	-2,097.73	485.68	14,593,342.74	1,637,055.23	40.1829184	-105.0120351
9,087.00	88.36	178.39	7,085.50	-2,186.64	487.97	14,593,253.83	1,637,057.51	40.1826743	-105.0120269
9,176.00	89.60	177.65	7,087.08	-2,275.57	491.05	14,593,164.90	1,637,060.57	40.1824301	-105.0120159
9,264.00	88.66	179.84	7,088.42	-2,363.54	492.97	14,593,076.93	1,637,062.48	40.1821885	-105.0120090
9,353.00	87.45	180.45	7,091.44	-2,452.48	492.75	14,592,987.99	1,637,062.25	40.1819443	-105.0120098
9,442.00	85.06	180.96	7,097.25	-2,541.28	491.66	14,592,899.19	1,637,061.14	40.1817004	-105.0120137
9,531.00	85.80	180.52	7,104.34	-2,629.99	490.51	14,592,810.48	1,637,059.98	40.1814568	-105.0120178
9,620.00	86.85	180.79	7,110.05	-2,718.80	489.49	14,592,721.67	1,637,058.95	40.1812129	-105.0120215
9,709.00	87.65	179.77	7,114.32	-2,807.69	489.06	14,592,632.78	1,637,058.50	40.1809688	-105.0120230
9,798.00	87.89	181.35	7,117.78	-2,896.62	488.19	14,592,543.85	1,637,057.62	40.1807246	-105.0120261
9,886.00	87.05	181.02	7,121.66	-2,984.51	486.37	14,592,455.96	1,637,055.79	40.1804833	-105.0120327
9,975.00	87.85	180.82	7,125.62	-3,073.41	484.95	14,592,367.06	1,637,054.35	40.1802391	-105.0120378
10,064.00	85.04	180.38	7,131.14	-3,162.23	484.02	14,592,278.25	1,637,053.40	40.1799952	-105.0120411

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	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
10,153.00	85.57	179.72	7,138.43	-3,250.93	483.94	14,592,189.55	1,637,053.31	40.1797516	-105.0120414
10,241.00	86.01	180.19	7,144.89	-3,338.69	484.01	14,592,101.78	1,637,053.37	40.1795106	-105.0120411
10,330.00	86.71	179.98	7,150.54	-3,427.51	483.88	14,592,012.96	1,637,053.22	40.1792667	-105.0120416
10,420.00	87.52	178.22	7,155.07	-3,517.38	485.29	14,591,923.09	1,637,054.62	40.1790199	-105.0120366
10,508.00	85.60	178.53	7,160.35	-3,605.18	487.78	14,591,835.29	1,637,057.10	40.1787788	-105.0120277
10,597.00	85.64	178.38	7,167.14	-3,693.89	490.17	14,591,746.58	1,637,059.48	40.1785352	-105.0120191
10,686.00	86.91	178.62	7,172.93	-3,782.67	492.50	14,591,657.80	1,637,061.79	40.1782914	-105.0120108
10,775.00	87.32	177.51	7,177.41	-3,871.50	495.50	14,591,568.97	1,637,064.77	40.1780475	-105.0120000
10,864.00	87.62	177.09	7,181.34	-3,960.32	499.69	14,591,480.15	1,637,068.95	40.1778036	-105.0119851
10,953.00	88.66	176.32	7,184.22	-4,049.12	504.80	14,591,391.35	1,637,074.05	40.1775597	-105.0119668
11,042.00	85.74	179.18	7,188.57	-4,137.93	508.29	14,591,302.54	1,637,077.53	40.1773159	-105.0119543
11,131.00	83.58	179.38	7,196.85	-4,226.53	509.40	14,591,213.94	1,637,078.63	40.1770725	-105.0119503
11,220.00	86.14	181.51	7,204.83	-4,315.16	508.71	14,591,125.31	1,637,077.92	40.1768292	-105.0119528
11,309.00	86.31	181.10	7,210.69	-4,403.94	506.69	14,591,036.53	1,637,075.89	40.1765854	-105.0119600
11,398.00	87.55	181.67	7,215.45	-4,492.78	504.54	14,590,947.69	1,637,073.72	40.1763414	-105.0119677
11,487.00	88.59	180.74	7,218.45	-4,581.71	502.67	14,590,858.76	1,637,071.84	40.1760972	-105.0119744
11,575.00	89.63	180.78	7,219.82	-4,669.69	501.50	14,590,770.78	1,637,070.66	40.1758556	-105.0119786
11,664.00	87.32	179.78	7,222.19	-4,758.65	501.07	14,590,681.82	1,637,070.21	40.1756113	-105.0119802
11,753.00	87.69	178.69	7,226.06	-4,847.56	502.26	14,590,592.91	1,637,071.38	40.1753671	-105.0119759
11,842.00	88.49	179.00	7,229.03	-4,936.49	504.05	14,590,503.98	1,637,073.16	40.1751229	-105.0119695
11,931.00	89.36	178.68	7,230.70	-5,025.45	505.85	14,590,415.02	1,637,074.95	40.1748786	-105.0119631
12,020.00	88.22	180.40	7,232.58	-5,114.43	506.57	14,590,326.04	1,637,075.65	40.1746343	-105.0119605
12,109.00	88.93	180.50	7,234.79	-5,203.40	505.87	14,590,237.08	1,637,074.94	40.1743900	-105.0119630
12,197.00	90.03	180.61	7,235.59	-5,291.39	505.01	14,590,149.08	1,637,074.07	40.1741483	-105.0119661
12,286.00	88.05	181.32	7,237.08	-5,380.36	503.52	14,590,060.12	1,637,072.56	40.1739040	-105.0119715
12,375.00	87.49	181.24	7,240.54	-5,469.27	501.53	14,589,971.21	1,637,070.56	40.1736599	-105.0119786
12,464.00	86.58	180.90	7,245.15	-5,558.13	499.87	14,589,882.34	1,637,068.89	40.1734158	-105.0119845
12,553.00	86.38	180.72	7,250.61	-5,646.95	498.61	14,589,793.52	1,637,067.62	40.1731719	-105.0119890
12,641.00	87.05	180.56	7,255.65	-5,734.80	497.63	14,589,705.67	1,637,066.62	40.1729307	-105.0119925
12,730.00	88.26	181.36	7,259.30	-5,823.71	496.14	14,589,616.76	1,637,065.12	40.1726865	-105.0119979
12,802.91	86.59	181.19	7,262.57	-5,896.53	494.52	14,589,543.94	1,637,063.48	40.1724865	-105.0120037
Enter 460' Circle : 12802.91' MD & 7262.57' TVD 881' FNL 1508' FWL									
12,818.00	86.24	181.16	7,263.52	-5,911.59	494.21	14,589,528.89	1,637,063.17	40.1724452	-105.0120048
12,907.00	87.15	181.53	7,268.65	-6,000.41	492.12	14,589,440.06	1,637,061.07	40.1722013	-105.0120123
12,996.00	88.56	182.63	7,271.98	-6,089.29	488.90	14,589,351.19	1,637,057.83	40.1719572	-105.0120238
13,085.00	86.75	182.32	7,275.62	-6,178.13	485.06	14,589,262.35	1,637,053.98	40.1717132	-105.0120376
13,174.00	88.76	179.55	7,279.11	-6,267.03	483.61	14,589,173.44	1,637,052.51	40.1714691	-105.0120428
13,263.00	89.43	179.21	7,280.51	-6,356.02	484.57	14,589,084.46	1,637,053.46	40.1712247	-105.0120393
13,352.00	88.69	180.84	7,281.97	-6,445.00	484.53	14,588,995.48	1,637,053.41	40.1709804	-105.0120395
13,441.00	87.62	180.53	7,284.84	-6,533.95	483.47	14,588,906.53	1,637,052.33	40.1707361	-105.0120433
13,529.00	87.89	180.52	7,288.29	-6,621.88	482.66	14,588,818.60	1,637,051.51	40.1704947	-105.0120462
13,618.00	86.55	179.16	7,292.60	-6,710.77	482.91	14,588,729.71	1,637,051.75	40.1702506	-105.0120453
13,707.00	86.95	179.69	7,297.65	-6,799.62	483.80	14,588,640.86	1,637,052.62	40.1700066	-105.0120421
13,796.00	87.82	179.30	7,301.71	-6,888.52	484.58	14,588,551.96	1,637,053.39	40.1697624	-105.0120393
13,885.00	88.09	179.60	7,304.88	-6,977.46	485.44	14,588,463.02	1,637,054.23	40.1695182	-105.0120363
Last SDI MWD Lateral Survey									
13,941.00	88.09	179.60	7,306.75	-7,033.43	485.83	14,588,407.05	1,637,054.62	40.1693645	-105.0120349
Projection to TD : 2018' FNL 1500' FWL Sec 4									

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 22N2-4HZ
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 22N2-4HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
2,289.00	2,231.67	Surface Casing	9.625	12.250	
13,941.00	7,306.75	Production Casing	5.500	8.500	

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
6,310.00	6,236.50	217.32	459.27	Curve KOP	
6,389.00	6,314.76	207.30	458.53	First SDI MWD Curve Survey	
7,035.41	6,817.56	-180.98	470.10	Enter Land Box : 7035.41' MD & 6817.56' TVD	
7,525.00	7,005.48	-627.05	492.63	Landing Point : 903' FNL 1491' FWL Sec 33	
7,544.00	7,007.48	-645.94	492.72	Last SDI MWD Curve Survey	
7,633.00	7,012.54	-734.79	492.61	First SDI MWD Lateral Survey	
8,378.69	7,052.58	-1,479.28	485.19	Exit 460' Circle : 8378.69' MD & 7052.58' TVD 1755' FNL 1483' FWL	
12,802.91	7,262.57	-5,896.53	494.52	Enter 460' Circle : 12802.91' MD & 7262.57' TVD 881' FNL 1508' FWL	
13,885.00	7,304.88	-6,977.46	485.44	Last SDI MWD Lateral Survey	
13,941.00	7,306.75	-7,033.43	485.83	Projection to TD : 2018' FNL 1500' FWL Sec 4	

Checked By: _____ Approved By: _____ Date: _____