

Wellbore: OH
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 25N-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
14595382.28	1636584.68	40.1885190	-105.0137210

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
124.99	125.00	1.19	144.59	-1.06	0.75	First Total MWD Survey
2214.51	2281.00	18.54	76.03	96.68	454.19	Last Total MWD Survey
2327.60	2400.00	17.74	74.62	106.06	490.03	First SDI MWD Survey
6339.32	6540.00	3.71	210.73	264.61	1275.24	Curve KOP
6399.87	6601.00	9.74	193.82	257.90	1273.00	First SDI MWD Curve Survey
7006.30	7341.27	67.87	173.94	-112.98	1285.96	Enter Land Box : 7341.27' MD & 7006.30' TVD
7017.48	7375.00	73.41	174.39	-144.63	1289.19	Last SDI MWD Curve Survey
7033.54	7452.00	82.49	176.92	-219.63	1294.87	Landing Point : 570' FNL 2307' FWL Sec 33
7037.02	7490.00	86.98	178.12	-257.42	1296.50	First SDI MWD Lateral Survey
7066.45	8525.44	86.03	181.59	-1291.45	1300.13	Exit 460' Circle : 8525.44' MD & 7066.45' TVD 1644' FNL 2313' FWL
7253.60	13126.02	86.33	179.94	-5885.14	1353.81	Enter 460' Circle : 13126.02' MD & 7253.60' TVD 937' FNL 2383' FWL
7296.65	14150.00	89.46	181.55	-6907.58	1345.34	Last SDI MWD Survey
7297.24	14213.00	89.46	181.55	-6970.55	1343.64	Projection to TD : 2020' FNL 2373' FWL Sec 4

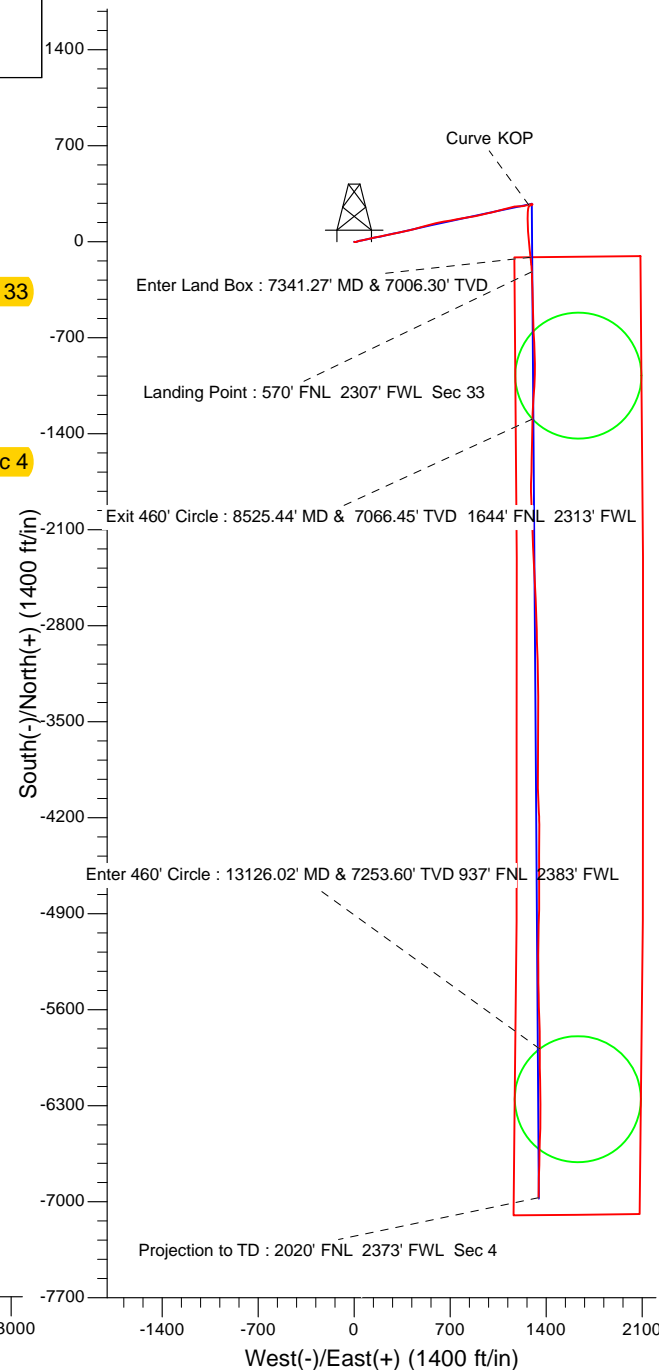
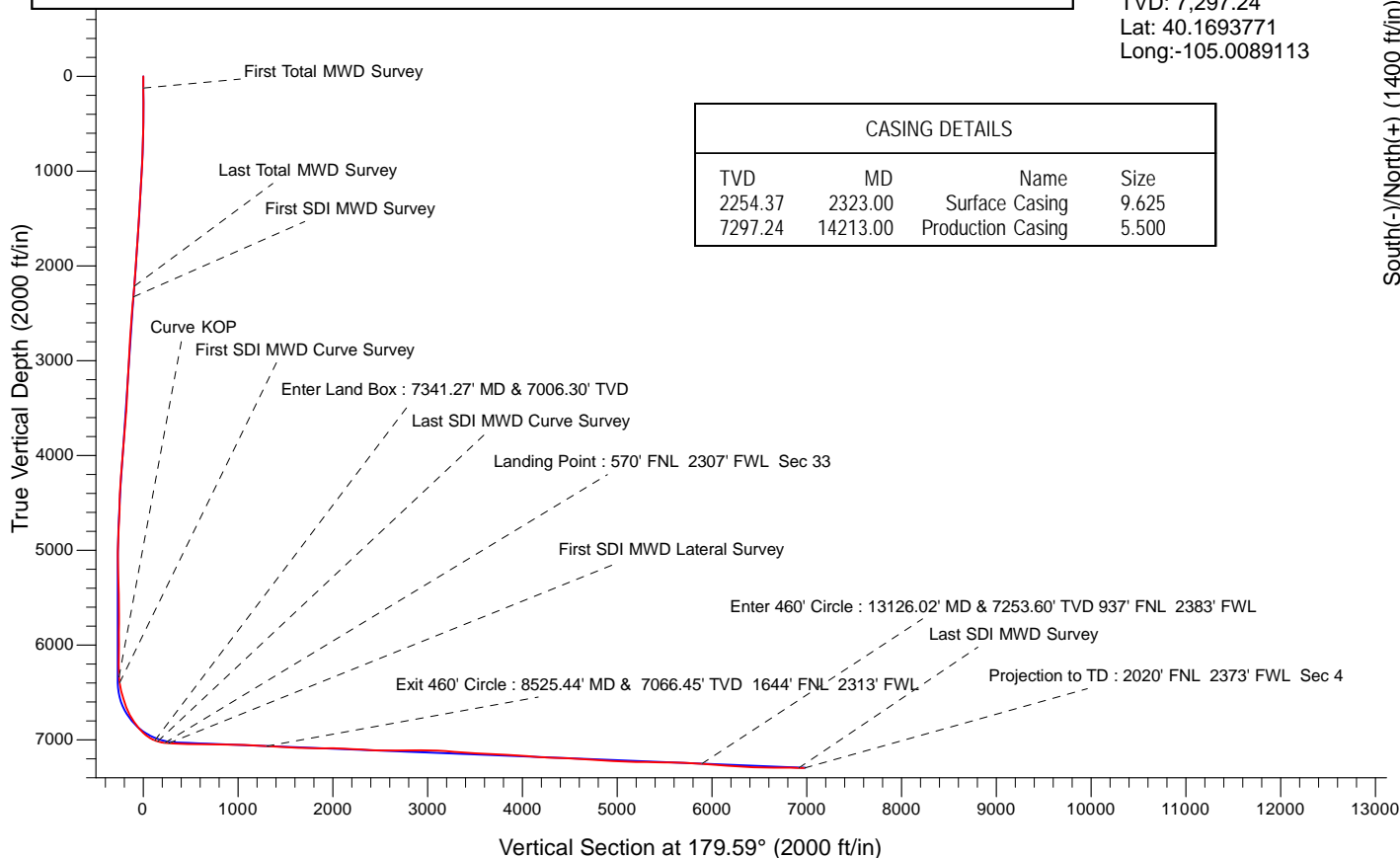
Surface Location:
 334' FNL 1013' FWL
 Sec 33 T3N R68W

Landing Point:
 570' FNL 2307' FWL Sec 33
 MD: 7,452.00
 TVD: 7,033.54
 Lat: 40.1879158
 Long: -105.0090846

BHL:
 2020' FNL 2373' FWL Sec 4
 MD: 14,213.00
 TVD: 7,297.24
 Lat: 40.1693771
 Long: -105.0089113

CASING DETAILS

TVD	MD	Name	Size
2254.37	2323.00	Surface Casing	9.625
7297.24	14213.00	Production Casing	5.500





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

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

Hergenreder 25N-4HZ

OH

Design: OH

Survey Report - Geographic

06 February, 2018



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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 25N-4HZ, 334' FNL 1013' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,382.27 usft	Latitude:	40.1885190
	+E/-W	0.00 ft	Easting:	1,636,584.67 usft	Longitude:	-105.0137210
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	179.59	

Survey Program	Date	2/6/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
125.00	2,281.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,400.00	14,213.00	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	14,595,382.27	1,636,584.67	40.1885190	-105.0137210
125.00	1.19	144.59	124.99	-1.06	0.75	14,595,381.22	1,636,585.42	40.1885161	-105.0137183
First Total MWD Survey									
157.00	1.23	135.18	156.98	-1.57	1.19	14,595,380.70	1,636,585.86	40.1885147	-105.0137167
188.00	1.32	124.72	187.98	-2.01	1.71	14,595,380.26	1,636,586.39	40.1885135	-105.0137148
220.00	1.41	107.85	219.97	-2.34	2.39	14,595,379.93	1,636,587.06	40.1885126	-105.0137124
251.00	1.67	94.93	250.96	-2.50	3.21	14,595,379.77	1,636,587.88	40.1885122	-105.0137095
283.00	2.07	91.94	282.94	-2.56	4.25	14,595,379.71	1,636,588.92	40.1885120	-105.0137058
314.00	1.93	88.60	313.92	-2.56	5.33	14,595,379.71	1,636,590.00	40.1885120	-105.0137019
346.00	2.37	85.53	345.90	-2.50	6.53	14,595,379.77	1,636,591.20	40.1885122	-105.0136976
377.00	2.68	83.59	376.87	-2.37	7.89	14,595,379.90	1,636,592.56	40.1885125	-105.0136927

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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	2.37	82.80	408.84	-2.20	9.29	14,595,380.07	1,636,593.96	40.1885130	-105.0136877	
441.00	1.89	77.26	440.81	-2.00	10.46	14,595,380.27	1,636,595.13	40.1885135	-105.0136835	
472.00	1.71	77.09	471.80	-1.79	11.41	14,595,380.48	1,636,596.08	40.1885141	-105.0136801	
504.00	1.93	69.09	503.78	-1.49	12.38	14,595,380.78	1,636,597.05	40.1885149	-105.0136767	
535.00	2.46	71.02	534.76	-1.08	13.49	14,595,381.19	1,636,598.16	40.1885161	-105.0136727	
567.00	3.08	70.32	566.72	-0.57	14.95	14,595,381.70	1,636,599.62	40.1885175	-105.0136674	
599.00	3.43	67.51	598.67	0.08	16.65	14,595,382.35	1,636,601.32	40.1885193	-105.0136614	
631.00	4.09	72.17	630.60	0.80	18.62	14,595,383.07	1,636,603.29	40.1885212	-105.0136543	
663.00	5.01	71.29	662.50	1.60	21.03	14,595,383.87	1,636,605.70	40.1885234	-105.0136457	
694.00	6.02	71.02	693.36	2.56	23.85	14,595,384.83	1,636,608.52	40.1885261	-105.0136356	
726.00	6.50	71.81	725.17	3.67	27.15	14,595,385.94	1,636,611.83	40.1885291	-105.0136237	
758.00	7.47	76.03	756.93	4.74	30.89	14,595,387.01	1,636,615.57	40.1885320	-105.0136104	
790.00	8.61	75.15	788.61	5.85	35.23	14,595,388.12	1,636,619.90	40.1885351	-105.0135948	
822.00	9.36	77.44	820.22	7.03	40.08	14,595,389.30	1,636,624.75	40.1885383	-105.0135775	
853.00	10.11	76.65	850.77	8.21	45.19	14,595,390.48	1,636,629.86	40.1885416	-105.0135592	
885.00	10.50	78.23	882.26	9.45	50.78	14,595,391.72	1,636,635.45	40.1885450	-105.0135392	
917.00	11.25	78.41	913.68	10.68	56.69	14,595,392.94	1,636,641.36	40.1885483	-105.0135180	
948.00	12.00	77.62	944.05	11.97	62.80	14,595,394.24	1,636,647.47	40.1885519	-105.0134961	
980.00	12.66	78.14	975.31	13.41	69.48	14,595,395.67	1,636,654.15	40.1885559	-105.0134722	
1,012.00	12.44	78.93	1,006.54	14.79	76.29	14,595,397.05	1,636,660.97	40.1885596	-105.0134478	
1,044.00	12.83	78.67	1,037.77	16.15	83.16	14,595,398.41	1,636,667.84	40.1885634	-105.0134232	
1,075.00	13.75	76.82	1,067.94	17.67	90.12	14,595,399.93	1,636,674.80	40.1885675	-105.0133983	
1,107.00	14.28	77.53	1,098.99	19.39	97.68	14,595,401.64	1,636,682.35	40.1885723	-105.0133712	
1,139.00	14.72	76.74	1,129.97	21.17	105.49	14,595,403.43	1,636,690.17	40.1885772	-105.0133433	
1,170.00	15.29	77.44	1,159.91	22.96	113.31	14,595,405.22	1,636,697.99	40.1885821	-105.0133152	
1,202.00	16.30	77.44	1,190.70	24.86	121.82	14,595,407.11	1,636,706.49	40.1885873	-105.0132848	
1,234.00	16.96	77.53	1,221.36	26.84	130.76	14,595,409.09	1,636,715.43	40.1885927	-105.0132528	
1,266.00	17.49	78.67	1,251.93	28.79	140.03	14,595,411.05	1,636,724.70	40.1885981	-105.0132196	
1,298.00	17.14	78.67	1,282.48	30.67	149.37	14,595,412.92	1,636,734.04	40.1886032	-105.0131861	
1,329.00	17.05	79.64	1,312.11	32.38	158.32	14,595,414.63	1,636,742.99	40.1886079	-105.0131541	
1,361.00	17.84	80.69	1,342.63	34.02	167.77	14,595,416.26	1,636,752.44	40.1886124	-105.0131203	
1,393.00	18.63	79.64	1,373.03	35.73	177.63	14,595,417.97	1,636,762.31	40.1886171	-105.0130849	
1,425.00	19.29	80.25	1,403.29	37.54	187.87	14,595,419.79	1,636,772.55	40.1886221	-105.0130483	
1,456.00	20.08	79.37	1,432.48	39.39	198.15	14,595,421.63	1,636,782.83	40.1886272	-105.0130115	
1,488.00	19.91	77.44	1,462.55	41.59	208.86	14,595,423.83	1,636,793.54	40.1886332	-105.0129731	
1,519.00	19.82	75.07	1,491.71	44.09	219.10	14,595,426.33	1,636,803.77	40.1886401	-105.0129365	
1,551.00	20.39	74.80	1,521.76	46.95	229.72	14,595,429.19	1,636,814.40	40.1886480	-105.0128984	
1,583.00	19.82	74.36	1,551.81	49.88	240.32	14,595,432.11	1,636,825.00	40.1886560	-105.0128605	
1,615.00	19.47	76.12	1,581.94	52.62	250.72	14,595,434.85	1,636,835.40	40.1886635	-105.0128232	
1,646.00	18.90	76.82	1,611.22	55.00	260.63	14,595,437.23	1,636,845.31	40.1886701	-105.0127878	
1,678.00	18.68	78.49	1,641.52	57.21	270.69	14,595,439.44	1,636,855.37	40.1886761	-105.0127517	
1,710.00	18.98	78.67	1,671.80	59.25	280.82	14,595,441.48	1,636,865.50	40.1886817	-105.0127155	
1,742.00	19.20	79.90	1,702.05	61.20	291.10	14,595,443.42	1,636,875.78	40.1886871	-105.0126786	
1,773.00	17.89	79.72	1,731.43	62.94	300.80	14,595,445.17	1,636,885.49	40.1886919	-105.0126439	
1,805.00	17.23	78.93	1,761.94	64.73	310.29	14,595,446.95	1,636,894.97	40.1886968	-105.0126099	
1,837.00	17.05	78.85	1,792.52	66.54	319.55	14,595,448.77	1,636,904.23	40.1887018	-105.0125768	
1,869.00	17.36	79.55	1,823.09	68.32	328.84	14,595,450.54	1,636,913.53	40.1887066	-105.0125435	
1,900.00	17.53	79.90	1,852.66	69.97	337.99	14,595,452.20	1,636,922.67	40.1887112	-105.0125108	
1,932.00	17.80	79.29	1,883.16	71.73	347.54	14,595,453.95	1,636,932.22	40.1887160	-105.0124766	
1,964.00	18.06	77.62	1,913.60	73.70	357.19	14,595,455.92	1,636,941.87	40.1887214	-105.0124420	
1,995.00	18.24	77.09	1,943.06	75.82	366.61	14,595,458.03	1,636,951.29	40.1887272	-105.0124083	
2,027.00	18.37	77.26	1,973.44	78.05	376.41	14,595,460.26	1,636,961.09	40.1887333	-105.0123732	
2,059.00	18.59	77.26	2,003.79	80.28	386.30	14,595,462.50	1,636,970.99	40.1887395	-105.0123378	
2,091.00	18.81	77.88	2,034.10	82.49	396.32	14,595,464.70	1,636,981.01	40.1887456	-105.0123019	
2,122.00	18.02	76.30	2,063.51	84.68	405.87	14,595,466.89	1,636,990.55	40.1887516	-105.0122677	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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	17.84	75.59	2,093.96	87.07	415.43	14,595,469.28	1,637,000.11	40.1887581	-105.0122335
2,185.00	17.75	76.21	2,123.48	89.38	424.61	14,595,471.58	1,637,009.30	40.1887645	-105.0122006
2,217.00	18.33	75.42	2,153.90	91.81	434.22	14,595,474.01	1,637,018.91	40.1887711	-105.0121662
2,249.00	19.03	76.82	2,184.22	94.26	444.17	14,595,476.47	1,637,028.86	40.1887779	-105.0121306
2,281.00	18.54	76.03	2,214.51	96.68	454.19	14,595,478.88	1,637,038.87	40.1887845	-105.0120947
Last Total MWD Survey									
2,323.00	18.26	75.55	2,254.37	99.93	467.04	14,595,482.13	1,637,051.72	40.1887934	-105.0120487
Surface Casing									
2,400.00	17.74	74.62	2,327.60	106.06	490.03	14,595,488.25	1,637,074.71	40.1888103	-105.0119664
First SDI MWD Survey									
2,489.00	16.94	68.92	2,412.56	114.32	515.20	14,595,496.51	1,637,099.89	40.1888329	-105.0118762
2,577.00	18.01	73.02	2,496.50	122.90	540.18	14,595,505.09	1,637,124.87	40.1888565	-105.0117868
2,692.00	17.90	78.78	2,605.91	131.53	574.52	14,595,513.72	1,637,159.21	40.1888802	-105.0116638
2,781.00	17.04	78.38	2,690.80	136.82	600.71	14,595,519.00	1,637,185.40	40.1888947	-105.0115700
2,870.00	19.73	80.59	2,775.25	141.90	628.31	14,595,524.08	1,637,213.00	40.1889087	-105.0114712
3,048.00	18.77	80.20	2,943.30	151.69	686.17	14,595,533.86	1,637,270.86	40.1889356	-105.0112640
3,225.00	18.07	77.47	3,111.23	162.49	741.03	14,595,544.65	1,637,325.72	40.1889652	-105.0110676
3,314.00	17.20	78.74	3,196.05	168.06	767.41	14,595,550.21	1,637,352.10	40.1889805	-105.0109731
3,403.00	16.34	81.57	3,281.26	172.46	792.70	14,595,554.61	1,637,377.40	40.1889926	-105.0108826
3,492.00	16.08	82.87	3,366.73	175.83	817.31	14,595,557.97	1,637,402.01	40.1890018	-105.0107944
3,581.00	17.63	80.22	3,451.90	179.65	842.83	14,595,561.79	1,637,427.53	40.1890123	-105.0107031
3,670.00	20.22	77.09	3,536.09	185.37	871.11	14,595,567.51	1,637,455.81	40.1890280	-105.0106018
3,759.00	22.33	77.74	3,619.02	192.40	902.62	14,595,574.53	1,637,487.32	40.1890473	-105.0104890
3,848.00	20.99	76.58	3,701.73	199.69	934.65	14,595,581.82	1,637,519.35	40.1890674	-105.0103743
3,937.00	19.71	77.52	3,785.17	206.63	964.81	14,595,588.76	1,637,549.51	40.1890864	-105.0102663
4,026.00	18.60	80.28	3,869.25	212.27	993.46	14,595,594.39	1,637,578.16	40.1891019	-105.0101637
4,203.00	18.84	71.93	4,036.91	225.91	1,048.46	14,595,608.02	1,637,633.16	40.1891393	-105.0099668
4,381.00	18.28	77.75	4,205.67	240.75	1,103.07	14,595,622.85	1,637,687.77	40.1891801	-105.0097713
4,469.00	16.25	76.24	4,289.70	246.60	1,128.52	14,595,628.70	1,637,713.22	40.1891962	-105.0096801
4,558.00	15.32	74.54	4,375.34	252.70	1,151.94	14,595,634.79	1,637,736.65	40.1892129	-105.0095962
4,647.00	16.78	84.97	4,460.89	256.96	1,176.08	14,595,639.05	1,637,760.79	40.1892246	-105.0095098
4,735.00	17.11	89.19	4,545.07	258.26	1,201.68	14,595,640.35	1,637,786.39	40.1892282	-105.0094182
4,824.00	14.40	82.80	4,630.73	259.83	1,225.75	14,595,641.91	1,637,810.46	40.1892325	-105.0093319
4,913.00	12.62	76.89	4,717.27	263.42	1,246.21	14,595,645.50	1,637,830.92	40.1892423	-105.0092587
5,002.00	11.14	74.47	4,804.36	267.93	1,263.96	14,595,650.01	1,637,848.67	40.1892547	-105.0091951
5,091.00	9.07	74.44	4,891.97	272.12	1,279.00	14,595,654.19	1,637,863.71	40.1892662	-105.0091413
5,179.00	6.36	79.80	4,979.17	274.84	1,290.48	14,595,656.91	1,637,875.20	40.1892737	-105.0091002
5,268.00	3.69	95.14	5,067.82	275.46	1,298.19	14,595,657.53	1,637,882.90	40.1892754	-105.0090726
5,357.00	1.24	182.45	5,156.75	274.24	1,301.00	14,595,656.31	1,637,885.71	40.1892720	-105.0090625
5,446.00	2.03	228.07	5,245.72	272.22	1,299.79	14,595,654.29	1,637,884.50	40.1892665	-105.0090669
5,535.00	2.12	228.33	5,334.66	270.07	1,297.39	14,595,652.15	1,637,882.10	40.1892606	-105.0090755
5,624.00	1.95	233.07	5,423.60	268.07	1,294.95	14,595,650.14	1,637,879.66	40.1892551	-105.0090842
5,712.00	1.83	242.54	5,511.56	266.52	1,292.50	14,595,648.60	1,637,877.21	40.1892508	-105.0090929
5,801.00	2.12	240.93	5,600.50	265.07	1,289.80	14,595,647.14	1,637,874.51	40.1892468	-105.0091026
5,890.00	1.15	289.77	5,689.47	264.57	1,287.52	14,595,646.64	1,637,872.23	40.1892455	-105.0091108
5,979.00	0.99	289.13	5,778.46	265.12	1,285.96	14,595,647.20	1,637,870.67	40.1892470	-105.0091164
6,068.00	1.36	278.17	5,867.44	265.53	1,284.18	14,595,647.60	1,637,868.89	40.1892481	-105.0091227
6,157.00	1.61	272.03	5,956.41	265.72	1,281.89	14,595,647.79	1,637,866.60	40.1892486	-105.0091309
6,246.00	0.15	259.62	6,045.39	265.74	1,280.53	14,595,647.82	1,637,865.24	40.1892487	-105.0091358
6,334.00	0.61	276.54	6,133.39	265.78	1,279.95	14,595,647.85	1,637,864.66	40.1892488	-105.0091379
6,423.00	1.32	266.59	6,222.38	265.77	1,278.45	14,595,647.84	1,637,863.16	40.1892488	-105.0091432
6,512.00	1.72	259.66	6,311.35	265.47	1,276.12	14,595,647.54	1,637,860.83	40.1892479	-105.0091516
6,540.00	3.71	210.73	6,339.32	264.61	1,275.24	14,595,646.69	1,637,859.95	40.1892456	-105.0091548
Curve KOP									

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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
6,601.00	9.74	193.82	6,399.87	257.90	1,273.00	14,595,639.98	1,637,857.71	40.1892272	-105.0091628
First SDI MWD Curve Survey									
6,690.00	13.63	192.20	6,487.01	240.33	1,268.98	14,595,622.41	1,637,853.69	40.1891789	-105.0091772
6,779.00	17.42	187.41	6,572.75	216.86	1,265.04	14,595,598.94	1,637,849.75	40.1891145	-105.0091913
6,868.00	21.04	178.61	6,656.79	187.67	1,263.71	14,595,569.74	1,637,848.41	40.1890343	-105.0091960
6,957.00	27.94	177.03	6,737.74	150.83	1,265.18	14,595,532.90	1,637,849.88	40.1889331	-105.0091908
7,046.00	34.62	178.73	6,813.76	104.68	1,266.83	14,595,486.75	1,637,851.51	40.1888064	-105.0091849
7,135.00	41.87	176.44	6,883.61	49.68	1,269.23	14,595,431.76	1,637,853.91	40.1886554	-105.0091763
7,198.00	47.05	174.43	6,928.57	5.72	1,272.78	14,595,387.79	1,637,857.45	40.1885346	-105.0091636
7,287.00	58.95	173.14	6,982.03	-64.81	1,280.52	14,595,317.27	1,637,865.18	40.1883410	-105.0091359
7,341.27	67.87	173.94	7,006.30	-112.98	1,285.96	14,595,269.09	1,637,870.61	40.1882087	-105.0091164
Enter Land Box : 7341.27' MD & 7006.30' TVD									
7,375.00	73.41	174.39	7,017.48	-144.63	1,289.19	14,595,237.45	1,637,873.84	40.1881218	-105.0091049
Last SDI MWD Curve Survey									
7,452.00	82.49	176.92	7,033.54	-219.63	1,294.87	14,595,162.44	1,637,879.50	40.1879158	-105.0090846
Landing Point : 570' FNL 2307' FWL Sec 33									
7,490.00	86.98	178.12	7,037.02	-257.42	1,296.50	14,595,124.65	1,637,881.13	40.1878120	-105.0090787
First SDI MWD Lateral Survey									
7,579.00	87.59	178.37	7,041.24	-346.28	1,299.22	14,595,035.79	1,637,883.84	40.1875680	-105.0090690
7,668.00	88.66	178.40	7,044.15	-435.20	1,301.73	14,594,946.87	1,637,886.33	40.1873238	-105.0090600
7,757.00	89.00	178.59	7,045.97	-524.15	1,304.07	14,594,857.92	1,637,888.66	40.1870796	-105.0090517
7,845.00	89.33	178.25	7,047.25	-612.11	1,306.49	14,594,769.97	1,637,891.07	40.1868380	-105.0090430
7,934.00	88.96	176.80	7,048.58	-701.01	1,310.34	14,594,681.06	1,637,894.90	40.1865939	-105.0090293
8,023.00	90.07	178.22	7,049.33	-789.92	1,314.20	14,594,592.15	1,637,898.75	40.1863497	-105.0090154
8,111.00	88.56	177.79	7,050.39	-877.86	1,317.27	14,594,504.21	1,637,901.80	40.1861083	-105.0090045
8,200.00	88.59	182.26	7,052.60	-966.81	1,317.23	14,594,415.26	1,637,901.75	40.1858640	-105.0090046
8,289.00	87.92	183.61	7,055.31	-1,055.65	1,312.67	14,594,326.43	1,637,897.18	40.1856200	-105.0090210
8,378.00	87.93	184.02	7,058.53	-1,144.39	1,306.75	14,594,237.68	1,637,891.25	40.1853763	-105.0090422
8,466.00	86.68	182.12	7,062.67	-1,232.16	1,302.05	14,594,149.91	1,637,886.53	40.1851353	-105.0090590
8,525.44	86.03	181.59	7,066.45	-1,291.45	1,300.13	14,594,090.63	1,637,884.60	40.1849725	-105.0090659
Exit 460' Circle : 8525.44' MD & 7066.45' TVD 1644' FNL 2313' FWL									
8,555.00	85.71	181.32	7,068.58	-1,320.92	1,299.38	14,594,061.15	1,637,883.85	40.1848916	-105.0090686
8,644.00	86.67	180.96	7,074.49	-1,409.71	1,297.61	14,593,972.37	1,637,882.07	40.1846477	-105.0090750
8,733.00	87.39	181.30	7,079.10	-1,498.57	1,295.86	14,593,883.51	1,637,880.30	40.1844037	-105.0090812
8,822.00	87.52	181.52	7,083.05	-1,587.46	1,293.67	14,593,794.62	1,637,878.10	40.1841596	-105.0090891
8,911.00	88.16	181.38	7,086.41	-1,676.36	1,291.42	14,593,705.71	1,637,875.83	40.1839155	-105.0090972
8,999.00	88.83	180.76	7,088.72	-1,764.32	1,289.78	14,593,617.76	1,637,874.18	40.1836739	-105.0091031
9,088.00	90.13	178.20	7,089.53	-1,853.30	1,290.59	14,593,528.78	1,637,874.97	40.1834296	-105.0091002
9,177.00	90.23	177.40	7,089.25	-1,942.23	1,294.00	14,593,439.84	1,637,878.37	40.1831854	-105.0090880
9,266.00	87.82	177.91	7,090.76	-2,031.14	1,297.65	14,593,350.94	1,637,882.00	40.1829412	-105.0090750
9,355.00	87.22	178.08	7,094.61	-2,120.00	1,300.76	14,593,262.08	1,637,885.10	40.1826972	-105.0090638
9,444.00	87.02	177.98	7,099.08	-2,208.84	1,303.81	14,593,173.24	1,637,888.14	40.1824533	-105.0090529
9,532.00	86.92	177.46	7,103.74	-2,296.64	1,307.31	14,593,085.43	1,637,891.62	40.1822121	-105.0090404
9,621.00	86.92	176.49	7,108.52	-2,385.39	1,312.00	14,592,996.69	1,637,896.30	40.1819684	-105.0090236
9,711.00	88.66	176.87	7,111.99	-2,475.17	1,317.21	14,592,906.91	1,637,901.49	40.1817219	-105.0090050
9,799.00	90.23	178.15	7,112.84	-2,563.08	1,321.03	14,592,819.00	1,637,905.30	40.1814805	-105.0089913
9,888.00	88.93	178.25	7,113.49	-2,652.03	1,323.82	14,592,730.05	1,637,908.08	40.1812362	-105.0089813
9,977.00	90.10	176.90	7,114.25	-2,740.94	1,327.59	14,592,641.13	1,637,911.84	40.1809920	-105.0089679
10,065.00	92.48	178.41	7,112.27	-2,828.84	1,331.19	14,592,553.24	1,637,915.42	40.1807507	-105.0089550
10,154.00	90.27	178.78	7,110.13	-2,917.78	1,333.37	14,592,464.29	1,637,917.59	40.1805064	-105.0089472
10,243.00	88.90	179.12	7,110.78	-3,006.76	1,335.00	14,592,375.31	1,637,919.21	40.1802621	-105.0089414
10,332.00	86.92	178.97	7,114.02	-3,095.68	1,336.48	14,592,286.39	1,637,920.67	40.1800179	-105.0089361
10,421.00	86.04	178.21	7,119.49	-3,184.49	1,338.67	14,592,197.59	1,637,922.85	40.1797740	-105.0089283
10,510.00	85.23	178.86	7,126.26	-3,273.20	1,340.94	14,592,108.87	1,637,925.10	40.1795304	-105.0089202

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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
10,599.00	85.10	179.01	7,133.76	-3,361.87	1,342.59	14,592,020.21	1,637,926.74	40.1792869	-105.0089143
10,687.00	86.65	180.28	7,140.09	-3,449.63	1,343.13	14,591,932.44	1,637,927.27	40.1790459	-105.0089124
10,776.00	87.65	180.47	7,144.52	-3,538.52	1,342.55	14,591,843.55	1,637,926.67	40.1788018	-105.0089145
10,865.00	87.35	181.32	7,148.40	-3,627.42	1,341.16	14,591,754.65	1,637,925.27	40.1785577	-105.0089195
10,954.00	87.55	181.27	7,152.36	-3,716.31	1,339.15	14,591,665.76	1,637,923.24	40.1783136	-105.0089267
11,043.00	86.12	179.62	7,157.27	-3,805.17	1,338.46	14,591,576.91	1,637,922.54	40.1780696	-105.0089292
11,132.00	85.91	179.72	7,163.46	-3,893.95	1,338.97	14,591,488.12	1,637,923.04	40.1778257	-105.0089274
11,221.00	85.58	178.50	7,170.06	-3,982.69	1,340.35	14,591,399.38	1,637,924.40	40.1775821	-105.0089224
11,310.00	85.88	178.13	7,176.69	-4,071.41	1,342.96	14,591,310.67	1,637,927.00	40.1773384	-105.0089131
11,399.00	86.48	177.28	7,182.62	-4,160.14	1,346.51	14,591,221.94	1,637,930.54	40.1770948	-105.0089004
11,488.00	87.55	179.73	7,187.25	-4,248.98	1,348.83	14,591,133.09	1,637,932.84	40.1768508	-105.0088921
11,577.00	88.29	180.44	7,190.48	-4,337.92	1,348.70	14,591,044.16	1,637,932.70	40.1766066	-105.0088926
11,666.00	88.79	179.72	7,192.75	-4,426.89	1,348.58	14,590,955.19	1,637,932.56	40.1763622	-105.0088931
11,755.00	86.65	180.13	7,196.29	-4,515.81	1,348.69	14,590,866.26	1,637,932.66	40.1761181	-105.0088927
11,844.00	85.84	180.24	7,202.12	-4,604.62	1,348.41	14,590,777.45	1,637,932.36	40.1758742	-105.0088937
11,933.00	85.60	179.66	7,208.76	-4,693.37	1,348.48	14,590,688.70	1,637,932.43	40.1756305	-105.0088935
12,022.00	85.81	180.47	7,215.43	-4,782.12	1,348.38	14,590,599.95	1,637,932.31	40.1753867	-105.0088938
12,110.00	86.98	180.69	7,220.96	-4,869.94	1,347.49	14,590,512.13	1,637,931.41	40.1751456	-105.0088970
12,199.00	88.06	181.85	7,224.81	-4,958.83	1,345.52	14,590,423.24	1,637,929.42	40.1749015	-105.0089041
12,288.00	87.99	180.90	7,227.88	-5,047.75	1,343.39	14,590,334.32	1,637,927.28	40.1746573	-105.0089118
12,377.00	88.56	180.69	7,230.56	-5,136.70	1,342.15	14,590,245.37	1,637,926.03	40.1744130	-105.0089162
12,466.00	88.49	179.95	7,232.85	-5,225.67	1,341.66	14,590,156.40	1,637,925.52	40.1741687	-105.0089180
12,554.00	88.56	179.71	7,235.11	-5,313.64	1,341.92	14,590,068.43	1,637,925.77	40.1739271	-105.0089171
12,643.00	88.73	178.92	7,237.22	-5,402.61	1,342.98	14,589,979.47	1,637,926.82	40.1736828	-105.0089133
12,732.00	88.96	178.72	7,239.01	-5,491.57	1,344.81	14,589,890.50	1,637,928.63	40.1734385	-105.0089067
12,820.00	89.03	178.27	7,240.56	-5,579.53	1,347.12	14,589,802.55	1,637,930.93	40.1731970	-105.0088985
12,909.00	88.15	177.90	7,242.75	-5,668.45	1,350.10	14,589,713.62	1,637,933.89	40.1729528	-105.0088879
12,998.00	87.29	178.73	7,246.29	-5,757.34	1,352.71	14,589,624.73	1,637,936.49	40.1727087	-105.0088785
13,087.00	86.45	179.92	7,251.15	-5,846.20	1,353.76	14,589,535.88	1,637,937.53	40.1724647	-105.0088748
13,126.02	86.33	179.94	7,253.60	-5,885.14	1,353.81	14,589,496.93	1,637,937.57	40.1723577	-105.0088746
Enter 460' Circle : 13126.02' MD & 7253.60' TVD 937' FNL 2383' FWL									
13,176.00	86.18	179.96	7,256.87	-5,935.02	1,353.85	14,589,447.06	1,637,937.61	40.1722208	-105.0088745
13,265.00	86.15	179.93	7,262.82	-6,023.82	1,353.94	14,589,358.26	1,637,937.68	40.1719769	-105.0088742
13,354.00	85.82	179.09	7,269.05	-6,112.59	1,354.70	14,589,269.48	1,637,938.42	40.1717331	-105.0088715
13,443.00	85.62	179.09	7,275.69	-6,201.33	1,356.11	14,589,180.74	1,637,939.82	40.1714894	-105.0088665
13,532.00	85.21	178.56	7,282.81	-6,290.03	1,357.93	14,589,092.05	1,637,941.62	40.1712459	-105.0088600
13,620.00	87.62	180.74	7,288.31	-6,377.84	1,358.46	14,589,004.23	1,637,942.14	40.1710047	-105.0088581
13,709.00	88.30	182.01	7,291.48	-6,466.76	1,356.33	14,588,915.32	1,637,940.00	40.1707605	-105.0088657
13,797.00	88.90	181.61	7,293.63	-6,554.69	1,353.55	14,588,827.39	1,637,937.20	40.1705191	-105.0088757
13,886.00	89.43	181.41	7,294.93	-6,643.65	1,351.20	14,588,738.43	1,637,934.84	40.1702748	-105.0088841
13,975.00	89.83	181.21	7,295.50	-6,732.62	1,349.17	14,588,649.45	1,637,932.80	40.1700305	-105.0088914
14,064.00	89.60	181.13	7,295.94	-6,821.60	1,347.35	14,588,560.47	1,637,930.97	40.1697861	-105.0088979
14,150.00	89.46	181.55	7,296.65	-6,907.58	1,345.34	14,588,474.50	1,637,928.94	40.1695500	-105.0089051
Last SDI MWD Survey									
14,213.00	89.46	181.55	7,297.24	-6,970.55	1,343.64	14,588,411.53	1,637,927.23	40.1693771	-105.0089113
Projection to TD : 2020' FNL 2373' FWL Sec 4 - Production Casing									

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Hergenreder 25N-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 25N-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)
2,323.00	2,254.37	Surface Casing	9.625	12.250
14,213.00	7,297.24	Production Casing	5.500	7.875

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
125.00	124.99	-1.06	0.75	First Total MWD Survey
2,281.00	2,214.51	96.68	454.19	Last Total MWD Survey
2,400.00	2,327.60	106.06	490.03	First SDI MWD Survey
6,540.00	6,339.32	264.61	1,275.24	Curve KOP
6,601.00	6,399.87	257.90	1,273.00	First SDI MWD Curve Survey
7,341.27	7,006.30	-112.98	1,285.96	Enter Land Box : 7341.27' MD & 7006.30' TVD
7,375.00	7,017.48	-144.63	1,289.19	Last SDI MWD Curve Survey
7,452.00	7,033.54	-219.63	1,294.87	Landing Point : 570' FNL 2307' FWL Sec 33
7,490.00	7,037.02	-257.42	1,296.50	First SDI MWD Lateral Survey
8,525.44	7,066.45	-1,291.45	1,300.13	Exit 460' Circle : 8525.44' MD & 7066.45' TVD 1644' FNL 2313' FWL
13,126.02	7,253.60	-5,885.14	1,353.81	Enter 460' Circle : 13126.02' MD & 7253.60' TVD 937' FNL 2383' FWL
14,150.00	7,296.65	-6,907.58	1,345.34	Last SDI MWD Survey
14,213.00	7,297.24	-6,970.55	1,343.64	Projection to TD : 2020' FNL 2373' FWL Sec 4

Checked By: _____	Approved By: _____	Date: _____
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