

Wellbore: OH  
 Design: OH

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

WELL DETAILS: Hergenreder 32N-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
14595483.88	1636558.44	40.1887980	-105.0138150

## ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
124.99	125.00	0.97	107.50	-0.32	1.01	First Total MWD Survey
2176.10	2244.00	19.95	280.38	93.44	-464.05	Last Total MWD Survey
2236.37	2308.00	19.34	276.03	96.52	-485.33	First SDI MWD Survey
6137.70	6259.00	1.47	201.07	145.86	-796.05	Curve KOP
6260.26	6383.00	13.99	181.30	128.87	-797.38	First SDI MWD Curve Survey
6754.68	7013.84	55.57	183.58	-239.29	-788.89	Enter Land Box : 7013.84' MD & 6754.68' TVD
6903.82	7450.00	83.74	181.15	-643.51	-800.81	Last SDI MWD Curve Survey
6903.82	7450.00	83.74	181.15	-643.51	-800.81	Landing Point : 866' FNL 185' FWL Sec 33
6916.58	7628.00	86.95	181.13	-820.98	-805.04	First SDI MWD Lateral Survey
6965.85	8334.94	88.33	180.17	-1525.76	-797.83	Exit 460' Circle : 8334.94' MD & 6965.85' TVD 1747' FNL 188' FWL
7204.26	12789.98	90.34	181.20	-5972.90	-772.47	Enter 460' Circle : 12789.98' MD & 7204.26' TVD 905' FNL 221' FWL
7219.16	13834.00	92.21	175.83	-7015.66	-767.85	Last SDI MWD Survey
7217.04	13889.00	92.21	175.83	-7070.48	-763.86	Projection to TD : 2001' FNL 240' FWL Sec 4

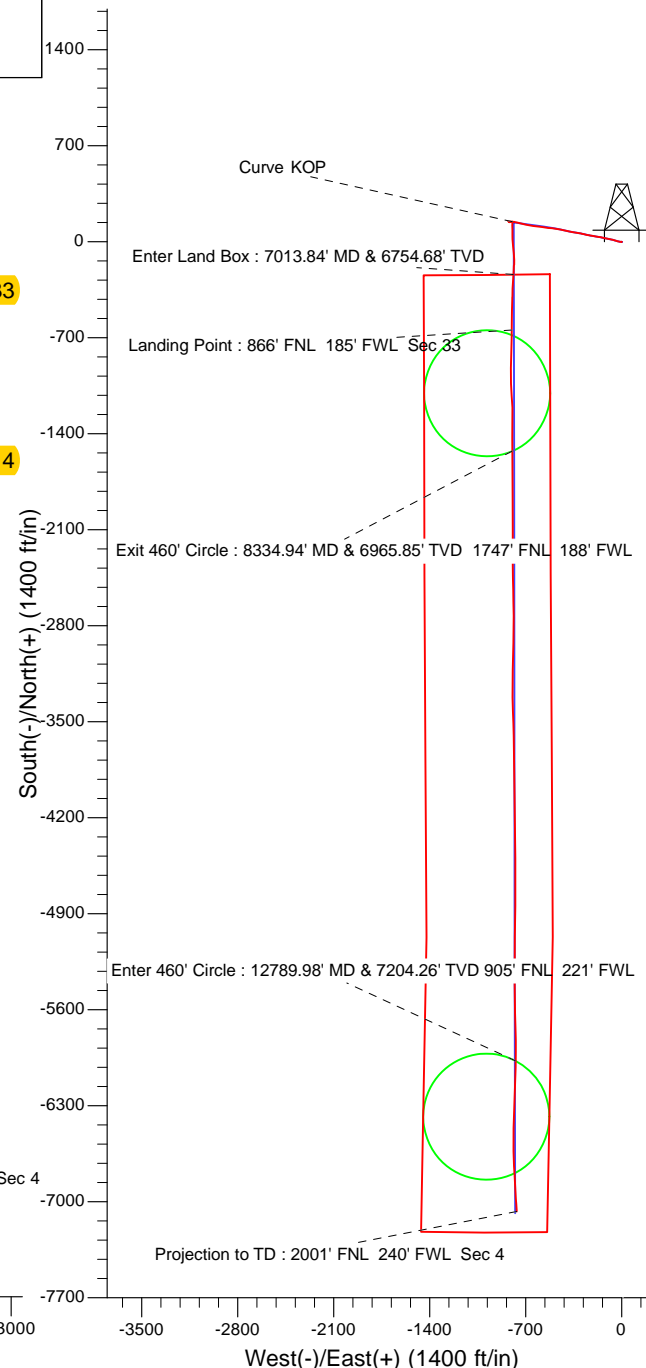
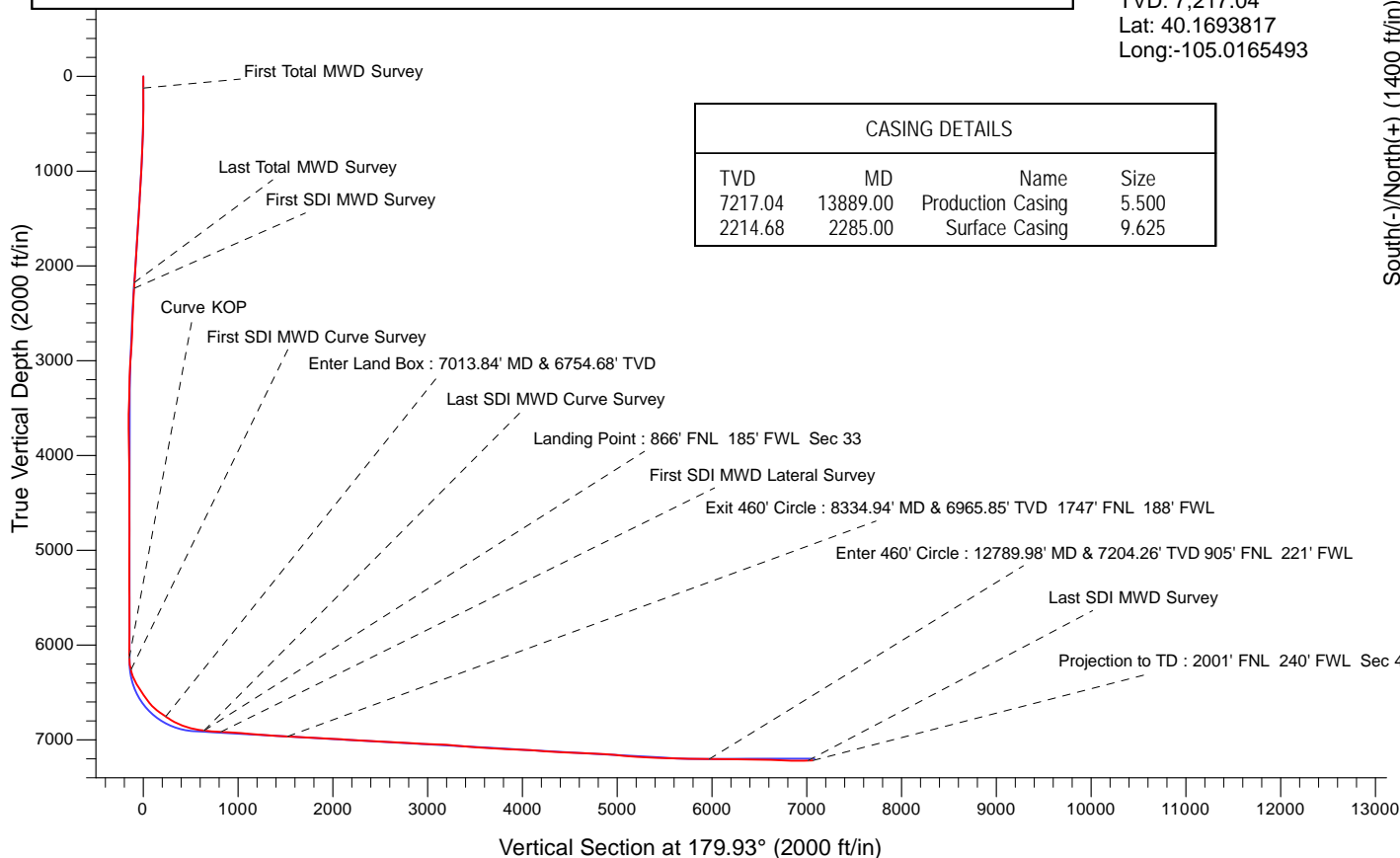
Surface Location:  
 232' FNL 987' FWL  
 Sec 33 T3N R68W

Landing Point:  
 866' FNL 185' FWL Sec 33  
 MD: 7,450.00  
 TVD: 6,903.82  
 Lat: 40.1870309  
 Long: -105.0166823

BHL:  
 2001' FNL 240' FWL Sec 4  
 MD: 13,889.00  
 TVD: 7,217.04  
 Lat: 40.1693817  
 Long: -105.0165493

## CASING DETAILS

TVD	MD	Name	Size
7217.04	13889.00	Production Casing	5.500
2214.68	2285.00	Surface Casing	9.625





# **US ROCKIES REGION PLANNING**

**US Rockies Wattenberg Planning UTM83**

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

**Hergenreder 32N-4HZ**

**OH**

**Design: OH**

## **Survey Report - Geographic**

**27 February, 2018**



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Denver Sales Office

<b>Project</b>	US Rockies Wattenberg Planning UTM83		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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 32N-4HZ, 232' FNL 987' FWL Sec 33 T3N R68W					
Well Position	+N/-S	0.00 ft	Northing:	14,595,483.88 usft	Latitude:	40.1887980
	+E/-W	0.00 ft	Easting:	1,636,558.44 usft	Longitude:	-105.0138150
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,944.00 ft

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

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	179.93	

<b>Survey Program</b>	<b>Date</b>	2/27/2018			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
125.00	2,244.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,244.00	13,889.00	Survey #2 - Production (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>
0.00	0.00	0.00	0.00	0.00	0.00	14,595,483.88	1,636,558.44	40.1887980	-105.0138150
125.00	0.97	107.50	124.99	-0.32	1.01	14,595,483.56	1,636,559.44	40.1887972	-105.0138114
<b>First Total MWD Survey</b>									
156.00	0.31	156.37	155.99	-0.47	1.29	14,595,483.40	1,636,559.73	40.1887967	-105.0138103
188.00	0.88	253.48	187.99	-0.62	1.09	14,595,483.25	1,636,559.53	40.1887963	-105.0138111
220.00	1.45	268.07	219.98	-0.71	0.45	14,595,483.17	1,636,558.89	40.1887961	-105.0138134
251.00	1.63	276.69	250.97	-0.67	-0.38	14,595,483.21	1,636,558.06	40.1887962	-105.0138163
283.00	1.89	268.25	282.96	-0.63	-1.36	14,595,483.24	1,636,557.08	40.1887963	-105.0138198
314.00	2.15	269.92	313.94	-0.65	-2.45	14,595,483.23	1,636,555.99	40.1887963	-105.0138237
346.00	1.89	270.45	345.92	-0.64	-3.58	14,595,483.23	1,636,554.86	40.1887963	-105.0138278
377.00	2.02	270.62	376.90	-0.63	-4.64	14,595,483.24	1,636,553.80	40.1887963	-105.0138316

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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	2.59	273.96	408.87	-0.58	-5.92	14,595,483.30	1,636,552.51	40.1887964	-105.0138362
441.00	3.34	274.84	440.83	-0.45	-7.57	14,595,483.43	1,636,550.86	40.1887968	-105.0138421
472.00	4.35	282.58	471.76	-0.12	-9.62	14,595,483.76	1,636,548.82	40.1887977	-105.0138494
504.00	4.79	282.75	503.66	0.44	-12.11	14,595,484.32	1,636,546.33	40.1887992	-105.0138583
535.00	4.97	282.84	534.55	1.03	-14.68	14,595,484.90	1,636,543.76	40.1888008	-105.0138675
567.00	5.36	281.35	566.42	1.63	-17.49	14,595,485.51	1,636,540.94	40.1888025	-105.0138776
599.00	5.63	281.79	598.27	2.24	-20.50	14,595,486.12	1,636,537.94	40.1888042	-105.0138884
631.00	6.42	281.61	630.09	2.92	-23.79	14,595,486.80	1,636,534.65	40.1888061	-105.0139001
663.00	7.65	284.51	661.85	3.82	-27.60	14,595,487.70	1,636,530.84	40.1888085	-105.0139138
694.00	8.48	285.39	692.54	4.94	-31.80	14,595,488.82	1,636,526.64	40.1888116	-105.0139288
726.00	9.05	287.94	724.17	6.34	-36.47	14,595,490.22	1,636,521.97	40.1888154	-105.0139456
758.00	9.54	287.59	755.75	7.92	-41.39	14,595,491.80	1,636,517.04	40.1888198	-105.0139632
790.00	9.89	286.88	787.29	9.52	-46.55	14,595,493.40	1,636,511.89	40.1888242	-105.0139817
821.00	10.41	288.11	817.81	11.16	-51.76	14,595,495.05	1,636,506.68	40.1888287	-105.0140003
853.00	11.29	286.44	849.23	12.95	-57.51	14,595,496.83	1,636,500.93	40.1888336	-105.0140209
885.00	12.17	281.61	880.57	14.51	-63.82	14,595,498.40	1,636,494.62	40.1888379	-105.0140435
917.00	12.79	280.38	911.81	15.83	-70.61	14,595,499.72	1,636,487.83	40.1888415	-105.0140678
948.00	13.27	280.82	942.01	17.12	-77.48	14,595,501.00	1,636,480.96	40.1888450	-105.0140924
980.00	13.89	280.91	973.12	18.53	-84.86	14,595,502.42	1,636,473.58	40.1888489	-105.0141188
1,012.00	14.59	281.26	1,004.13	20.05	-92.58	14,595,503.94	1,636,465.86	40.1888531	-105.0141465
1,044.00	15.12	283.89	1,035.06	21.83	-100.59	14,595,505.73	1,636,457.85	40.1888580	-105.0141751
1,075.00	15.12	283.37	1,064.99	23.74	-108.44	14,595,507.63	1,636,449.99	40.1888632	-105.0142033
1,107.00	14.99	283.02	1,095.89	25.64	-116.54	14,595,509.53	1,636,441.90	40.1888684	-105.0142323
1,139.00	15.82	281.26	1,126.74	27.42	-124.85	14,595,511.32	1,636,433.59	40.1888733	-105.0142620
1,170.00	16.52	280.99	1,156.52	29.09	-133.32	14,595,512.98	1,636,425.12	40.1888779	-105.0142923
1,202.00	16.08	279.68	1,187.23	30.70	-142.15	14,595,514.60	1,636,416.29	40.1888823	-105.0143240
1,234.00	17.18	281.17	1,217.89	32.36	-151.16	14,595,516.26	1,636,407.28	40.1888869	-105.0143562
1,266.00	17.71	280.12	1,248.42	34.13	-160.59	14,595,518.03	1,636,397.85	40.1888918	-105.0143900
1,298.00	18.98	279.85	1,278.79	35.88	-170.51	14,595,519.78	1,636,387.94	40.1888965	-105.0144255
1,329.00	19.38	281.35	1,308.07	37.75	-180.52	14,595,521.65	1,636,377.93	40.1889017	-105.0144613
1,361.00	19.12	279.76	1,338.28	39.68	-190.89	14,595,523.59	1,636,367.56	40.1889070	-105.0144985
1,393.00	18.06	279.50	1,368.61	41.39	-200.94	14,595,525.30	1,636,357.50	40.1889117	-105.0145345
1,424.00	17.71	278.97	1,398.12	42.92	-210.34	14,595,526.83	1,636,348.10	40.1889159	-105.0145681
1,456.00	17.14	279.85	1,428.65	44.49	-219.79	14,595,528.40	1,636,338.65	40.1889202	-105.0146020
1,488.00	17.01	279.76	1,459.24	46.09	-229.05	14,595,530.00	1,636,329.39	40.1889246	-105.0146351
1,519.00	17.71	280.82	1,488.82	47.74	-238.15	14,595,531.65	1,636,320.29	40.1889291	-105.0146677
1,551.00	18.32	281.08	1,519.26	49.62	-247.87	14,595,533.53	1,636,310.58	40.1889343	-105.0147025
1,583.00	19.16	282.49	1,549.56	51.72	-257.93	14,595,535.64	1,636,300.51	40.1889401	-105.0147385
1,615.00	19.29	282.49	1,579.77	54.00	-268.22	14,595,537.92	1,636,290.23	40.1889463	-105.0147754
1,646.00	19.29	281.61	1,609.03	56.14	-278.23	14,595,540.06	1,636,280.21	40.1889522	-105.0148112
1,678.00	18.72	283.02	1,639.29	58.36	-288.41	14,595,542.28	1,636,270.03	40.1889583	-105.0148477
1,710.00	17.97	281.79	1,669.66	60.52	-298.25	14,595,544.45	1,636,260.20	40.1889642	-105.0148829
1,741.00	17.23	281.61	1,699.21	62.43	-307.43	14,595,546.35	1,636,251.02	40.1889695	-105.0149158
1,773.00	17.62	279.94	1,729.74	64.22	-316.84	14,595,548.14	1,636,241.61	40.1889744	-105.0149495
1,805.00	17.67	278.97	1,760.24	65.81	-326.41	14,595,549.74	1,636,232.04	40.1889787	-105.0149837
1,837.00	17.67	279.32	1,790.73	67.35	-336.00	14,595,551.28	1,636,222.45	40.1889830	-105.0150181
1,869.00	18.41	279.76	1,821.16	69.00	-345.77	14,595,552.93	1,636,212.68	40.1889875	-105.0150531
1,900.00	18.33	279.59	1,850.58	70.64	-355.40	14,595,554.57	1,636,203.05	40.1889920	-105.0150875
1,932.00	18.59	280.03	1,880.93	72.36	-365.39	14,595,556.30	1,636,193.06	40.1889967	-105.0151233
1,963.00	17.97	279.24	1,910.36	73.99	-374.97	14,595,557.93	1,636,183.48	40.1890012	-105.0151576
1,995.00	17.27	280.12	1,940.86	75.62	-384.52	14,595,559.56	1,636,173.93	40.1890057	-105.0151918
2,027.00	17.40	281.43	1,971.41	77.40	-393.89	14,595,561.34	1,636,164.56	40.1890106	-105.0152253
2,059.00	18.11	283.63	2,001.89	79.52	-403.41	14,595,563.46	1,636,155.04	40.1890164	-105.0152594
2,091.00	18.94	284.07	2,032.23	81.96	-413.28	14,595,565.90	1,636,145.17	40.1890231	-105.0152948
2,122.00	19.38	283.98	2,061.51	84.42	-423.15	14,595,568.36	1,636,135.30	40.1890299	-105.0153301

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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
2,153.00	20.13	282.75	2,090.69	86.84	-433.35	14,595,570.79	1,636,125.10	40.1890365	-105.0153666
2,185.00	20.13	282.31	2,120.73	89.23	-444.10	14,595,573.18	1,636,114.35	40.1890431	-105.0154051
2,217.00	20.39	282.40	2,150.75	91.60	-454.92	14,595,575.55	1,636,103.53	40.1890496	-105.0154439
2,244.00	19.95	280.38	2,176.10	93.44	-464.05	14,595,577.39	1,636,094.41	40.1890546	-105.0154766
<b>Last Total MWD Survey</b>									
2,308.00	19.34	276.03	2,236.37	96.52	-485.33	14,595,580.48	1,636,073.13	40.1890631	-105.0155528
<b>First SDI MWD Survey</b>									
2,420.00	18.96	275.02	2,342.18	100.06	-521.89	14,595,584.02	1,636,036.56	40.1890728	-105.0156837
2,508.00	20.14	278.61	2,425.10	103.58	-551.12	14,595,587.54	1,636,007.34	40.1890825	-105.0157883
2,597.00	19.42	277.89	2,508.85	107.91	-580.92	14,595,591.87	1,635,977.53	40.1890943	-105.0158951
2,686.00	18.78	277.17	2,592.95	111.73	-609.79	14,595,595.70	1,635,948.66	40.1891048	-105.0159984
2,775.00	17.74	276.60	2,677.47	115.07	-637.48	14,595,599.05	1,635,920.98	40.1891140	-105.0160976
2,864.00	16.77	276.06	2,762.46	117.99	-663.71	14,595,601.97	1,635,894.74	40.1891220	-105.0161915
2,953.00	16.81	285.60	2,847.69	122.81	-688.88	14,595,606.79	1,635,869.57	40.1891352	-105.0162816
3,042.00	15.65	283.17	2,933.14	129.00	-712.97	14,595,612.99	1,635,845.49	40.1891523	-105.0163679
3,130.00	14.56	282.39	3,018.10	134.08	-735.33	14,595,618.07	1,635,823.13	40.1891662	-105.0164479
3,219.00	13.90	282.26	3,104.37	138.75	-756.70	14,595,622.74	1,635,801.76	40.1891790	-105.0165245
3,308.00	13.11	281.32	3,190.90	143.00	-777.05	14,595,627.00	1,635,781.41	40.1891907	-105.0165973
3,397.00	10.66	276.34	3,277.99	145.89	-795.13	14,595,629.89	1,635,763.33	40.1891986	-105.0166621
3,486.00	7.04	267.41	3,365.92	146.55	-808.76	14,595,630.56	1,635,749.70	40.1892004	-105.0167109
3,575.00	4.59	294.41	3,454.47	147.78	-817.46	14,595,631.78	1,635,741.00	40.1892038	-105.0167420
3,664.00	3.63	308.02	3,543.24	150.99	-822.92	14,595,634.99	1,635,735.54	40.1892126	-105.0167616
3,753.00	1.97	245.17	3,632.15	152.08	-826.53	14,595,636.09	1,635,731.93	40.1892156	-105.0167745
3,842.00	0.47	157.68	3,721.13	151.10	-827.78	14,595,635.11	1,635,730.68	40.1892129	-105.0167790
3,931.00	0.51	122.19	3,810.13	150.55	-827.30	14,595,634.56	1,635,731.16	40.1892114	-105.0167773
4,020.00	0.81	212.52	3,899.13	149.81	-827.31	14,595,633.81	1,635,731.15	40.1892094	-105.0167773
4,109.00	1.55	117.64	3,988.11	148.72	-826.58	14,595,632.73	1,635,731.88	40.1892064	-105.0167747
4,197.00	1.48	117.34	4,076.08	147.65	-824.51	14,595,631.65	1,635,733.95	40.1892034	-105.0167673
4,286.00	1.17	148.45	4,165.06	146.35	-823.02	14,595,630.35	1,635,735.44	40.1891999	-105.0167619
4,375.00	0.59	131.53	4,254.05	145.27	-822.20	14,595,629.27	1,635,736.26	40.1891969	-105.0167590
4,463.00	0.30	201.56	4,342.05	144.75	-821.94	14,595,628.76	1,635,736.51	40.1891955	-105.0167581
4,552.00	0.26	259.64	4,431.05	144.50	-822.23	14,595,628.50	1,635,736.23	40.1891948	-105.0167591
4,641.00	0.93	95.20	4,520.04	144.40	-821.71	14,595,628.40	1,635,736.75	40.1891945	-105.0167572
4,730.00	0.95	105.51	4,609.03	144.14	-820.28	14,595,628.14	1,635,738.18	40.1891938	-105.0167521
4,818.00	1.18	86.34	4,697.02	144.00	-818.67	14,595,628.00	1,635,739.79	40.1891934	-105.0167464
4,907.00	1.11	82.03	4,786.00	144.18	-816.90	14,595,628.18	1,635,741.56	40.1891939	-105.0167400
4,996.00	0.76	55.08	4,874.99	144.63	-815.57	14,595,628.64	1,635,742.89	40.1891952	-105.0167352
5,085.00	0.86	25.00	4,963.98	145.58	-814.80	14,595,629.58	1,635,743.66	40.1891978	-105.0167325
5,174.00	0.81	93.04	5,052.97	146.15	-813.89	14,595,630.15	1,635,744.57	40.1891993	-105.0167292
5,263.00	0.88	79.90	5,141.96	146.23	-812.59	14,595,630.24	1,635,745.87	40.1891996	-105.0167246
5,351.00	1.15	89.57	5,229.95	146.36	-811.04	14,595,630.36	1,635,747.42	40.1891999	-105.0167190
5,440.00	2.53	99.31	5,318.90	146.05	-808.21	14,595,630.05	1,635,750.25	40.1891991	-105.0167089
5,529.00	2.55	100.27	5,407.81	145.38	-804.32	14,595,629.38	1,635,754.14	40.1891972	-105.0166950
5,618.00	1.53	98.26	5,496.75	144.85	-801.20	14,595,628.85	1,635,757.26	40.1891958	-105.0166838
5,707.00	1.06	102.63	5,585.73	144.50	-799.22	14,595,628.50	1,635,759.24	40.1891948	-105.0166767
5,795.00	0.96	111.89	5,673.72	144.05	-797.74	14,595,628.05	1,635,760.72	40.1891936	-105.0166714
5,884.00	0.36	87.59	5,762.71	143.78	-796.77	14,595,627.78	1,635,761.69	40.1891928	-105.0166679
5,973.00	0.27	72.94	5,851.71	143.86	-796.29	14,595,627.86	1,635,762.17	40.1891930	-105.0166662
6,062.00	0.52	32.67	5,940.71	144.26	-795.87	14,595,628.26	1,635,762.59	40.1891941	-105.0166647
6,151.00	0.55	7.80	6,029.70	145.02	-795.59	14,595,629.02	1,635,762.87	40.1891962	-105.0166637
6,240.00	0.82	326.44	6,118.70	145.98	-795.89	14,595,629.98	1,635,762.57	40.1891989	-105.0166648
6,259.00	1.47	201.07	6,137.70	145.86	-796.05	14,595,629.86	1,635,762.41	40.1891985	-105.0166654
<b>Curve KOP</b>									
6,328.00	8.86	185.14	6,206.37	139.74	-796.85	14,595,623.74	1,635,761.61	40.1891817	-105.0166682

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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
6,383.00	13.99	181.30	6,260.26	128.87	-797.38	14,595,612.87	1,635,761.08	40.1891519	-105.0166701
<b>First SDI MWD Curve Survey</b>									
6,417.00	17.17	180.06	6,293.01	119.74	-797.47	14,595,603.74	1,635,760.98	40.1891268	-105.0166705
6,506.00	24.93	179.03	6,376.01	87.80	-797.17	14,595,571.80	1,635,761.28	40.1890391	-105.0166694
6,595.00	32.82	179.02	6,453.88	44.86	-796.44	14,595,528.86	1,635,762.01	40.1889212	-105.0166667
6,684.00	35.63	175.97	6,527.47	-5.13	-794.20	14,595,478.87	1,635,764.23	40.1887839	-105.0166587
6,773.00	36.88	173.02	6,599.24	-57.50	-789.14	14,595,426.50	1,635,769.29	40.1886401	-105.0166406
6,862.00	47.89	177.61	6,664.89	-117.19	-784.50	14,595,366.81	1,635,773.92	40.1884762	-105.0166240
6,951.00	56.37	183.76	6,719.51	-187.32	-785.55	14,595,296.68	1,635,772.85	40.1882836	-105.0166277
7,013.84	55.57	183.58	6,754.68	-239.29	-788.89	14,595,244.71	1,635,769.51	40.1881409	-105.0166397
<b>Enter Land Box : 7013.84' MD &amp; 6754.68' TVD</b>									
7,040.00	55.24	183.50	6,769.53	-260.78	-790.22	14,595,223.22	1,635,768.18	40.1880819	-105.0166444
7,129.00	62.69	182.88	6,815.38	-336.87	-794.44	14,595,147.13	1,635,763.94	40.1878729	-105.0166595
7,218.00	69.74	181.75	6,851.26	-418.19	-797.71	14,595,065.81	1,635,760.67	40.1876496	-105.0166712
7,306.00	75.02	180.85	6,877.88	-502.01	-799.60	14,594,981.99	1,635,758.76	40.1874194	-105.0166780
7,395.00	80.88	180.02	6,896.46	-589.01	-800.25	14,594,894.99	1,635,758.09	40.1871805	-105.0166803
7,450.00	83.74	181.15	6,903.82	-643.51	-800.81	14,594,840.49	1,635,757.52	40.1870309	-105.0166823
<b>Last SDI MWD Curve Survey - Landing Point : 866' FNL 185' FWL Sec 33</b>									
7,484.00	85.51	181.85	6,907.00	-677.35	-801.70	14,594,806.66	1,635,756.63	40.1869379	-105.0166855
7,573.00	86.31	181.09	6,913.35	-766.09	-803.98	14,594,717.91	1,635,754.34	40.1866942	-105.0166936
7,628.00	86.95	181.13	6,916.58	-820.98	-805.04	14,594,663.02	1,635,753.27	40.1865435	-105.0166975
<b>First SDI MWD Lateral Survey</b>									
7,662.00	87.35	181.16	6,918.27	-854.93	-805.72	14,594,629.07	1,635,752.58	40.1864503	-105.0166999
7,751.00	86.82	180.12	6,922.80	-943.81	-806.72	14,594,540.19	1,635,751.58	40.1862062	-105.0167034
7,840.00	85.07	178.47	6,929.09	-1,032.57	-805.62	14,594,451.43	1,635,752.65	40.1859624	-105.0166995
7,928.00	84.27	177.14	6,937.26	-1,120.13	-802.27	14,594,363.88	1,635,755.99	40.1857220	-105.0166875
8,017.00	84.94	176.29	6,945.63	-1,208.59	-797.19	14,594,275.42	1,635,761.06	40.1854791	-105.0166693
8,105.00	85.51	180.51	6,952.96	-1,296.23	-794.74	14,594,187.78	1,635,763.49	40.1852384	-105.0166605
8,194.00	86.34	181.15	6,959.29	-1,384.99	-796.03	14,594,099.01	1,635,762.19	40.1849947	-105.0166651
8,283.00	87.59	180.68	6,964.00	-1,473.85	-797.45	14,594,010.15	1,635,760.76	40.1847507	-105.0166702
8,334.94	88.33	180.17	6,965.85	-1,525.76	-797.83	14,593,958.25	1,635,760.37	40.1846081	-105.0166716
<b>Exit 460' Circle : 8334.94' MD &amp; 6965.85' TVD 1747' FNL 188' FWL</b>									
8,372.00	88.86	179.80	6,966.75	-1,562.81	-797.82	14,593,921.20	1,635,760.37	40.1845064	-105.0166715
8,461.00	85.37	179.52	6,971.23	-1,651.68	-797.30	14,593,832.33	1,635,760.88	40.1842623	-105.0166696
8,549.00	86.44	179.64	6,977.52	-1,739.45	-796.65	14,593,744.55	1,635,761.51	40.1840213	-105.0166673
8,638.00	87.25	178.96	6,982.42	-1,828.31	-795.57	14,593,655.70	1,635,762.59	40.1837773	-105.0166634
8,727.00	87.92	178.81	6,986.17	-1,917.21	-793.84	14,593,566.79	1,635,764.30	40.1835331	-105.0166572
8,816.00	86.44	180.09	6,990.54	-2,006.09	-792.98	14,593,477.91	1,635,765.14	40.1832891	-105.0166541
8,905.00	87.12	179.98	6,995.54	-2,094.95	-793.04	14,593,389.05	1,635,765.07	40.1830450	-105.0166543
8,994.00	85.34	180.33	7,001.40	-2,183.76	-793.28	14,593,300.25	1,635,764.82	40.1828012	-105.0166552
9,083.00	86.38	179.99	7,007.82	-2,272.52	-793.52	14,593,211.48	1,635,764.56	40.1825574	-105.0166560
9,171.00	87.56	179.65	7,012.47	-2,360.40	-793.25	14,593,123.61	1,635,764.82	40.1823161	-105.0166550
9,260.00	88.83	178.95	7,015.28	-2,449.34	-792.16	14,593,034.66	1,635,765.90	40.1820719	-105.0166511
9,349.00	85.68	179.44	7,019.54	-2,538.22	-790.91	14,592,945.78	1,635,767.13	40.1818278	-105.0166467
9,438.00	86.51	179.26	7,025.60	-2,627.01	-789.90	14,592,857.00	1,635,768.12	40.1815840	-105.0166430
9,527.00	87.69	178.10	7,030.10	-2,715.87	-787.86	14,592,768.14	1,635,770.16	40.1813400	-105.0166357
9,616.00	86.68	180.64	7,034.47	-2,804.75	-786.88	14,592,679.26	1,635,771.12	40.1810959	-105.0166322
9,705.00	86.31	181.58	7,039.91	-2,893.56	-788.60	14,592,590.44	1,635,769.39	40.1808520	-105.0166383
9,793.00	88.02	181.62	7,044.27	-2,981.42	-791.05	14,592,502.59	1,635,766.92	40.1806107	-105.0166471
9,882.00	88.02	181.49	7,047.34	-3,070.33	-793.47	14,592,413.67	1,635,764.49	40.1803666	-105.0166557
9,971.00	87.08	180.25	7,051.15	-3,159.24	-794.82	14,592,324.77	1,635,763.13	40.1801224	-105.0166606
10,060.00	85.95	179.83	7,056.56	-3,248.07	-794.88	14,592,235.94	1,635,763.05	40.1798785	-105.0166608
10,148.00	83.86	179.14	7,064.37	-3,335.71	-794.09	14,592,148.29	1,635,763.83	40.1796378	-105.0166580
10,237.00	85.18	178.57	7,072.87	-3,424.29	-792.32	14,592,059.72	1,635,765.58	40.1793946	-105.0166516



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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
10,326.00	86.38	177.58	7,079.42	-3,512.99	-789.34	14,591,971.01	1,635,768.55	40.1791510	-105.0166409
10,415.00	86.01	178.68	7,085.33	-3,601.75	-786.44	14,591,882.26	1,635,771.44	40.1789072	-105.0166305
10,504.00	85.91	179.23	7,091.60	-3,690.51	-784.82	14,591,793.49	1,635,773.04	40.1786635	-105.0166247
10,593.00	87.86	178.98	7,096.43	-3,779.37	-783.43	14,591,704.64	1,635,774.42	40.1784195	-105.0166198
10,682.00	88.12	179.98	7,099.55	-3,868.31	-782.63	14,591,615.70	1,635,775.21	40.1781752	-105.0166169
10,770.00	86.98	179.58	7,103.32	-3,956.22	-782.29	14,591,527.78	1,635,775.53	40.1779338	-105.0166156
10,860.00	87.59	179.63	7,107.58	-4,046.12	-781.67	14,591,437.89	1,635,776.14	40.1776869	-105.0166134
10,949.00	86.14	179.28	7,112.45	-4,134.98	-780.82	14,591,349.03	1,635,776.97	40.1774429	-105.0166104
11,038.00	84.90	178.51	7,119.40	-4,223.69	-779.11	14,591,260.32	1,635,778.67	40.1771993	-105.0166042
11,127.00	86.31	179.37	7,126.22	-4,312.41	-777.47	14,591,171.60	1,635,780.29	40.1769557	-105.0165983
11,216.00	87.96	178.89	7,130.67	-4,401.28	-776.12	14,591,082.72	1,635,781.63	40.1767116	-105.0165935
11,305.00	86.89	180.01	7,134.66	-4,490.19	-775.27	14,590,993.82	1,635,782.47	40.1764675	-105.0165904
11,394.00	86.85	180.25	7,139.52	-4,579.05	-775.47	14,590,904.95	1,635,782.25	40.1762235	-105.0165912
11,482.00	88.43	180.39	7,143.15	-4,666.98	-775.96	14,590,817.03	1,635,781.75	40.1759820	-105.0165929
11,571.00	88.16	179.69	7,145.80	-4,755.94	-776.02	14,590,728.07	1,635,781.67	40.1757377	-105.0165931
11,660.00	86.68	180.06	7,149.80	-4,844.84	-775.83	14,590,639.16	1,635,781.85	40.1754936	-105.0165924
11,749.00	85.31	180.75	7,156.02	-4,933.62	-776.46	14,590,550.39	1,635,781.21	40.1752498	-105.0165946
11,838.00	84.09	180.76	7,164.24	-5,022.23	-777.62	14,590,461.78	1,635,780.03	40.1750064	-105.0165988
11,927.00	85.20	180.51	7,172.54	-5,110.84	-778.61	14,590,373.17	1,635,779.04	40.1747631	-105.0166023
12,015.00	86.28	180.52	7,179.08	-5,198.59	-779.40	14,590,285.42	1,635,778.23	40.1745221	-105.0166051
12,104.00	87.32	180.25	7,184.05	-5,287.45	-779.99	14,590,196.56	1,635,777.62	40.1742781	-105.0166073
12,193.00	88.39	179.68	7,187.38	-5,376.38	-779.94	14,590,107.63	1,635,777.66	40.1740339	-105.0166071
12,282.00	86.92	179.49	7,191.02	-5,465.30	-779.29	14,590,018.71	1,635,778.29	40.1737897	-105.0166047
12,371.00	87.92	178.86	7,195.03	-5,554.20	-778.01	14,589,929.81	1,635,779.56	40.1735456	-105.0166001
12,460.00	87.09	178.97	7,198.90	-5,643.10	-776.33	14,589,840.91	1,635,781.23	40.1733015	-105.0165941
12,549.00	88.56	178.58	7,202.28	-5,732.01	-774.43	14,589,752.00	1,635,783.12	40.1730573	-105.0165873
12,637.00	89.63	177.87	7,203.67	-5,819.96	-771.70	14,589,664.05	1,635,785.83	40.1728158	-105.0165775
12,726.00	89.63	181.31	7,204.25	-5,908.94	-771.07	14,589,575.07	1,635,786.45	40.1725714	-105.0165752
12,789.98	90.34	181.20	7,204.26	-5,972.90	-772.47	14,589,511.10	1,635,785.04	40.1723958	-105.0165802
Enter 460' Circle : 12789.98' MD & 7204.26' TVD 905' FNL 221' FWL									
12,814.00	90.60	181.16	7,204.07	-5,996.92	-772.96	14,589,487.09	1,635,784.54	40.1723298	-105.0165820
12,903.00	90.87	181.36	7,202.93	-6,085.89	-774.92	14,589,398.12	1,635,782.57	40.1720855	-105.0165890
12,992.00	88.43	182.19	7,203.47	-6,174.84	-777.68	14,589,309.17	1,635,779.80	40.1718413	-105.0165989
13,081.00	89.63	181.89	7,204.98	-6,263.77	-780.84	14,589,220.24	1,635,776.62	40.1715971	-105.0166102
13,170.00	87.86	182.07	7,206.93	-6,352.69	-783.92	14,589,131.32	1,635,773.53	40.1713529	-105.0166212
13,259.00	89.03	181.81	7,209.34	-6,441.60	-786.93	14,589,042.41	1,635,770.51	40.1711087	-105.0166320
13,348.00	90.34	181.43	7,209.83	-6,530.56	-789.45	14,588,953.45	1,635,767.98	40.1708644	-105.0166410
13,437.00	87.09	178.53	7,211.83	-6,619.52	-789.42	14,588,864.49	1,635,767.99	40.1706201	-105.0166408
13,525.00	86.85	176.95	7,216.48	-6,707.33	-785.95	14,588,776.69	1,635,771.44	40.1703790	-105.0166284
13,614.00	88.46	177.08	7,220.12	-6,796.13	-781.32	14,588,687.88	1,635,776.06	40.1701351	-105.0166118
13,703.00	89.83	176.99	7,221.45	-6,885.00	-776.72	14,588,599.01	1,635,780.65	40.1698911	-105.0165954
13,792.00	91.41	175.62	7,220.48	-6,973.80	-770.98	14,588,510.21	1,635,786.37	40.1696472	-105.0165748
13,834.00	92.21	175.83	7,219.16	-7,015.66	-767.85	14,588,468.35	1,635,789.49	40.1695323	-105.0165636
Last SDI MWD Survey									
13,889.00	92.21	175.83	7,217.04	-7,070.48	-763.86	14,588,413.53	1,635,793.48	40.1693817	-105.0165493
Projection to TD : 2001' FNL 240' FWL Sec 4									

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well Hergenreder 32N-4HZ
<b>Project:</b>	US Rockies Wattenberg Planning UTM83	<b>TVD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Site:</b>	3N-68W-33 Hergenreder 4-33H Pad	<b>MD Reference:</b>	GL 4944' & KB 17' @ 4961.00ft (Xtreme 24)
<b>Well:</b>	Hergenreder 32N-4HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Denver Sales Office

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
2,285.00	2,214.68	Surface Casing	9.625	12.250
13,889.00	7,217.04	Production Casing	5.500	8.500

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
125.00	124.99	-0.32	1.01	First Total MWD Survey
2,244.00	2,176.10	93.44	-464.05	Last Total MWD Survey
2,308.00	2,236.37	96.52	-485.33	First SDI MWD Survey
6,259.00	6,137.70	145.86	-796.05	Curve KOP
6,383.00	6,260.26	128.87	-797.38	First SDI MWD Curve Survey
7,013.84	6,754.68	-239.29	-788.89	Enter Land Box : 7013.84' MD & 6754.68' TVD
7,450.00	6,903.82	-643.51	-800.81	Last SDI MWD Curve Survey
7,450.00	6,903.82	-643.51	-800.81	Landing Point : 866' FNL 185' FWL Sec 33
7,628.00	6,916.58	-820.98	-805.04	First SDI MWD Lateral Survey
8,334.94	6,965.85	-1,525.76	-797.83	Exit 460' Circle : 8334.94' MD & 6965.85' TVD 1747' FNL 188' FWL
12,789.98	7,204.26	-5,972.90	-772.47	Enter 460' Circle : 12789.98' MD & 7204.26' TVD 905' FNL 221' FWL
13,834.00	7,219.16	-7,015.66	-767.85	Last SDI MWD Survey
13,889.00	7,217.04	-7,070.48	-763.86	Projection to TD : 2001' FNL 240' FWL Sec 4

Checked By: _____	Approved By: _____	Date: _____
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