

WELL DETAILS: Butterball 40C-34HZ

PROJECT DETAILS: US Rockies Wattenberg Planning UTM83

GL 4916' & KB 20' @ 4936.00ft (Precision 461) 4916.00
 Northing 14584392.82 Easting 1676881.60 Latitude 40.1582680 Longitude -104.8694900

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Zone 13N (108 W to 102 W)
 System Datum: Mean Sea Level
 Local North: True

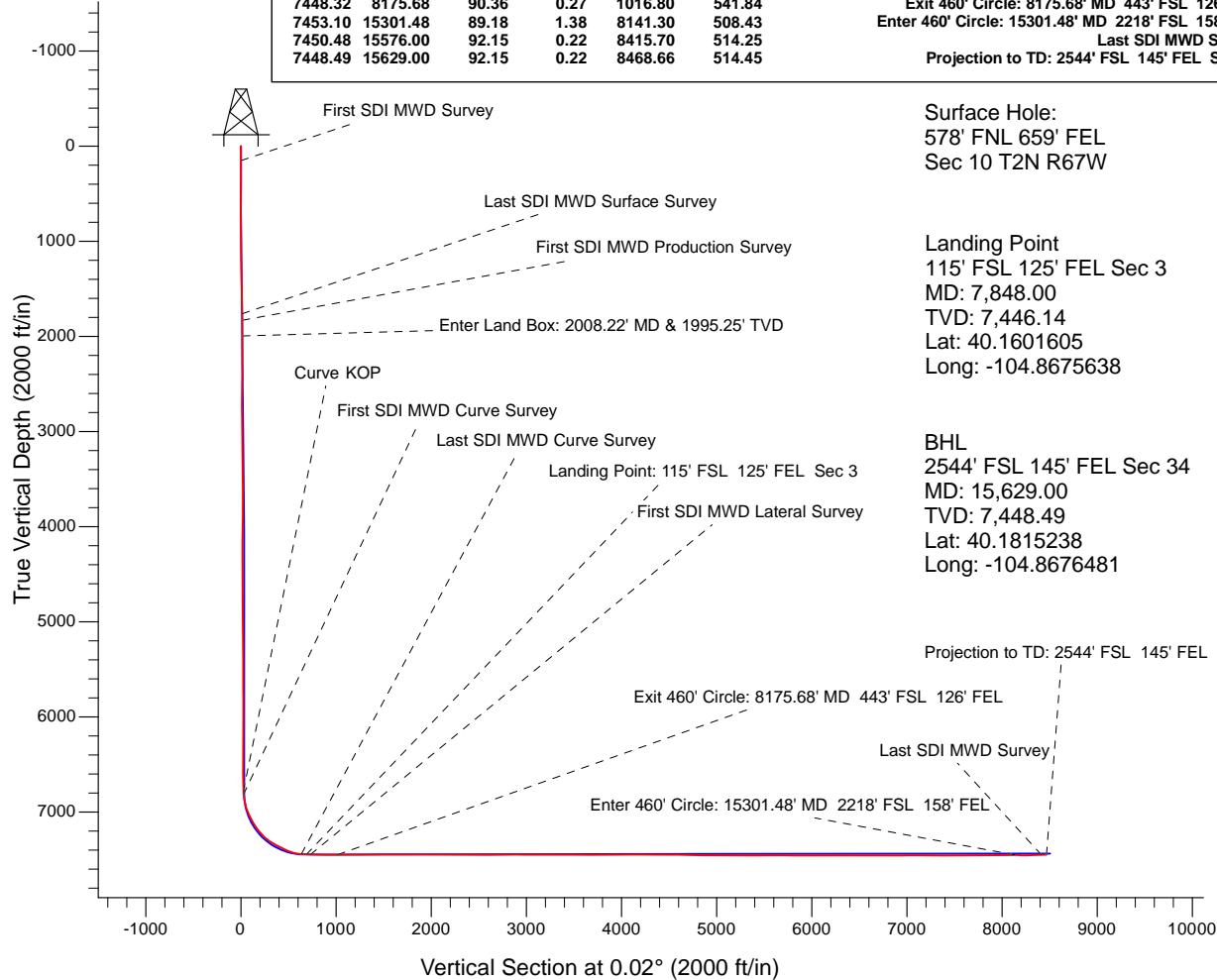
Design: OH (Butterball 40C-34HZ/OH)

Created By: Seth Burstad Date: 5-15-2017

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W
153.00	153.00	0.60	47.41	0.54	0.59
1762.07	1773.00	8.06	86.19	13.73	171.81
1831.38	1843.00	7.98	82.33	14.71	181.52
1995.25	2008.22	6.96	86.77	17.79	202.41
6780.63	6816.00	3.41	13.72	26.60	531.99
6815.53	6851.00	5.28	12.00	29.19	532.57
7443.61	7795.00	86.34	0.91	636.23	537.29
7446.14	7848.00	88.19	0.99	689.16	538.17
7446.92	7889.00	89.63	1.06	730.14	538.91
7448.32	8175.68	90.36	0.27	1016.80	541.84
7453.10	15301.48	89.18	1.38	8141.30	508.43
7450.48	15576.00	92.15	0.22	8415.70	514.25
7448.49	15629.00	92.15	0.22	8468.66	514.45

Annotation
 First SDI MWD Survey
 Last SDI MWD Surface Survey
 First SDI MWD Production Survey
 Enter Land Box: 2008.22' MD & 1995.25' TVD
 Curve KOP
 First SDI MWD Curve Survey
 Last SDI MWD Curve Survey
 Landing Point: 115' FSL 125' FEL Sec 3
 First SDI MWD Lateral Survey
 Exit 460' Circle: 8175.68' MD 443' FSL 126' FEL
 Enter 460' Circle: 15301.48' MD 2218' FSL 158' FEL
 Last SDI MWD Survey
 Projection to TD: 2544' FSL 145' FEL Sec 34

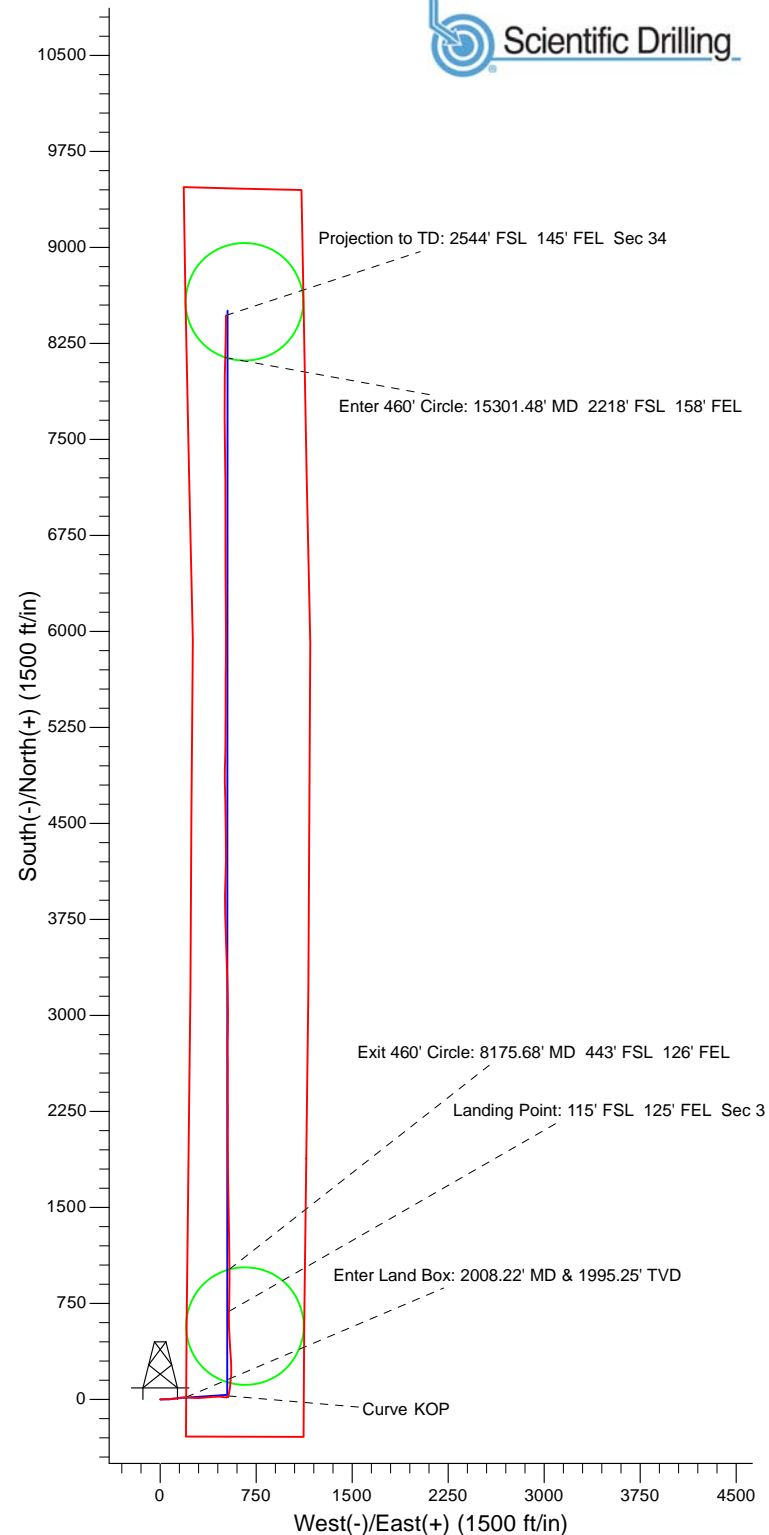


Surface Hole:
 578' FNL 659' FEL
 Sec 10 T2N R67W

Landing Point
 115' FSL 125' FEL Sec 3
 MD: 7,848.00
 TVD: 7,446.14
 Lat: 40.1601605
 Long: -104.8675638

BHL
 2544' FSL 145' FEL Sec 34
 MD: 15,629.00
 TVD: 7,448.49
 Lat: 40.1815238
 Long: -104.8676481

Projection to TD: 2544' FSL 145' FEL Sec 34





US ROCKIES REGION PLANNING

US Rockies Wattenberg Planning UTM83

Butterball 1-10HZ Pad 2N-67W-10

Butterball 40C-34HZ

OH

Design: OH

Standard Survey Report

15 May, 2017



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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	Butterball 1-10HZ Pad 2N-67W-10, Site Center : Butterball 9N-34HZ		
Site Position:		Northing:	14,584,393.12 usft
From:	Lat/Long	Easting:	1,676,836.61 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	40.1582690
		Longitude:	-104.8696510
		Grid Convergence:	0.08 °

Well	Butterball 40C-34HZ, 578' FNL 659' FEL Sec 10 T2N R67W		
Well Position	+N/-S	0.00 ft	Latitude: 40.1582680
	+E/-W	0.00 ft	Longitude: -104.8694900
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Ground Level:	4,916.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2016	4/6/2017	8.44	66.67	52,273

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		0.02

Survey Program	Date	5/15/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
153.00	1,773.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
1,773.00	15,629.00	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
153.00	0.60	47.41	153.00	0.54	0.59	0.54	0.39	0.39	0.00	
First SDI MWD Survey										
239.00	0.86	99.27	238.99	0.74	1.56	0.74	0.79	0.30	60.30	
328.00	1.56	82.14	327.97	0.80	3.42	0.80	0.88	0.79	-19.25	
415.00	2.61	99.72	414.91	0.63	6.54	0.63	1.40	1.21	20.21	
503.00	3.54	86.29	502.79	0.47	11.23	0.47	1.33	1.06	-15.26	
592.00	3.96	85.54	591.60	0.88	17.04	0.89	0.48	0.47	-0.84	
679.00	5.69	90.79	678.28	1.06	24.34	1.07	2.05	1.99	6.03	
765.00	5.70	88.93	763.86	1.08	32.88	1.09	0.21	0.01	-2.16	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
854.00	7.32	87.61	852.28	1.40	42.96	1.41	1.83	1.82	-1.48
943.00	8.44	89.64	940.44	1.67	55.16	1.69	1.30	1.26	2.28
1,032.00	8.25	87.19	1,028.50	2.03	68.07	2.05	0.45	-0.21	-2.75
1,121.00	8.56	85.41	1,116.54	2.87	81.05	2.90	0.45	0.35	-2.00
1,209.00	8.65	82.13	1,203.55	4.30	94.13	4.33	0.57	0.10	-3.73
1,298.00	8.10	83.94	1,291.60	5.88	106.99	5.92	0.69	-0.62	2.03
1,382.00	8.70	84.63	1,374.70	7.10	119.20	7.14	0.72	0.71	0.82
1,469.00	8.60	82.00	1,460.71	8.62	132.20	8.67	0.47	-0.11	-3.02
1,556.00	7.20	78.54	1,546.89	10.61	143.98	10.66	1.70	-1.61	-3.98
1,640.00	7.42	83.80	1,630.20	12.24	154.53	12.29	0.84	0.26	6.26
1,729.00	7.35	85.52	1,718.47	13.31	165.92	13.36	0.26	-0.08	1.93
1,773.00	8.06	86.19	1,762.07	13.73	171.81	13.79	1.63	1.61	1.52
Last SDI MWD Surface Survey									
1,843.00	7.98	82.33	1,831.38	14.71	181.52	14.77	0.78	-0.11	-5.51
First SDI MWD Production Survey									
1,938.00	7.16	79.03	1,925.56	16.71	193.87	16.78	0.98	-0.86	-3.47
2,008.22	6.96	86.77	1,995.25	17.79	202.41	17.86	1.38	-0.29	11.02
Enter Land Box: 2008.22' MD & 1995.25' TVD									
2,032.00	6.92	89.47	2,018.85	17.88	205.28	17.95	1.38	-0.16	11.37
2,127.00	7.22	98.55	2,113.13	17.04	216.91	17.12	1.22	0.32	9.56
2,222.00	8.82	97.31	2,207.20	15.23	230.04	15.31	1.69	1.68	-1.31
2,315.00	8.12	93.32	2,299.19	13.94	243.66	14.03	0.98	-0.75	-4.29
2,408.00	9.19	94.69	2,391.13	12.96	257.62	13.05	1.17	1.15	1.47
2,503.00	8.47	94.04	2,485.00	11.84	272.16	11.94	0.77	-0.76	-0.68
2,597.00	7.74	89.98	2,578.06	11.36	285.40	11.46	0.99	-0.78	-4.32
2,691.00	7.28	88.68	2,671.25	11.50	297.68	11.60	0.52	-0.49	-1.38
2,785.00	8.71	88.22	2,764.34	11.85	310.75	11.96	1.52	1.52	-0.49
2,879.00	8.56	87.74	2,857.27	12.35	324.86	12.46	0.18	-0.16	-0.51
2,973.00	7.91	86.26	2,950.30	13.05	338.30	13.17	0.73	-0.69	-1.57
3,068.00	8.23	79.64	3,044.36	14.70	351.51	14.82	1.03	0.34	-6.97
3,162.00	8.95	84.80	3,137.31	16.57	365.41	16.70	1.12	0.77	5.49
3,256.00	8.23	83.44	3,230.26	18.00	379.38	18.13	0.80	-0.77	-1.45
3,349.00	8.45	88.30	3,322.27	18.97	392.82	19.10	0.79	0.24	5.23
3,442.00	7.57	87.67	3,414.36	19.42	405.77	19.56	0.95	-0.95	-0.68
3,535.00	8.29	88.27	3,506.47	19.87	418.60	20.01	0.78	0.77	0.65
3,630.00	7.39	87.34	3,600.59	20.36	431.54	20.51	0.96	-0.95	-0.98
3,724.00	8.22	86.77	3,693.71	21.02	444.29	21.17	0.89	0.88	-0.61
3,818.00	7.39	83.14	3,786.84	22.12	457.00	22.28	1.03	-0.88	-3.86
3,910.00	7.58	101.38	3,878.07	21.63	468.83	21.79	2.58	0.21	19.83
4,005.00	8.65	96.56	3,972.12	19.58	482.07	19.74	1.33	1.13	-5.07
4,100.00	8.16	95.36	4,066.10	18.13	495.88	18.30	0.55	-0.52	-1.26
4,194.00	5.77	96.06	4,159.40	17.01	507.22	17.18	2.54	-2.54	0.74
4,288.00	3.79	89.39	4,253.07	16.54	515.03	16.72	2.18	-2.11	-7.10
4,383.00	3.42	77.26	4,347.88	17.20	520.93	17.38	0.89	-0.39	-12.77

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,478.00	1.22	85.20	4,442.80	17.91	524.70	18.09	2.33	-2.32	8.36
4,572.00	1.22	87.37	4,536.78	18.04	526.70	18.22	0.05	0.00	2.31
4,666.00	0.43	80.60	4,630.77	18.14	528.05	18.33	0.85	-0.84	-7.20
4,759.00	0.35	343.49	4,723.77	18.47	528.31	18.66	0.63	-0.09	-104.42
4,854.00	0.69	314.25	4,818.76	19.15	527.82	19.33	0.44	0.36	-30.78
4,948.00	0.48	24.22	4,912.76	19.90	527.57	20.09	0.74	-0.22	74.44
5,043.00	0.99	18.71	5,007.75	21.04	528.00	21.23	0.54	0.54	-5.80
5,137.00	0.83	37.84	5,101.74	22.35	528.68	22.54	0.36	-0.17	20.35
5,256.00	0.47	69.05	5,220.73	23.21	529.66	23.39	0.41	-0.30	26.23
5,351.00	0.77	79.71	5,315.72	23.46	530.66	23.64	0.34	0.32	11.22
5,447.00	0.79	294.04	5,411.72	23.84	530.69	24.03	1.55	0.02	-151.74
5,541.00	0.71	299.68	5,505.71	24.40	529.59	24.58	0.12	-0.09	6.00
5,635.00	0.32	316.69	5,599.71	24.88	528.90	25.06	0.44	-0.41	18.10
5,727.00	0.41	344.34	5,691.71	25.38	528.64	25.56	0.21	0.10	30.05
5,819.00	0.24	342.71	5,783.71	25.88	528.49	26.07	0.19	-0.18	-1.77
5,913.00	0.57	80.87	5,877.70	26.14	528.89	26.33	0.69	0.35	104.43
6,007.00	0.64	108.78	5,971.70	26.05	529.85	26.23	0.32	0.07	29.69
6,100.00	0.56	105.65	6,064.69	25.76	530.78	25.94	0.09	-0.09	-3.37
6,194.00	0.84	123.71	6,158.69	25.25	531.80	25.44	0.38	0.30	19.21
6,288.00	0.51	109.59	6,252.68	24.73	532.76	24.92	0.39	-0.35	-15.02
6,382.00	0.86	260.14	6,346.68	24.47	532.46	24.65	1.41	0.37	160.16
6,476.00	0.34	274.69	6,440.67	24.37	531.49	24.56	0.57	-0.55	15.48
6,570.00	0.31	279.78	6,534.67	24.44	530.96	24.62	0.04	-0.03	5.41
6,664.00	0.29	68.67	6,628.67	24.57	530.93	24.75	0.61	-0.02	158.39
6,757.00	0.37	59.81	6,721.67	24.80	531.41	24.99	0.10	0.09	-9.53
6,816.00	3.41	13.72	6,780.63	26.60	531.99	26.79	5.36	5.15	-78.12
Curve KOP									
6,851.00	5.28	12.00	6,815.53	29.19	532.57	29.37	5.36	5.35	-4.91
First SDI MWD Curve Survey									
6,946.00	13.59	13.45	6,909.16	44.35	536.09	44.53	8.75	8.75	1.53
7,039.00	22.63	10.22	6,997.46	72.64	541.81	72.83	9.78	9.72	-3.47
7,133.00	27.84	4.30	7,082.48	112.36	546.67	112.55	6.15	5.54	-6.30
7,227.00	35.65	6.36	7,162.36	161.55	551.36	161.74	8.39	8.31	2.19
7,323.00	41.85	1.31	7,237.21	221.44	555.20	221.64	7.24	6.46	-5.26
7,417.00	54.72	356.55	7,299.65	291.41	553.60	291.60	14.20	13.69	-5.06
7,512.00	62.05	355.86	7,349.41	372.07	548.23	372.26	7.74	7.72	-0.73
7,605.00	64.47	356.40	7,391.25	454.93	542.63	455.12	2.65	2.60	0.58
7,700.00	72.41	357.86	7,426.14	543.10	538.24	543.29	8.48	8.36	1.54
7,795.00	86.34	0.91	7,443.61	636.23	537.29	636.41	15.00	14.66	3.21
Last SDI MWD Curve Survey									
7,848.00	88.20	0.99	7,446.14	689.16	538.17	689.34	3.50	3.50	0.16
Landing Point: 115' FSL 125' FEL Sec 3									
7,889.00	89.63	1.06	7,446.92	730.14	538.91	730.33	3.50	3.50	0.16
First SDI MWD Lateral Survey									

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,983.00	89.40	0.65	7,447.72	824.13	540.31	824.32	0.50	-0.24	-0.44
8,077.00	89.73	0.43	7,448.43	918.12	541.20	918.31	0.42	0.35	-0.23
8,172.00	90.37	0.32	7,448.35	1,013.12	541.82	1,013.31	0.68	0.67	-0.12
8,175.68	90.36	0.27	7,448.32	1,016.80	541.84	1,016.99	1.34	-0.18	-1.32
Exit 460' Circle: 8175.68' MD 443' FSL 126' FEL									
8,265.00	90.20	359.09	7,447.88	1,106.11	541.34	1,106.30	1.34	-0.18	-1.32
8,359.00	89.53	359.25	7,448.10	1,200.10	539.98	1,200.29	0.73	-0.71	0.17
8,452.00	89.73	359.23	7,448.71	1,293.09	538.74	1,293.28	0.22	0.22	-0.02
8,548.00	91.01	358.80	7,448.09	1,389.07	537.09	1,389.26	1.41	1.33	-0.45
8,641.00	90.17	357.25	7,447.13	1,482.01	533.89	1,482.20	1.90	-0.90	-1.67
8,736.00	90.10	358.60	7,446.90	1,576.95	530.45	1,577.13	1.42	-0.07	1.42
8,830.00	89.56	359.61	7,447.18	1,670.93	528.98	1,671.12	1.22	-0.57	1.07
8,925.00	90.44	359.88	7,447.18	1,765.93	528.56	1,766.12	0.97	0.93	0.28
9,020.00	89.60	0.19	7,447.15	1,860.93	528.62	1,861.11	0.94	-0.88	0.33
9,114.00	90.40	0.70	7,447.15	1,954.93	529.35	1,955.11	1.01	0.85	0.54
9,208.00	89.53	359.85	7,447.21	2,048.92	529.80	2,049.11	1.29	-0.93	-0.90
9,302.00	90.13	359.87	7,447.49	2,142.92	529.57	2,143.11	0.64	0.64	0.02
9,397.00	88.93	359.53	7,448.27	2,237.92	529.07	2,238.10	1.31	-1.26	-0.36
9,492.00	89.43	359.57	7,449.62	2,332.90	528.32	2,333.09	0.53	0.53	0.04
9,586.00	90.03	359.86	7,450.07	2,426.90	527.86	2,427.08	0.71	0.64	0.31
9,681.00	90.54	359.77	7,449.60	2,521.90	527.55	2,522.08	0.55	0.54	-0.09
9,775.00	89.33	359.59	7,449.70	2,615.89	527.03	2,616.08	1.30	-1.29	-0.19
9,869.00	90.07	359.56	7,450.19	2,709.89	526.33	2,710.07	0.79	0.79	-0.03
9,963.00	91.07	0.11	7,449.26	2,803.88	526.06	2,804.07	1.21	1.06	0.59
10,057.00	90.60	0.64	7,447.89	2,897.87	526.67	2,898.05	0.75	-0.50	0.56
10,150.00	89.23	0.17	7,448.03	2,990.87	527.33	2,991.05	1.56	-1.47	-0.51
10,245.00	90.20	0.02	7,448.50	3,085.86	527.49	3,086.05	1.03	1.02	-0.16
10,338.00	89.30	359.38	7,448.91	3,178.86	527.00	3,179.04	1.19	-0.97	-0.69
10,433.00	90.07	358.85	7,449.43	3,273.85	525.53	3,274.03	0.98	0.81	-0.56
10,525.00	90.60	358.58	7,448.89	3,365.82	523.47	3,366.00	0.65	0.58	-0.29
10,620.00	89.70	356.60	7,448.64	3,460.73	519.48	3,460.91	2.29	-0.95	-2.08
10,715.00	89.09	357.03	7,449.64	3,555.58	514.20	3,555.76	0.79	-0.64	0.45
10,809.00	90.13	358.71	7,450.28	3,649.51	510.70	3,649.68	2.10	1.11	1.79
10,903.00	90.60	358.25	7,449.69	3,743.47	508.21	3,743.65	0.70	0.50	-0.49
10,997.00	90.17	359.35	7,449.05	3,837.45	506.24	3,837.62	1.26	-0.46	1.17
11,091.00	90.40	0.96	7,448.59	3,931.44	506.50	3,931.62	1.73	0.24	1.71
11,185.00	89.73	1.80	7,448.48	4,025.41	508.76	4,025.59	1.14	-0.71	0.89
11,279.00	90.34	1.76	7,448.42	4,119.37	511.68	4,119.55	0.65	0.65	-0.04
11,373.00	91.21	1.21	7,447.15	4,213.33	514.12	4,213.51	1.09	0.93	-0.59
11,466.00	88.36	359.42	7,447.50	4,306.31	514.63	4,306.49	3.62	-3.06	-1.92
11,559.00	89.33	359.04	7,449.37	4,399.28	513.38	4,399.46	1.12	1.04	-0.41
11,652.00	90.40	358.46	7,449.59	4,492.26	511.35	4,492.44	1.31	1.15	-0.62
11,745.00	89.56	359.11	7,449.63	4,585.24	509.38	4,585.41	1.14	-0.90	0.70

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,840.00	90.00	359.04	7,449.99	4,680.22	507.84	4,680.40	0.47	0.46	-0.07
11,934.00	87.92	359.44	7,451.70	4,774.19	506.60	4,774.37	2.25	-2.21	0.43
12,028.00	88.02	359.69	7,455.03	4,868.13	505.88	4,868.31	0.29	0.11	0.27
12,122.00	89.13	1.03	7,457.36	4,962.10	506.47	4,962.27	1.85	1.18	1.43
12,217.00	90.07	0.69	7,458.03	5,057.08	507.90	5,057.26	1.05	0.99	-0.36
12,310.00	91.28	0.86	7,456.93	5,150.07	509.16	5,150.24	1.31	1.30	0.18
12,404.00	90.57	0.45	7,455.41	5,244.05	510.23	5,244.22	0.87	-0.76	-0.44
12,498.00	89.50	0.17	7,455.36	5,338.04	510.74	5,338.22	1.18	-1.14	-0.30
12,593.00	90.17	359.76	7,455.63	5,433.04	510.68	5,433.22	0.83	0.71	-0.43
12,688.00	89.97	0.36	7,455.51	5,528.04	510.78	5,528.22	0.67	-0.21	0.63
12,782.00	90.64	0.59	7,455.01	5,622.04	511.56	5,622.22	0.75	0.71	0.24
12,875.00	89.03	0.21	7,455.28	5,715.03	512.21	5,715.21	1.78	-1.73	-0.41
12,970.00	89.40	0.46	7,456.58	5,810.02	512.77	5,810.20	0.47	0.39	0.26
13,065.00	89.97	0.51	7,457.11	5,905.01	513.57	5,905.19	0.60	0.60	0.05
13,159.00	90.74	359.87	7,456.52	5,999.01	513.88	5,999.19	1.07	0.82	-0.68
13,253.00	89.80	359.93	7,456.08	6,093.01	513.72	6,093.19	1.00	-1.00	0.06
13,348.00	90.64	359.61	7,455.72	6,188.01	513.34	6,188.19	0.95	0.88	-0.34
13,442.00	89.33	359.51	7,455.74	6,282.00	512.61	6,282.18	1.40	-1.39	-0.11
13,536.00	90.20	359.02	7,456.13	6,375.99	511.41	6,376.17	1.06	0.93	-0.52
13,630.00	88.93	359.75	7,456.84	6,469.98	510.40	6,470.16	1.56	-1.35	0.78
13,725.00	89.97	359.55	7,457.75	6,564.97	509.82	6,565.15	1.11	1.09	-0.21
13,818.00	90.07	0.18	7,457.72	6,657.97	509.60	6,658.15	0.69	0.11	0.68
13,912.00	90.81	0.23	7,457.00	6,751.97	509.94	6,752.15	0.79	0.79	0.05
14,006.00	89.76	359.95	7,456.53	6,845.97	510.08	6,846.14	1.16	-1.12	-0.30
14,101.00	90.47	359.55	7,456.34	6,940.96	509.67	6,941.14	0.86	0.75	-0.42
14,196.00	90.17	0.23	7,455.81	7,035.96	509.49	7,036.14	0.78	-0.32	0.72
14,290.00	90.67	359.61	7,455.12	7,129.96	509.36	7,130.14	0.85	0.53	-0.66
14,384.00	88.66	359.30	7,455.67	7,223.95	508.46	7,224.13	2.16	-2.14	-0.33
14,478.00	89.36	359.16	7,457.29	7,317.93	507.20	7,318.10	0.76	0.74	-0.15
14,573.00	90.77	359.06	7,457.18	7,412.91	505.72	7,413.09	1.49	1.48	-0.11
14,667.00	90.50	359.78	7,456.14	7,506.90	504.77	7,507.08	0.82	-0.29	0.77
14,761.00	89.66	359.80	7,456.01	7,600.90	504.43	7,601.07	0.89	-0.89	0.02
14,853.00	90.71	359.30	7,455.71	7,692.89	503.71	7,693.07	1.26	1.14	-0.54
14,947.00	90.44	0.13	7,454.77	7,786.89	503.24	7,787.06	0.93	-0.29	0.88
15,040.00	89.73	0.57	7,454.63	7,879.88	503.81	7,880.06	0.90	-0.76	0.47
15,134.00	91.14	0.75	7,453.92	7,973.87	504.89	7,974.05	1.51	1.50	0.19
15,229.00	90.27	1.40	7,452.75	8,068.85	506.67	8,069.02	1.14	-0.92	0.68
15,301.48	89.18	1.38	7,453.10	8,141.30	508.43	8,141.48	1.50	-1.50	-0.02
Exnter 460' Circle: 15301.48' MD 2218' FSL 158' FEL									
15,321.00	88.89	1.38	7,453.43	8,160.82	508.90	8,160.99	1.50	-1.50	-0.02
15,415.00	90.17	1.48	7,454.20	8,254.78	511.25	8,254.96	1.37	1.36	0.11
15,509.00	91.65	1.18	7,452.70	8,348.74	513.43	8,348.92	1.61	1.57	-0.32
15,576.00	92.15	0.22	7,450.48	8,415.70	514.25	8,415.88	1.61	0.75	-1.43
Last SDI MWD Survey									

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Butterball 40C-34HZ
Project:	US Rockies Wattenberg Planning UTM83	TVD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Site:	Butterball 1-10HZ Pad 2N-67W-10	MD Reference:	GL 4916' & KB 20' @ 4936.00ft (Precision 461)
Well:	Butterball 40C-34HZ	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)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
15,629.00	92.15	0.22	7,448.49	8,468.66	514.45	8,468.84	0.00	0.00	0.00
Projection to TD: 2544' FSL 145' FEL Sec 34									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Butterball 40C-34HZ PB	0.00	0.00	7,437.00	8,505.51	525.94	14,592,899.08	1,677,395.04	40.1816250	-104.8676070
- actual wellpath misses target center by 40.28ft at 15629.00ft MD (7448.49 TVD, 8468.66 N, 514.45 E)									
- Point									
Butterball 40C-34HZ LP	0.00	0.00	7,447.00	672.96	523.31	14,585,066.54	1,677,403.92	40.1601160	-104.8676170
- actual wellpath misses target center by 14.66ft at 7831.62ft MD (7445.54 TVD, 672.79 N, 537.89 E)									
- Point									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
153.00	153.00	0.54	0.59	First SDI MWD Survey
1,773.00	1,762.07	13.73	171.81	Last SDI MWD Surface Survey
1,843.00	1,831.38	14.71	181.52	First SDI MWD Production Survey
2,008.22	1,995.25	17.79	202.41	Enter Land Box: 2008.22' MD & 1995.25' TVD
6,816.00	6,780.63	26.60	531.99	Curve KOP
6,851.00	6,815.53	29.19	532.57	First SDI MWD Curve Survey
7,795.00	7,443.61	636.23	537.29	Last SDI MWD Curve Survey
7,848.00	7,446.14	689.16	538.17	Landing Point: 115' FSL 125' FEL Sec 3
7,889.00	7,446.92	730.14	538.91	First SDI MWD Lateral Survey
8,175.68	7,448.32	1,016.80	541.84	Exit 460' Circle: 8175.68' MD 443' FSL 126' FEL
15,301.48	7,453.10	8,141.30	508.43	Exnter 460' Circle: 15301.48' MD 2218' FSL 158' FEL
15,576.00	7,450.48	8,415.70	514.25	Last SDI MWD Survey
15,629.00	7,448.49	8,468.66	514.45	Projection to TD: 2544' FSL 145' FEL Sec 34

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------