



# **Extraction Oil & Gas**

**Weld County, CO (NAD83)  
BERTHOUD FARMS Pad  
BERTHOUD FARMS 8E-10-11C**

**Wellbore #1**

**Design: Wellbore #1**

## **Standard Survey Report**

**24 January, 2018**



<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well BERTHOUD FARMS 8E-10-11C
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	KB=25' @ 5060.00ft (P 346)
<b>Site:</b>	BERTHOUD FARMS Pad	<b>MD Reference:</b>	KB=25' @ 5060.00ft (P 346)
<b>Well:</b>	BERTHOUD FARMS 8E-10-11C	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1

<b>Project</b>	Weld County, CO (NAD83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Ground Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		BERTHOUD FARMS Pad			
Site Position:		Northing:	1,361,363.3700 usft	Latitude:	40.324432
From:	Map	Easting:	3,128,119.8200 usft	Longitude:	-105.040492
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.30 °

Well	BERTHOUD FARMS 8E-10-11C					
Well Position	+N/-S	0.00 ft	Northing:	1,361,363.3700 usfl	Latitude:	40.324432
	+E/-W	0.00 ft	Easting:	3,128,119.8200 usfl	Longitude:	-105.040492
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,035.00 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	12/22/2017	8.53	66.65	52,162

<b>Design</b>	Wellbore #1				
<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	70.56	

<b>Survey Program</b>	<b>Date</b>	1/24/2018			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
113.00	1,537.00	Surface Surveys (Wellbore #1)	MWD	MWD - Standard	
1,650.00	10,690.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

<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>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
113.00	0.97	173.09	112.99	-0.95	0.12	-0.21	0.86	0.86	0.00	
208.00	0.92	120.10	207.98	-2.13	0.87	0.11	0.89	-0.05	-55.78	
304.00	1.05	148.22	303.97	-3.26	2.00	0.80	0.52	0.14	29.29	
399.00	1.10	8.74	398.96	-3.10	2.60	1.42	2.12	0.05	-146.82	
493.00	1.58	23.07	492.94	-1.02	3.24	2.72	0.62	0.51	15.24	
589.00	0.48	106.56	588.92	0.08	4.15	3.94	1.66	-1.15	86.97	
684.00	0.70	326.92	683.92	0.46	4.21	4.12	1.17	0.23	-146.99	
778.00	3.56	2.67	777.85	3.85	4.03	5.09	3.21	3.04	38.03	
873.00	5.23	20.87	872.57	10.85	5.72	9.00	2.27	1.76	19.16	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well BERTHOUD FARMS 8E-10-11C
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	KB=25' @ 5060.00ft (P 346)
<b>Site:</b>	BERTHOUD FARMS Pad	<b>MD Reference:</b>	KB=25' @ 5060.00ft (P 346)
<b>Well:</b>	BERTHOUD FARMS 8E-10-11C	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1

## Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
968.00	8.53	22.19	966.87	21.42	9.92	16.48	3.48	3.47	1.39
1,064.00	10.46	28.60	1,061.56	35.66	16.78	27.70	2.29	2.01	6.68
1,159.00	12.00	20.08	1,154.74	52.51	24.30	40.40	2.38	1.62	-8.97
1,255.00	14.33	22.71	1,248.21	72.85	32.31	54.72	2.51	2.43	2.74
1,350.00	16.39	22.98	1,339.81	96.04	42.09	71.66	2.17	2.17	0.28
1,444.00	18.37	28.87	1,429.53	121.22	54.42	91.67	2.82	2.11	6.27
1,487.00	18.76	30.80	1,470.29	133.09	61.23	102.04	1.69	0.91	4.49
1,537.00	18.76	30.80	1,517.63	146.91	69.46	114.40	0.00	0.00	0.00
1,650.00	20.81	26.95	1,623.96	180.41	87.87	142.91	2.15	1.81	-3.41
<b>First MWD Survey @ 1650'MD</b>									
1,745.00	22.40	27.21	1,712.28	211.56	103.79	168.30	1.68	1.67	0.27
1,840.00	22.89	27.74	1,799.96	244.01	120.67	195.01	0.56	0.52	0.56
1,934.00	25.32	27.52	1,885.76	278.02	138.47	223.12	2.59	2.59	-0.23
2,028.00	27.40	26.33	1,969.98	315.23	157.35	253.31	2.28	2.21	-1.27
2,123.00	30.09	26.42	2,053.26	356.16	177.65	286.08	2.83	2.83	0.09
2,218.00	33.98	25.54	2,133.78	401.46	199.70	321.95	4.12	4.09	-0.93
2,312.00	35.79	25.14	2,210.89	450.05	222.70	359.81	1.94	1.93	-0.43
2,407.00	35.48	26.51	2,288.10	499.87	246.81	399.13	0.90	-0.33	1.44
2,501.00	35.00	23.65	2,364.88	548.97	269.80	437.16	1.83	-0.51	-3.04
2,595.00	34.82	25.14	2,441.96	597.96	292.02	474.41	0.93	-0.19	1.59
2,690.00	35.22	26.64	2,519.77	647.00	315.83	513.19	1.00	0.42	1.58
2,785.00	35.09	25.23	2,597.44	696.19	339.75	552.12	0.87	-0.14	-1.48
2,879.00	34.91	24.04	2,674.44	745.20	362.22	589.62	0.75	-0.19	-1.27
2,974.00	36.59	26.42	2,751.54	795.39	385.90	628.66	2.30	1.77	2.51
3,068.00	35.79	23.73	2,827.41	845.64	409.43	667.57	1.89	-0.85	-2.86
3,162.00	34.20	26.11	2,904.42	894.53	432.12	705.24	2.23	-1.69	2.53
3,256.00	34.51	27.21	2,982.02	941.94	455.92	743.47	0.74	0.33	1.17
3,351.00	35.62	28.23	3,059.78	990.25	481.31	783.49	1.32	1.17	1.07
3,445.00	34.51	25.72	3,136.72	1,038.36	505.82	822.61	1.94	-1.18	-2.67
3,539.00	35.62	27.04	3,213.66	1,086.73	529.82	861.35	1.43	1.18	1.40
3,633.00	34.20	24.35	3,290.74	1,135.18	553.16	899.49	2.23	-1.51	-2.86
3,727.00	34.29	25.32	3,368.45	1,183.19	575.37	936.42	0.59	0.10	1.03
3,821.00	33.72	27.21	3,446.38	1,230.33	598.63	974.04	1.28	-0.61	2.01
3,916.00	35.09	28.62	3,524.76	1,277.75	623.77	1,013.53	1.67	1.44	1.48
4,010.00	36.01	29.64	3,601.23	1,325.49	650.38	1,054.51	1.16	0.98	1.09
4,104.00	37.12	31.31	3,676.73	1,373.74	678.78	1,097.36	1.59	1.18	1.78
4,198.00	35.22	29.33	3,752.62	1,421.61	706.80	1,139.72	2.37	-2.02	-2.11
4,293.00	33.10	26.33	3,831.23	1,468.75	731.73	1,178.91	2.85	-2.23	-3.16
4,387.00	30.31	27.35	3,911.19	1,512.83	754.02	1,214.60	3.02	-2.97	1.09
4,482.00	28.02	28.93	3,994.14	1,553.66	775.83	1,248.76	2.54	-2.41	1.66
4,576.00	24.88	30.34	4,078.29	1,590.06	796.51	1,280.37	3.41	-3.34	1.50
4,671.00	23.51	31.62	4,164.95	1,623.44	816.54	1,310.37	1.54	-1.44	1.35
4,765.00	20.90	34.84	4,251.97	1,653.18	835.95	1,338.58	3.06	-2.78	3.43

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<b>Well:</b>	BERTHOUD FARMS 8E-10-11C	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1

## Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,859.00	18.91	38.23	4,340.36	1,678.91	854.95	1,365.06	2.45	-2.12	3.61
4,954.00	18.60	37.61	4,430.31	1,703.00	873.73	1,390.79	0.39	-0.33	-0.65
5,048.00	18.52	36.51	4,519.42	1,726.88	891.76	1,415.74	0.38	-0.09	-1.17
5,142.00	18.91	37.83	4,608.45	1,750.91	909.98	1,440.92	0.61	0.41	1.40
5,236.00	18.52	35.94	4,697.48	1,775.02	928.09	1,466.02	0.77	-0.41	-2.01
5,330.00	18.29	36.42	4,786.68	1,798.98	945.61	1,490.51	0.29	-0.24	0.51
5,424.00	19.62	42.24	4,875.58	1,822.54	964.97	1,516.62	2.46	1.41	6.19
5,471.49	19.27	43.85	4,920.37	1,834.09	975.76	1,530.64	1.35	-0.73	3.39
<b>Enter Lease @ 5471.49'MD</b>									
5,542.00	18.78	46.34	4,987.02	1,850.32	992.04	1,551.39	1.35	-0.70	3.53
5,637.00	27.62	57.44	5,074.30	1,872.78	1,021.73	1,586.87	10.34	9.31	11.68
5,732.00	35.79	67.05	5,155.10	1,895.52	1,065.97	1,636.15	10.09	8.60	10.12
5,826.00	44.59	70.93	5,226.85	1,917.06	1,122.59	1,696.71	9.73	9.36	4.13
5,921.00	50.69	76.13	5,290.85	1,936.79	1,189.88	1,766.73	7.58	6.42	5.47
6,015.00	58.20	82.83	5,345.52	1,950.53	1,264.98	1,842.12	9.87	7.99	7.13
6,109.00	65.53	87.01	5,389.83	1,957.76	1,347.47	1,922.31	8.73	7.80	4.45
6,203.00	72.91	88.64	5,423.15	1,961.06	1,435.23	2,006.17	8.02	7.85	1.73
6,203.61	72.96	88.63	5,423.33	1,961.07	1,435.81	2,006.72	8.74	8.60	-1.64
<b>Hardline Crossing @ 6203.51'MD (1824'FNL &amp; 460'FWL)</b>									
6,229.83	75.22	88.20	5,430.52	1,961.77	1,461.02	2,030.72	8.74	8.60	-1.62
<b>BERTHOUD 11N LP</b>									
6,297.00	81.00	87.15	5,444.36	1,964.44	1,526.66	2,093.51	8.74	8.61	-1.57
6,391.00	81.31	85.25	5,458.81	1,970.59	1,619.34	2,182.95	2.02	0.33	-2.02
6,486.00	80.78	86.44	5,473.60	1,977.39	1,712.93	2,273.47	1.36	-0.56	1.25
6,580.00	81.62	88.51	5,487.98	1,981.48	1,805.73	2,362.33	2.35	0.89	2.20
6,674.00	82.19	89.35	5,501.22	1,983.22	1,898.77	2,450.65	1.07	0.61	0.89
6,768.00	82.68	88.73	5,513.59	1,984.78	1,991.94	2,539.03	0.84	0.52	-0.66
6,862.00	82.81	87.01	5,525.46	1,988.25	2,085.12	2,628.05	1.82	0.14	-1.83
6,956.00	82.02	87.15	5,537.87	1,993.00	2,178.18	2,717.37	0.85	-0.84	0.15
7,051.00	81.40	88.34	5,551.57	1,996.70	2,272.11	2,807.18	1.40	-0.65	1.25
7,145.00	82.10	87.63	5,565.06	1,999.97	2,365.08	2,895.94	1.06	0.74	-0.76
7,239.00	81.22	89.35	5,578.69	2,002.42	2,458.05	2,984.42	2.04	-0.94	1.83
7,333.00	81.09	88.03	5,593.15	2,004.54	2,550.90	3,072.69	1.39	-0.14	-1.40
7,428.00	82.10	89.61	5,607.03	2,006.48	2,644.86	3,161.93	1.96	1.06	1.66
7,522.00	83.52	89.61	5,618.80	2,007.11	2,738.11	3,250.08	1.51	1.51	0.00
7,617.00	81.88	90.45	5,630.87	2,007.06	2,832.34	3,338.91	1.94	-1.73	0.88
7,711.00	80.60	90.85	5,645.19	2,006.01	2,925.23	3,426.16	1.43	-1.36	0.43
7,805.00	77.82	89.44	5,662.78	2,005.77	3,017.56	3,513.14	3.30	-2.96	-1.50
7,900.00	77.51	88.82	5,683.08	2,007.18	3,110.36	3,601.12	0.72	-0.33	-0.65
7,994.00	77.51	88.64	5,703.41	2,009.21	3,202.11	3,688.31	0.19	0.00	-0.19
8,089.00	77.82	87.01	5,723.70	2,012.74	3,294.85	3,776.93	1.71	0.33	-1.72
8,183.00	78.88	88.73	5,742.69	2,016.16	3,386.84	3,864.82	2.12	1.13	1.83
8,277.00	79.50	88.12	5,760.32	2,018.69	3,479.14	3,952.70	0.92	0.66	-0.65
8,371.00	76.58	86.84	5,779.79	2,022.73	3,571.00	4,040.66	3.38	-3.11	-1.36

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<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,465.00	76.49	89.13	5,801.68	2,025.95	3,662.35	4,127.87	2.37	-0.10	2.44
8,559.00	76.71	88.42	5,823.47	2,027.90	3,753.77	4,214.73	0.77	0.23	-0.76
8,653.00	75.30	89.83	5,846.20	2,029.30	3,844.96	4,301.19	2.09	-1.50	1.50
8,748.00	75.78	89.75	5,869.92	2,029.63	3,936.95	4,388.05	0.51	0.51	-0.08
8,842.00	76.49	89.13	5,892.45	2,030.53	4,028.21	4,474.39	0.99	0.76	-0.66
8,936.00	77.20	88.25	5,913.84	2,032.62	4,119.71	4,561.38	1.18	0.76	-0.94
9,030.00	78.22	87.94	5,933.85	2,035.67	4,211.51	4,648.95	1.13	1.09	-0.33
9,124.00	80.69	89.53	5,951.05	2,037.71	4,303.89	4,736.74	3.11	2.63	1.69
9,218.00	81.49	88.51	5,965.61	2,039.30	4,396.74	4,824.83	1.37	0.85	-1.09
9,312.00	82.41	88.12	5,978.78	2,042.03	4,489.77	4,913.47	1.06	0.98	-0.41
9,407.00	80.12	87.72	5,993.20	2,045.44	4,583.60	5,003.08	2.45	-2.41	-0.42
9,501.00	78.08	89.35	6,010.98	2,047.81	4,675.87	5,090.87	2.76	-2.17	1.73
9,594.00	74.99	89.22	6,032.63	2,048.93	4,766.29	5,176.51	3.33	-3.32	-0.14
9,688.00	72.91	90.54	6,058.62	2,049.13	4,856.62	5,261.76	2.59	-2.21	1.40
9,782.00	71.50	92.21	6,087.35	2,046.99	4,946.09	5,345.41	2.26	-1.50	1.78
9,876.00	69.11	92.35	6,119.02	2,043.47	5,034.52	5,427.62	2.55	-2.54	0.15
9,971.00	67.79	92.04	6,153.92	2,040.08	5,122.81	5,509.75	1.42	-1.39	-0.33
10,065.00	67.21	92.21	6,189.89	2,036.86	5,209.59	5,590.51	0.64	-0.62	0.18
10,159.00	68.58	89.83	6,225.27	2,035.32	5,296.66	5,672.10	2.76	1.46	-2.53
10,253.00	69.42	89.61	6,258.95	2,035.75	5,384.41	5,755.00	0.92	0.89	-0.23
10,348.00	69.91	89.83	6,291.97	2,036.18	5,473.49	5,839.14	0.56	0.52	0.23
10,442.00	69.60	88.03	6,324.50	2,037.83	5,561.66	5,922.83	1.83	-0.33	-1.91
10,536.00	70.48	88.42	6,356.58	2,040.57	5,649.97	6,007.02	1.01	0.94	0.41
10,629.00	88.41	88.91	6,373.55	2,042.68	5,741.00	6,093.56	19.29	19.28	0.53
Final MWD Survey @ 10629'MD									
10,690.00	88.41	88.91	6,375.24	2,043.83	5,801.97	6,151.43	0.00	0.00	0.00
PTD @ 10690'MD (1824'FNL & 460'FWL) - BERTHOUD 11N BHL									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,650.00	1,623.96	180.41	87.87	First MWD Survey @ 1650'MD	
5,471.49	4,920.37	1,834.09	975.76	Enter Lease @ 5471.49'MD	
6,203.61	5,423.33	1,961.07	1,435.81	Hardline Crossing @ 6203.51'MD (1824'FNL & 460'FWL)	
10,629.00	6,373.55	2,042.68	5,741.00	Final MWD Survey @ 10629'MD	
10,690.00	6,375.24	2,043.83	5,801.97	PTD @ 10690'MD (1824'FNL & 460'FWL)	

Checked By: _____	Approved By: _____	Date: _____
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