

# **Extraction Oil & Gas**

**Weld County, CO (NAD83)**

**Berthound Farms Pad KB 29**

**Berthoud Farms 8E-10-7N**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**02 May, 2018**

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well Berthoud Farms 8E-10-7N
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	KB=29 @ 5062.00ft
<b>Site:</b>	Berthoud Farms Pad KB 29	<b>MD Reference:</b>	KB=29 @ 5062.00ft
<b>Well:</b>	Berthoud Farms 8E-10-7N	<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 KB 29						
Site Position:		Northing:	1,361,363.24	usft	Latitude:	40.324431		
From:	Map	Easting:	3,128,155.77	usft	Longitude:	-105.040363		
Position Uncertainty:	0.00	ft	Slot Radius:	13-3/16	"	Grid Convergence:	0.30	°

Well		Berthoud Farms 8E-10-7N				
Well Position	+N/-S	0.00 ft	Northing:	1,361,363.02 usft	Latitude:	40.324430
	+E/-W	0.00 ft	Easting:	3,128,192.02 usft	Longitude:	-105.040233
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,033.00 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	5/1/2018	8.52	66.65	52,119

<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	64.78	

<b>Survey Program</b>	<b>Date</b>	5/2/2018			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
123.00	10,790.00	Survey #1 (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
123.00	0.09	29.75	123.00	0.08	0.05	0.08	0.07	0.07	0.00
<b>1st MWD Survey</b>									
218.00	0.04	62.00	218.00	0.16	0.11	0.17	0.06	-0.05	33.95
314.00	0.57	105.16	314.00	0.06	0.60	0.57	0.56	0.55	44.96
409.00	0.79	132.67	408.99	-0.51	1.54	1.18	0.41	0.23	28.96
503.00	1.80	13.84	502.98	0.48	2.37	2.35	2.43	1.07	-126.42
599.00	4.17	8.92	598.84	5.39	3.27	5.26	2.48	2.47	-5.13
694.00	7.43	11.82	693.34	14.82	5.07	10.90	3.44	3.43	3.05
788.00	9.10	27.72	786.37	27.35	9.77	20.50	3.00	1.78	16.91
883.00	9.76	32.29	880.09	40.81	17.57	33.28	1.05	0.69	4.81

# Survey Report

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<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	KB=29 @ 5062.00ft
<b>Site:</b>	Berthoud Farms Pad KB 29	<b>MD Reference:</b>	KB=29 @ 5062.00ft
<b>Well:</b>	Berthoud Farms 8E-10-7N	<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)
978.00	10.11	26.14	973.67	55.10	25.54	46.59	1.18	0.37	-6.47
1,074.00	10.81	23.42	1,068.07	70.93	32.83	59.93	0.89	0.73	-2.83
1,169.00	12.22	16.39	1,161.16	88.75	39.21	73.29	2.09	1.48	-7.40
1,264.00	17.05	9.62	1,253.06	112.14	44.38	87.94	5.39	5.08	-7.13
1,360.00	20.04	9.71	1,344.06	142.24	49.51	105.40	3.11	3.11	0.09
1,454.00	21.81	12.26	1,431.86	175.18	55.93	125.25	2.12	1.88	2.71
1,498.00	22.10	14.30	1,472.67	191.19	59.71	135.49	1.85	0.66	4.64
1,577.00	22.58	11.67	1,545.75	220.44	66.45	154.05	1.40	0.61	-3.33
1,673.00	27.49	16.47	1,632.71	259.77	76.47	179.87	5.53	5.11	5.00
1,768.00	29.30	17.04	1,716.28	303.02	89.50	210.09	1.93	1.91	0.60
1,864.00	30.71	18.63	1,799.41	348.72	104.21	242.87	1.69	1.47	1.66
1,959.00	32.39	21.93	1,880.37	395.31	121.47	278.33	2.54	1.77	3.47
2,055.00	31.42	19.86	1,961.87	442.70	139.57	314.91	1.52	-1.01	-2.16
2,150.00	31.51	23.43	2,042.91	488.77	157.86	351.08	1.96	0.09	3.76
2,246.00	30.58	20.83	2,125.16	534.62	176.52	387.50	1.70	-0.97	-2.71
2,341.00	29.70	23.17	2,207.32	578.84	194.37	422.49	1.55	-0.93	2.46
2,436.00	29.92	23.34	2,289.75	622.23	213.02	457.85	0.25	0.23	0.18
2,532.00	30.31	25.77	2,372.79	666.03	233.04	494.62	1.33	0.41	2.53
2,627.00	33.41	25.64	2,453.47	711.21	254.78	533.55	3.26	3.26	-0.14
2,723.00	34.91	25.06	2,532.90	759.93	277.86	575.18	1.60	1.56	-0.60
2,818.00	34.29	23.83	2,611.10	809.03	300.18	616.30	0.98	-0.65	-1.29
2,913.00	33.89	22.55	2,689.78	857.97	321.15	656.13	0.86	-0.42	-1.35
3,008.00	33.19	19.86	2,768.97	906.89	340.14	694.15	1.73	-0.74	-2.83
3,104.00	30.80	16.73	2,850.38	955.15	356.15	729.20	3.03	-2.49	-3.26
3,199.00	30.40	19.64	2,932.16	1,001.09	371.23	762.41	1.61	-0.42	3.06
3,295.00	32.70	18.85	3,013.96	1,048.51	387.77	797.59	2.43	2.40	-0.82
3,390.00	35.31	18.45	3,092.71	1,098.85	404.76	834.40	2.76	2.75	-0.42
3,486.00	37.69	20.44	3,169.88	1,152.68	423.79	874.55	2.77	2.48	2.07
3,581.00	39.59	22.33	3,244.08	1,207.90	445.44	917.67	2.35	2.00	1.99
3,676.00	37.69	21.45	3,318.28	1,262.93	467.56	961.13	2.08	-2.00	-0.93
3,772.00	39.11	23.74	3,393.52	1,317.97	490.48	1,005.32	2.09	1.48	2.39
3,867.00	40.21	24.14	3,466.65	1,373.38	515.09	1,051.19	1.19	1.16	0.42
3,962.00	41.89	24.45	3,538.29	1,430.24	540.76	1,098.65	1.78	1.77	0.33
4,058.00	39.20	23.04	3,611.23	1,487.35	565.90	1,145.73	2.96	-2.80	-1.47
4,153.00	36.50	21.23	3,686.24	1,541.32	587.89	1,188.61	3.07	-2.84	-1.91
4,249.00	39.02	21.23	3,762.13	1,596.11	609.17	1,231.22	2.63	2.63	0.00
4,344.00	39.81	20.35	3,835.53	1,652.51	630.58	1,274.61	1.02	0.83	-0.93
4,439.00	36.28	17.44	3,910.34	1,707.86	649.59	1,315.39	4.17	-3.72	-3.06
4,535.00	36.19	19.47	3,987.77	1,761.68	667.55	1,354.57	1.25	-0.09	2.11
4,630.00	36.90	21.05	4,064.10	1,814.74	687.14	1,394.91	1.24	0.75	1.66
4,726.00	38.00	19.64	4,140.31	1,869.47	707.42	1,436.58	1.45	1.15	-1.47
4,821.00	38.80	22.07	4,214.76	1,924.60	728.44	1,479.08	1.80	0.84	2.56
4,917.00	40.30	23.83	4,288.79	1,980.88	752.28	1,524.64	1.95	1.56	1.83

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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)	
5,012.00	43.31	22.64	4,359.60	2,039.07	777.25	1,572.01	3.28	3.17	-1.25	
5,107.00	39.28	22.46	4,430.96	2,096.95	801.29	1,618.43	4.24	-4.24	-0.19	
5,203.00	39.28	21.23	4,505.27	2,153.37	823.90	1,662.93	0.81	0.00	-1.28	
5,323.00	38.71	15.77	4,598.56	2,224.91	847.86	1,715.09	2.90	-0.48	-4.55	
5,419.00	39.81	18.54	4,672.89	2,282.94	865.79	1,756.04	2.16	1.15	2.89	
5,514.00	38.80	14.84	4,746.41	2,340.55	883.09	1,796.23	2.69	-1.06	-3.89	
5,609.00	36.72	18.23	4,821.52	2,396.31	899.60	1,834.93	3.09	-2.19	3.57	
5,704.00	41.32	36.04	4,895.55	2,448.84	927.04	1,882.14	12.71	4.84	18.75	
5,800.00	46.18	52.03	4,965.09	2,495.95	973.16	1,943.93	12.55	5.06	16.66	
5,895.00	54.88	65.56	5,025.58	2,533.28	1,035.84	2,016.55	14.28	9.16	14.24	
5,991.00	65.49	75.26	5,073.33	2,560.77	1,114.18	2,099.13	14.09	11.05	10.10	
6,086.00	65.62	74.95	5,112.65	2,583.00	1,197.76	2,184.22	0.33	0.14	-0.33	
6,182.00	68.41	79.35	5,150.15	2,602.61	1,283.90	2,270.50	5.12	2.91	4.58	
6,215.57	69.99	81.05	5,162.07	2,607.95	1,314.82	2,300.75	6.66	4.69	5.06	
70° Inc. 6215.57 MD/5162.07 TVD 2607.96 N 1314.82 E N: 1363977.7 E: 3129493.2										
6,277.00	72.91	84.07	5,181.61	2,615.48	1,372.56	2,356.19	6.66	4.76	4.92	
6,282.54	73.17	84.36	5,183.23	2,616.01	1,377.83	2,361.18	6.87	4.64	5.29	
Cross 460' FWL 6282.54 MD/5183.23 TVD 2616.08 N 1377.83 E N: 1363986.1 E: 3129556.2										
6,373.00	77.42	89.05	5,206.20	2,621.00	1,465.13	2,442.29	6.87	4.70	5.18	
6,468.00	77.42	89.05	5,226.89	2,622.54	1,557.84	2,526.82	0.00	0.00	0.00	
6,564.00	76.98	88.26	5,248.16	2,624.73	1,651.43	2,612.42	0.92	-0.46	-0.82	
6,659.00	75.30	88.34	5,270.92	2,627.47	1,743.62	2,696.99	1.77	-1.77	0.08	
6,754.00	74.42	87.95	5,295.73	2,630.44	1,835.27	2,781.17	1.01	-0.93	-0.41	
6,850.00	75.52	87.86	5,320.63	2,633.83	1,927.92	2,866.43	1.15	1.15	-0.09	
6,946.00	77.99	88.34	5,342.62	2,636.92	2,021.31	2,952.24	2.62	2.57	0.50	
7,041.00	79.72	88.96	5,360.98	2,639.12	2,114.49	3,037.47	1.93	1.82	0.65	
7,137.00	80.60	88.83	5,377.39	2,640.94	2,209.06	3,123.80	0.93	0.92	-0.14	
7,232.00	80.91	89.05	5,392.65	2,642.68	2,302.81	3,209.35	0.40	0.33	0.23	
7,328.00	82.59	89.53	5,406.42	2,643.85	2,397.80	3,295.79	1.82	1.75	0.50	
7,424.00	82.81	89.14	5,418.62	2,644.96	2,493.02	3,382.40	0.46	0.23	-0.41	
7,519.00	82.41	88.56	5,430.84	2,646.85	2,587.21	3,468.42	0.74	-0.42	-0.61	
7,614.00	82.99	88.56	5,442.91	2,649.22	2,681.41	3,554.65	0.61	0.61	0.00	
7,709.00	83.92	87.95	5,453.74	2,652.09	2,775.75	3,641.22	1.17	0.98	-0.64	
7,804.00	84.80	87.15	5,463.08	2,656.13	2,870.20	3,728.39	1.25	0.93	-0.84	
7,900.00	80.78	89.36	5,475.13	2,659.04	2,965.37	3,815.73	4.77	-4.19	2.30	
7,995.00	79.50	88.43	5,491.39	2,660.84	3,058.95	3,901.15	1.66	-1.35	-0.98	
8,091.00	79.98	88.56	5,508.49	2,663.33	3,153.38	3,987.64	0.52	0.50	0.14	
8,186.00	81.22	89.67	5,524.01	2,664.77	3,247.09	4,073.03	1.74	1.31	1.17	
8,282.00	81.79	90.15	5,538.19	2,664.92	3,342.03	4,158.99	0.77	0.59	0.50	
8,378.00	78.30	89.36	5,554.78	2,665.32	3,436.57	4,244.69	3.72	-3.64	-0.82	
8,473.00	77.60	88.17	5,574.62	2,667.32	3,529.45	4,329.57	1.43	-0.74	-1.25	
8,569.00	77.91	87.64	5,594.98	2,670.75	3,623.21	4,415.84	0.63	0.32	-0.55	
8,664.00	78.79	87.64	5,614.16	2,674.58	3,716.17	4,501.58	0.93	0.93	0.00	
8,760.00	79.32	88.83	5,632.39	2,677.49	3,810.38	4,588.04	1.34	0.55	1.24	

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<b>Site:</b>	Berthoud Farms Pad KB 29	<b>MD Reference:</b>	KB=29 @ 5062.00ft
<b>Well:</b>	Berthoud Farms 8E-10-7N	<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)
8,855.00	79.41	89.14	5,649.92	2,679.14	3,903.73	4,673.20	0.33	0.09	0.33
8,950.00	77.11	90.94	5,669.25	2,679.08	3,996.73	4,757.31	3.05	-2.42	1.89
9,046.00	75.78	91.87	5,691.75	2,676.79	4,090.03	4,840.74	1.68	-1.39	0.97
9,141.00	74.19	89.93	5,716.36	2,675.35	4,181.77	4,923.11	2.59	-1.67	-2.04
9,237.00	71.01	88.43	5,745.07	2,676.65	4,273.35	5,006.52	3.63	-3.31	-1.56
9,332.00	75.30	86.36	5,772.60	2,680.80	4,364.15	5,090.44	4.97	4.52	-2.18
9,428.00	75.78	86.14	5,796.57	2,686.88	4,456.91	5,176.94	0.55	0.50	-0.23
9,523.00	76.01	85.66	5,819.72	2,693.47	4,548.81	5,262.89	0.55	0.24	-0.51
9,619.00	76.40	85.66	5,842.61	2,700.52	4,641.77	5,350.00	0.41	0.41	0.00
9,714.00	77.20	84.86	5,864.30	2,708.16	4,733.94	5,436.64	1.18	0.84	-0.84
9,810.00	76.18	88.83	5,886.41	2,713.31	4,827.20	5,523.20	4.16	-1.06	4.14
9,905.00	72.78	89.53	5,911.83	2,714.63	4,918.71	5,606.55	3.65	-3.58	0.74
10,001.00	72.51	89.36	5,940.47	2,715.51	5,010.34	5,689.82	0.33	-0.28	-0.18
10,096.00	72.69	89.75	5,968.87	2,716.22	5,100.99	5,772.13	0.44	0.19	0.41
10,192.00	71.50	90.24	5,998.39	2,716.23	5,192.34	5,854.77	1.33	-1.24	0.51
10,287.00	71.72	92.05	6,028.36	2,714.42	5,282.46	5,935.54	1.82	0.23	1.91
10,383.00	69.82	87.07	6,060.00	2,715.10	5,373.07	6,017.79	5.28	-1.98	-5.19
10,478.00	70.61	87.46	6,092.15	2,719.36	5,462.36	6,100.38	0.92	0.83	0.41
10,574.00	70.88	88.17	6,123.81	2,722.82	5,552.92	6,183.79	0.75	0.28	0.74
10,735.00	71.01	90.64	6,176.38	2,724.40	5,705.07	6,322.11	1.45	0.08	1.53
Last MWD Survey 10735 MD/6176.38 TVD 2724.4 N 5705.07 E N: 1364116.96 E: 3133882.88									
10,790.00	71.01	90.64	6,194.28	2,723.82	5,757.08	6,368.91	0.00	0.00	0.00
473' FEL PTB 10790 MD/6194.28 TVD 2723.82 N 5757.08 E N: 1364116.65 E: 3133934.89									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
123.00	123.00	0.08	0.05	1st MWD Survey
6,215.57	5,162.07	2,607.95	1,314.82	70° Inc. 6215.57 MD/5162.07 TVD 2607.96 N 1314.82 E N: 1363977.7 E: 3129.0
6,282.54	5,183.23	2,616.01	1,377.83	Cross 460' FWL 6282.54 MD/5183.23 TVD 2616.08 N 1377.83 E N: 1363986.1
10,735.00	6,176.38	2,724.40	5,705.07	Last MWD Survey 10735 MD/6176.38 TVD 2724.4 N 5705.07 E N: 1364116.96
10,790.00	6,194.28	2,723.82	5,757.08	473' FEL PTB 10790 MD/6194.28 TVD 2723.82 N 5757.08 E N: 1364116.65 E:

Checked By: _____	Approved By: _____	Date: _____
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