

Extraction Oil & Gas

Weld County, CO (NAD83)

Berthound Farms Pad KB 29

Berthoud Fams 8E-10-1N

Wellbore #1

Survey: Survey #1

Standard Survey Report

10 May, 2018

Survey Report

Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well Berthoud Fams 8E-10-1N
Project:	Weld County, CO (NAD83)	TVD Reference:	KB=29 @ 5062.00ft
Site:	Berthoud Farms Pad KB 29	MD Reference:	KB=29 @ 5062.00ft
Well:	Berthoud Fams 8E-10-1N	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Project	Weld County, CO (NAD83)		
Map System:	US State Plane 1983	System Datum:	Ground Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 Fams 8E-10-1N				
Well Position	+N/-S	0.00 ft	Northing:	1,361,362.99 usft	Latitude:	40.324429
	+E/-W	0.00 ft	Easting:	3,128,263.97 usft	Longitude:	-105.039975
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,033.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/7/2018	8.52	66.65	52,117

Design	Wellbore #1				
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	56.99	

Survey Program	Date	5/10/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
123.00	11,178.00	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
123.00	0.97	321.54	122.99	0.82	-0.65	-0.10	0.79	0.79	0.00
1st MWD Survey									
218.00	1.85	356.70	217.97	2.98	-1.24	0.58	1.26	0.93	37.01
314.00	5.19	5.75	313.77	8.84	-0.89	4.07	3.52	3.48	9.43
409.00	7.08	27.46	408.24	18.32	2.24	11.86	3.12	1.99	22.85
503.00	9.36	13.93	501.27	30.88	6.75	22.48	3.17	2.43	-14.39
599.00	10.28	13.40	595.87	46.79	10.62	34.39	0.96	0.96	-0.55
694.00	10.77	12.96	689.27	63.69	14.57	46.91	0.52	0.52	-0.46
788.00	12.52	10.23	781.33	82.27	18.35	60.21	1.95	1.86	-2.90
883.00	14.94	9.18	873.61	104.50	22.14	75.49	2.56	2.55	-1.11

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Well:	Berthoud Fams 8E-10-1N	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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	16.74	8.56	965.00	130.12	26.13	92.79	1.90	1.89	-0.65
1,074.00	19.82	11.46	1,056.14	159.75	31.42	113.37	3.34	3.21	3.02
1,169.00	20.57	14.10	1,145.30	191.72	38.68	136.88	1.24	0.79	2.78
1,265.00	21.88	16.30	1,234.79	225.25	47.81	162.80	1.60	1.36	2.29
1,360.00	25.62	13.93	1,321.73	262.19	57.73	191.24	4.06	3.94	-2.49
1,454.00	27.42	12.34	1,405.84	303.06	67.25	221.49	2.06	1.91	-1.69
1,504.00	27.60	12.08	1,450.19	325.63	72.13	237.88	0.43	0.36	-0.52
1,576.00	28.28	12.15	1,513.79	358.62	79.21	261.79	0.95	0.94	0.10
1,672.00	35.62	15.46	1,595.20	407.86	91.47	298.89	7.86	7.65	3.45
1,767.00	36.90	15.77	1,671.80	461.98	106.60	341.05	1.36	1.35	0.33
1,863.00	36.19	18.37	1,748.93	516.61	123.36	384.88	1.77	-0.74	2.71
1,958.00	40.79	14.84	1,823.28	573.26	140.16	429.82	5.36	4.84	-3.72
2,054.00	41.01	14.27	1,895.84	634.10	155.96	476.21	0.45	0.23	-0.59
2,149.00	40.52	13.17	1,967.79	694.36	170.67	521.38	0.92	-0.52	-1.16
2,245.00	39.42	11.53	2,041.37	754.60	183.87	565.26	1.59	-1.15	-1.71
2,340.00	42.29	12.77	2,113.22	815.33	196.97	609.33	3.14	3.02	1.31
2,436.00	41.80	11.76	2,184.51	878.16	210.63	655.01	0.87	-0.51	-1.05
2,531.00	44.72	15.15	2,253.69	941.44	225.82	702.22	3.93	3.07	3.57
2,626.00	47.28	14.36	2,319.68	1,007.52	243.21	752.80	2.76	2.69	-0.83
2,722.00	46.40	13.43	2,385.35	1,075.49	260.03	803.94	1.16	-0.92	-0.97
2,817.00	45.52	12.55	2,451.39	1,142.03	275.39	853.06	1.14	-0.93	-0.93
2,912.00	44.90	10.83	2,518.32	1,208.05	289.05	900.48	1.44	-0.65	-1.81
3,008.00	45.12	13.96	2,586.20	1,274.34	303.62	948.82	2.32	0.23	3.26
3,103.00	45.21	13.96	2,653.18	1,339.72	319.88	998.06	0.09	0.09	0.00
3,198.00	45.21	13.25	2,720.11	1,405.25	335.74	1,047.06	0.53	0.00	-0.75
3,294.00	43.88	11.67	2,788.53	1,471.00	350.27	1,095.06	1.80	-1.39	-1.65
3,389.00	41.80	9.33	2,858.19	1,534.49	362.07	1,139.55	2.76	-2.19	-2.46
3,485.00	42.51	12.77	2,929.37	1,597.70	374.43	1,184.34	2.52	0.74	3.58
3,580.00	43.48	18.63	2,998.88	1,660.01	391.97	1,232.99	4.33	1.02	6.17
3,676.00	46.18	19.55	3,066.96	1,723.95	414.11	1,286.40	2.89	2.81	0.96
3,771.00	44.32	17.35	3,133.84	1,787.94	435.48	1,339.17	2.56	-1.96	-2.32
3,866.00	46.49	18.37	3,200.53	1,852.31	456.24	1,391.65	2.41	2.28	1.07
3,962.00	47.28	19.95	3,266.15	1,918.50	479.24	1,447.00	1.46	0.82	1.65
4,057.00	45.29	17.66	3,331.80	1,983.48	501.40	1,500.97	2.72	-2.09	-2.41
4,152.00	46.40	16.56	3,397.98	2,048.63	521.44	1,553.27	1.43	1.17	-1.16
4,248.00	47.19	16.65	3,463.70	2,115.68	541.44	1,606.57	0.83	0.82	0.09
4,343.00	45.29	15.94	3,529.40	2,181.53	560.70	1,658.59	2.07	-2.00	-0.75
4,438.00	46.80	15.54	3,595.34	2,247.36	579.24	1,710.00	1.62	1.59	-0.42
4,534.00	45.21	14.84	3,662.02	2,314.00	597.34	1,761.48	1.74	-1.66	-0.73
4,629.00	48.70	13.56	3,726.86	2,381.30	614.35	1,812.41	3.80	3.67	-1.35
4,725.00	46.89	13.43	3,791.34	2,450.45	630.95	1,863.99	1.89	-1.89	-0.14
4,820.00	44.59	12.24	3,857.64	2,516.77	646.07	1,912.81	2.58	-2.42	-1.25
4,916.00	46.40	13.34	3,924.93	2,583.53	661.24	1,961.89	2.05	1.89	1.15

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Survey										
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5,011.00	43.88	12.06	3,991.94	2,649.21	676.06	2,010.10	2.82	-2.65	-1.35	
5,107.00	45.60	14.75	4,060.13	2,714.93	691.74	2,059.05	2.66	1.79	2.80	
5,202.00	43.31	13.17	4,127.94	2,779.48	707.81	2,107.69	2.68	-2.41	-1.66	
5,321.00	46.00	18.23	4,212.61	2,859.91	730.51	2,170.54	3.75	2.26	4.25	
5,417.00	43.22	15.46	4,280.96	2,924.41	750.08	2,222.09	3.53	-2.90	-2.89	
5,512.00	43.61	15.46	4,349.96	2,987.34	767.48	2,270.96	0.41	0.41	0.00	
5,607.00	45.21	15.94	4,417.82	3,051.33	785.47	2,320.91	1.72	1.68	0.51	
5,703.00	42.51	12.46	4,487.05	3,115.78	801.83	2,369.74	3.77	-2.81	-3.63	
5,798.00	44.98	16.03	4,555.68	3,179.41	818.04	2,417.99	3.68	2.60	3.76	
5,894.00	44.72	18.14	4,623.75	3,244.12	837.92	2,469.92	1.57	-0.27	2.20	
5,989.00	43.08	15.15	4,692.20	3,307.21	856.81	2,520.12	2.78	-1.73	-3.15	
6,084.00	46.09	24.67	4,759.93	3,369.71	879.60	2,573.28	7.71	3.17	10.02	
6,180.00	54.40	36.83	4,821.41	3,432.62	917.58	2,639.40	13.00	8.66	12.67	
6,276.00	55.02	47.23	4,876.97	3,490.67	969.95	2,714.94	8.86	0.65	10.83	
6,371.00	60.32	64.37	4,928.03	3,535.22	1,036.12	2,794.70	16.21	5.58	18.04	
6,466.00	65.49	71.64	4,971.33	3,566.74	1,114.49	2,877.59	8.72	5.44	7.65	
6,562.00	68.01	74.55	5,009.23	3,592.36	1,198.87	2,962.31	3.83	2.63	3.03	
6,625.02	69.92	81.97	5,031.87	3,604.30	1,256.41	3,017.06	11.40	3.03	11.77	
70° Inc. 6625.02 MD/5031.87 TVD 3604.30 N 1256.41 E N: 1364973.7 E: 3129501.6										
6,657.00	71.01	85.66	5,042.57	3,607.54	1,286.36	3,043.95	11.40	3.40	11.54	
6,673.18	71.46	86.20	5,047.78	3,608.63	1,301.65	3,057.36	4.22	2.79	3.34	
Cross 460' FWL 6673.18 MD/5047.78 TVD 3608.63 N 1301.65 E N: 1364978.3 E: 3129546.8										
6,753.00	73.71	88.83	5,071.67	3,611.92	1,377.72	3,122.95	4.22	2.82	3.29	
6,848.00	77.20	90.06	5,095.52	3,612.80	1,469.66	3,200.53	3.88	3.67	1.29	
6,944.00	75.78	89.53	5,117.95	3,613.13	1,563.00	3,278.98	1.57	-1.48	-0.55	
7,039.00	77.60	91.03	5,139.82	3,612.68	1,655.44	3,356.26	2.46	1.92	1.58	
7,135.00	76.40	90.77	5,161.41	3,611.21	1,748.97	3,433.89	1.28	-1.25	-0.27	
7,231.00	80.12	91.87	5,180.94	3,609.04	1,842.91	3,511.49	4.03	3.88	1.15	
7,326.00	84.49	88.96	5,193.66	3,608.37	1,937.02	3,590.04	5.51	4.60	-3.06	
7,422.00	81.49	85.44	5,205.38	3,613.01	2,032.17	3,672.36	4.80	-3.13	-3.67	
7,517.00	85.02	87.86	5,216.54	3,618.52	2,126.33	3,754.32	4.49	3.72	2.55	
7,613.00	84.89	87.95	5,224.98	3,622.01	2,221.89	3,836.36	0.16	-0.14	0.09	
7,707.00	84.80	87.55	5,233.43	3,625.69	2,315.44	3,916.82	0.43	-0.10	-0.43	
7,802.00	84.89	86.45	5,241.96	3,630.64	2,409.92	3,998.75	1.16	0.09	-1.16	
7,898.00	85.20	86.93	5,250.26	3,636.16	2,505.40	4,081.83	0.59	0.32	0.50	
7,994.00	85.42	86.36	5,258.11	3,641.76	2,600.92	4,164.97	0.63	0.23	-0.59	
8,089.00	85.59	86.14	5,265.55	3,647.95	2,695.42	4,247.60	0.29	0.18	-0.23	
8,185.00	85.68	85.74	5,272.86	3,654.73	2,790.90	4,331.36	0.43	0.09	-0.42	
8,280.00	86.39	85.44	5,279.43	3,662.02	2,885.39	4,414.57	0.81	0.75	-0.32	
8,376.00	84.18	88.74	5,287.32	3,666.88	2,980.93	4,497.33	4.13	-2.30	3.44	
8,471.00	84.40	87.95	5,296.77	3,669.61	3,075.41	4,578.06	0.86	0.23	-0.83	
8,567.00	79.01	87.86	5,310.62	3,673.08	3,170.31	4,659.53	5.62	-5.61	-0.09	
8,662.00	78.61	87.55	5,329.05	3,676.81	3,263.43	4,739.65	0.53	-0.42	-0.33	
8,758.00	78.61	87.46	5,348.01	3,680.91	3,357.45	4,820.73	0.09	0.00	-0.09	

Survey Report

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Well:	Berthoud Fams 8E-10-1N	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

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8,853.00	78.88	87.64	5,366.55	3,684.89	3,450.54	4,900.96	0.34	0.28	0.19
8,948.00	78.61	86.14	5,385.10	3,689.95	3,543.57	4,981.73	1.57	-0.28	-1.58
9,044.00	76.09	87.64	5,406.12	3,695.03	3,637.09	5,062.93	3.04	-2.63	1.56
9,139.00	74.59	90.55	5,430.17	3,696.49	3,728.97	5,140.78	3.36	-1.58	3.06
9,235.00	74.50	90.24	5,455.75	3,695.86	3,821.50	5,218.02	0.33	-0.09	-0.32
9,331.00	72.60	90.24	5,482.93	3,695.47	3,913.57	5,295.02	1.98	-1.98	0.00
9,426.00	72.21	89.75	5,511.65	3,695.48	4,004.12	5,370.96	0.64	-0.41	-0.52
9,521.00	71.50	89.67	5,541.23	3,695.93	4,094.40	5,446.91	0.75	-0.75	-0.08
9,617.00	73.22	91.74	5,570.33	3,694.80	4,185.86	5,523.00	2.73	1.79	2.16
9,712.00	76.89	90.06	5,594.82	3,693.37	4,277.62	5,599.17	4.22	3.86	-1.77
9,808.00	75.92	88.65	5,617.39	3,694.42	4,370.92	5,677.98	1.75	-1.01	-1.47
9,903.00	75.61	89.67	5,640.75	3,695.77	4,462.99	5,755.93	1.09	-0.33	1.07
9,999.00	73.00	90.55	5,666.72	3,695.60	4,555.40	5,833.33	2.86	-2.72	0.92
10,095.00	69.82	91.43	5,697.32	3,694.03	4,646.37	5,908.76	3.42	-3.31	0.92
10,190.00	68.71	91.96	5,730.95	3,691.40	4,735.18	5,981.80	1.28	-1.17	0.56
10,285.00	67.52	92.35	5,766.36	3,688.09	4,823.27	6,053.87	1.31	-1.25	0.41
10,381.00	69.91	90.37	5,801.21	3,685.98	4,912.68	6,127.70	3.14	2.49	-2.06
10,476.00	70.31	90.86	5,833.53	3,685.02	5,002.01	6,202.09	0.64	0.42	0.52
10,572.00	71.19	91.74	5,865.19	3,682.96	5,092.61	6,276.95	1.26	0.92	0.92
10,667.00	73.00	89.05	5,894.40	3,682.35	5,183.00	6,352.41	3.30	1.91	-2.83
10,763.00	72.60	87.07	5,922.79	3,685.45	5,274.65	6,430.96	2.01	-0.42	-2.06
10,858.00	71.41	87.15	5,952.13	3,690.01	5,364.88	6,509.11	1.26	-1.25	0.08
10,954.00	70.70	87.15	5,983.30	3,694.52	5,455.57	6,587.62	0.74	-0.74	0.00
11,049.00	71.01	85.83	6,014.46	3,700.02	5,545.14	6,665.73	1.35	0.33	-1.39
Last MWD Survey 11049 MD/6014.46 TVD 3700.02 N 5545.14 E N: 1365091.7 E: 3133789.3									
11,178.00	71.01	85.83	6,056.44	3,708.89	5,666.80	6,772.59	0.00	0.00	0.00
488' FEL PTB 11178 MD/6056.44 TVD 3708.89 N 5666.8 E N: 1365101.2 E: 3133911.4									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
123.00	122.99	0.82	-0.65	1st MWD Survey
6,625.02	5,031.87	3,604.30	1,256.41	70° Inc. 6625.02 MD/5031.87 TVD 3604.30 N 1256.41 E N: 1364973.7 E: 3129.3
6,673.18	5,047.78	3,608.63	1,301.65	Cross 460' FWL 6673.18 MD/5047.78 TVD 3608.63 N 1301.65 E N: 1364978.3
11,049.00	6,014.46	3,700.02	5,545.14	Last MWD Survey 11049 MD/6014.46 TVD 3700.02 N 5545.14 E N: 1365091.7
11,178.00	6,056.44	3,708.89	5,666.80	488' FEL PTB 11178 MD/6056.44 TVD 3708.89 N 5666.8 E N: 1365101.2 E: 31

Checked By: _____ Approved By: _____ Date: _____