

# **Extraction Oil & Gas**

**Weld County, CO (NAD83)  
Sec 09-T05N-R65W Ash Pad  
MT Fed Heath 8W-20-12**

**Wellbore #1**

**Design: Wellbore #1**

## **Standard Survey Report**

**02 July, 2019**

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well MT Fed Heath 8W-20-12
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Site:</b>	Sec 09-T05N-R65W Ash Pad	<b>MD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Well:</b>	MT Fed Heath 8W-20-12	<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 5000.15 Single User Db

<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	Sec 09-T05N-R65W Ash Pad				
Site Position:		Northing:	1,396,398.96 usft	Latitude:	40.418560
From:	Lat/Long	Easting:	3,230,631.97 usft	Longitude:	-104.671670
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.54 °

Well	MT Fed Heath 8W-20-12					
Well Position	+N/-S	0.00 usft	Northing:	1,396,220.47 usft	Latitude:	40.418070
	+E/-W	0.00 usft	Easting:	3,230,636.42 usft	Longitude:	-104.671660
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,635.00 usft

<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>
	IGRF2000	12/31/2018	8.07	66.87	52,193.30000000

<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	265.54	

<b>Survey Program</b>	<b>Date</b>	7/2/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
121.00	1,529.00	Surface Surveys (Wellbore #1)	MWD	MWD - Standard	
1,658.00	17,365.00	Atlas MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</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	
121.00	1.45	190.22	120.99	-1.51	-0.27	0.39	1.20	1.20	0.00	
215.00	0.04	88.18	214.98	-2.68	-0.45	0.66	1.55	-1.50	-108.55	
310.00	0.62	26.56	309.98	-2.22	-0.19	0.36	0.63	0.61	-64.86	
405.00	1.05	67.17	404.97	-1.42	0.85	-0.73	0.74	0.45	42.75	
500.00	1.36	64.36	499.94	-0.59	2.66	-2.61	0.33	0.33	-2.96	
595.00	0.48	299.20	594.94	0.09	3.33	-3.33	1.77	-0.93	-131.75	
690.00	0.35	250.86	689.93	0.19	2.71	-2.72	0.38	-0.14	-50.88	
785.00	0.26	17.07	784.93	0.30	2.50	-2.52	0.57	-0.09	132.85	
880.00	0.83	12.15	879.93	1.18	2.71	-2.79	0.60	0.60	-5.18	

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<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Site:</b>	Sec 09-T05N-R65W Ash Pad	<b>MD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Well:</b>	MT Fed Heath 8W-20-12	<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 5000.15 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
975.00	1.23	350.71	974.91	2.86	2.69	-2.90	0.58	0.42	-22.57
1,071.00	0.88	258.86	1,070.90	3.73	1.80	-2.08	1.60	-0.36	-95.68
1,166.00	0.57	320.12	1,165.90	3.95	0.78	-1.09	0.83	-0.33	64.48
1,261.00	1.54	153.57	1,260.89	3.17	1.05	-1.29	2.21	1.02	-175.32
1,356.00	0.66	193.38	1,355.87	1.50	1.49	-1.60	1.17	-0.93	41.91
1,451.00	1.05	233.20	1,450.86	0.44	0.66	-0.70	0.72	0.41	41.92
1,529.00	2.11	257.72	1,528.83	-0.29	-1.31	1.33	1.58	1.36	31.44
Tie into Surface Surveys									
1,658.00	3.31	247.40	1,657.68	-2.23	-7.07	7.22	1.00	0.93	-8.00
First MWD Survey @ 1658' MD									
1,753.00	6.67	238.59	1,752.31	-6.16	-14.31	14.75	3.62	3.54	-9.27
1,847.00	8.62	237.48	1,845.47	-12.79	-24.91	25.83	2.08	2.07	-1.18
1,943.00	10.91	231.89	1,940.08	-22.27	-38.13	39.75	2.58	2.39	-5.82
2,037.00	12.33	229.29	2,032.15	-34.30	-52.74	55.25	1.61	1.51	-2.77
2,133.00	14.32	231.84	2,125.56	-48.32	-69.84	73.39	2.16	2.07	2.66
2,227.00	16.53	229.29	2,216.17	-64.23	-89.12	93.85	2.46	2.35	-2.71
2,322.00	17.50	230.92	2,307.01	-82.05	-110.46	116.50	1.14	1.02	1.72
2,417.00	19.09	233.47	2,397.21	-100.30	-134.03	141.42	1.87	1.67	2.68
2,512.00	22.01	234.27	2,486.15	-119.95	-160.97	169.81	3.09	3.07	0.84
2,607.00	23.51	231.67	2,573.76	-142.10	-190.29	200.76	1.90	1.58	-2.74
2,702.00	26.51	231.76	2,659.84	-166.98	-221.81	234.12	3.16	3.16	0.09
2,797.00	29.25	231.54	2,743.80	-194.54	-256.64	270.99	2.89	2.88	-0.23
2,892.00	31.77	230.52	2,825.64	-224.89	-294.13	310.72	2.71	2.65	-1.07
2,987.00	31.73	229.77	2,906.43	-256.92	-332.50	351.47	0.42	-0.04	-0.79
3,082.00	32.13	231.27	2,987.05	-288.86	-371.28	392.62	0.94	0.42	1.58
3,177.00	33.50	230.92	3,066.89	-321.20	-411.34	435.07	1.46	1.44	-0.37
3,272.00	33.72	230.96	3,146.01	-354.33	-452.18	478.36	0.23	0.23	0.04
3,367.00	34.91	232.20	3,224.48	-387.60	-494.14	522.78	1.45	1.25	1.31
3,462.00	33.14	232.86	3,303.21	-419.95	-536.32	567.35	1.90	-1.86	0.69
3,557.00	33.50	229.91	3,382.60	-452.51	-577.08	610.52	1.75	0.38	-3.11
3,651.00	35.44	230.13	3,460.09	-486.69	-617.85	653.82	2.07	2.06	0.23
3,746.00	34.38	227.97	3,538.00	-522.31	-658.91	697.53	1.71	-1.12	-2.27
3,841.00	35.22	229.29	3,616.01	-558.13	-699.60	740.88	1.19	0.88	1.39
3,937.00	35.57	229.33	3,694.26	-594.38	-741.76	785.73	0.37	0.36	0.04
4,031.00	35.62	228.98	3,770.70	-630.17	-783.15	829.78	0.22	0.05	-0.37
4,126.00	36.10	228.14	3,847.69	-667.00	-824.87	874.24	0.72	0.51	-0.88
4,221.00	35.66	228.01	3,924.66	-704.20	-866.30	918.43	0.47	-0.46	-0.14
4,316.00	32.66	227.66	4,003.27	-740.00	-905.83	960.63	3.16	-3.16	-0.37
4,410.00	34.69	230.74	4,081.49	-774.02	-945.30	1,002.62	2.82	2.16	3.28
4,506.00	35.62	232.95	4,159.99	-808.15	-988.77	1,048.61	1.64	0.97	2.30
4,599.00	35.48	232.81	4,235.65	-840.78	-1,031.88	1,094.13	0.17	-0.15	-0.15
4,694.00	35.40	231.32	4,313.05	-874.64	-1,075.33	1,140.08	0.91	-0.08	-1.57
4,789.00	36.28	232.28	4,390.06	-909.04	-1,119.04	1,186.34	1.10	0.93	1.01

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<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.15 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,885.00	34.91	231.93	4,468.12	-943.36	-1,163.14	1,232.97	1.44	-1.43	-0.36
4,980.00	32.83	233.78	4,547.00	-975.34	-1,205.32	1,277.51	2.44	-2.19	1.95
5,075.00	32.48	230.65	4,626.99	-1,006.73	-1,245.82	1,320.33	1.82	-0.37	-3.29
5,170.00	32.74	229.77	4,707.02	-1,039.50	-1,285.16	1,362.09	0.57	0.27	-0.93
5,264.00	28.63	227.08	4,787.84	-1,071.26	-1,321.08	1,400.37	4.61	-4.37	-2.86
5,360.00	29.87	227.00	4,871.60	-1,103.23	-1,355.40	1,437.08	1.29	1.29	-0.08
5,455.00	30.93	230.65	4,953.54	-1,134.85	-1,391.59	1,475.61	2.24	1.12	3.84
5,572.00	27.80	228.72	5,055.50	-1,171.92	-1,435.35	1,522.13	2.79	-2.68	-1.65
5,668.00	27.57	231.80	5,140.51	-1,200.43	-1,469.64	1,558.53	1.51	-0.24	3.21
5,763.00	25.01	227.75	5,225.69	-1,227.54	-1,501.79	1,592.69	3.29	-2.69	-4.26
5,858.00	22.32	232.64	5,312.70	-1,251.99	-1,531.00	1,623.71	3.50	-2.83	5.15
5,953.00	19.93	230.30	5,401.31	-1,273.29	-1,557.80	1,652.09	2.67	-2.52	-2.46
6,048.00	16.79	234.27	5,491.47	-1,291.65	-1,581.40	1,677.05	3.56	-3.31	4.18
6,143.00	14.80	234.84	5,582.87	-1,306.65	-1,602.46	1,699.21	2.10	-2.09	0.60
6,238.00	10.87	232.86	5,675.48	-1,319.05	-1,619.53	1,717.19	4.16	-4.14	-2.08
6,333.00	7.25	231.27	5,769.28	-1,328.21	-1,631.35	1,729.69	3.82	-3.81	-1.67
6,428.00	5.21	228.80	5,863.72	-1,334.80	-1,639.27	1,738.10	2.17	-2.15	-2.60
6,522.00	3.05	227.26	5,957.47	-1,339.31	-1,644.32	1,743.48	2.30	-2.30	-1.64
6,618.00	0.97	154.07	6,053.41	-1,341.78	-1,645.84	1,745.19	3.04	-2.17	-76.24
6,713.00	0.53	355.72	6,148.41	-1,342.06	-1,645.52	1,744.89	1.55	-0.46	-166.68
6,807.00	0.75	330.20	6,242.40	-1,341.09	-1,645.86	1,745.16	0.38	0.23	-27.15
6,902.00	6.67	269.65	6,337.17	-1,340.59	-1,651.69	1,750.93	6.67	6.23	-63.74
6,997.00	18.07	272.47	6,429.82	-1,339.98	-1,672.00	1,771.13	12.01	12.00	2.97
7,093.00	25.01	273.00	6,519.06	-1,338.28	-1,707.18	1,806.07	7.23	7.23	0.55
7,163.54	30.00	274.96	6,581.61	-1,335.97	-1,739.66	1,838.27	7.18	7.07	2.78
<b>30° Inclination @ 7163.54' MD</b>									
7,188.00	31.73	275.51	6,602.60	-1,334.83	-1,752.15	1,850.64	7.18	7.09	2.24
7,192.45	32.16	275.27	6,606.38	-1,334.60	-1,754.50	1,852.96	10.13	9.73	-5.33
<b>Cross @ 7192.45' MD</b>									
7,283.00	41.05	271.42	6,679.00	-1,331.65	-1,808.34	1,906.40	10.13	9.81	-4.25
7,378.00	49.58	271.68	6,745.75	-1,329.81	-1,875.79	1,973.51	8.98	8.98	0.27
7,473.00	55.94	273.58	6,803.21	-1,326.29	-1,951.30	2,048.51	6.88	6.69	2.00
7,568.00	63.81	275.43	6,850.86	-1,319.79	-2,033.14	2,129.60	8.45	8.28	1.95
7,631.10	69.99	272.98	6,875.60	-1,315.56	-2,090.99	2,186.95	10.43	9.80	-3.89
<b>70° Inclination @ 7631.10' MD</b>									
7,663.00	73.13	271.81	6,885.69	-1,314.30	-2,121.22	2,216.99	10.43	9.84	-3.65
7,758.00	79.32	272.25	6,908.30	-1,311.03	-2,213.39	2,308.62	6.53	6.52	0.46
7,853.00	86.48	273.00	6,920.04	-1,306.71	-2,307.50	2,402.11	7.58	7.54	0.79
7,949.00	88.60	272.43	6,924.16	-1,302.17	-2,403.30	2,497.27	2.29	2.21	-0.59
8,044.00	89.35	271.46	6,925.86	-1,298.95	-2,498.22	2,591.66	1.29	0.79	-1.02
8,139.00	90.01	270.89	6,926.39	-1,297.00	-2,593.20	2,686.20	0.92	0.69	-0.60
8,235.00	89.17	274.24	6,927.07	-1,292.70	-2,689.09	2,781.46	3.60	-0.88	3.49
8,330.00	89.44	273.75	6,928.23	-1,286.09	-2,783.85	2,875.42	0.59	0.28	-0.52
8,425.00	89.97	273.53	6,928.72	-1,280.05	-2,878.66	2,969.47	0.60	0.56	-0.23

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8,520.00	90.63	273.09	6,928.22	-1,274.57	-2,973.50	3,063.60	0.83	0.69	-0.46
8,615.00	89.13	273.36	6,928.42	-1,269.22	-3,068.34	3,157.74	1.60	-1.58	0.28
8,710.00	90.59	273.62	6,928.65	-1,263.44	-3,163.16	3,251.83	1.56	1.54	0.27
8,805.00	88.86	273.66	6,929.10	-1,257.41	-3,257.97	3,345.87	1.82	-1.82	0.04
8,900.00	89.79	274.10	6,930.22	-1,250.98	-3,352.74	3,439.86	1.08	0.98	0.46
8,995.00	89.97	273.97	6,930.42	-1,244.30	-3,447.51	3,533.82	0.23	0.19	-0.14
9,091.00	91.52	275.03	6,929.17	-1,236.77	-3,543.20	3,628.63	1.96	1.61	1.10
9,185.00	89.35	273.84	6,928.46	-1,229.50	-3,636.91	3,721.49	2.63	-2.31	-1.27
9,280.00	89.31	273.31	6,929.57	-1,223.58	-3,731.71	3,815.56	0.56	-0.04	-0.56
9,375.00	89.35	272.65	6,930.68	-1,218.64	-3,826.58	3,909.75	0.70	0.04	-0.69
9,470.00	88.86	271.68	6,932.17	-1,215.05	-3,921.50	4,004.10	1.14	-0.52	-1.02
9,566.00	88.56	271.15	6,934.33	-1,212.68	-4,017.44	4,099.57	0.63	-0.31	-0.55
9,660.00	88.91	271.28	6,936.40	-1,210.69	-4,111.40	4,193.09	0.40	0.37	0.14
9,755.00	90.54	271.20	6,936.86	-1,208.63	-4,206.37	4,287.61	1.72	1.72	-0.08
9,851.00	90.46	270.40	6,936.02	-1,207.29	-4,302.36	4,383.21	0.84	-0.08	-0.83
9,946.00	90.77	270.58	6,935.00	-1,206.48	-4,397.35	4,477.85	0.38	0.33	0.19
10,041.00	90.46	269.70	6,933.98	-1,206.25	-4,492.34	4,572.53	0.98	-0.33	-0.93
10,136.00	90.68	269.92	6,933.04	-1,206.56	-4,587.34	4,667.27	0.33	0.23	0.23
10,231.00	90.32	269.79	6,932.21	-1,206.80	-4,682.33	4,761.99	0.40	-0.38	-0.14
10,326.00	90.68	269.79	6,931.38	-1,207.15	-4,777.33	4,856.73	0.38	0.38	0.00
10,421.00	90.23	270.89	6,930.62	-1,206.59	-4,872.32	4,951.39	1.25	-0.47	1.16
10,517.00	89.26	272.47	6,931.05	-1,203.77	-4,968.28	5,046.83	1.93	-1.01	1.65
10,612.00	88.78	271.81	6,932.68	-1,200.22	-5,063.20	5,141.19	0.86	-0.51	-0.69
10,707.00	88.86	273.58	6,934.63	-1,195.76	-5,158.07	5,235.43	1.86	0.08	1.86
10,803.00	90.41	272.83	6,935.24	-1,190.39	-5,253.91	5,330.56	1.79	1.61	-0.78
10,898.00	89.13	271.95	6,935.63	-1,186.43	-5,348.83	5,424.88	1.64	-1.35	-0.93
10,993.00	91.52	272.30	6,935.09	-1,182.91	-5,443.75	5,519.25	2.54	2.52	0.37
11,088.00	91.91	271.99	6,932.24	-1,179.35	-5,538.64	5,613.57	0.52	0.41	-0.33
11,183.00	89.97	272.52	6,930.69	-1,175.62	-5,633.55	5,707.90	2.12	-2.04	0.56
11,278.00	90.01	272.25	6,930.70	-1,171.66	-5,728.47	5,802.23	0.29	0.04	-0.28
11,373.00	89.62	271.50	6,931.01	-1,168.56	-5,823.42	5,896.65	0.89	-0.41	-0.79
11,468.00	88.42	270.89	6,932.63	-1,166.57	-5,918.38	5,991.17	1.42	-1.26	-0.64
11,562.00	88.03	271.42	6,935.55	-1,164.68	-6,012.31	6,084.67	0.70	-0.41	0.56
11,657.00	88.60	271.37	6,938.34	-1,162.37	-6,107.24	6,179.13	0.60	0.60	-0.05
11,752.00	88.11	271.28	6,941.07	-1,160.17	-6,202.18	6,273.61	0.52	-0.52	-0.09
11,847.00	89.44	273.75	6,943.10	-1,156.01	-6,297.06	6,367.88	2.95	1.40	2.60
11,942.00	89.00	273.14	6,944.39	-1,150.30	-6,391.88	6,461.97	0.79	-0.46	-0.64
12,037.00	90.06	272.78	6,945.17	-1,145.39	-6,486.74	6,556.17	1.18	1.12	-0.38
12,133.00	91.21	273.09	6,944.11	-1,140.48	-6,582.61	6,651.36	1.24	1.20	0.32
12,228.00	90.90	272.43	6,942.36	-1,135.90	-6,677.48	6,745.59	0.77	-0.33	-0.69
12,322.00	91.03	271.81	6,940.77	-1,132.43	-6,771.41	6,838.96	0.67	0.14	-0.66
12,417.00	89.84	272.21	6,940.05	-1,129.09	-6,866.34	6,933.35	1.32	-1.25	0.42
12,512.00	90.19	271.90	6,940.03	-1,125.69	-6,961.28	7,027.73	0.49	0.37	-0.33

# Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well MT Fed Heath 8W-20-12
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Site:</b>	Sec 09-T05N-R65W Ash Pad	<b>MD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Well:</b>	MT Fed Heath 8W-20-12	<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 5000.15 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,569.74	90.24	271.07	6,939.81	-1,124.19	-7,019.00	7,085.16	1.43	0.09	-1.43	
<b>Cross @ 12569.74' MD</b>										
12,607.00	90.28	270.54	6,939.64	-1,123.67	-7,056.26	7,122.26	1.43	0.09	-1.43	
12,702.00	90.90	274.94	6,938.66	-1,119.13	-7,151.12	7,216.49	4.68	0.65	4.63	
12,797.00	88.78	274.55	6,938.92	-1,111.27	-7,245.79	7,310.26	2.27	-2.23	-0.41	
12,892.00	88.60	273.58	6,941.10	-1,104.53	-7,340.52	7,404.18	1.04	-0.19	-1.02	
12,987.00	90.50	273.66	6,941.84	-1,098.54	-7,435.33	7,498.23	2.00	2.00	0.08	
13,083.00	90.59	273.58	6,940.93	-1,092.48	-7,531.13	7,593.28	0.13	0.09	-0.08	
13,178.00	90.28	273.09	6,940.21	-1,086.95	-7,625.97	7,687.39	0.61	-0.33	-0.52	
13,273.00	90.01	271.95	6,939.97	-1,082.77	-7,720.87	7,781.69	1.23	-0.28	-1.20	
13,368.00	90.46	271.46	6,939.58	-1,079.95	-7,815.83	7,876.14	0.70	0.47	-0.52	
13,463.00	90.85	271.20	6,938.49	-1,077.74	-7,910.80	7,970.65	0.49	0.41	-0.27	
13,558.00	90.99	273.97	6,936.97	-1,073.46	-8,005.68	8,064.91	2.92	0.15	2.92	
13,653.00	88.95	273.88	6,937.02	-1,066.96	-8,100.45	8,158.89	2.15	-2.15	-0.09	
13,748.00	88.56	272.61	6,939.08	-1,061.58	-8,195.27	8,253.01	1.40	-0.41	-1.34	
13,843.00	89.04	272.56	6,941.07	-1,057.30	-8,290.16	8,347.27	0.51	0.51	-0.05	
13,939.00	88.64	271.28	6,943.01	-1,054.08	-8,386.08	8,442.65	1.40	-0.42	-1.33	
14,033.00	89.04	271.11	6,944.92	-1,052.12	-8,480.04	8,536.17	0.46	0.43	-0.18	
14,128.00	89.84	273.14	6,945.84	-1,048.60	-8,574.97	8,630.54	2.30	0.84	2.14	
14,223.00	89.13	272.34	6,946.70	-1,044.06	-8,669.85	8,724.78	1.13	-0.75	-0.84	
14,318.00	90.90	272.91	6,946.67	-1,039.71	-8,764.75	8,819.05	1.96	1.86	0.60	
14,413.00	89.75	271.20	6,946.13	-1,036.30	-8,859.68	8,913.43	2.17	-1.21	-1.80	
14,509.00	90.94	271.86	6,945.56	-1,033.74	-8,955.64	9,008.91	1.42	1.24	0.69	
14,604.00	90.81	272.17	6,944.11	-1,030.40	-9,050.57	9,103.29	0.35	-0.14	0.33	
14,699.00	90.72	272.21	6,942.84	-1,026.77	-9,145.49	9,197.64	0.10	-0.09	0.04	
14,794.00	89.84	270.98	6,942.37	-1,024.12	-9,240.45	9,292.11	1.59	-0.93	-1.29	
14,889.00	91.69	274.24	6,941.10	-1,019.80	-9,335.33	9,386.36	3.95	1.95	3.43	
14,985.00	91.30	273.49	6,938.60	-1,013.33	-9,431.08	9,481.32	0.88	-0.41	-0.78	
15,080.00	91.16	273.00	6,936.56	-1,007.95	-9,525.90	9,575.44	0.54	-0.15	-0.52	
15,176.00	91.07	272.34	6,934.69	-1,003.48	-9,621.78	9,670.68	0.69	-0.09	-0.69	
15,271.00	90.59	272.03	6,933.32	-999.86	-9,716.70	9,765.03	0.60	-0.51	-0.33	
15,366.00	90.15	271.68	6,932.70	-996.79	-9,811.65	9,859.45	0.59	-0.46	-0.37	
15,461.00	89.93	271.99	6,932.64	-993.74	-9,906.60	9,953.88	0.40	-0.23	0.33	
15,556.00	89.79	271.24	6,932.87	-991.07	-10,001.56	10,048.34	0.80	-0.15	-0.79	
15,651.00	90.85	275.29	6,932.34	-985.66	-10,096.38	10,142.46	4.41	1.12	4.26	
15,746.00	90.63	274.81	6,931.11	-977.29	-10,191.01	10,236.14	0.56	-0.23	-0.51	
15,841.00	90.23	273.93	6,930.40	-970.06	-10,285.73	10,330.01	1.02	-0.42	-0.93	
15,936.00	90.54	273.93	6,929.76	-963.55	-10,380.50	10,423.99	0.33	0.33	0.00	
16,032.00	89.93	272.43	6,929.37	-958.22	-10,476.35	10,519.14	1.69	-0.64	-1.56	
16,126.00	89.93	272.78	6,929.48	-953.95	-10,570.25	10,612.43	0.37	0.00	0.37	
16,221.00	89.57	272.21	6,929.90	-949.81	-10,665.16	10,706.72	0.71	-0.38	-0.60	
16,316.00	89.31	272.34	6,930.82	-946.04	-10,760.08	10,801.06	0.31	-0.27	0.14	
16,411.00	89.53	272.25	6,931.79	-942.24	-10,855.00	10,895.40	0.25	0.23	-0.09	
16,507.00	89.66	271.95	6,932.46	-938.72	-10,950.93	10,990.77	0.34	0.14	-0.31	

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well MT Fed Heath 8W-20-12
<b>Project:</b>	Weld County, CO (NAD83)	<b>TVD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Site:</b>	Sec 09-T05N-R65W Ash Pad	<b>MD Reference:</b>	kb @ 4660.00usft (Patterson 340)
<b>Well:</b>	MT Fed Heath 8W-20-12	<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 5000.15 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,602.00	89.40	271.81	6,933.24	-935.60	-11,045.88	11,085.19	0.31	-0.27	-0.15
16,697.00	90.19	273.18	6,933.58	-931.47	-11,140.79	11,179.48	1.66	0.83	1.44
16,792.00	90.01	271.50	6,933.42	-927.59	-11,235.70	11,273.81	1.78	-0.19	-1.77
16,887.00	89.88	271.77	6,933.51	-924.88	-11,330.66	11,368.27	0.32	-0.14	0.28
16,981.00	90.37	271.06	6,933.30	-922.56	-11,424.63	11,461.78	0.92	0.52	-0.76
17,077.00	90.37	271.37	6,932.68	-920.52	-11,520.61	11,557.31	0.32	0.00	0.32
17,172.00	90.10	269.79	6,932.29	-919.56	-11,615.60	11,651.94	1.69	-0.28	-1.66
17,266.00	90.37	269.52	6,931.91	-920.13	-11,709.60	11,745.69	0.41	0.29	-0.29
<b>Last MWD Survey @ 17266' MD</b>									
17,365.00	90.37	269.52	6,931.27	-920.96	-11,808.59	11,844.45	0.00	0.00	0.00
<b>Projection to TD @ 17365' MD 2658' FNL/ 508' FWL</b>									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
30° Inclination @ 7163.5	0.00	0.00	6,581.61	-1,336.00	-1,739.67	1,394,868.28	3,228,909.31	40.414403	-104.677908
- actual wellpath misses target center by 0.03usft at 7163.54usft MD (6581.61 TVD, -1335.97 N, -1739.66 E)									
- Point									
Cross @ 7192.45' MD	0.00	0.00	6,606.38	-1,334.60	-1,754.50	1,394,869.54	3,228,894.47	40.414406	-104.677961
- actual wellpath hits target center									
- Point									
70° Inclination @ 7631.1	0.00	0.00	6,875.60	-1,315.54	-2,090.99	1,394,885.46	3,228,557.82	40.414459	-104.679170
- actual wellpath misses target center by 0.03usft at 7631.10usft MD (6875.60 TVD, -1315.56 N, -2090.99 E)									
- Point									
Cross @ 12569.74' MD	0.00	0.00	6,939.81	-1,124.19	-7,019.00	1,395,030.76	3,223,628.23	40.414981	-104.696868
- actual wellpath hits target center									
- Point									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,529.00	1,528.83	-0.29	-1.31	Tie into Surface Surveys	
1,658.00	1,657.68	-2.23	-7.07	First MWD Survey @ 1658' MD	
7,163.54	6,581.61	-1,335.97	-1,739.66	30° Inclination @ 7163.54' MD	
7,192.45	6,606.38	-1,334.60	-1,754.50	Cross @ 7192.45' MD	
7,631.10	6,875.60	-1,315.56	-2,090.99	70° Inclination @ 7631.10' MD	
12,569.74	6,939.81	-1,124.19	-7,019.00	Cross @ 12569.74' MD	
17,266.00	6,931.91	-920.13	-11,709.60	Last MWD Survey @ 17266' MD	
17,365.00	6,931.27	-920.96	-11,808.59	Projection to TD @ 17365' MD 2658' FNL/ 508' FWL	

Checked By: _____	Approved By: _____	Date: _____
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