



Extraction Oil & Gas

Weld County, CO (NAD83)

MLD Pad

MLD 8

Wellbore #1

Design: Wellbore #1

Standard Survey Report

21 September, 2017





Integrity Directional Services, LLC

Survey Report



Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well MLD 8
Project:	Weld County, CO (NAD83)	TVD Reference:	KB=25' @ 4901.00ft (P 346)
Site:	MLD Pad	MD Reference:	KB=25' @ 4901.00ft (P 346)
Well:	MLD 8	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

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	MLD Pad		
Site Position:		Northing:	1,350,393.7900 usft
From:	Map	Easting:	3,140,798.8300 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	40.294131
		Longitude:	-104.995243
		Grid Convergence:	0.33 °

Well	MLD 8		
Well Position	+N/-S	0.00 ft	Northing: 1,353,975.8800 usft
	+E/-W	0.00 ft	Easting: 3,140,409.1600 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	40.303970
		Longitude:	-104.996567
		Ground Level:	4,876.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/15/2017	8.60	66.68	52,218

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	93.30	

Survey Program	Date	9/21/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
600.50	1,546.50	Surface Surveys (Wellbore #1)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,653.00	11,284.00	MWD Surveys (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	
600.50	1.58	244.84	600.42	-3.52	-7.49	-7.28	0.26	0.26	0.00	
696.50	1.63	202.04	696.39	-5.35	-9.20	-8.88	1.22	0.05	-44.58	
792.50	0.79	187.98	792.37	-7.27	-9.81	-9.37	0.92	-0.88	-14.65	
887.50	1.10	199.58	887.35	-8.78	-10.20	-9.68	0.38	0.33	12.21	
983.50	0.53	134.63	983.35	-9.96	-10.20	-9.61	1.04	-0.59	-67.66	
1,079.50	0.66	168.47	1,079.34	-10.81	-9.77	-9.13	0.38	0.14	35.25	
1,175.50	0.13	291.16	1,175.34	-11.31	-9.76	-9.09	0.77	-0.55	127.80	
1,270.50	0.44	311.73	1,270.34	-11.03	-10.13	-9.48	0.34	0.33	21.65	
1,366.50	1.19	305.22	1,366.33	-10.21	-11.22	-10.62	0.79	0.78	-6.78	

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Well:	MLD 8	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

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)
1,492.50	1.10	271.47	1,492.30	-9.43	-13.50	-12.94	0.53	-0.07	-26.79
1,546.50	1.19	256.80	1,546.29	-9.54	-14.57	-13.99	0.57	0.17	-27.17
1,653.00	1.81	251.10	1,652.76	-10.34	-17.23	-16.61	0.60	0.58	-5.35
First MWD Survey @ 1653									
1,747.00	3.31	262.12	1,746.66	-11.19	-21.33	-20.65	1.67	1.60	11.72
1,841.00	5.48	270.58	1,840.38	-11.52	-28.50	-27.79	2.40	2.31	9.00
1,935.00	7.38	259.61	1,933.79	-12.56	-38.93	-38.14	2.40	2.02	-11.67
2,029.00	9.50	254.32	2,026.77	-15.75	-52.34	-51.35	2.40	2.26	-5.63
2,123.00	11.09	251.59	2,119.25	-20.70	-68.39	-67.08	1.77	1.69	-2.90
2,218.00	12.81	247.62	2,212.19	-27.59	-86.80	-85.06	2.01	1.81	-4.18
2,311.00	14.10	243.39	2,302.64	-36.59	-106.46	-104.18	1.74	1.39	-4.55
2,406.00	13.30	243.30	2,394.93	-46.69	-126.57	-123.67	0.84	-0.84	-0.09
2,500.00	13.92	244.71	2,486.29	-56.38	-146.45	-142.96	0.75	0.66	1.50
2,595.00	13.08	244.71	2,578.67	-65.85	-166.50	-162.43	0.88	-0.88	0.00
2,689.00	13.08	247.62	2,670.23	-74.44	-185.96	-181.36	0.70	0.00	3.10
2,784.00	13.79	247.49	2,762.63	-82.87	-206.36	-201.24	0.75	0.75	-0.14
2,878.00	14.49	247.62	2,853.78	-91.64	-227.58	-221.92	0.75	0.74	0.14
2,972.00	13.52	246.92	2,944.99	-100.42	-248.56	-242.37	1.05	-1.03	-0.74
3,067.00	13.08	246.78	3,037.44	-109.02	-268.66	-261.93	0.46	-0.46	-0.15
3,161.00	12.90	245.90	3,129.03	-117.49	-288.01	-280.77	0.28	-0.19	-0.94
3,256.00	12.51	245.02	3,221.71	-126.17	-307.02	-299.24	0.46	-0.41	-0.93
3,350.00	12.99	247.89	3,313.39	-134.44	-326.03	-317.75	0.85	0.51	3.05
3,444.00	13.52	248.68	3,404.88	-142.42	-346.06	-337.28	0.60	0.56	0.84
3,538.00	12.99	248.50	3,496.38	-150.28	-366.12	-356.86	0.57	-0.56	-0.19
3,633.00	13.52	248.50	3,588.85	-158.27	-386.39	-376.63	0.56	0.56	0.00
3,727.00	14.32	244.32	3,680.09	-167.33	-407.09	-396.78	1.37	0.85	-4.45
3,821.00	13.39	244.80	3,771.35	-177.00	-427.42	-416.51	1.00	-0.99	0.51
3,915.00	14.01	243.08	3,862.68	-186.79	-447.41	-435.91	0.79	0.66	-1.83
4,010.00	13.39	242.29	3,954.98	-197.11	-467.40	-455.27	0.68	-0.65	-0.83
4,105.00	13.92	244.89	4,047.29	-207.07	-487.49	-474.75	0.85	0.56	2.74
4,199.00	12.99	245.02	4,138.71	-216.33	-507.30	-494.00	0.99	-0.99	0.14
4,293.00	12.90	252.38	4,230.33	-223.97	-526.88	-513.11	1.76	-0.10	7.83
4,388.00	12.10	253.31	4,323.07	-230.04	-546.53	-532.37	0.87	-0.84	0.98
4,481.00	13.21	253.00	4,413.81	-235.95	-566.02	-551.50	1.20	1.19	-0.33
4,575.00	12.20	254.01	4,505.51	-241.83	-585.84	-570.94	1.10	-1.07	1.07
4,669.00	12.90	246.39	4,597.27	-248.76	-605.01	-589.68	1.91	0.74	-8.11
4,763.00	11.49	248.59	4,689.15	-256.38	-623.34	-607.54	1.58	-1.50	2.34
4,857.00	12.11	241.50	4,781.17	-264.51	-640.72	-624.42	1.68	0.66	-7.54
4,952.00	11.09	244.01	4,874.23	-273.27	-657.69	-640.86	1.20	-1.07	2.64
5,046.00	9.72	249.52	4,966.68	-280.00	-673.25	-656.01	1.80	-1.46	5.86
5,140.00	9.59	247.31	5,059.35	-285.80	-687.91	-670.31	0.42	-0.14	-2.35
5,234.00	8.79	253.31	5,152.14	-290.89	-702.02	-684.10	1.33	-0.85	6.38
5,328.00	7.29	243.48	5,245.22	-295.61	-714.23	-696.02	2.16	-1.60	-10.46

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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)
5,421.00	5.70	230.39	5,337.63	-301.19	-723.07	-704.52	2.33	-1.71	-14.08
5,515.00	2.70	252.12	5,431.37	-304.85	-728.78	-710.01	3.56	-3.19	23.12
5,609.00	1.50	252.82	5,525.30	-305.89	-732.06	-713.23	1.28	-1.28	0.74
5,703.00	0.49	35.48	5,619.29	-305.93	-733.00	-714.17	2.03	-1.07	151.77
5,796.00	1.10	243.70	5,712.29	-306.00	-733.57	-714.73	1.67	0.66	-163.20
5,890.00	1.59	46.32	5,806.28	-305.50	-733.44	-714.62	2.83	0.52	173.00
6,008.00	4.29	13.09	5,924.12	-300.07	-731.25	-712.76	2.61	2.29	-28.16
6,102.00	11.31	65.09	6,017.28	-292.74	-722.08	-704.02	9.89	7.47	55.32
6,195.00	18.69	71.31	6,107.06	-284.12	-699.66	-682.13	8.11	7.94	6.69
6,289.00	25.10	83.12	6,194.27	-276.89	-665.55	-648.49	8.24	6.82	12.56
6,384.00	33.01	87.48	6,277.26	-273.33	-619.61	-602.84	8.61	8.33	4.59
6,478.00	40.21	92.50	6,352.68	-273.53	-563.63	-546.94	8.29	7.66	5.34
6,573.00	48.08	94.31	6,420.80	-277.53	-497.64	-480.83	8.39	8.28	1.91
6,667.00	57.09	91.01	6,477.87	-280.86	-423.15	-406.27	9.98	9.59	-3.51
6,759.00	66.11	91.01	6,521.58	-282.29	-342.32	-325.49	9.80	9.80	0.00
6,853.00	76.80	91.71	6,551.43	-284.42	-253.36	-236.56	11.39	11.37	0.74
6,938.61	88.79	92.22	6,562.15	-287.33	-168.63	-151.80	14.01	14.00	0.60
Hardline Crossing Point @ 6938.61'MD /-151.80'VS_ (1087' FNL & 460' FWL)									
6,948.00	90.10	92.28	6,562.24	-287.70	-159.25	-142.41	14.01	14.00	0.59
7,042.00	92.49	92.90	6,560.12	-291.95	-65.37	-48.45	2.63	2.54	0.66
7,136.00	93.02	91.49	6,555.60	-295.54	28.45	45.42	1.60	0.56	-1.50
7,231.00	92.18	89.90	6,551.29	-296.69	123.34	140.22	1.89	-0.88	-1.67
7,325.00	90.59	89.99	6,549.02	-296.60	217.31	234.03	1.69	-1.69	0.10
7,419.00	89.62	89.82	6,548.85	-296.45	311.30	327.86	1.05	-1.03	-0.18
7,513.00	90.10	89.51	6,549.08	-295.90	405.30	421.67	0.61	0.51	-0.33
7,607.00	89.79	88.98	6,549.17	-294.66	499.29	515.44	0.65	-0.33	-0.56
7,701.00	89.48	88.80	6,549.77	-292.84	593.27	609.16	0.38	-0.33	-0.19
7,795.00	89.00	88.49	6,551.01	-290.62	687.24	702.84	0.61	-0.51	-0.33
7,890.00	89.22	88.32	6,552.49	-287.97	782.19	797.48	0.29	0.23	-0.18
7,984.00	90.72	88.10	6,552.54	-285.04	876.14	891.10	1.61	1.60	-0.23
8,078.00	90.90	87.48	6,551.21	-281.41	970.06	984.66	0.69	0.19	-0.66
8,172.00	89.62	88.98	6,550.78	-278.51	1,064.01	1,078.29	2.10	-1.36	1.60
8,267.00	88.60	88.98	6,552.26	-276.82	1,158.98	1,173.00	1.07	-1.07	0.00
8,361.00	85.99	88.19	6,556.69	-274.50	1,252.84	1,266.57	2.90	-2.78	-0.84
8,455.00	84.71	89.60	6,564.31	-272.69	1,346.51	1,359.98	2.02	-1.36	1.50
8,644.00	83.52	89.20	6,583.69	-270.72	1,534.50	1,547.55	0.66	-0.63	-0.21
8,738.00	84.80	88.71	6,593.26	-269.02	1,627.99	1,640.79	1.46	1.36	-0.52
8,832.00	86.70	89.11	6,600.22	-267.24	1,721.71	1,734.25	2.07	2.02	0.43
8,926.00	86.70	88.98	6,605.63	-265.67	1,815.55	1,827.83	0.14	0.00	-0.14
9,021.00	86.79	88.71	6,611.03	-263.76	1,910.37	1,922.39	0.30	0.09	-0.28
9,115.00	87.19	87.79	6,615.96	-260.89	2,004.20	2,015.90	1.07	0.43	-0.98
9,209.00	87.80	88.89	6,620.07	-258.17	2,098.07	2,109.45	1.34	0.65	1.17
9,303.00	87.80	90.21	6,623.68	-257.43	2,191.99	2,203.18	1.40	0.00	1.40
9,397.00	88.38	90.21	6,626.81	-257.78	2,285.94	2,296.99	0.62	0.62	0.00

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Site:	MLD Pad	MD Reference:	KB=25' @ 4901.00ft (P 346)
Well:	MLD 8	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

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)
9,491.00	86.08	91.40	6,631.36	-259.10	2,379.81	2,390.79	2.75	-2.45	1.27
9,585.00	85.99	91.49	6,637.86	-261.46	2,473.56	2,484.51	0.14	-0.10	0.10
9,680.00	86.08	91.71	6,644.43	-264.11	2,568.29	2,579.24	0.25	0.09	0.23
9,774.00	85.90	92.20	6,651.00	-267.31	2,662.01	2,672.99	0.55	-0.19	0.52
9,868.00	85.42	89.99	6,658.11	-269.10	2,755.72	2,766.64	2.40	-0.51	-2.35
9,963.00	83.78	89.90	6,667.05	-269.01	2,850.29	2,861.05	1.73	-1.73	-0.09
10,057.00	85.99	88.49	6,675.43	-267.69	2,943.90	2,954.43	2.79	2.35	-1.50
10,151.00	88.11	87.30	6,680.27	-264.24	3,037.70	3,047.88	2.59	2.26	-1.27
10,246.00	88.91	88.19	6,682.74	-260.51	3,132.60	3,142.40	1.26	0.84	0.94
10,340.00	87.98	88.32	6,685.29	-257.64	3,226.52	3,236.00	1.00	-0.99	0.14
10,434.00	89.31	89.51	6,687.52	-255.86	3,320.47	3,329.70	1.90	1.41	1.27
10,528.00	91.30	89.60	6,687.01	-255.13	3,414.46	3,423.49	2.12	2.12	0.10
10,623.00	92.40	89.29	6,683.95	-254.22	3,509.41	3,518.22	1.20	1.16	-0.33
10,717.00	90.19	88.41	6,681.82	-252.33	3,603.36	3,611.91	2.53	-2.35	-0.94
10,811.00	89.62	88.10	6,681.98	-249.47	3,697.31	3,705.54	0.69	-0.61	-0.33
10,904.00	90.19	88.41	6,682.13	-246.63	3,790.27	3,798.18	0.70	0.61	0.33
10,999.00	90.01	88.10	6,681.97	-243.74	3,885.22	3,892.81	0.38	-0.19	-0.33
11,093.00	91.38	88.80	6,680.83	-241.20	3,979.18	3,986.47	1.64	1.46	0.74
11,187.00	91.30	88.19	6,678.63	-238.73	4,073.12	4,080.11	0.65	-0.09	-0.65
Final MWD Survey @ 11187'MD									
11,284.00	91.30	88.19	6,676.43	-235.67	4,170.05	4,176.70	0.00	0.00	0.00
PTD @ 11284'MD / 4176.70'VS_ (1114.6'FNL & 522' FEL)									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,653.00	1,652.76	-10.34	-17.23	First MWD Survey @ 1653
6,938.61	6,562.15	-287.33	-168.63	Hardline Crossing Point @ 6938.61'MD /-151.80'VS_ (1087' FNL & 460
11,187.00	6,678.63	-238.73	4,073.12	Final MWD Survey @ 11187'MD
11,284.00	6,676.43	-235.67	4,170.05	PTD @ 11284'MD / 4176.70'VS_ (1114.6'FNL & 522' FEL)

Checked By: _____ Approved By: _____ Date: _____