

# **Extraction Oil & Gas**

**Adams County (NAD 83)**

**Sec 12-T01S-R66W**

**Duck Club 12W-20-5C**

**Wellbore #1**

**Design: Wellbore #1**

## **Standard Survey Report**

**17 December, 2018**

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well Duck Club 12W-20-5C
<b>Project:</b>	Adams County (NAD 83)	<b>TVD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Site:</b>	Sec 12-T01S-R66W	<b>MD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Well:</b>	Duck Club 12W-20-5C	<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>	Adams County (NAD 83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		Sec 12-T01S-R66W			
Site Position:		Northing:	1,239,018.46 usft	Latitude:	39.98694
From:	Map	Easting:	3,214,796.41 usft	Longitude:	-104.73343
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.50 °

Well		Duck Club 12W-20-5C				
Well Position	+N/-S	0.00 usft	Northing:	1,236,182.64 usft	Latitude:	39.97914
	+E/-W	0.00 usft	Easting:	3,215,515.32 usft	Longitude:	-104.73095
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,037.00 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>
	HDGM	11/6/2018	8.20	66.32	51,945

<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	276.04	

<b>Survey Program</b>	<b>Date</b>	12/17/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
129.00	1,588.00	Surface Surveys (Wellbore #1)	MWD	MWD - Standard	
1,663.00	17,921.00	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	
129.00	0.70	142.31	129.00	-0.62	0.48	-0.54	0.54	0.54	0.00	
<b>First Surface Surveys</b>										
225.00	0.70	133.08	224.99	-1.49	1.27	-1.42	0.12	0.00	-9.61	
320.00	0.66	147.41	319.98	-2.35	1.99	-2.22	0.18	-0.04	15.08	
415.00	0.22	183.79	414.98	-2.99	2.27	-2.57	0.53	-0.46	38.29	
510.00	0.09	278.01	509.98	-3.16	2.18	-2.50	0.26	-0.14	99.18	
604.00	0.13	243.73	603.98	-3.20	2.02	-2.34	0.08	0.04	-36.47	
699.00	0.13	157.95	698.98	-3.34	1.96	-2.30	0.19	0.00	-90.29	
795.00	0.22	120.86	794.98	-3.54	2.16	-2.52	0.15	0.09	-38.64	

# Survey Report

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<b>Site:</b>	Sec 12-T01S-R66W	<b>MD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Well:</b>	Duck Club 12W-20-5C	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
890.00	0.31	52.75	889.98	-3.48	2.52	-2.87	0.32	0.09	-71.69	
985.00	1.93	46.95	984.96	-2.23	3.89	-4.11	1.71	1.71	-6.11	
1,080.00	3.25	51.96	1,079.86	0.52	7.18	-7.09	1.41	1.39	5.27	
1,175.00	5.36	56.00	1,174.58	4.66	12.98	-12.42	2.24	2.22	4.25	
1,270.00	8.21	70.50	1,268.92	9.41	23.06	-21.94	3.48	3.00	15.26	
1,364.00	9.05	75.25	1,361.85	13.53	36.53	-34.91	1.17	0.89	5.05	
1,459.00	11.43	74.63	1,455.33	17.93	52.84	-50.66	2.51	2.51	-0.65	
1,555.00	12.79	71.55	1,549.20	23.81	72.09	-69.19	1.57	1.42	-3.21	
1,588.00	13.23	69.80	1,581.35	26.27	79.10	-75.90	1.79	1.33	-5.30	
Last Surface Surveys - Tie into Surface Surveys										
1,663.00	13.70	70.86	1,654.29	32.15	95.55	-91.63	0.71	0.63	1.41	
First MWD Survey @ 1663.00' MD										
1,758.00	16.57	76.86	1,745.99	38.92	119.37	-114.62	3.44	3.02	6.32	
1,854.00	19.89	76.72	1,837.16	45.78	148.60	-142.96	3.46	3.46	-0.15	
1,950.00	23.82	77.47	1,926.24	53.74	183.44	-176.77	4.10	4.09	0.78	
2,046.00	27.09	70.73	2,012.93	65.17	223.01	-214.92	4.55	3.41	-7.02	
2,141.00	26.60	69.06	2,097.69	79.91	263.30	-253.43	0.95	-0.52	-1.76	
2,237.00	25.90	68.26	2,183.79	95.36	302.85	-291.14	0.82	-0.73	-0.83	
2,333.00	24.92	68.79	2,270.50	110.44	341.18	-327.67	1.05	-1.02	0.55	
2,429.00	23.95	66.90	2,357.90	125.40	377.96	-362.67	1.30	-1.01	-1.97	
2,524.00	26.43	69.41	2,443.86	140.41	415.49	-398.42	2.84	2.61	2.64	
2,619.00	25.19	67.65	2,529.39	155.53	453.98	-435.11	1.53	-1.31	-1.85	
2,715.00	25.50	69.32	2,616.15	170.60	492.21	-471.54	0.81	0.32	1.74	
2,810.00	23.86	68.66	2,702.47	184.81	529.24	-506.87	1.75	-1.73	-0.69	
2,906.00	25.59	73.24	2,789.67	197.86	567.19	-543.23	2.69	1.80	4.77	
3,001.00	24.79	75.53	2,875.64	208.75	606.12	-580.80	1.33	-0.84	2.41	
3,097.00	25.36	69.94	2,962.60	220.83	644.92	-618.12	2.54	0.59	-5.82	
3,192.00	23.24	69.85	3,049.18	234.27	681.63	-653.21	2.23	-2.23	-0.09	
3,288.00	24.53	65.05	3,136.97	249.20	717.49	-687.29	2.43	1.34	-5.00	
3,383.00	27.31	71.00	3,222.42	264.62	755.99	-723.96	4.00	2.93	6.26	
3,479.00	25.32	70.25	3,308.46	278.73	796.13	-762.40	2.10	-2.07	-0.78	
3,574.00	22.58	70.38	3,395.28	291.72	832.44	-797.14	2.88	-2.88	0.14	
3,669.00	24.75	67.65	3,482.28	305.41	868.02	-831.08	2.56	2.28	-2.87	
3,765.00	25.98	70.56	3,569.03	320.05	906.43	-867.74	1.82	1.28	3.03	
3,860.00	24.22	68.66	3,655.06	334.07	944.21	-903.84	2.04	-1.85	-2.00	
3,956.00	24.75	70.29	3,742.43	348.01	981.47	-939.42	0.89	0.55	1.70	
4,051.00	22.67	72.93	3,829.40	360.09	1,017.70	-974.18	2.46	-2.19	2.78	
4,146.00	24.61	69.32	3,916.43	372.46	1,053.71	-1,008.69	2.55	2.04	-3.80	
4,242.00	28.63	71.57	4,002.24	386.79	1,094.25	-1,047.50	4.32	4.19	2.34	
4,337.00	25.41	72.80	4,086.86	400.02	1,135.32	-1,086.95	3.44	-3.39	1.29	
4,432.00	26.87	67.65	4,172.15	414.21	1,174.66	-1,124.57	2.84	1.54	-5.42	
4,528.00	24.39	66.24	4,258.70	430.45	1,212.87	-1,160.87	2.66	-2.58	-1.47	
4,623.00	25.14	62.05	4,344.97	447.81	1,248.65	-1,194.62	2.01	0.79	-4.41	

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Survey										
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4,719.00	24.26	69.45	4,432.21	464.30	1,285.14	-1,229.18	3.35	-0.92	7.71	
4,814.00	21.92	67.07	4,519.59	478.06	1,319.75	-1,262.15	2.65	-2.46	-2.51	
4,909.00	24.97	67.43	4,606.74	492.67	1,354.61	-1,295.27	3.21	3.21	0.38	
5,005.00	22.14	67.25	4,694.73	507.44	1,390.01	-1,328.92	2.95	-2.95	-0.19	
5,100.00	23.07	63.64	4,782.44	522.63	1,423.20	-1,360.33	1.76	0.98	-3.80	
5,196.00	24.26	62.18	4,870.36	540.19	1,457.49	-1,392.59	1.38	1.24	-1.52	
5,292.00	25.54	64.34	4,957.44	558.35	1,493.59	-1,426.58	1.64	1.33	2.25	
5,387.00	29.12	68.13	5,041.83	575.84	1,533.52	-1,464.45	4.19	3.77	3.99	
5,482.00	28.37	66.90	5,125.12	593.31	1,575.73	-1,504.59	1.01	-0.79	-1.29	
5,578.00	25.10	64.43	5,210.85	611.05	1,615.09	-1,541.86	3.60	-3.41	-2.57	
5,674.00	25.63	62.98	5,297.60	629.27	1,651.96	-1,576.61	0.85	0.55	-1.51	
5,769.00	24.26	64.03	5,383.73	647.15	1,687.81	-1,610.38	1.52	-1.44	1.11	
5,865.00	23.51	68.31	5,471.52	662.87	1,723.33	-1,644.05	1.97	-0.78	4.46	
5,960.00	26.82	74.79	5,557.50	675.50	1,761.64	-1,680.82	4.53	3.48	6.82	
6,056.00	26.20	75.40	5,643.41	686.52	1,803.05	-1,720.84	0.71	-0.65	0.64	
6,175.00	26.25	76.64	5,750.16	699.22	1,854.07	-1,770.24	0.46	0.04	1.04	
6,270.00	23.46	74.96	5,836.36	708.99	1,892.78	-1,807.71	3.03	-2.94	-1.77	
6,366.00	22.54	77.21	5,924.72	718.02	1,929.18	-1,842.96	1.33	-0.96	2.34	
6,461.00	18.56	74.08	6,013.66	726.20	1,961.49	-1,874.23	4.34	-4.19	-3.29	
6,556.00	14.85	72.10	6,104.64	734.09	1,987.62	-1,899.39	3.95	-3.91	-2.08	
6,652.00	14.63	65.05	6,197.49	742.99	2,010.32	-1,921.03	1.88	-0.23	-7.34	
6,748.00	11.49	63.95	6,290.99	752.30	2,029.91	-1,939.52	3.28	-3.27	-1.15	
6,843.00	12.02	55.48	6,384.01	762.07	2,046.56	-1,955.06	1.90	0.56	-8.92	
6,938.00	9.41	50.86	6,477.34	772.58	2,060.74	-1,968.05	2.89	-2.75	-4.86	
7,034.00	6.01	62.80	6,572.47	779.83	2,071.30	-1,977.79	3.90	-3.54	12.44	
7,129.00	1.99	87.26	6,667.22	782.18	2,077.38	-1,983.58	4.50	-4.23	25.75	
7,225.00	1.46	263.39	6,763.21	782.12	2,077.83	-1,984.04	3.59	-0.55	183.47	
7,321.00	2.34	277.10	6,859.15	782.22	2,074.67	-1,980.88	1.03	0.92	14.28	
7,417.00	3.18	285.12	6,955.04	783.16	2,070.15	-1,976.29	0.96	0.88	8.35	
7,512.00	11.98	277.36	7,049.12	785.11	2,057.80	-1,963.81	9.30	9.26	-8.17	
7,608.00	21.34	275.47	7,140.99	788.06	2,030.47	-1,936.32	9.77	9.75	-1.97	
7,703.00	27.62	268.07	7,227.43	788.97	1,991.21	-1,897.18	7.34	6.61	-7.79	
7,799.00	35.26	265.47	7,309.28	786.03	1,941.27	-1,847.83	8.08	7.96	-2.71	
7,894.00	44.01	268.15	7,382.37	782.79	1,880.83	-1,788.06	9.38	9.21	2.82	
7,990.00	50.86	269.26	7,447.27	781.23	1,810.18	-1,717.97	7.19	7.14	1.16	
8,085.00	60.98	272.78	7,500.45	782.77	1,731.64	-1,639.70	11.08	10.65	3.71	
8,180.00	71.45	271.99	7,538.71	786.36	1,644.90	-1,553.07	11.05	11.02	-0.83	
8,276.00	77.95	270.71	7,564.03	788.53	1,552.38	-1,460.83	6.89	6.77	-1.33	
8,347.42	85.82	270.01	7,574.10	788.96	1,481.73	-1,390.53	11.06	11.02	-0.98	
LP Duck Club 12W-20-5C										
8,371.00	88.42	269.78	7,575.29	788.92	1,458.19	-1,367.12	11.06	11.02	-0.96	
8,467.00	88.56	269.56	7,577.82	788.37	1,362.22	-1,271.74	0.27	0.15	-0.23	
8,562.00	88.69	269.12	7,580.09	787.27	1,267.25	-1,177.42	0.48	0.14	-0.46	
8,657.00	90.37	268.02	7,580.87	784.90	1,172.29	-1,083.23	2.11	1.77	-1.16	

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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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,753.00	91.56	267.58	7,579.26	781.22	1,076.38	-988.24	1.32	1.24	-0.46
8,848.00	90.06	269.21	7,577.91	778.56	981.43	-894.10	2.33	-1.58	1.72
8,944.00	90.37	268.37	7,577.55	776.53	885.45	-798.87	0.93	0.32	-0.88
9,039.00	89.88	272.12	7,577.35	776.94	790.47	-704.37	3.98	-0.52	3.95
9,134.00	90.10	271.41	7,577.36	779.86	695.52	-609.63	0.78	0.23	-0.75
9,230.00	90.54	270.89	7,576.83	781.79	599.54	-513.99	0.71	0.46	-0.54
9,325.00	89.26	270.22	7,576.99	782.71	504.55	-419.42	1.52	-1.35	-0.71
9,421.00	89.93	269.61	7,577.67	782.57	408.55	-323.97	0.94	0.70	-0.64
9,516.00	87.67	270.58	7,579.66	782.72	313.58	-229.51	2.59	-2.38	1.02
9,612.00	88.25	270.45	7,583.08	783.59	217.64	-134.02	0.62	0.60	-0.14
9,707.00	89.57	271.37	7,584.89	785.10	122.68	-39.42	1.69	1.39	0.97
9,803.00	91.34	271.24	7,584.12	787.28	26.71	56.25	1.85	1.84	-0.14
9,898.00	88.38	270.58	7,584.36	788.79	-68.27	150.86	3.19	-3.12	-0.69
9,994.00	88.69	270.53	7,586.81	789.72	-164.23	246.39	0.33	0.32	-0.05
10,089.00	88.64	270.93	7,589.02	790.93	-259.20	340.95	0.42	-0.05	0.42
10,185.00	88.91	270.84	7,591.08	792.41	-355.17	436.54	0.30	0.28	-0.09
10,281.00	89.75	270.93	7,592.20	793.90	-451.15	532.15	0.88	0.88	0.09
10,376.00	90.46	270.75	7,592.02	795.29	-546.14	626.76	0.77	0.75	-0.19
10,472.00	91.30	270.40	7,590.55	796.25	-642.12	722.31	0.95	0.88	-0.36
10,567.00	89.44	270.31	7,589.94	796.84	-737.11	816.83	1.96	-1.96	-0.09
10,662.00	89.66	269.92	7,590.68	797.03	-832.11	911.32	0.47	0.23	-0.41
10,758.00	90.19	269.61	7,590.81	796.64	-928.11	1,006.75	0.64	0.55	-0.32
10,853.00	89.35	270.05	7,591.19	796.35	-1,023.10	1,101.19	1.00	-0.88	0.46
10,949.00	90.06	269.96	7,591.68	796.36	-1,119.10	1,196.66	0.75	0.74	-0.09
11,044.00	89.35	271.24	7,592.17	797.36	-1,214.09	1,291.22	1.54	-0.75	1.35
11,140.00	90.68	271.99	7,592.15	800.06	-1,310.05	1,386.94	1.59	1.39	0.78
11,235.00	88.16	271.19	7,593.11	802.70	-1,405.00	1,481.64	2.78	-2.65	-0.84
11,331.00	88.73	270.80	7,595.71	804.37	-1,500.95	1,577.23	0.72	0.59	-0.41
11,426.00	88.03	272.25	7,598.40	806.89	-1,595.88	1,671.89	1.69	-0.74	1.53
11,521.00	88.60	271.77	7,601.19	810.22	-1,690.78	1,766.62	0.78	0.60	-0.51
11,616.00	89.75	271.99	7,602.56	813.34	-1,785.71	1,861.36	1.23	1.21	0.23
11,712.00	90.54	272.03	7,602.32	816.71	-1,881.65	1,957.12	0.82	0.82	0.04
11,808.00	88.64	271.81	7,603.01	819.92	-1,977.59	2,052.86	1.99	-1.98	-0.23
11,903.00	88.73	271.46	7,605.19	822.63	-2,072.53	2,147.56	0.38	0.09	-0.37
11,999.00	89.26	271.50	7,606.87	825.11	-2,168.48	2,243.24	0.55	0.55	0.04
12,094.00	87.27	270.97	7,609.75	827.16	-2,263.41	2,337.86	2.17	-2.09	-0.56
12,190.00	87.63	270.31	7,614.02	828.23	-2,359.31	2,433.34	0.78	0.38	-0.69
12,285.00	90.01	268.86	7,615.97	827.54	-2,454.28	2,527.71	2.93	2.51	-1.53
12,381.00	89.26	268.46	7,616.58	825.30	-2,550.25	2,622.91	0.89	-0.78	-0.42
12,476.00	90.28	269.08	7,616.97	823.26	-2,645.22	2,717.14	1.26	1.07	0.65
12,572.00	90.32	268.64	7,616.46	821.35	-2,741.20	2,812.39	0.46	0.04	-0.46
12,667.00	90.50	268.59	7,615.78	819.05	-2,836.17	2,906.59	0.20	0.19	-0.05
12,762.00	92.18	268.51	7,613.56	816.65	-2,931.11	3,000.75	1.77	1.77	-0.08

# Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well Duck Club 12W-20-5C
<b>Project:</b>	Adams County (NAD 83)	<b>TVD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Site:</b>	Sec 12-T01S-R66W	<b>MD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Well:</b>	Duck Club 12W-20-5C	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,858.00	90.77	270.00	7,611.09	815.40	-3,027.07	3,096.04	2.14	-1.47	1.55	
12,954.00	89.97	272.82	7,610.47	817.76	-3,123.03	3,191.72	3.05	-0.83	2.94	
13,050.00	88.42	271.41	7,611.82	821.30	-3,218.95	3,287.48	2.18	-1.61	-1.47	
13,145.00	89.09	271.94	7,613.88	824.08	-3,313.88	3,382.18	0.90	0.71	0.56	
13,241.00	89.70	272.12	7,614.90	827.48	-3,409.82	3,477.94	0.66	0.64	0.19	
13,336.00	90.41	272.25	7,614.81	831.10	-3,504.75	3,572.72	0.76	0.75	0.14	
13,431.00	89.04	270.97	7,615.26	833.77	-3,599.70	3,667.43	1.97	-1.44	-1.35	
13,527.00	88.86	271.28	7,617.02	835.66	-3,695.67	3,763.06	0.37	-0.19	0.32	
13,622.00	88.86	268.59	7,618.91	835.55	-3,790.64	3,857.50	2.83	0.00	-2.83	
13,718.00	89.88	269.08	7,619.97	833.60	-3,886.61	3,952.73	1.18	1.06	0.51	
13,813.00	91.30	269.08	7,618.99	832.07	-3,981.59	4,047.03	1.49	1.49	0.00	
13,909.00	86.61	268.73	7,620.74	830.24	-4,077.53	4,142.24	4.90	-4.89	-0.36	
14,004.00	88.51	269.30	7,624.78	828.61	-4,172.43	4,236.44	2.09	2.00	0.60	
14,100.00	88.60	268.77	7,627.20	826.99	-4,268.39	4,331.69	0.56	0.09	-0.55	
14,196.00	88.11	269.30	7,629.96	825.38	-4,364.33	4,426.94	0.75	-0.51	0.55	
14,291.00	90.85	270.14	7,630.82	824.91	-4,459.32	4,521.35	3.02	2.88	0.88	
14,386.00	89.48	269.34	7,630.55	824.48	-4,554.31	4,615.77	1.67	-1.44	-0.84	
14,482.00	90.85	270.22	7,630.27	824.11	-4,650.31	4,711.19	1.70	1.43	0.92	
14,578.00	88.69	270.89	7,630.66	825.04	-4,746.30	4,806.75	2.36	-2.25	0.70	
14,673.00	88.20	271.11	7,633.24	826.70	-4,841.25	4,901.35	0.57	-0.52	0.23	
14,769.00	87.80	270.89	7,636.59	828.37	-4,937.17	4,996.92	0.48	-0.42	-0.23	
14,865.00	88.47	272.56	7,639.71	831.26	-5,033.07	5,092.59	1.87	0.70	1.74	
14,960.00	89.79	272.25	7,641.15	835.25	-5,127.98	5,187.39	1.43	1.39	-0.33	
15,055.00	89.66	271.19	7,641.61	838.10	-5,222.93	5,282.11	1.12	-0.14	-1.12	
15,150.00	91.78	270.75	7,640.41	839.71	-5,317.91	5,376.73	2.28	2.23	-0.46	
15,245.00	91.78	271.11	7,637.46	841.25	-5,412.85	5,471.31	0.38	0.00	0.38	
15,340.00	90.72	270.71	7,635.39	842.76	-5,507.81	5,565.90	1.19	-1.12	-0.42	
15,435.00	90.32	269.92	7,634.53	843.28	-5,602.80	5,660.42	0.93	-0.42	-0.83	
15,531.00	90.50	270.18	7,633.84	843.36	-5,698.80	5,755.90	0.33	0.19	0.27	
15,626.00	90.01	268.68	7,633.42	842.42	-5,793.79	5,850.26	1.66	-0.52	-1.58	
15,722.00	90.19	268.73	7,633.25	840.25	-5,889.77	5,945.48	0.19	0.19	0.05	
15,817.00	89.31	270.00	7,633.67	839.19	-5,984.76	6,039.83	1.63	-0.93	1.34	
15,913.00	88.86	269.96	7,635.20	839.16	-6,080.75	6,135.28	0.47	-0.47	-0.04	
16,008.00	88.60	269.17	7,637.31	838.44	-6,175.72	6,229.65	0.88	-0.27	-0.83	
16,104.00	89.97	271.06	7,638.50	838.63	-6,271.71	6,325.13	2.43	1.43	1.97	
16,199.00	91.38	271.72	7,637.38	840.94	-6,366.67	6,419.80	1.64	1.48	0.69	
16,295.00	91.34	271.28	7,635.11	843.45	-6,462.61	6,515.48	0.46	-0.04	-0.46	
16,390.00	89.17	271.37	7,634.68	845.65	-6,557.58	6,610.15	2.29	-2.28	0.09	
16,485.00	88.73	271.63	7,636.42	848.13	-6,652.53	6,704.83	0.54	-0.46	0.27	
16,581.00	89.53	271.41	7,637.88	850.68	-6,748.48	6,800.52	0.86	0.83	-0.23	
16,676.00	89.53	271.46	7,638.66	853.06	-6,843.45	6,895.21	0.05	0.00	0.05	
16,771.00	89.09	270.80	7,639.80	854.93	-6,938.42	6,989.86	0.83	-0.46	-0.69	
16,867.00	89.62	270.80	7,640.89	856.27	-7,034.41	7,085.45	0.55	0.55	0.00	
16,963.00	89.44	270.31	7,641.67	857.20	-7,130.40	7,181.01	0.54	-0.19	-0.51	

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well Duck Club 12W-20-5C
<b>Project:</b>	Adams County (NAD 83)	<b>TVD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Site:</b>	Sec 12-T01S-R66W	<b>MD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Well:</b>	Duck Club 12W-20-5C	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,058.00	88.60	269.83	7,643.30	857.32	-7,225.38	7,275.48	1.02	-0.88	-0.51
17,153.00	89.31	271.72	7,645.03	858.60	-7,320.35	7,370.06	2.12	0.75	1.99
17,249.00	90.90	271.68	7,644.85	861.45	-7,416.31	7,465.78	1.66	1.66	-0.04
17,344.00	90.90	271.59	7,643.36	864.16	-7,511.26	7,560.49	0.09	0.00	-0.09
17,439.00	90.15	271.19	7,642.49	866.46	-7,606.23	7,655.17	0.89	-0.79	-0.42
17,535.00	89.40	270.71	7,642.87	868.06	-7,702.21	7,750.79	0.93	-0.78	-0.50
17,630.00	89.22	270.84	7,644.01	869.34	-7,797.19	7,845.38	0.23	-0.19	0.14
17,726.00	89.26	270.62	7,645.29	870.56	-7,893.18	7,940.96	0.23	0.04	-0.23
17,821.00	89.09	270.18	7,646.65	871.23	-7,988.17	8,035.49	0.50	-0.18	-0.46
Last MWD Survey @ 17821.00' MD									
17,921.00	89.09	270.18	7,648.24	871.54	-8,088.15	8,134.96	0.00	0.00	0.00
Projection to TD @ 17921' MD 1950' FNL/ 2123' FEL - PBHL Duck Club 12W-20-5C									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
30° Inclination @ 7732.9	0.00	0.00	7,253.63	788.38	1,976.81	1,236,988.13	3,217,485.22	39.98131	-104.72390
- actual wellpath misses target center by 0.02usft at 7732.89usft MD (7253.62 TVD, 788.36 N, 1976.82 E)									
- Point									
70° Inclination @ 8166.8	0.00	0.00	7,534.37	785.92	1,657.31	1,236,982.91	3,217,165.76	39.98130	-104.72504
- actual wellpath misses target center by 0.02usft at 8166.87usft MD (7534.37 TVD, 785.92 N, 1657.29 E)									
- Point									
LP Duck Club 12W-20-5	0.00	0.00	7,580.00	779.59	1,482.42	1,236,975.05	3,216,990.93	39.98128	-104.72566
- actual wellpath misses target center by 11.10usft at 8347.42usft MD (7574.10 TVD, 788.96 N, 1481.73 E)									
- Point									
Cross @ 10517.89' MD	0.00	0.00	7,589.87	796.55	-688.00	1,236,973.19	3,214,820.44	39.98133	-104.73341
- actual wellpath hits target center									
- Point									
Cross @ 15794.74' MD	0.00	0.00	7,633.44	839.25	-5,962.50	1,236,970.15	3,209,545.77	39.98144	-104.75223
- actual wellpath hits target center									
- Point									
PBHL Duck Club 12W-20-5	0.00	0.00	7,658.00	861.02	-8,140.70	1,236,973.02	3,207,367.46	39.98150	-104.76000
- actual wellpath misses target center by 54.47usft at 17921.00usft MD (7648.24 TVD, 871.54 N, -8088.15 E)									
- Point									

## Survey Report

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well Duck Club 12W-20-5C
<b>Project:</b>	Adams County (NAD 83)	<b>TVD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Site:</b>	Sec 12-T01S-R66W	<b>MD Reference:</b>	KB=25 @ 5062.00usft (Patt 901)
<b>Well:</b>	Duck Club 12W-20-5C	<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

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
129.00	129.00	-0.62	0.48	First Surface Surveys
1,588.00	1,581.35	26.27	79.10	Last Surface Surveys
1,588.00	1,581.35	26.27	79.10	Tie into Surface Surveys
1,663.00	1,654.29	32.15	95.55	First MWD Survey @ 1663.00' MD
17,821.00	7,646.65	871.23	-7,988.17	Last MWD Survey @ 17821.00' MD
17,921.00	7,648.24	871.54	-8,088.15	Projection to TD @ 17921' MD 1950' FNL/ 2123' FEL

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_