



Where energy meets innovation.

## **EQT PRODUCTION**

Ritchie County, WV

OXF122

Well #512427 -Marcellus

512427 ST01

API#:47-085-10087

Design: 512427 ST01 As Drilled Surveys

## **Standard Survey Report**

07 June, 2016

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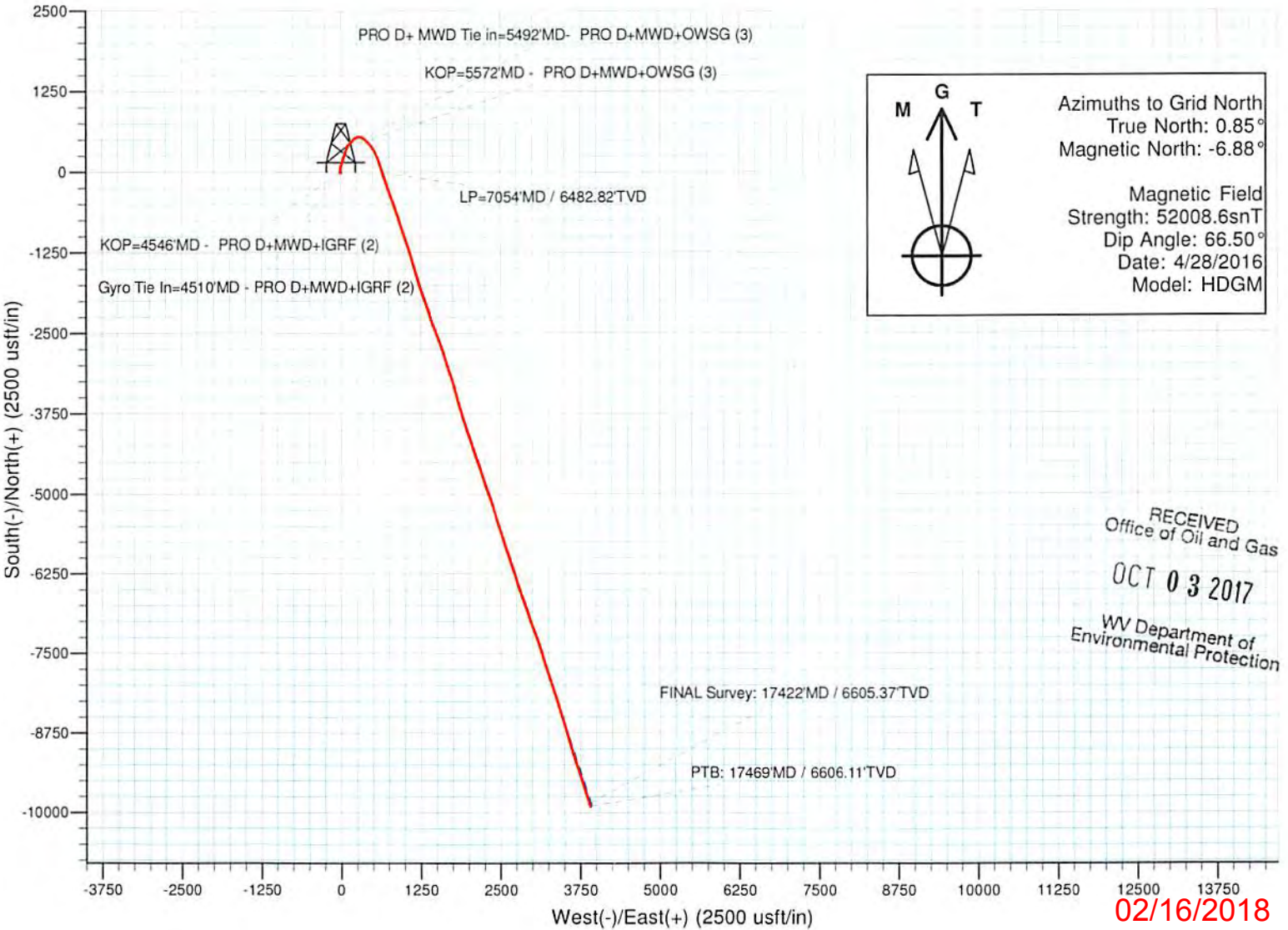
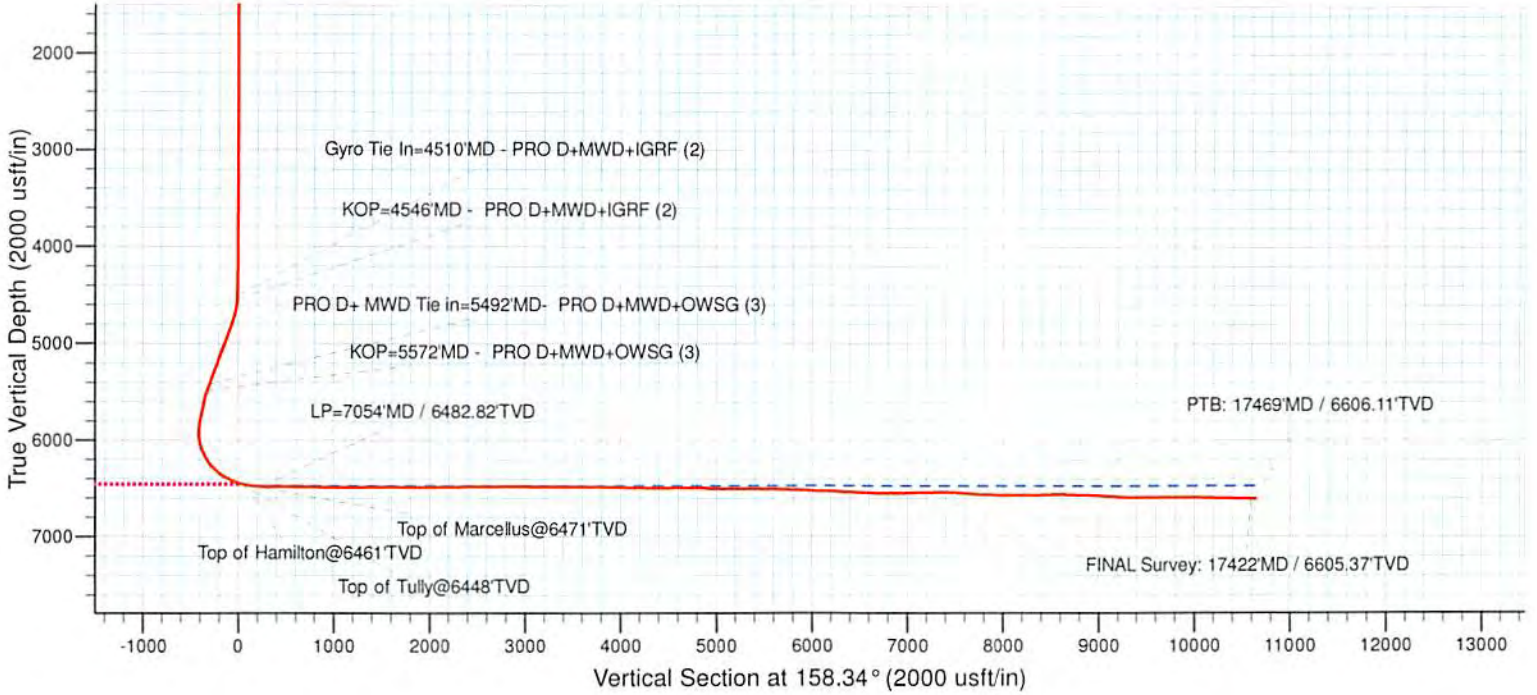
**PRO**DIRECTIONAL

02/16/2018



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Project: Ritchie County, WV  
Site: OXF122  
Well: Well #512427 -Marcellus  
Wellbore: 512427 ST01  
Design: 512427 ST01 As Drilled Surveys  
Elevation: GL 1111 + 23' KB @ 1134.00usft



Azimuths to Grid North  
True North: 0.85°  
Magnetic North: -6.88°

Magnetic Field  
Strength: 52008.6snT  
Dip Angle: 66.50°  
Date: 4/28/2016  
Model: HDGM

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<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #512427 -Marcellus
<b>Project:</b>	Ritchie County, WV	<b>TVD Reference:</b>	GL 1111 + 23' KB @ 1134.00usft
<b>Site:</b>	OXF122	<b>MD Reference:</b>	GL 1111 + 23' KB @ 1134.00usft
<b>Well:</b>	Well #512427 -Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	512427 ST01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	512427 ST01 As Drilled Surveys	<b>Database:</b>	Well_Planner1

<b>Project</b>	Ritchie County, WV		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	West Virginia North 4701		

<b>Site</b>	OXF122				
<b>Site Position:</b>		<b>Northing:</b>	233,060.52 usft	<b>Latitude:</b>	39° 7' 55.941 N
<b>From:</b>	Map	<b>Easting:</b>	1,622,368.52 usft	<b>Longitude:</b>	80° 49' 52.485 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.85 °

<b>Well</b>	Well #512427 -Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	233,088.44 usft	<b>Latitude:</b>	39° 7' 56.229 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,622,454.07 usft	<b>Longitude:</b>	80° 49' 51.405 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,111.00 usft

<b>Wellbore</b>	512427 ST01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	4/28/2016	-7.73	66.50	52,009

<b>Design</b>	512427 ST01 As Drilled Surveys				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	4,510.00
<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	158.34	

<b>Survey Program</b>	<b>Date</b>	6/7/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
110.00	4,510.00	Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
4,546.00	5,492.00	512427 ST01 MWD (2) (512427 ST01)	MWD+IGRF	MWD+IGRF v3:standard declination	
5,572.00	17,469.00	512427 ST01 MWD (3) (512427 ST01)	MWD - OWSG	MWD - OWSG	

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<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	
110.00	0.11	163.16	110.00	-0.10	0.03	0.11	0.10	0.10	0.00	
210.00	0.07	102.08	210.00	-0.21	0.12	0.23	0.10	-0.04	-61.08	
310.00	0.04	298.20	310.00	-0.20	0.15	0.24	0.11	-0.03	-163.88	
410.00	0.08	301.13	410.00	-0.15	0.06	0.16	0.04	0.04	2.93	
510.00	0.09	97.01	510.00	-0.12	0.07	0.14	0.17	0.01	155.88	
610.00	0.11	113.74	610.00	-0.17	0.24	0.25	0.04	0.02	16.73	
710.00	0.14	60.72	710.00	-0.15	0.44	0.30	0.11	0.03	-53.02	
810.00	0.20	73.63	810.00	-0.04	0.71	0.30	0.07	0.06	12.91	



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 Site: OXF122  
 Well: Well #512427 -Marcellus  
 Wellbore: 512427 ST01  
 Design: 512427 ST01 As Drilled Surveys

Local Co-ordinate Reference: Well Well #512427 -Marcellus  
 TVD Reference: GL 1111 + 23' KB @ 1134.00usft  
 MD Reference: GL 1111 + 23' KB @ 1134.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: Well\_Planner1

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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)	
910.00	0.23	72.80	910.00	0.07	1.07	0.33	0.03	0.03	-0.83	
1,010.00	0.20	55.66	1,010.00	0.23	1.40	0.31	0.07	-0.03	-17.14	
1,110.00	0.42	260.96	1,110.00	0.27	1.19	0.19	0.61	0.22	-154.70	
1,210.00	0.49	250.61	1,209.99	0.07	0.42	0.09	0.11	0.07	-10.35	
1,310.00	0.49	258.29	1,309.99	-0.16	-0.40	0.00	0.07	0.00	7.68	
1,410.00	0.40	270.56	1,409.99	-0.25	-1.17	-0.20	0.13	-0.09	12.27	
1,510.00	0.37	293.42	1,509.98	-0.11	-1.81	-0.56	0.16	-0.03	22.86	
1,610.00	0.30	303.93	1,609.98	0.16	-2.33	-1.01	0.09	-0.07	10.51	
1,710.00	0.29	291.43	1,709.98	0.40	-2.78	-1.40	0.06	-0.01	-12.50	
1,810.00	0.30	247.84	1,809.98	0.39	-3.26	-1.57	0.22	0.01	-43.59	
1,910.00	0.30	239.71	1,909.98	0.16	-3.73	-1.53	0.04	0.00	-8.13	
2,010.00	0.22	246.20	2,009.98	-0.05	-4.13	-1.48	0.09	-0.08	6.49	
2,110.00	0.13	250.15	2,109.98	-0.16	-4.41	-1.48	0.09	-0.09	3.95	
2,210.00	0.07	213.54	2,209.98	-0.25	-4.55	-1.45	0.08	-0.06	-36.61	
2,310.00	0.08	232.24	2,309.98	-0.35	-4.64	-1.39	0.03	0.01	18.70	
2,410.00	0.12	240.62	2,409.98	-0.44	-4.79	-1.36	0.04	0.04	8.38	
2,510.00	0.09	281.50	2,509.98	-0.48	-4.96	-1.39	0.08	-0.03	40.88	
2,610.00	0.13	316.68	2,609.98	-0.38	-5.11	-1.53	0.08	0.04	35.18	
2,710.00	0.09	318.68	2,709.98	-0.24	-5.24	-1.71	0.04	-0.04	2.00	
2,810.00	0.12	326.03	2,809.98	-0.09	-5.35	-1.89	0.03	0.03	7.35	
2,910.00	0.04	210.34	2,909.98	-0.03	-5.43	-1.97	0.14	-0.08	-115.69	
3,010.00	0.04	136.38	3,009.98	-0.09	-5.42	-1.92	0.05	0.00	-73.96	
3,110.00	0.23	81.70	3,109.98	-0.09	-5.20	-1.84	0.21	0.19	-54.68	
3,210.00	0.27	88.78	3,209.98	-0.05	-4.76	-1.71	0.05	0.04	7.08	
3,310.00	0.18	60.80	3,309.97	0.03	-4.39	-1.65	0.14	-0.09	-27.98	
3,410.00	0.17	75.33	3,409.97	0.14	-4.11	-1.65	0.05	-0.01	14.53	
3,510.00	0.24	69.98	3,509.97	0.25	-3.77	-1.63	0.07	0.07	-5.35	
3,610.00	0.25	40.19	3,609.97	0.49	-3.43	-1.72	0.13	0.01	-29.79	
3,710.00	0.30	21.55	3,709.97	0.90	-3.19	-2.02	0.10	0.05	-18.64	
3,810.00	0.25	360.00	3,809.97	1.36	-3.10	-2.41	0.11	-0.05	-21.55	
3,910.00	0.38	343.97	3,909.97	1.90	-3.19	-2.94	0.16	0.13	-16.03	
4,010.00	0.48	313.86	4,009.97	2.51	-3.58	-3.66	0.24	0.10	-30.11	
4,110.00	0.54	310.74	4,109.96	3.11	-4.24	-4.45	0.07	0.06	-3.12	
4,210.00	0.57	310.73	4,209.96	3.74	-4.98	-5.31	0.03	0.03	-0.01	
4,310.00	0.67	308.79	4,309.95	4.43	-5.81	-6.26	0.10	0.10	-1.94	
4,410.00	1.01	307.52	4,409.94	5.33	-6.96	-7.53	0.34	0.34	-1.27	
4,510.00	1.23	305.73	4,509.92	6.50	-8.53	-9.19	0.22	0.22	-1.79	
<b>Gyro Tie In=4510'MD - PRO D+MWD+IGRF (2)</b>										
4,546.00	2.64	337.38	4,545.90	7.49	-9.17	-10.34	4.77	3.92	87.92	
<b>KOP=4546'MD - PRO D+MWD+IGRF (2)</b>										
4,589.00	6.88	354.24	4,588.74	10.97	-9.81	-13.81	10.28	9.86	39.21	
4,632.00	11.93	359.12	4,631.15	17.98	-10.13	-20.45	11.88	11.74	11.35	
4,675.00	15.60	0.50	4,672.91	28.21	-10.15	-29.96	8.57	8.53	3.21	

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GL 1111 + 23' KB @ 1134.00usft  
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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)
4,718.00	17.48	3.19	4,714.13	40.44	-9.74	-41.18	4.72	4.37	6.26
4,761.00	19.69	5.34	4,754.89	54.10	-8.71	-53.49	5.38	5.14	5.00
4,804.00	22.04	9.35	4,795.07	69.28	-6.72	-66.86	6.39	5.47	9.33
4,847.00	23.87	13.37	4,834.66	85.70	-3.40	-80.91	5.60	4.26	9.35
4,890.00	25.09	18.83	4,873.80	102.80	1.56	-94.97	5.98	2.84	12.70
4,933.00	25.34	19.05	4,912.70	120.13	7.50	-108.87	0.62	0.58	0.51
4,976.00	25.67	17.25	4,951.51	137.72	13.27	-123.10	1.96	0.77	-4.19
5,019.00	25.96	15.50	4,990.22	155.68	18.54	-137.84	1.90	0.67	-4.07
5,062.00	26.41	16.43	5,028.81	173.93	23.76	-152.87	1.42	1.05	2.16
5,104.00	26.73	15.09	5,066.37	192.00	28.87	-167.79	1.62	0.76	-3.19
5,147.00	26.42	17.06	5,104.83	210.49	34.19	-183.00	2.17	-0.72	4.58
5,190.00	25.63	19.23	5,143.47	228.41	40.06	-197.50	2.88	-1.84	5.05
5,234.00	25.48	22.19	5,183.17	246.16	46.77	-211.51	2.92	-0.34	6.73
5,277.00	25.81	20.94	5,221.93	263.47	53.61	-225.08	1.47	0.77	-2.91
5,320.00	25.89	18.78	5,260.63	281.10	59.97	-239.11	2.20	0.19	-5.02
5,363.00	25.76	16.70	5,299.34	298.94	65.68	-253.58	2.13	-0.30	-4.84
5,406.00	25.71	16.15	5,338.07	316.85	70.96	-268.28	0.57	-0.12	-1.28
5,449.00	26.14	17.66	5,376.75	334.83	76.43	-282.97	1.83	1.00	3.51
5,492.00	26.31	18.41	5,415.32	352.90	82.31	-297.59	0.87	0.40	1.74
<b>PRO D+ MWD Tie in=5492'MD- PRO D+MWD+OWSG (3)</b>									
5,572.00	27.30	19.50	5,486.72	387.02	94.04	-324.97	1.38	1.24	1.36
<b>KOP=5572'MD - PRO D+MWD+OWSG (3)</b>									
5,603.00	27.80	29.70	5,514.22	400.01	99.99	-334.84	15.29	1.61	32.90
5,635.00	28.20	37.30	5,542.49	412.51	108.28	-343.41	11.21	1.25	23.75
5,666.00	28.90	45.10	5,569.73	423.62	118.02	-350.14	12.23	2.26	25.16
5,698.00	28.80	49.50	5,597.76	434.09	129.36	-355.68	6.64	-0.31	13.75
5,729.00	28.70	49.50	5,624.94	443.77	140.70	-360.49	0.32	-0.32	0.00
5,761.00	28.30	47.50	5,653.06	453.89	152.14	-365.67	3.23	-1.25	-6.25
5,792.00	27.00	41.90	5,680.52	464.09	162.26	-371.42	9.37	-4.19	-18.06
5,824.00	26.00	38.00	5,709.16	475.03	171.43	-378.20	6.27	-3.13	-12.19
5,855.00	25.60	36.70	5,737.07	485.75	179.61	-385.14	2.24	-1.29	-4.19
5,887.00	24.60	40.20	5,766.05	496.38	188.04	-391.91	5.59	-3.13	10.94
5,919.00	24.60	44.40	5,795.15	506.23	197.00	-397.76	5.46	0.00	13.13
5,950.00	24.70	49.50	5,823.33	515.05	206.45	-402.47	6.87	0.32	16.45
5,982.00	24.90	56.60	5,852.39	523.10	217.16	-406.00	9.32	0.63	22.19
6,013.00	25.20	61.50	5,880.47	529.84	228.40	-408.11	6.76	0.97	15.81
6,045.00	25.50	64.60	5,909.39	536.05	240.61	-409.37	4.25	0.94	9.69
6,076.00	25.30	70.20	5,937.40	541.15	252.88	-409.59	7.77	-0.65	18.06
6,108.00	25.50	78.80	5,966.32	544.81	266.07	-408.12	11.54	0.63	26.88
6,139.00	25.90	87.90	5,994.26	546.35	279.39	-404.64	12.78	1.29	29.35
6,171.00	25.80	94.60	6,023.07	546.05	293.32	-399.21	9.13	-0.31	20.94
6,202.00	25.90	102.90	6,050.97	544.00	306.65	-392.39	11.67	0.32	26.77
6,234.00	26.10	110.10	6,079.74	540.02	320.07	-383.73	9.88	0.63	22.50
6,265.00	27.30	117.30	6,107.44	534.41	332.80	-373.82	11.12	3.87	23.23





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# Professional Directional Survey Report



**Company:** EQT PRODUCTION  
**Project:** Ritchie County, WV  
**Site:** OXF122  
**Well:** Well #512427 -Marcellus  
**Wellbore:** 512427 ST01  
**Design:** 512427 ST01 As Drilled Surveys

**Local Co-ordinate Reference:**  
**TVD Reference:**  
**MD Reference:**  
**North Reference:**  
**Survey Calculation Method:**  
**Database:**

Well Well #512427 -Marcellus  
 GL 1111 + 23' KB @ 1134.00usft  
 GL 1111 + 23' KB @ 1134.00usft  
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 Minimum Curvature  
 Well\_Planner1

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### 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)
6,297.00	28.80	123.30	6,135.69	526.81	345.76	-361.97	9.98	4.69	18.75
6,328.00	30.40	128.60	6,162.65	517.82	358.14	-349.05	9.89	5.16	17.10
6,360.00	33.50	130.10	6,189.80	507.08	371.22	-334.23	10.00	9.69	4.69
6,391.00	36.50	130.90	6,215.19	495.53	384.74	-318.51	9.79	9.68	2.58
6,423.00	39.10	133.20	6,240.47	482.38	399.29	-300.92	9.24	8.13	7.19
6,454.00	42.40	135.10	6,263.95	468.28	413.80	-282.46	11.37	10.65	6.13
6,486.00	45.60	137.60	6,286.97	452.20	429.13	-261.85	11.38	10.00	7.81
6,518.00	48.40	139.50	6,308.79	434.65	444.61	-239.83	9.77	8.75	5.94
6,549.00	51.50	141.90	6,328.74	416.29	459.63	-217.22	11.62	10.00	7.74
6,581.00	55.00	143.20	6,347.88	395.93	475.21	-192.55	11.41	10.94	4.06
6,612.00	58.00	144.60	6,364.99	375.04	490.44	-167.52	10.38	9.68	4.52
6,644.00	60.30	146.50	6,381.40	352.39	505.97	-140.73	8.81	7.19	5.94
6,675.00	62.30	149.10	6,396.29	329.38	520.45	-114.00	9.78	6.45	8.39
6,707.00	64.90	150.80	6,410.52	304.57	534.80	-85.65	9.42	8.13	5.31
6,738.00	67.40	153.30	6,423.05	279.53	548.08	-57.47	10.93	8.06	8.06
6,770.00	70.20	154.80	6,434.63	252.70	561.13	-27.72	9.78	8.75	4.69
6,801.00	72.30	156.40	6,444.59	225.97	573.25	1.60	8.35	6.77	5.16
6,812.48	73.12	157.12	6,448.00	215.90	577.58	12.55	9.36	7.17	6.30
<b>Top of Tully@6448'TVD</b>									
6,833.00	74.60	158.40	6,453.71	197.65	585.04	32.26	9.36	7.20	6.22
6,862.42	76.69	160.11	6,461.00	171.00	595.13	60.76	9.06	7.10	5.81
<b>Top of Hamilton@6461'TVD</b>									
6,864.00	76.80	160.20	6,461.36	169.56	595.65	62.29	9.06	7.12	5.75
6,896.00	79.30	161.50	6,467.99	139.99	605.92	93.57	8.77	7.81	4.06
6,913.56	80.95	161.61	6,471.00	123.57	611.39	110.84	9.40	9.37	0.63
<b>Top of Marcellus@6471'TVD</b>									
6,928.00	82.30	161.70	6,473.10	110.02	615.89	125.10	9.40	9.38	0.62
6,959.00	84.20	161.30	6,476.75	80.82	625.66	155.84	6.26	6.13	-1.29
6,991.00	85.40	161.50	6,479.65	50.62	635.82	187.66	3.80	3.75	0.63
7,022.00	86.90	161.60	6,481.73	21.28	645.61	218.54	4.85	4.84	0.32
7,054.00	89.20	161.40	6,482.82	-9.05	655.76	250.47	7.21	7.19	-0.63
<b>LP=7054'MD / 6482.82'TVD</b>									
7,085.00	89.30	161.40	6,483.22	-38.43	665.64	281.42	0.32	0.32	0.00
7,180.00	89.40	161.20	6,484.30	-128.40	696.10	376.29	0.24	0.11	-0.21
7,274.00	89.40	161.20	6,485.29	-217.38	726.39	470.17	0.00	0.00	0.00
7,369.00	89.80	160.90	6,485.95	-307.23	757.24	565.06	0.53	0.42	-0.32
7,464.00	90.10	160.60	6,486.03	-396.92	788.56	659.97	0.45	0.32	-0.32
7,558.00	88.10	160.30	6,487.51	-485.49	820.01	753.89	2.15	-2.13	-0.32
7,653.00	89.30	160.20	6,489.66	-574.87	852.10	848.82	1.27	1.26	-0.11
7,748.00	89.80	159.90	6,490.41	-664.17	884.52	943.77	0.61	0.53	-0.32
7,842.00	89.50	162.60	6,490.98	-753.17	914.73	1,037.64	2.89	-0.32	2.87
7,937.00	89.50	162.00	6,491.81	-843.67	943.61	1,132.41	0.63	0.00	-0.63
8,032.00	91.40	161.60	6,491.07	-933.91	973.28	1,227.23	2.04	2.00	-0.42
8,126.00	91.30	161.30	6,488.85	-1,023.00	1,003.18	1,321.06	0.34	-0.11	-0.32

02/16/2018



Where energy meets innovation.

# Professional Directional Survey Report



Company: EQT PRODUCTION  
 Project: Ritchie County, WV  
 Site: OXF122  
 Well: Well #512427 -Marcellus  
 Wellbore: 512427 ST01  
 Design: 512427 ST01 As Drilled Surveys

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:  
 Database:

Well Well #512427 -Marcellus  
 GL 1111 + 23' KB @ 1134.00usft  
 GL 1111 + 23' KB @ 1134.00usft  
 Grid  
 Minimum Curvature  
 Well\_Planner1

**RECEIVED**  
**Office of Oil and Gas**  
**OCT 03 2017**  
**WV Department of Environmental Protection**

## 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)
8,221.00	91.40	160.90	6,486.61	-1,112.86	1,033.94	1,415.92	0.43	0.11	-0.42
8,316.00	89.50	161.30	6,485.87	-1,202.73	1,064.71	1,510.81	2.04	-2.00	0.42
8,411.00	89.10	164.20	6,487.03	-1,293.44	1,092.88	1,605.51	3.08	-0.42	3.05
8,505.00	89.00	163.60	6,488.59	-1,383.74	1,118.94	1,699.05	0.65	-0.11	-0.64
8,600.00	89.20	163.40	6,490.08	-1,474.81	1,145.92	1,793.65	0.30	0.21	-0.21
8,695.00	89.20	162.90	6,491.41	-1,565.73	1,173.45	1,888.31	0.53	0.00	-0.53
8,789.00	90.80	162.90	6,491.41	-1,655.57	1,201.09	1,982.01	1.70	1.70	0.00
8,884.00	90.90	163.20	6,490.00	-1,746.43	1,228.78	2,076.68	0.33	0.11	0.32
8,978.00	91.20	160.60	6,488.27	-1,835.76	1,257.98	2,170.47	2.78	0.32	-2.77
9,073.00	90.90	160.00	6,486.53	-1,925.18	1,290.00	2,265.40	0.71	-0.32	-0.63
9,168.00	90.70	159.60	6,485.21	-2,014.33	1,322.80	2,360.36	0.47	-0.21	-0.42
9,262.00	90.60	162.20	6,484.14	-2,103.14	1,353.55	2,454.25	2.77	-0.11	2.77
9,357.00	90.60	162.20	6,483.14	-2,193.59	1,382.59	2,548.03	0.00	0.00	0.00
9,452.00	90.60	161.80	6,482.15	-2,283.93	1,411.95	2,643.83	0.42	0.00	-0.42
9,546.00	90.30	160.50	6,481.41	-2,372.89	1,442.32	2,737.71	1.42	-0.32	-1.38
9,641.00	89.20	156.70	6,481.83	-2,461.32	1,476.97	2,832.69	4.16	-1.16	-4.00
9,736.00	90.60	160.80	6,481.99	-2,549.84	1,511.40	2,927.67	4.56	1.47	4.32
9,830.00	90.00	158.50	6,481.50	-2,637.96	1,544.08	3,021.63	2.53	-0.64	-2.45
9,925.00	89.30	159.90	6,482.08	-2,726.77	1,577.82	3,116.62	1.65	-0.74	1.47
10,019.00	90.50	164.40	6,482.24	-2,816.22	1,606.62	3,210.38	4.95	1.28	4.79
10,114.00	89.80	163.40	6,482.00	-2,907.49	1,632.97	3,304.93	1.28	-0.74	-1.05
10,208.00	89.40	162.40	6,482.65	-2,997.33	1,660.60	3,398.63	1.15	-0.43	-1.06
10,303.00	90.20	160.70	6,482.98	-3,087.44	1,690.67	3,493.48	1.98	0.84	-1.79
10,398.00	89.70	160.20	6,483.07	-3,176.97	1,722.46	3,588.41	0.74	-0.53	-0.53
10,492.00	89.40	162.50	6,483.80	-3,266.02	1,752.51	3,682.27	2.47	-0.32	2.45
10,587.00	88.80	165.20	6,485.30	-3,357.25	1,778.93	3,776.81	2.91	-0.63	2.84
10,682.00	88.70	164.70	6,487.37	-3,448.97	1,803.60	3,871.16	0.54	-0.11	-0.53
10,777.00	88.60	164.20	6,489.61	-3,540.47	1,829.06	3,965.59	0.54	-0.11	-0.53
10,872.00	88.80	164.20	6,491.76	-3,631.86	1,854.92	4,060.07	0.21	0.21	0.00
10,966.00	88.90	163.50	6,493.65	-3,722.13	1,881.06	4,153.62	0.75	0.11	-0.74
11,061.00	89.10	162.60	6,495.31	-3,812.99	1,908.75	4,248.28	0.97	0.21	-0.95
11,156.00	89.10	162.10	6,496.80	-3,903.50	1,937.55	4,343.04	0.53	0.00	-0.53
11,250.00	90.80	161.30	6,496.88	-3,992.74	1,967.06	4,436.87	2.00	1.81	-0.85
11,345.00	91.20	161.30	6,495.22	-4,082.71	1,997.52	4,531.73	0.42	0.42	0.00
11,440.00	91.10	159.90	6,493.32	-4,172.30	2,029.06	4,626.63	1.48	-0.11	-1.47
11,534.00	89.20	161.70	6,493.07	-4,261.06	2,059.97	4,720.54	2.78	-2.02	1.91
11,629.00	89.40	161.90	6,494.23	-4,351.30	2,089.64	4,815.36	0.30	0.21	0.21
11,724.00	87.60	160.40	6,496.72	-4,441.17	2,120.33	4,910.20	2.47	-1.89	-1.58
11,818.00	87.70	160.60	6,500.57	-4,529.71	2,151.68	5,004.06	0.24	0.11	0.21
11,913.00	89.80	161.50	6,502.65	-4,619.53	2,182.52	5,098.92	2.40	2.21	0.95
12,008.00	90.40	161.90	6,502.48	-4,709.72	2,212.35	5,193.76	0.76	0.63	0.42
12,103.00	89.50	161.90	6,502.56	-4,800.02	2,241.86	5,288.57	0.95	-0.95	0.00
12,197.00	89.20	161.30	6,503.63	-4,889.21	2,271.53	5,382.42	0.71	-0.32	-0.64

02/16/2018

**Company:** EQT PRODUCTION  
**Project:** Ritchie County, WV  
**Site:** OXF122  
**Well:** Well #512427 -Marcellus  
**Wellbore:** 512427 ST01  
**Design:** 512427 ST01 As Drilled Surveys

**Local Co-ordinate Reference:**  
**TVD Reference:**  
**MD Reference:**  
**North Reference:**  
**Survey Calculation Method:**  
**Database:**

Well Well #512427 -Marcellus  
 GL 1111 + 23' KB @ 1134.00usft  
 GL 1111 + 23' KB @ 1134.00usft  
 Grid  
 Minimum Curvature  
 Well\_Planner1

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 Office of Oil and Gas  
 OCT 03 2017  
 WV Department of  
 Environmental Protection

**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)
12,292.00	89.10	160.50	6,505.04	-4,978.97	2,302.61	5,477.31	0.85	-0.11	-0.84
12,387.00	89.00	159.60	6,506.61	-5,068.26	2,335.02	5,572.25	0.95	-0.11	-0.95
12,481.00	88.30	160.80	6,508.83	-5,156.67	2,366.85	5,666.17	1.48	-0.74	1.28
12,576.00	88.80	162.80	6,511.23	-5,246.89	2,396.51	5,760.97	2.17	0.53	2.11
12,671.00	86.60	162.30	6,515.04	-5,337.44	2,424.98	5,855.63	2.37	-2.32	-0.53
12,765.00	87.70	162.50	6,519.72	-5,426.92	2,453.36	5,949.27	1.19	1.17	0.21
12,860.00	88.00	162.30	6,523.28	-5,517.41	2,482.07	6,043.97	0.38	0.32	-0.21
12,955.00	88.50	162.30	6,526.18	-5,607.87	2,510.94	6,138.70	0.53	0.53	0.00
13,049.00	87.40	163.20	6,529.55	-5,697.58	2,538.79	6,232.35	1.51	-1.17	0.96
13,144.00	87.50	162.20	6,533.77	-5,788.20	2,567.02	6,326.98	1.06	0.11	-1.05
13,239.00	87.80	161.90	6,537.67	-5,878.50	2,596.27	6,421.71	0.45	0.32	-0.32
13,333.00	87.60	161.50	6,541.44	-5,967.67	2,625.76	6,515.47	0.48	-0.21	-0.43
13,428.00	87.40	160.60	6,545.58	-6,057.43	2,656.58	6,610.27	0.97	-0.21	-0.95
13,522.00	87.50	162.10	6,549.77	-6,146.41	2,686.61	6,704.04	1.60	0.11	1.60
13,617.00	90.90	163.00	6,551.09	-6,237.01	2,715.09	6,798.76	3.70	3.58	0.95
13,711.00	91.60	162.70	6,549.04	-6,326.81	2,742.80	6,892.45	0.81	0.74	-0.32
13,806.00	91.50	161.50	6,546.47	-6,417.18	2,771.99	6,987.21	1.27	-0.11	-1.26
13,900.00	91.60	161.30	6,543.93	-6,506.24	2,801.96	7,081.04	0.24	0.11	-0.21
13,995.00	90.30	161.10	6,542.35	-6,596.15	2,832.57	7,175.91	1.38	-1.37	-0.21
14,089.00	90.80	160.70	6,541.45	-6,684.97	2,863.33	7,269.81	0.68	0.53	-0.43
14,184.00	90.00	160.40	6,540.79	-6,774.55	2,894.96	7,364.73	0.90	-0.84	-0.32
14,279.00	88.00	161.40	6,542.45	-6,864.30	2,926.04	7,459.62	2.35	-2.11	1.05
14,373.00	86.20	161.00	6,547.20	-6,953.17	2,956.29	7,553.38	1.96	-1.91	-0.43
14,465.00	86.50	159.90	6,553.06	-7,039.69	2,987.02	7,645.13	1.24	0.33	-1.20
14,563.00	87.00	159.90	6,558.62	-7,131.57	3,020.64	7,742.93	0.51	0.51	0.00
14,657.00	87.10	159.20	6,563.45	-7,219.53	3,053.44	7,836.79	0.75	0.11	-0.74
14,752.00	88.60	160.50	6,567.02	-7,308.65	3,086.14	7,931.68	2.09	1.58	1.37
14,846.00	88.60	163.10	6,569.31	-7,397.91	3,115.49	8,025.47	2.77	0.00	2.77
14,941.00	90.10	163.30	6,570.39	-7,488.85	3,142.94	8,120.12	1.59	1.58	0.21
15,035.00	90.40	162.70	6,569.98	-7,578.74	3,170.43	8,213.81	0.71	0.32	-0.64
15,130.00	91.30	162.10	6,568.57	-7,669.28	3,199.15	8,308.56	1.14	0.95	-0.63
15,225.00	90.60	162.40	6,567.00	-7,759.74	3,228.11	8,403.32	0.80	-0.74	0.32
15,320.00	90.90	162.00	6,565.60	-7,861.61	3,260.81	8,510.07	0.47	0.28	-0.37
15,426.00	89.90	161.40	6,564.94	-7,950.85	3,290.33	8,603.91	1.24	-1.06	-0.64
15,521.00	88.30	161.80	6,566.43	-8,040.98	3,320.31	8,698.74	1.74	-1.68	0.42
15,616.00	89.40	162.10	6,568.34	-8,131.29	3,349.74	8,793.53	1.20	1.16	0.32
15,710.00	88.10	162.50	6,570.39	-8,220.82	3,378.31	8,887.28	1.45	-1.38	0.43
15,805.00	87.70	163.30	6,573.87	-8,311.55	3,406.22	8,981.91	0.94	-0.42	0.84
15,899.00	85.80	162.70	6,579.20	-8,401.30	3,433.66	9,075.45	2.12	-2.02	-0.64
15,994.00	86.00	162.50	6,585.99	-8,491.72	3,462.00	9,169.94	0.30	0.21	-0.21
16,089.00	87.80	163.00	6,591.13	-8,582.31	3,490.13	9,264.52	1.97	1.89	0.53
16,183.00	88.40	163.40	6,594.25	-8,672.25	3,517.28	9,358.13	0.77	0.64	0.43
16,278.00	89.80	163.90	6,595.74	-8,763.39	3,544.02	9,452.70	1.56	1.47	0.53
16,372.00	90.00	163.50	6,595.90	-8,853.61	3,570.40	9,546.29	0.48	0.21	-0.43



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #512427 -Marcellus
<b>Project:</b>	Ritchie County, WV	<b>TVD Reference:</b>	GL 1111 + 23' KB @ 1134.00usft
<b>Site:</b>	OXF122	<b>MD Reference:</b>	GL 1111 + 23' KB @ 1134.00usft
<b>Well:</b>	Well #512427 -Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	512427 ST01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	512427 ST01 As Drilled Surveys	<b>Database:</b>	Well_Planner1

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)	
16,467.00	90.20	163.40	6,595.74	-8,944.68	3,597.46	9,640.91	0.24	0.21	-0.11	
16,562.00	90.20	163.20	6,595.41	-9,035.67	3,624.76	9,735.56	0.21	0.00	-0.21	
16,656.00	89.90	162.40	6,595.32	-9,125.46	3,652.56	9,829.27	0.91	-0.32	-0.85	
16,751.00	89.90	161.80	6,595.49	-9,215.86	3,681.76	9,924.07	0.63	0.00	-0.63	
16,846.00	90.20	161.90	6,595.41	-9,306.14	3,711.35	10,018.89	0.33	0.32	0.11	
16,941.00	88.90	161.60	6,596.15	-9,396.35	3,741.10	10,113.71	1.40	-1.37	-0.32	
17,036.00	89.20	161.80	6,597.73	-9,486.54	3,770.92	10,208.54	0.38	0.32	0.21	
17,129.00	88.30	161.70	6,599.76	-9,574.84	3,800.04	10,301.35	0.97	-0.97	-0.11	
17,224.00	89.10	162.40	6,601.91	-9,665.19	3,829.31	10,396.12	1.12	0.84	0.74	
17,318.00	88.90	162.20	6,603.55	-9,754.73	3,857.88	10,489.89	0.30	-0.21	-0.21	
17,422.00	89.10	162.40	6,605.37	-9,853.79	3,889.50	10,593.62	0.27	0.19	0.19	
<b>FINAL Survey: 17422'MD / 6605.37'TVD</b>										
17,469.00	89.10	162.40	6,606.11	-9,898.58	3,903.71	10,640.50	0.00	0.00	0.00	
<b>PTB: 17469'MD / 6606.11'TVD</b>										

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
6,812.48	6,448.00	Top of Tully@6448'TVD		0.00		
6,862.42	6,461.00	Top of Hamilton@6461'TVD		0.00		
6,913.56	6,471.00	Top of Marcellus@6471'TVD		0.00		

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
4,510.00	4,509.92	6.50	-8.53	Gyro Tie In=4510'MD - PRO D+MWD+IGRF (2)	<b>RECEIVED</b> Office of Oil and Gas <b>OCT 03 2017</b> WV Department of Environmental Protection
4,546.00	4,545.90	7.49	-9.17	KOP=4546'MD - PRO D+MWD+IGRF (2)	
5,492.00	5,415.32	352.90	82.31	PRO D+ MWD Tie in=5492'MD- PRO D+MWD+OWSG (3)	
5,572.00	5,486.72	387.02	94.04	KOP=5572'MD - PRO D+MWD+OWSG (3)	
7,054.00	6,482.82	-9.05	655.76	LP=7054'MD / 6482.82'TVD	
17,422.00	6,605.37	-9,853.79	3,889.50	FINAL Survey: 17422'MD / 6605.37'TVD	
17,469.00	6,606.11	-9,898.58	3,903.71	PTB: 17469'MD / 6606.11'TVD	