



Where energy meets innovation.

## **EQT PRODUCTION**

**Tyler County, WV**

**SHR60**

**Well #514462- Marcellus**

**Main Wellbore**

**API:47-950-2255**

**Design: 514462 As Drilled Surveys**

## **Standard Survey Report**

**13 April, 2016**

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**JAN 06 2017**

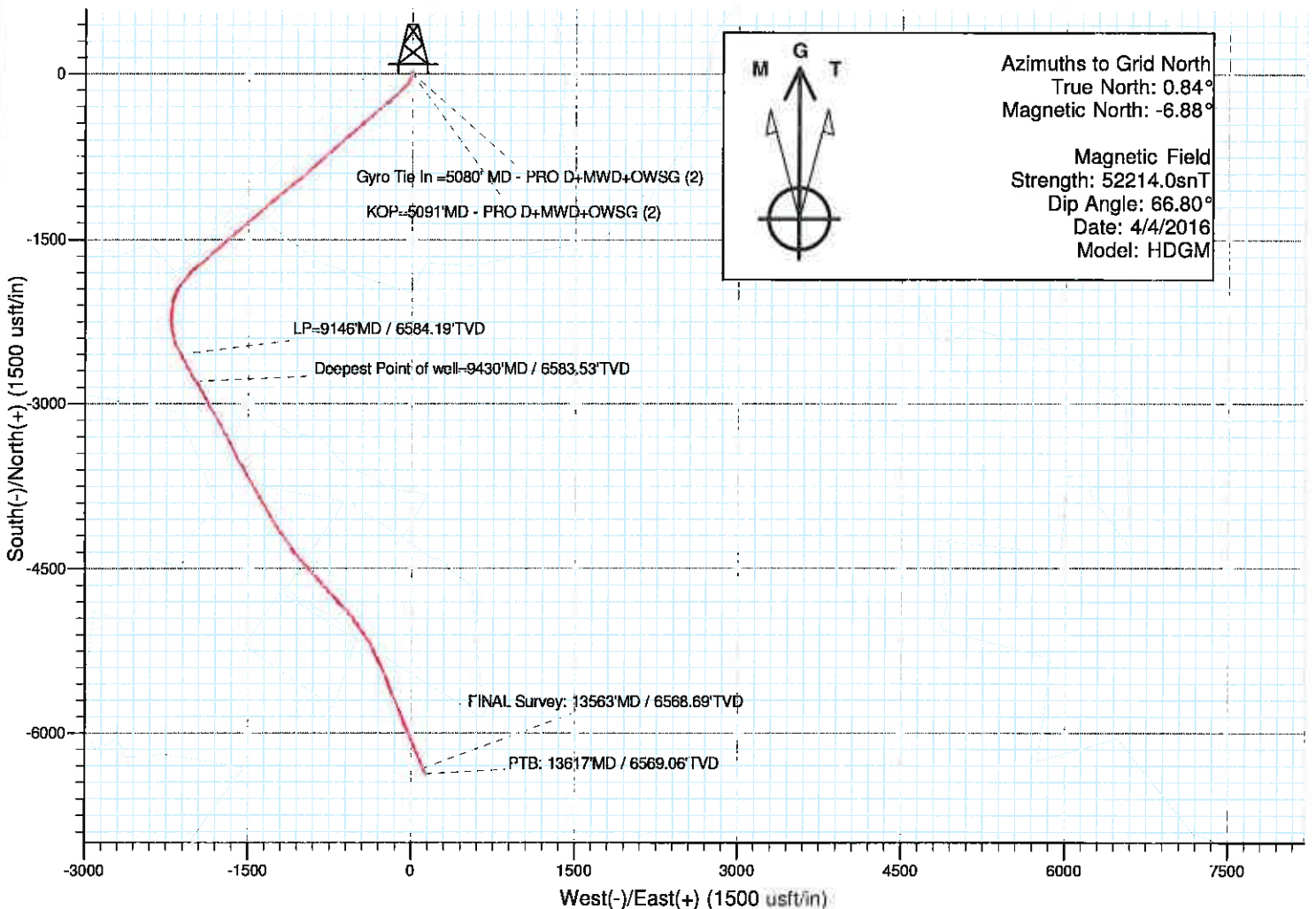
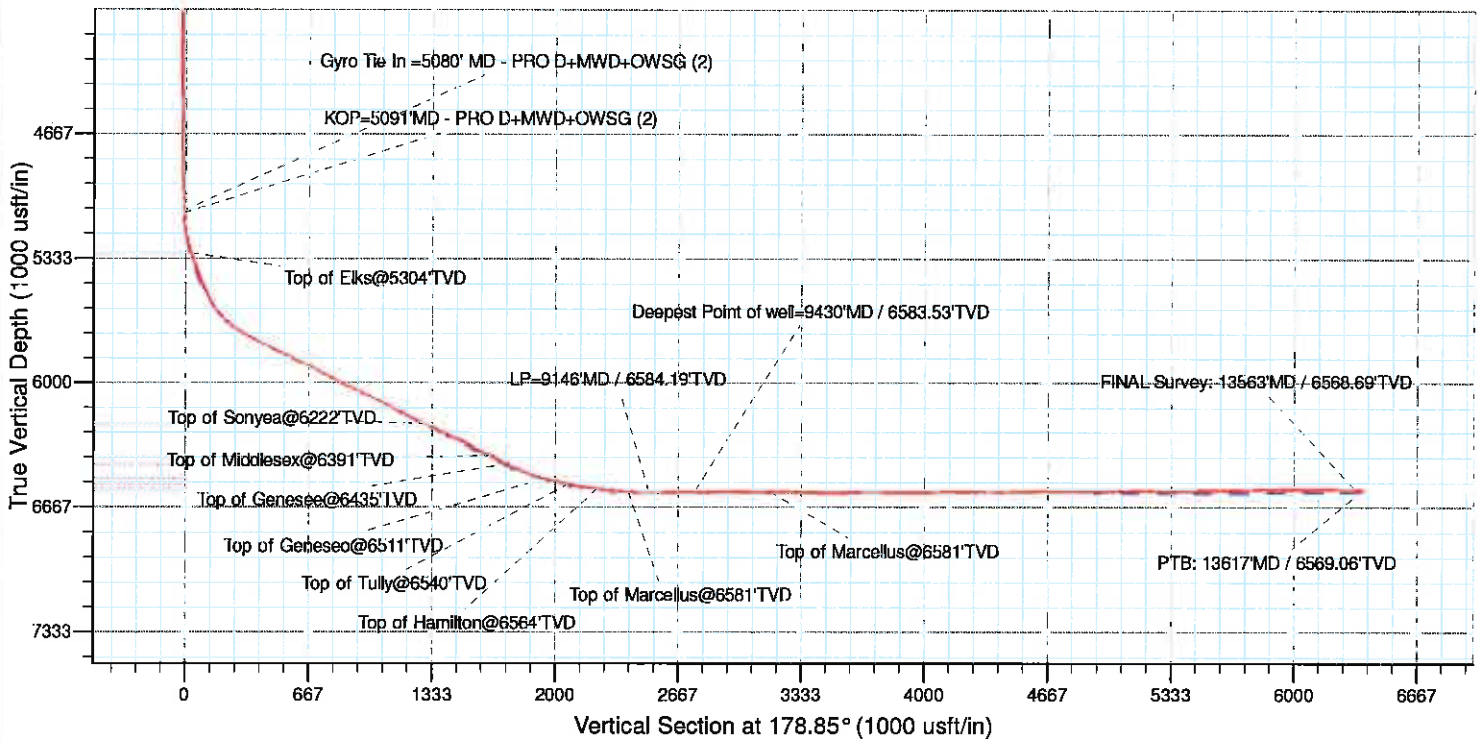


**PRO-DIRECTIONAL**  
WV Department of  
Environmental Protection



Where energy meets innovation.

Project: Tyler County, WV  
Site: SHR60  
Well: Well #514462- Marcellus  
Wellbore: Main Wellbore  
Design: 514462 As Drilled Surveys  
Elevation: GL 1011 + 23' KB @ 1034.00usft





# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #514462- Marcellus
<b>Project:</b>	Tyler County, WV	<b>TVD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Site:</b>	SHR60	<b>MD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Well:</b>	Well #514462- Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	514462 As Drilled Surveys	<b>Database:</b>	Well_Planner1

<b>Project</b>	Tyler 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>	SHR60				
<b>Site Position:</b>		<b>Northing:</b>	328,582.21 usft	<b>Latitude:</b>	39° 23' 41.02 N
<b>From:</b>	Map	<b>Easting:</b>	1,629,438.62 usft	<b>Longitude:</b>	80° 48' 40.46 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.84 °

<b>Well</b>	Well #514462- Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	328,552.21 usft	<b>Latitude:</b>	39° 23' 40.72 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,629,438.84 usft	<b>Longitude:</b>	80° 48' 40.46 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,011.00 usft

<b>Wellbore</b>	Main Wellbore				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	4/4/2016	-7.72	66.80	52,214

<b>Design</b>	514462 As Drilled Surveys				
<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	178.85	

<b>Survey Program</b>	<b>Date</b>	4/13/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
100.00	5,080.00	514462 Gyrodata Gyro (Main Wellbore)	Gyrodata_DP_MS	Gyrodata gyro-compassing and drop	
5,091.00	13,617.00	514462 PRO D MWD (Main Wellbore)	MWD - OWSG	MWD - OWSG	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.12	123.85	100.00	-0.06	0.09	0.06	0.12	0.00	0.00
200.00	0.09	135.13	200.00	-0.17	0.23	0.18	0.04	-0.03	0.00
300.00	0.18	169.67	300.00	-0.38	0.31	0.39	0.12	0.09	34.54
400.00	0.19	172.02	400.00	-0.70	0.36	0.71	0.01	0.00	0.00
500.00	0.20	173.61	500.00	-1.04	0.41	1.05	0.01	0.01	1.58
600.00	0.29	158.32	600.00	-1.45	0.52	1.46	0.01	0.00	15.28
700.00	0.30	164.95	700.00	-1.94	0.68	1.95	0.01	0.00	6.83
800.00	0.06	286.57	800.00	-2.17	0.70	2.19	0.34	-0.01	0.00
900.00	0.09	69.71	900.00	-2.13	0.72	2.15	0.14	-0.24	143.14



# Professional Directional Survey Report



**Company:** EQT PRODUCTION  
**Project:** Tyler County, WV  
**Site:** SHR80  
**Well:** Well #514462- Marcellus  
**Wellbore:** Main Wellbore  
**Design:** 514462 As Drilled Surveys

**Local Co-ordinate Reference:** Well Well #514462- Marcellus  
**TVD Reference:** GL 1011 + 23' KB @ 1034.00usft  
**MD Reference:** GL 1011 + 23' KB @ 1034 00usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** 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)
1,000.00	0.29	58.21	1,000.00	-1.97	1.01	1.99	0.20	0.20	-11.50
1,100.00	0.72	24.57	1,099.99	-1.27	1.49	1.30	0.50	0.43	-33.64
1,200.00	0.73	21.89	1,199.98	-0.10	1.99	0.14	0.04	0.01	-2.68
1,300.00	0.77	22.32	1,299.97	1.11	2.48	-1.06	0.04	0.04	0.43
1,400.00	0.80	22.76	1,399.97	2.37	3.00	-2.31	0.03	0.03	0.44
1,500.00	0.86	24.42	1,499.95	3.70	3.58	-3.63	0.06	0.06	1.66
1,600.00	0.91	30.30	1,599.94	5.07	4.30	-4.98	0.10	0.05	5.88
1,700.00	0.91	34.36	1,699.93	6.41	5.14	-6.31	0.06	0.00	4.06
1,800.00	0.98	12.21	1,799.92	7.90	5.77	-7.79	0.37	0.07	-22.15
1,900.00	0.99	4.63	1,899.90	9.60	6.02	-9.48	0.13	0.01	-7.58
2,000.00	0.98	2.39	1,999.89	11.32	6.13	-11.19	0.04	-0.01	-2.24
2,100.00	1.02	356.01	2,099.87	13.06	6.10	-12.93	0.12	0.04	-6.38
2,200.00	1.11	359.53	2,199.85	14.91	6.03	-14.79	0.11	0.09	3.52
2,300.00	1.18	347.77	2,299.84	16.89	5.81	-16.77	0.24	0.07	-11.76
2,400.00	1.20	343.51	2,399.81	18.90	5.29	-18.79	0.09	0.02	-4.26
2,500.00	1.13	335.57	2,499.79	20.80	4.59	-20.71	0.18	-0.07	-7.94
2,600.00	1.08	328.32	2,599.77	22.50	3.88	-22.42	0.15	-0.05	-7.25
2,700.00	1.09	322.84	2,699.76	24.06	2.61	-24.00	0.10	0.01	-5.48
2,800.00	0.95	320.48	2,799.74	25.46	1.51	-25.42	0.15	-0.14	-2.36
2,900.00	0.89	310.84	2,899.73	26.49	0.53	-26.48	0.29	-0.26	-9.64
3,000.00	0.51	295.14	2,999.72	27.07	-0.33	-27.08	0.24	-0.18	-15.70
3,100.00	0.38	278.10	3,099.72	27.30	-1.06	-27.31	0.20	-0.13	-19.04
3,200.00	0.42	281.20	3,199.72	27.41	-1.75	-27.44	0.05	0.04	5.10
3,300.00	0.30	250.17	3,299.72	27.39	-2.36	-27.43	0.22	-0.12	-31.03
3,400.00	0.30	255.75	3,399.72	27.23	-2.86	-27.29	0.03	0.00	5.58
3,500.00	0.35	235.81	3,499.71	27.00	-3.36	-27.06	0.12	0.05	-19.94
3,600.00	0.36	241.99	3,599.71	26.68	-3.89	-26.75	0.04	0.01	6.18
3,700.00	0.35	239.11	3,699.71	26.38	-4.43	-26.46	0.02	-0.01	-2.88
3,800.00	0.35	233.10	3,799.71	26.03	-4.94	-26.13	0.04	0.00	-6.01
3,900.00	0.38	224.21	3,899.71	25.61	-5.41	-25.72	0.06	0.03	-8.89
4,000.00	0.58	245.67	3,999.70	25.17	-6.11	-25.29	0.27	0.20	21.46
4,100.00	0.57	253.04	4,099.70	24.81	-7.04	-24.95	0.07	-0.01	7.37
4,200.00	0.53	246.86	4,199.69	24.49	-7.95	-24.64	0.07	-0.04	-6.18
4,300.00	0.55	232.28	4,299.69	24.01	-8.75	-24.18	0.14	0.02	-14.58
4,400.00	0.78	210.24	4,399.68	23.13	-9.47	-23.32	0.34	0.23	-22.04
4,500.00	0.96	210.97	4,499.67	21.82	-10.25	-22.02	0.18	0.18	0.73
4,600.00	0.88	215.54	4,599.66	20.48	-11.12	-20.70	0.11	-0.08	4.57
4,700.00	0.92	210.87	4,699.65	19.17	-11.98	-19.40	0.08	0.04	-4.87
4,800.00	0.95	215.52	4,799.63	17.80	-12.88	-18.06	0.08	0.03	4.85
4,900.00	0.97	201.10	4,899.62	16.34	-13.66	-16.61	0.24	0.02	-14.42
5,000.00	0.85	196.24	4,999.61	14.84	-14.17	-15.12	0.14	-0.12	-4.86
5,080.00	0.78	206.17	5,079.60	13.78	-14.58	-14.07	0.20	-0.09	12.41

Gyro Tie In =5080' MD - PRO D+MWD+OWSG (2)



# Professional Directional Survey Report



**Company:** EQT PRODUCTION  
**Project:** Tyler County, WV  
**Site:** SHR60  
**Well:** Well #514462- Marcellus  
**Wellbore:** Main Wellbore  
**Design:** 514462 As Drilled Surveys

**Local Co-ordinate Reference:** Well Well #514462- Marcellus  
**TVD Reference:** GL 1011 + 23' KB @ 1034.00usft  
**MD Reference:** GL 1011 + 23' KB @ 1034.00usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** 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)
5,091.00	0.70	215.40	5,090.60	13.66	-14.65	-13.95	1.30	-0.73	83.91
<b>KOP=5091'MD - PRO D+MWD+OWSG (2)</b>									
5,121.00	2.40	178.60	5,120.59	12.88	-14.72	-13.17	6.35	5.67	-129.33
5,154.00	6.50	167.40	5,153.48	10.37	-14.27	-10.65	12.57	12.42	-27.88
5,185.00	10.30	164.50	5,184.14	5.98	-13.15	-6.24	12.33	12.26	-9.35
5,217.00	13.70	174.20	5,215.44	-0.55	-12.00	0.31	12.32	10.63	30.31
5,248.00	16.00	183.80	5,245.41	-8.47	-11.91	8.22	10.84	7.42	30.97
5,279.00	17.80	190.10	5,275.07	-17.39	-13.03	17.13	8.28	5.81	20.32
5,309.51	19.23	195.74	5,304.00	-26.82	-15.21	26.51	7.50	4.67	18.50
<b>Top of Elks@5304'TVD</b>									
5,311.00	19.30	196.00	5,305.41	-27.30	-15.34	26.98	7.50	4.95	17.09
5,342.00	20.00	201.90	5,334.61	-37.14	-18.73	36.76	6.78	2.26	19.03
5,374.00	21.50	209.20	5,364.54	-47.34	-23.64	46.85	9.33	4.69	22.81
5,405.00	24.60	214.70	5,393.06	-57.61	-30.08	56.99	12.17	10.00	17.74
5,437.00	27.00	217.30	5,421.87	-68.86	-36.28	68.08	8.29	7.50	8.13
5,468.00	29.90	218.80	5,449.12	-80.48	-47.39	79.52	9.63	9.35	4.84
5,500.00	32.10	221.00	5,476.55	-93.12	-57.96	91.94	7.73	6.88	6.88
5,531.00	34.80	223.20	5,502.42	-105.79	-69.42	104.37	9.55	8.71	7.10
5,562.00	37.40	224.40	5,527.46	-118.96	-82.07	117.29	8.69	8.39	3.87
5,594.00	40.50	225.70	5,552.35	-133.17	-96.31	131.21	10.02	9.69	4.06
5,625.00	43.90	226.90	5,575.31	-147.55	-111.37	145.28	11.27	10.97	3.87
5,657.00	47.30	227.60	5,597.69	-163.06	-128.16	160.45	10.74	10.63	2.19
5,688.00	50.90	228.30	5,617.99	-178.75	-145.55	175.79	11.74	11.61	2.26
5,720.00	54.30	228.90	5,637.42	-195.55	-164.62	192.21	10.73	10.63	1.88
5,751.00	57.60	228.80	5,654.78	-212.45	-183.96	208.72	10.65	10.65	-0.32
5,783.00	61.30	228.70	5,671.04	-230.62	-204.67	226.47	11.57	11.56	-0.31
5,814.00	64.70	229.10	5,685.11	-248.78	-225.49	244.20	11.03	10.97	1.29
5,846.00	68.10	229.50	5,697.92	-267.89	-247.72	262.87	10.69	10.63	1.25
5,877.00	69.80	229.60	5,709.05	-286.66	-269.73	281.19	5.49	5.48	0.32
5,940.00	70.30	229.20	5,730.55	-325.20	-314.69	318.82	0.99	0.79	-0.63
6,034.00	71.10	229.30	5,761.62	-383.11	-381.90	375.37	0.86	0.85	0.11
6,128.00	72.40	229.70	5,791.05	-441.09	-449.78	431.97	1.44	1.38	0.43
6,223.00	73.70	230.00	5,818.75	-499.68	-519.24	489.16	1.40	1.37	0.32
6,318.00	71.80	228.30	5,846.92	-559.01	-587.87	547.10	2.63	-2.00	-1.79
6,412.00	72.80	228.30	5,875.50	-618.58	-654.73	605.32	1.06	1.06	0.00
6,506.00	73.80	227.90	5,902.51	-678.71	-721.74	664.09	1.14	1.06	-0.43
6,600.00	71.20	229.60	5,930.78	-737.82	-788.13	721.83	3.26	-2.77	0.11
6,695.00	71.70	229.50	5,961.00	-796.25	-857.67	778.88	0.54	0.64	0.45
6,789.00	72.30	229.10	5,990.05	-854.55	-925.44	835.80	0.76	0.11	-0.53
6,883.00	72.40	228.60	6,018.55	-913.49	-992.89	893.38	0.52	0.00	3.58
6,978.00	72.40	232.00	6,047.28	-971.32	-1,062.55	949.80	3.41	0.00	0.00
7,072.00	73.70	232.00	6,074.69	-1,026.68	-1,133.40	1,003.73	1.38	1.26	0.00
7,167.00	74.90	231.00	6,100.39	-1,083.61	-1,204.97	1,059.21	1.62	1.26	0.53
7,261.00	72.10	230.50	6,127.09	-1,140.63	-1,274.76	1,114.82	3.04	1.26	0.53

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**JAN 06 2017**  
 WV Department of  
 Environmental Protection





# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #514462- Marcellus
<b>Project:</b>	Tyler County, WV	<b>TVD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Site:</b>	SHR60	<b>MD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Well:</b>	Well #514462- Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	514462 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)
7,355.00	73.60	230.50	6,154.80	-1,197.76	-1,344.07	1,170.55	1.60	1.60	0.00
7,449.00	71.10	229.70	6,183.30	-1,255.21	-1,412.79	1,226.60	2.78	-2.66	-0.85
7,543.00	72.80	229.90	6,212.43	-1,312.90	-1,481.05	1,282.91	1.82	1.81	0.21
7,575.69	73.14	229.83	6,222.00	-1,333.04	-1,504.94	1,302.57	1.07	1.05	-0.21
<b>Top of Sonyea@6222'TVD</b>									
7,638.00	73.80	229.70	6,239.73	-1,371.63	-1,550.55	1,340.23	1.07	1.05	-0.21
7,732.00	75.40	229.00	6,264.69	-1,430.66	-1,619.30	1,397.88	1.85	1.70	-0.74
7,826.00	72.80	228.80	6,290.44	-1,490.09	-1,687.42	1,455.92	2.77	-2.77	-0.21
7,920.00	71.80	228.80	6,319.02	-1,549.07	-1,754.80	1,513.54	1.06	-1.06	0.00
8,015.00	72.30	228.30	6,348.30	-1,608.90	-1,822.54	1,572.00	0.73	0.53	-0.53
8,109.00	71.70	228.80	6,377.34	-1,668.08	-1,889.54	1,629.82	0.81	-0.64	0.53
8,152.82	71.98	228.38	6,391.00	-1,695.62	-1,920.77	1,656.72	1.11	0.64	-0.96
<b>Top of Middlesex@6391'TVD</b>									
8,203.00	72.30	227.90	6,406.39	-1,727.49	-1,956.34	1,687.88	1.11	0.64	-0.96
8,297.00	72.40	227.90	6,434.89	-1,787.54	-2,022.80	1,746.59	0.11	0.11	0.00
8,297.36	72.40	227.88	6,435.00	-1,787.77	-2,023.06	1,746.81	4.47	-0.02	-4.69
<b>Top of Genesee@6435'TVD</b>									
8,329.00	72.40	226.40	6,444.57	-1,808.29	-2,045.17	1,766.88	4.47	0.00	-4.69
8,360.00	72.10	223.70	6,454.02	-1,829.14	-2,066.06	1,787.31	8.35	-0.97	-8.71
8,392.00	71.70	219.80	6,463.97	-1,851.83	-2,086.31	1,809.58	11.65	-1.25	-12.19
8,423.00	72.50	216.20	6,473.50	-1,875.07	-2,104.46	1,832.46	11.35	2.58	-11.61
8,455.00	73.70	212.90	6,482.80	-1,900.29	-2,121.82	1,857.32	10.56	3.75	-10.31
8,486.00	75.00	210.00	6,491.17	-1,925.75	-2,137.39	1,882.46	9.94	4.19	-9.35
8,518.00	75.40	206.90	6,499.34	-1,952.95	-2,152.13	1,909.36	9.45	1.25	-9.69
8,549.00	76.20	204.30	6,506.95	-1,980.05	-2,165.11	1,936.20	8.53	2.58	-8.39
8,566.12	76.41	202.59	6,511.00	-1,995.30	-2,171.73	1,951.32	9.80	1.22	-10.01
<b>Top of Genesee@6511'TVD</b>									
8,581.00	76.60	201.10	6,514.47	-2,008.74	-2,177.11	1,964.64	9.80	1.28	-9.99
8,612.00	77.20	197.90	6,521.50	-2,037.20	-2,187.19	1,992.89	10.24	1.94	-10.32
8,644.00	77.80	194.20	6,528.43	-2,067.21	-2,195.82	2,022.73	11.44	1.88	-11.56
8,675.00	78.40	190.80	6,534.82	-2,096.82	-2,202.39	2,052.20	10.91	1.94	-10.97
8,701.50	79.08	187.81	6,540.00	-2,122.47	-2,206.59	2,077.76	11.37	2.57	-11.29
<b>Top of Tully@6540'TVD</b>									
8,706.00	79.20	187.30	6,540.85	-2,126.85	-2,207.17	2,082.12	11.37	2.64	-11.26
8,738.00	80.10	184.60	6,546.60	-2,158.16	-2,210.43	2,113.36	8.76	2.81	-8.44
8,769.00	81.10	182.40	6,551.66	-2,188.68	-2,212.30	2,143.84	7.71	3.23	-7.10
8,801.00	81.80	179.40	6,556.42	-2,220.32	-2,212.79	2,175.48	9.53	2.19	-8.99
8,832.00	82.20	176.40	6,560.73	-2,250.99	-2,211.67	2,206.15	9.67	2.50	-8.68
8,857.06	82.83	174.68	6,564.00	-2,275.76	-2,209.74	2,230.95	7.26	2.50	-8.68
<b>Top of Hamilton@6564'TVD</b>									
8,864.00	83.00	174.20	6,564.86	-2,282.62	-2,209.07	2,237.82	7.26	2.50	-8.68
8,895.00	84.20	171.70	6,568.31	-2,313.19	-2,205.29	2,268.46	8.90	3.87	-8.06
8,926.00	84.40	168.70	6,571.39	-2,343.58	-2,200.04	2,298.95	9.65	0.65	-9.88
8,958.00	84.30	165.60	6,574.54	-2,374.62	-2,192.95	2,330.13	9.65	0.65	-9.88

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WV Department of  
Environmental Protection

**Company:** EQT PRODUCTION  
**Project:** Tyler County, WV  
**Site:** SHR60  
**Well:** Well #514462- Marcellus  
**Wellbore:** Main Wellbore  
**Design:** 514462 As Drilled Surveys

**Local Co-ordinate Reference:** Well Well #514462- Marcellus  
**TVD Reference:** GL 1011 + 23' KB @ 1034.00usft  
**MD Reference:** GL 1011 + 23' KB @ 1034.00usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** 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)
8,989.00	84.10	162.60	6,577.68	-2,404.28	-2,184.51	2,359.95	9.65	-0.65	-9.68
9,021.00	85.20	160.20	6,580.66	-2,434.47	-2,174.34	2,390.34	8.22	3.44	-7.50
9,025.15	85.43	159.89	6,581.00	-2,438.36	-2,172.93	2,394.26	9.21	5.47	-7.43
<b>Top of Marcellus@6581'TVD</b>									
9,052.00	86.90	157.90	6,582.80	-2,463.35	-2,163.29	2,419.44	9.21	5.49	-7.42
9,146.00	91.40	152.50	6,584.19	-2,548.62	-2,123.89	2,505.48	7.48	4.79	-5.74
<b>LP=9146'MD / 6584.19'TVD</b>									
9,241.00	89.80	150.60	6,583.20	-2,632.14	-2,078.63	2,589.89	2.61	-1.68	-2.00
9,335.00	89.80	150.30	6,583.53	-2,713.91	-2,032.28	2,672.57	0.32	0.00	-0.32
9,430.00	90.20	149.80	6,583.53	-2,796.22	-1,984.85	2,755.82	0.67	0.42	-0.53
<b>Deepest Point of well=9430'MD / 6583.53'TVD</b>									
9,524.00	90.00	149.20	6,583.36	-2,877.21	-1,937.14	2,837.76	0.67	-0.21	-0.64
9,618.00	90.90	151.00	6,582.62	-2,958.70	-1,890.29	2,920.16	2.14	0.96	1.91
9,713.00	90.70	150.40	6,581.30	-3,041.53	-1,843.80	3,003.92	0.67	-0.21	-0.63
9,807.00	90.20	148.90	6,580.56	-3,122.65	-1,796.31	3,085.97	1.68	-0.53	-1.60
9,902.00	89.10	152.60	6,581.14	-3,205.52	-1,749.90	3,169.75	4.06	-1.16	3.89
9,996.00	89.10	152.90	6,582.62	-3,289.07	-1,706.86	3,254.15	0.32	0.00	0.32
10,091.00	89.50	153.90	6,583.78	-3,374.01	-1,664.33	3,339.93	1.13	0.42	1.05
10,185.00	88.40	152.60	6,585.50	-3,457.93	-1,622.03	3,424.68	1.81	-1.17	-1.38
10,279.00	90.70	150.40	6,586.24	-3,540.53	-1,577.18	3,508.16	3.39	2.45	-2.34
10,373.00	90.80	149.90	6,585.01	-3,622.05	-1,530.40	3,590.61	0.54	0.11	-0.53
10,468.00	90.80	148.40	6,583.88	-3,703.60	-1,481.69	3,673.12	1.58	0.00	-1.58
10,562.00	89.30	151.00	6,583.60	-3,784.75	-1,434.27	3,755.20	3.19	-1.60	2.77
10,657.00	89.50	150.30	6,584.59	-3,867.55	-1,387.71	3,838.92	0.77	0.21	-0.74
10,751.00	89.90	150.00	6,585.08	-3,949.08	-1,340.92	3,921.37	0.53	0.43	-0.32
10,845.00	90.80	149.90	6,584.51	-4,030.44	-1,293.85	4,003.66	0.96	0.96	-0.11
10,940.00	91.10	146.70	6,582.94	-4,111.25	-1,243.95	4,085.45	3.38	0.32	-3.37
11,034.00	90.40	144.30	6,581.70	-4,188.70	-1,190.71	4,163.96	2.66	-0.74	-2.55
11,128.00	89.80	143.20	6,581.54	-4,264.51	-1,135.13	4,240.86	1.33	-0.64	-1.17
11,222.00	89.90	142.40	6,581.79	-4,339.38	-1,078.30	4,316.86	0.86	0.11	-0.85
11,317.00	90.30	140.30	6,581.62	-4,413.57	-1,018.97	4,392.23	2.25	0.42	-2.21
11,411.00	90.90	139.80	6,580.64	-4,485.62	-958.61	4,465.48	0.63	0.64	-0.53
11,505.00	90.80	137.60	6,579.24	-4,556.23	-898.58	4,537.32	2.34	-0.11	-2.34
11,599.00	90.70	137.20	6,578.01	-4,625.42	-832.96	4,607.77	0.44	-0.11	-0.43
11,694.00	89.90	136.90	6,577.51	-4,694.95	-768.24	4,678.59	0.90	-0.84	-0.32
11,788.00	89.80	136.60	6,577.76	-4,763.42	-703.83	4,748.33	0.34	-0.11	-0.32
11,883.00	90.40	136.60	6,577.59	-4,832.44	-638.56	4,818.65	0.63	0.63	0.00
11,977.00	90.60	139.40	6,576.77	-4,902.29	-575.67	4,889.75	2.99	0.21	2.98
12,071.00	90.80	141.50	6,575.63	-4,974.76	-515.82	4,963.40	2.24	0.21	2.23
12,165.00	90.40	144.90	6,574.64	-5,050.01	-459.52	5,039.77	3.64	-0.43	3.62
12,259.00	90.60	148.30	6,573.82	-5,128.47	-407.79	5,119.25	3.62	0.21	3.62
12,354.00	90.00	152.40	6,573.32	-5,211.01	-360.80	5,202.72	4.36	-0.63	4.32
12,448.00	89.80	156.20	6,573.49	-5,295.70	-320.05	5,288.21	4.05	-0.21	4.04
12,542.00	90.10	156.30	6,573.57	-5,381.74	-282.19	5,374.99	0.34	0.32	0.11



# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #514462- Marcellus
<b>Project:</b>	Tyler County, WV	<b>TVD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Site:</b>	SHR60	<b>MD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Well:</b>	Well #514462- Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	514462 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)
12,636.00	90.20	155.60	6,573.32	-5,467.58	-243.88	5,461.58	0.75	0.11	-0.74
12,731.00	90.50	158.30	6,572.74	-5,554.98	-206.69	5,549.72	2.86	0.32	2.84
12,825.00	90.70	158.40	6,571.76	-5,642.35	-172.01	5,637.76	0.24	0.21	0.11
12,919.00	91.20	158.40	6,570.20	-5,729.73	-137.41	5,725.82	0.53	0.53	0.00
13,014.00	91.70	158.00	6,567.80	-5,817.91	-102.14	5,814.69	0.67	0.53	-0.42
13,108.00	90.20	158.00	6,566.24	-5,905.05	-66.94	5,902.52	1.60	-1.60	0.00
13,202.00	90.20	157.20	6,565.91	-5,991.96	-31.12	5,990.13	0.85	0.00	-0.85
13,296.00	90.80	156.90	6,565.09	-6,078.51	5.54	6,077.40	0.71	0.64	-0.32
13,391.00	88.40	157.40	6,565.75	-6,166.05	42.42	6,165.66	2.58	-2.53	0.53
13,485.00	89.10	157.30	6,567.80	-6,252.78	78.61	6,253.10	0.75	0.74	-0.11
13,563.00	89.60	156.70	6,568.69	-6,324.57	109.09	6,325.49	1.00	0.64	-0.77
<b>FINAL Survey: 13563'MD / 6568.69'TVD</b>									
13,617.00	89.60	156.70	6,569.06	-6,374.17	130.45	6,375.50	0.00	0.00	0.00
<b>PTB: 13617'MD / 6569.06'TVD</b>									

### Design Targets

Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
514464 Plat TD2 p5 - hit/miss target - Shape	0.00	0.00	6,600.00	-9,051.72	997.63	319,500.49	1,630,436.47	39° 22' 11.41 N	80° 48' 26.07 W
- actual wellpath misses target center by 2814.65usft at 13617.00usft MD (6569.06 TVD, -6374.17 N, 130.45 E)									
- Point									
514462 Plat LP2 p5 - hit/miss target - Shape	0.00	360.00	6,600.00	-1,900.42	-2,278.99	326,651.79	1,627,159.85	39° 23' 21.61 N	80° 49' 9.13 W
- actual wellpath misses target center by 167.23usft at 8549.00usft MD (6506.95 TVD, -1980.05 N, -2165.11 E)									
- Point									
514462 LP @1779' VS ( - hit/miss target - Shape	0.00	360.00	6,600.00	-2,035.58	-2,235.00	326,516.63	1,627,203.84	39° 23' 20.28 N	80° 49' 8.54 W
- actual wellpath misses target center by 87.37usft at 8640.39usft MD (6527.66 TVD, -2063.79 N, -2194.95 E)									
- Point									
514464 Plat TD p5 - hit/miss target - Shape	0.00	0.00	6,600.00	-5,513.04	1,298.90	323,039.16	1,630,737.74	39° 22' 46.42 N	80° 48' 22.89 W
- actual wellpath misses target center by 1411.95usft at 13279.30usft MD (6565.31 TVD, -6063.15 N, -1.01 E)									
- Point									
514462 LP @1734' VS - hit/miss target - Shape	0.00	360.00	6,600.00	-1,991.33	-2,237.34	326,560.88	1,627,201.50	39° 23' 20.72 N	80° 49' 8.58 W
- actual wellpath misses target center by 103.40usft at 8603.99usft MD (6519.72 TVD, -2029.78 N, -2184.74 E)									
- Point									
514462 LP @1779' VS † - hit/miss target - Shape	0.00	360.00	6,606.00	-2,008.27	-2,235.00	326,543.94	1,627,203.84	39° 23' 20.55 N	80° 49' 8.55 W
- actual wellpath misses target center by 101.15usft at 8616.06usft MD (6522.40 TVD, -2040.97 N, -2188.39 E)									
- Point									





## Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #514462- Marcellus
<b>Project:</b>	Tyler County, WV	<b>TVD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Site:</b>	SHR60	<b>MD Reference:</b>	GL 1011 + 23' KB @ 1034.00usft
<b>Well:</b>	Well #514462- Marcellus	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	514462 As Drilled Surveys	<b>Database:</b>	Well_Planner1

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,309.51	5,304.00	Top of Elks@5304'TVD		0.00	
7,575.69	6,222.00	Top of Sonyea@6222'TVD		0.00	
8,152.82	6,391.00	Top of Middlesex@6391'TVD		0.00	
8,297.36	6,435.00	Top of Genesee@6435'TVD		0.00	
8,566.12	6,511.00	Top of Genesee@6511'TVD		0.00	
8,701.50	6,540.00	Top of Tully@6540'TVD		0.00	
8,857.06	6,564.00	Top of Hamilton@6564'TVD		0.00	
9,025.15	6,581.00	Top of Marcellus@6581'TVD		0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
5,080.00	5,079.60	13.78	-14.58	Gyro Tie In =5080' MD - PRO D+MWD+OWSG (2)	
5,091.00	5,090.60	13.66	-14.65	KOP=5091'MD - PRO D+MWD+OWSG (2)	
9,146.00	6,584.19	-2,548.62	-2,123.89	LP=9146'MD / 6584.19'TVD	
9,430.00	6,583.53	-2,796.22	-1,984.85	Deepest Point of well=9430'MD / 6583.53'TVD	
13,563.00	6,568.69	-6,324.57	109.09	FINAL Survey: 13563'MD / 6568.69'TVD	
13,617.00	6,569.06	-6,374.17	130.45	PTB: 13617'MD / 6569.06'TVD	

<b>Checked By:</b> _____	<b>Approved By:</b> _____	<b>Date:</b> _____
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