



Where energy meets innovation.

EQT PRODUCTION

Tyler County, WV

SHR60

Well #514463- Marcellus

Main Wellbore

Design: 514463 As Drilled Surveys

Standard Survey Report

13 September, 2016

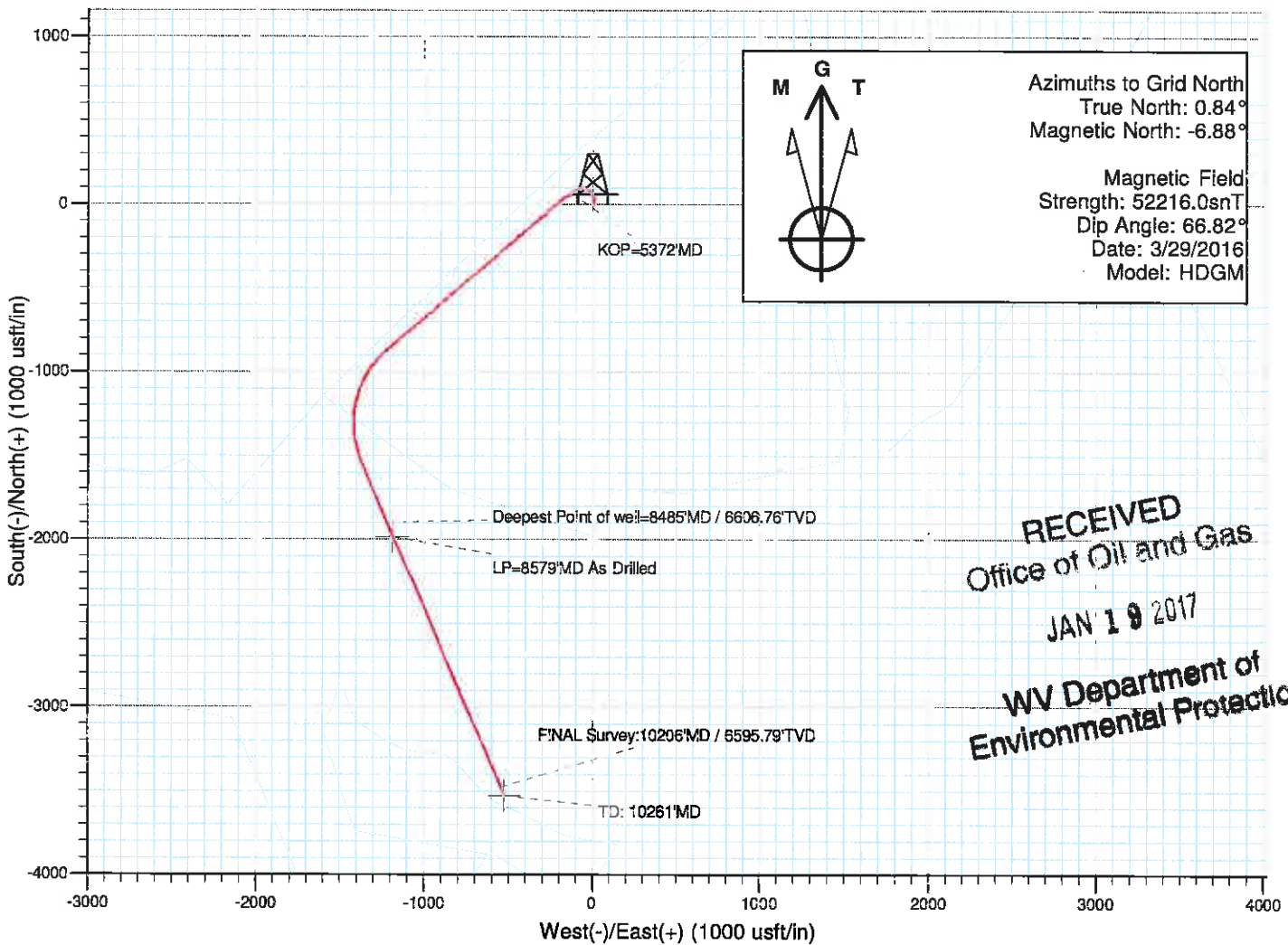
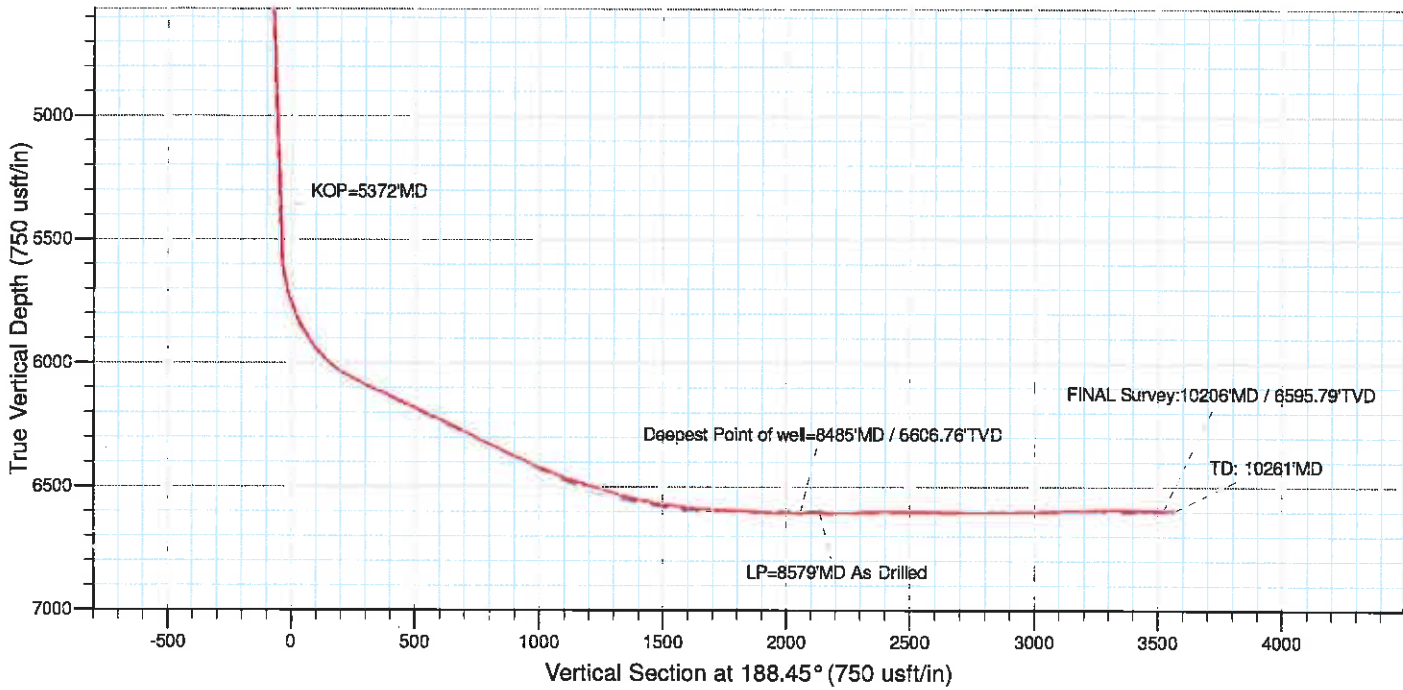


02/03/2017



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Project: Tyler County, WV
Site: SHR60
Well: Well #514463- Marcellus
Wellbore: Main Wellbore
Design: 514463 As Drilled Surveys
Elevation: GL 1011 + 23' KB @ 1034.00usft



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Environmental Protection

02/03/2017



Professional Directional Survey Report



Company:	EQT PRODUCTION	Local Co-ordinate Reference:	Well Well #514463- Marcellus
Project:	Tyler County, WV	TVD Reference:	GL 1011 + 23' KB @ 1034.00usft
Site:	SHR60	MD Reference:	GL 1011 + 23' KB @ 1034 00usft
Well:	Well #514463- Marcellus	North Reference:	Grd
Wellbore:	Main Wellbore	Survey Calculation Method:	Minimum Curvature
Design:	514463 As Drilled Surveys	Database:	Well_Planner1

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

Site	SHR60				
Site Position:		Northing:	328,582.21 usft	Latitude:	39° 23' 41.019 N
From:	Map	Easting:	1,629,438.62 usft	Longitude:	80° 48' 40.465 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.84 °

Well	Well: #514463- Marcellus					
Well Position	+N/-S	0.00 usft	Northing:	328,537.21 usft	Latitude:	39° 23' 40.574 N
	+E/-W	0.00 usft	Easting:	1,629,438.95 usft	Longitude:	80° 48' 40.452 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,011.00 usft

Wellbore	Main Wellbore				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	3/29/2016	-7.72	66.82	52,216

Design	514463 As Drilled Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	188.45	

Survey Program	Date 9/13/2016				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.00	5,350.00	VES Gyro (Main Wellbore)	VES Spec AVG 04-09-15	Triaxial Continuous Gyro Model	
5,372.00	10,261.00	514463 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)	Turn 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
110.00	0.20	134.90	110.00	-0.14	0.14	0.11	0.18	0.18	0.00
210.00	0.22	176.04	210.00	-0.45	0.27	0.41	0.15	0.02	0.00
310.00	0.12	214.11	310.00	-0.73	0.23	0.69	0.15	-0.05	38.07
410.00	0.07	331.52	410.00	-0.76	0.14	0.73	0.16	-0.05	38.07
510.00	0.08	308.47	510.00	-0.66	0.06	0.65	0.05	0.01	-23.05
610.00	0.12	36.74	610.00	-0.54	0.06	0.52	0.14	0.04	88.27
710.00	0.16	19.36	710.00	-0.32	0.17	0.29	0.06	0.04	-17.38
810.00	0.27	353.42	810.00	0.04	0.19	-0.07	0.14	0.11	-25.94
910.00	0.28	73.87	910.00	0.35	0.40	-0.40	0.36	0.01	80.45

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Professional Directional Survey Report



Company:	EQT PRODUCTION	Local Co-ordinate Reference:	Well Well #514463- Marcellus
Project:	Tyler County, WV	TVD Reference:	GL 1011 + 23' KB @ 1034 00usft
Site:	SHR60	MD Reference:	GL 1011 + 23' KB @ 1034 00usft
Well:	Well #514463- Marcellus	North Reference:	Gnd
Wellbore:	Main Wellbore	Survey Calculation Method:	Minimum Curvature
Design:	514463 As Drilled Surveys	Database:	Well_Planner1

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)
1,010.00	0.31	34.75	1,010.00	0.64	0.79	-0.75	0.20	0.03	-39.12
1,110.00	1.23	7.33	1,109.99	1.92	1.08	-2.06	0.97	0.92	-27.42
1,210.00	1.39	4.90	1,209.96	4.20	1.32	-4.34	0.17	0.16	-2.43
1,310.00	1.59	5.82	1,309.93	6.79	1.56	-6.94	0.20	0.20	0.92
1,410.00	1.70	4.59	1,409.88	9.64	1.82	-9.81	0.12	0.11	-1.23
1,510.00	2.03	9.47	1,509.83	12.87	2.23	-13.06	0.37	0.33	4.88
1,610.00	2.14	12.15	1,609.77	16.44	2.92	-16.69	0.15	0.11	2.68
1,710.00	2.12	15.92	1,709.70	20.05	3.82	-20.39	0.14	-0.02	3.77
1,810.00	1.99	11.09	1,809.63	23.53	4.66	-23.96	0.22	-0.13	-4.83
1,910.00	2.01	4.44	1,909.57	26.98	5.13	-27.44	0.23	0.02	-6.65
2,010.00	2.16	358.64	2,009.50	30.61	5.22	-31.05	0.26	0.15	-5.80
2,110.00	2.40	354.45	2,109.43	34.58	4.97	-34.94	0.29	0.24	-4.19
2,210.00	2.68	347.91	2,209.33	38.95	4.28	-39.16	0.40	0.28	-6.54
2,310.00	2.87	345.39	2,309.21	43.66	3.16	-43.65	0.23	0.19	-2.52
2,410.00	2.96	340.80	2,409.08	48.52	1.68	-48.24	0.25	0.09	-4.59
2,510.00	2.98	332.76	2,508.95	53.27	-0.36	-52.64	0.42	0.02	-8.04
2,610.00	3.03	327.88	2,608.81	57.82	-2.95	-56.76	0.26	0.05	-4.88
2,710.00	3.11	323.03	2,708.67	62.22	-5.99	-60.67	0.27	0.08	-4.85
2,810.00	3.10	318.29	2,808.52	66.41	-9.42	-64.31	0.26	-0.01	-4.74
2,910.00	3.11	313.30	2,908.37	70.29	-13.19	-67.59	0.27	0.01	-4.99
3,010.00	3.18	309.91	3,008.22	73.93	-17.30	-70.59	0.20	0.07	-3.39
3,110.00	3.20	307.15	3,108.07	77.39	-21.65	-73.37	0.15	0.02	-2.76
3,210.00	3.25	302.92	3,207.91	80.62	-26.25	-75.89	0.24	0.05	-4.23
3,310.00	3.23	299.77	3,307.75	83.56	-31.08	-78.09	0.18	-0.02	-3.15
3,410.00	3.30	298.70	3,407.59	86.34	-36.05	-80.11	0.09	0.07	-1.07
3,510.00	3.38	293.98	3,507.42	88.92	-41.27	-81.89	0.29	0.08	-4.72
3,610.00	3.38	291.35	3,607.24	91.19	-46.70	-83.34	0.16	0.00	-2.63
3,710.00	3.35	288.58	3,707.07	93.20	-52.22	-84.51	0.17	-0.03	-2.77
3,810.00	3.15	283.74	3,806.91	94.78	-57.66	-85.28	0.34	-0.20	-4.84
3,910.00	3.05	278.64	3,906.76	95.83	-62.96	-85.54	0.29	-0.10	-5.10
4,010.00	3.01	272.44	4,006.63	96.34	-68.21	-85.27	0.33	-0.04	-6.20
4,110.00	2.87	268.47	4,106.49	96.39	-73.34	-84.57	0.25	-0.14	-3.97
4,210.00	2.77	264.62	4,206.37	96.10	-78.24	-83.55	0.21	-0.10	-3.75
4,310.00	2.73	258.07	4,306.26	95.38	-82.98	-82.15	0.32	-0.04	-3.65
4,410.00	2.74	254.41	4,406.14	94.24	-87.81	-80.34	0.17	0.08	-3.65
4,510.00	2.82	250.28	4,506.03	92.77	-92.23	-78.21	0.22	0.08	-3.65
4,610.00	2.94	248.29	4,605.90	90.99	-96.93	-75.76	0.16	0.08	-3.65
4,710.00	3.04	242.93	4,705.76	88.84	-101.67	-72.93	0.30	0.10	-3.65
4,810.00	2.98	239.01	4,805.63	86.29	-106.26	-69.74	0.21	0.06	-3.65
4,910.00	3.05	236.72	4,905.49	83.49	-110.71	-66.32	0.14	0.07	-3.65
5,010.00	3.29	235.83	5,005.33	80.42	-115.31	-62.60	0.24	0.24	-0.89
5,110.00	3.30	232.55	5,105.17	77.06	-119.97	-58.59	0.19	0.01	-3.28
5,210.00	3.05	226.15	5,205.02	73.47	-124.18	-54.42	0.43	-0.25	-6.40

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Professional Directional Survey Report



Company: EQT PRODUCTION
Project: Tyler County, WV
Site: SHR60
Well: Well #514463- Marcellus
Wellbore: Main Wellbore
Design: 514463 As Drilled Surveys

Local Co-ordinate Reference: Well Well# 514463- Marcellus
TVD Reference: GL 1011 + 23' KB @ 1034 00usft
MD Reference: GL 1011 + 23' KB @ 1034 00usft
North Reference: Gnd
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)	
5,310.00	2.11	227.45	5,304.91	70.38	-127.45	-50.89	0.94	-0.94	1.30	
5,350.00	1.97	226.53	5,344.89	69.41	-128.49	-49.77	0.36	-0.35	-2.30	
5,372.00	1.90	226.70	5,366.88	68.90	-129.03	-49.19	0.32	-0.32	0.77	
KOP=5372'MD										
5,466.00	1.70	223.40	5,460.83	66.81	-131.12	-46.82	0.24	-0.21	-3.51	
5,529.00	2.00	221.60	5,523.80	65.31	-132.50	-45.13	0.48	0.48	-2.88	
5,561.00	4.80	230.10	5,555.74	64.04	-133.89	-43.67	8.87	8.75	26.56	
5,592.00	8.90	233.60	5,586.51	61.78	-136.82	-41.01	13.29	13.23	11.29	
5,624.00	12.10	235.60	5,617.97	58.42	-141.58	-36.98	10.06	10.00	6.25	
5,655.00	14.90	236.20	5,648.11	54.36	-147.58	-32.09	9.04	9.03	1.94	
5,686.00	18.00	235.70	5,677.84	49.45	-154.85	-26.15	10.01	10.00	-1.61	
5,718.00	21.50	235.40	5,707.95	43.33	-163.76	-18.79	10.94	10.94	-0.94	
5,750.00	24.10	234.70	5,737.45	36.22	-173.92	-10.27	8.17	8.13	-2.19	
5,781.00	26.50	233.40	5,765.47	28.44	-184.64	-1.00	7.95	7.74	-4.19	
5,813.00	29.40	231.50	5,793.74	19.29	-196.52	9.80	9.48	9.06	-5.94	
5,844.00	32.80	229.50	5,820.28	9.10	-208.86	21.69	11.46	10.97	-6.45	
5,875.00	35.10	229.40	5,845.99	-2.16	-222.02	34.76	7.42	7.42	-0.32	
5,907.00	36.80	229.10	5,871.90	-14.42	-236.25	48.98	5.34	5.31	-0.94	
5,938.00	39.10	228.50	5,896.34	-26.98	-250.59	63.51	7.51	7.42	-1.94	
5,970.00	43.20	228.60	5,920.43	-40.91	-266.37	79.61	12.81	12.81	0.31	
6,001.00	46.20	228.80	5,942.46	-55.30	-282.75	96.25	9.69	9.68	0.65	
6,032.00	48.90	228.50	5,963.38	-70.41	-299.92	113.72	8.74	8.71	-0.97	
6,064.00	52.40	228.10	5,983.67	-86.87	-316.39	132.72	10.98	10.94	-1.25	
6,095.00	56.80	228.30	6,001.62	-103.71	-337.22	152.14	14.20	14.19	0.65	
6,127.00	60.70	229.30	6,018.22	-121.72	-357.81	172.98	12.48	12.19	3.13	
6,158.00	64.40	230.10	6,032.51	-139.51	-378.79	193.66	12.15	11.94	2.58	
6,190.00	67.20	229.50	6,045.63	-158.35	-401.08	215.57	8.92	8.75	-1.88	
6,221.00	69.30	229.80	6,057.11	-176.99	-423.02	237.23	6.83	6.77	0.97	
6,316.00	69.80	228.40	6,090.31	-235.27	-490.30	304.76	1.48	0.53	-1.47	
6,410.00	70.50	226.80	6,122.23	-294.89	-555.58	373.33	1.77	0.74	-1.70	
6,504.00	70.00	230.30	6,154.00	-353.45	-621.88	440.99	3.54	-0.53	3.72	
6,599.00	71.20	230.10	6,185.55	-410.80	-690.72	507.84	1.28	1.26	-0.21	
6,693.00	70.60	229.60	6,216.31	-468.08	-758.81	574.47	0.81	-0.64	-0.53	
6,787.00	68.50	229.00	6,249.15	-525.50	-825.38	641.09	2.31	-2.23	-0.64	
6,882.00	68.90	228.10	6,283.66	-584.09	-891.72	708.79	0.96	0.88	0.08	
6,976.00	69.70	227.60	6,316.89	-643.10	-956.91	776.74	0.99	0.81	0.18	
7,071.00	69.30	230.00	6,350.16	-701.71	-1,023.86	844.55	2.42	2.42	2.53	
7,165.00	70.80	229.30	6,382.24	-758.92	-1,091.19	911.03	1.60	1.60	0.74	
7,259.00	71.10	228.40	6,412.92	-817.39	-1,158.10	978.69	0.96	0.32	-0.99	
7,353.00	71.70	228.10	6,442.90	-876.71	-1,224.56	1,047.14	0.71	0.64	-0.64	
7,385.00	72.20	225.70	6,452.82	-897.50	-1,246.78	1,070.96	7.30	7.30	-7.50	
7,416.00	73.40	222.40	6,461.98	-918.78	-1,267.38	1,095.04	10.88	10.88	-10.88	
7,447.00	74.00	219.60	6,470.69	-941.23	-1,286.88	1,120.12	8.88	8.88	-9.03	

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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)
7,479.00	74.40	216.30	6,479.40	-965.51	-1,305.81	1,146.91	10.00	1.25	-10.31
7,510.00	75.10	213.80	6,487.56	-989.99	-1,322.98	1,173.65	8.10	2.26	-8.06
7,541.00	75.30	211.60	6,495.48	-1,015.21	-1,339.17	1,200.98	6.89	0.65	-7.10
7,573.00	74.30	208.00	6,503.87	-1,042.00	-1,354.52	1,229.73	11.30	-3.13	-11.25
7,604.00	73.40	205.30	6,512.49	-1,068.61	-1,367.88	1,258.02	8.86	-2.90	-8.71
7,636.00	73.00	201.60	6,521.75	-1,096.71	-1,380.06	1,287.60	11.14	-1.25	-11.56
7,667.00	73.80	197.60	6,530.80	-1,124.69	-1,390.03	1,316.74	12.63	2.58	-12.90
7,699.00	74.90	195.00	6,539.24	-1,154.26	-1,398.67	1,347.26	8.55	3.44	-8.13
7,730.00	76.30	192.30	6,546.95	-1,183.44	-1,405.75	1,377.16	9.57	4.52	-8.71
7,762.00	77.60	188.90	6,554.18	-1,214.08	-1,411.48	1,408.31	11.12	4.06	-10.63
7,793.00	79.00	185.50	6,560.46	-1,244.19	-1,415.29	1,438.65	11.65	4.52	-10.97
7,824.00	80.30	182.70	6,566.03	-1,274.60	-1,417.47	1,469.06	9.82	4.19	-9.03
7,856.00	81.50	179.10	6,571.10	-1,308.19	-1,417.96	1,500.37	11.72	3.75	-11.25
7,887.00	82.60	176.80	6,575.39	-1,338.87	-1,416.86	1,530.56	8.16	3.55	-7.42
7,919.00	83.30	174.60	6,579.31	-1,368.53	-1,414.48	1,561.53	7.17	2.19	-6.88
7,950.00	84.30	171.30	6,582.66	-1,399.12	-1,410.70	1,591.22	11.06	3.23	-10.65
7,982.00	84.40	169.00	6,585.81	-1,430.49	-1,405.25	1,621.46	7.16	0.31	-7.19
8,013.00	85.30	167.10	6,588.60	-1,460.69	-1,398.86	1,650.39	6.76	2.90	-6.13
8,044.00	86.20	163.30	6,590.89	-1,490.58	-1,390.96	1,678.79	12.56	2.90	-12.26
8,076.00	87.50	158.80	6,592.65	-1,520.79	-1,380.59	1,707.15	14.62	4.06	-14.06
8,107.00	88.20	157.80	6,593.82	-1,549.57	-1,369.13	1,733.94	3.94	2.26	-3.23
8,201.00	87.40	157.30	6,597.43	-1,636.38	-1,333.26	1,814.53	1.00	-0.85	-0.53
8,296.00	87.40	157.30	6,601.73	-1,723.93	-1,296.64	1,895.75	0.00	0.00	0.00
8,390.00	88.90	157.20	6,604.77	-1,810.57	-1,260.31	1,976.11	1.60	1.60	-0.11
8,485.00	88.70	157.80	6,606.76	-1,898.32	-1,223.96	2,057.57	0.67	-0.21	0.63
Deepest Point of well=8485'MD / 6606.76'TVD									
8,579.00	91.30	156.10	6,606.76	-1,984.80	-1,187.16	2,137.71	3.30	2.77	-1.81
LP=8679'MD As Drilled									
8,673.00	91.30	155.90	6,604.63	-2,070.65	-1,148.94	2,217.01	0.21	0.00	-0.21
8,768.00	91.30	155.90	6,602.47	-2,157.35	-1,110.16	2,297.07	0.00	0.00	0.00
8,862.00	91.20	155.40	6,600.42	-2,242.97	-1,071.41	2,376.06	0.54	-0.11	-0.53
8,956.00	89.40	157.10	6,599.93	-2,328.30	-1,033.55	2,455.60	2.63	-1.91	1.81
9,050.00	89.70	157.10	6,600.67	-2,415.59	-996.98	2,535.87	0.32	0.32	0.00
9,145.00	89.50	157.30	6,601.33	-2,503.16	-960.17	2,617.08	0.30	-0.21	0.21
9,239.00	89.20	157.50	6,602.40	-2,589.94	-924.04	2,697.61	0.38	-0.32	0.21
9,334.00	89.30	158.50	6,603.64	-2,678.01	-888.46	2,779.50	1.08	0.11	1.05
9,428.00	91.10	159.00	6,603.31	-2,765.62	-854.39	2,861.15	1.99	0.43	0.63
9,522.00	90.70	156.80	6,601.83	-2,852.70	-819.03	2,942.08	2.30	0.43	-2.34
9,616.00	91.10	156.90	6,600.36	-2,939.12	-782.08	3,022.13	0.44	0.43	0.71
9,711.00	91.00	155.70	6,598.62	-3,026.09	-743.91	3,102.55	1.27	0.00	-1.26
9,806.00	91.00	155.40	6,598.96	-3,112.56	-704.59	3,182.30	0.32	0.00	-0.32
9,900.00	91.60	156.20	6,594.83	-3,198.27	-666.07	3,261.43	1.06	0.64	0.85
9,994.00	89.60	156.90	6,593.84	-3,284.50	-628.67	3,341.22	2.25	-2.13	0.74
10,089.00	89.40	156.90	6,594.67	-3,371.88	-591.40	3,422.18	0.21	0.21	0.00

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Professional Directional Survey Report



Company: EQT PRODUCTION
Project: Tyler County, WV
Site: SHR60
Well: Well #514463- Marcellus
Wellbore: Main Wellbore
Design: 514463 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514463- 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)	Burid Rate (°/100usft)	Turn Rate (°/100usft)
10,183.00	89.50	157.70	6,595.57	-3,458.59	-555.12	3,502.62	0.86	0.11	0.85
10,206.00	89.40	157.60	6,595.79	-3,479.86	-546.38	3,522.37	0.61	-0.43	-0.43
FINAL Survey:10206'MD / 6595.79'TVD									
10,261.00	89.40	157.60	6,596.37	-3,530.71	-525.42	3,569.59	0.00	0.00	0.00
TD: 10261'MD									

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LP=8579'MD As Drilled	0.00	0.00	0.00	-1,984.80	-1,187.16	326,552.40	1,628,251.78	39° 23' 20.787 N	80° 48' 55.203 W
- hit/miss target									
- Shape									
- actual wellpath misses target center by 2312.75usft at 0.98usft MD (0.98 TVD, 0.00 N, 0.00 E)									
- Point									
TD: 10261'MD	0.00	360.00	0.00	-3,530.71	-525.42	325,006.50	1,628,913.53	39° 23' 5.604 N	80° 48' 46.487 W
- actual wellpath misses target center by 3569.59usft at 3.70usft MD (3.70 TVD, 0.00 N, 0.00 E)									
- Point									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,372.00	5,366.88	68.90	-129.03	KOP=5372'MD
8,485.00	6,606.76	-1,898.32	-1,223.96	Deepest Point of well=8485'MD / 6606.76'TVD
8,579.00	6,606.76	-1,984.80	-1,187.16	LP=8579'MD As Drilled
10,206.00	6,595.79	-3,479.86	-546.38	FINAL Survey:10206'MD / 6595.79'TVD
10,261.00	6,596.37	-3,530.71	-525.42	TD: 10261'MD

Checked By: _____ Approved By: _____ Date: _____

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