

EQT PRODUCTION

Ritchie County, WV

PEN54

Well #514478 - Slot 514478

Main Wellbore

Design: 514478 As Drilled Surveys

Standard Survey Report

12 July, 2016

RECEIVED
Office of Oil and Gas

JUN 29 2017

WV Department of
Environmental Protection

09/15/2017



Where energy meets innovation.

Project: Ritchie County, WV
Site: PEN54
Well: Well #514478
Wellbore: Main Wellbore
Design: 514478 As Drilled Surveys

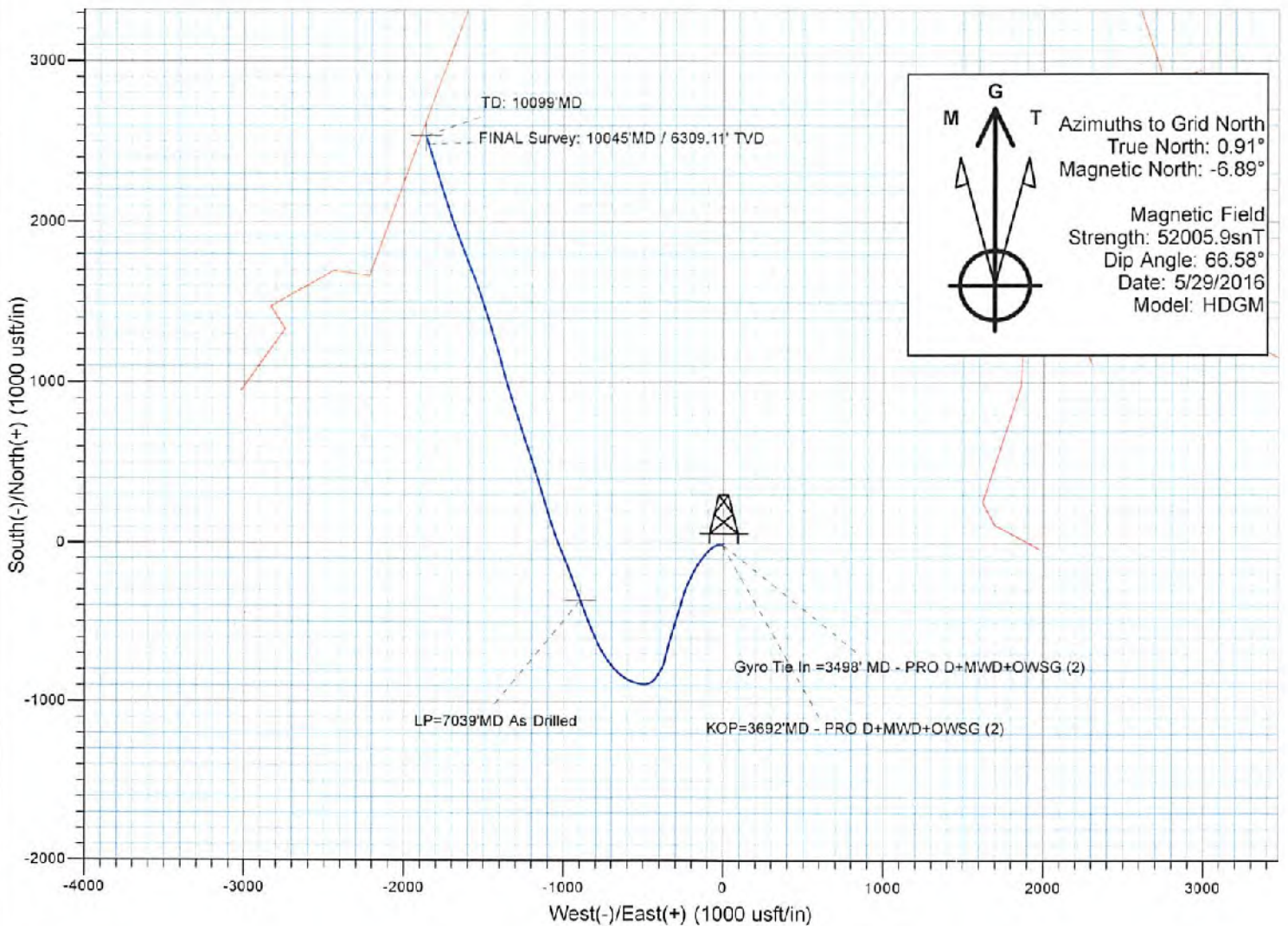
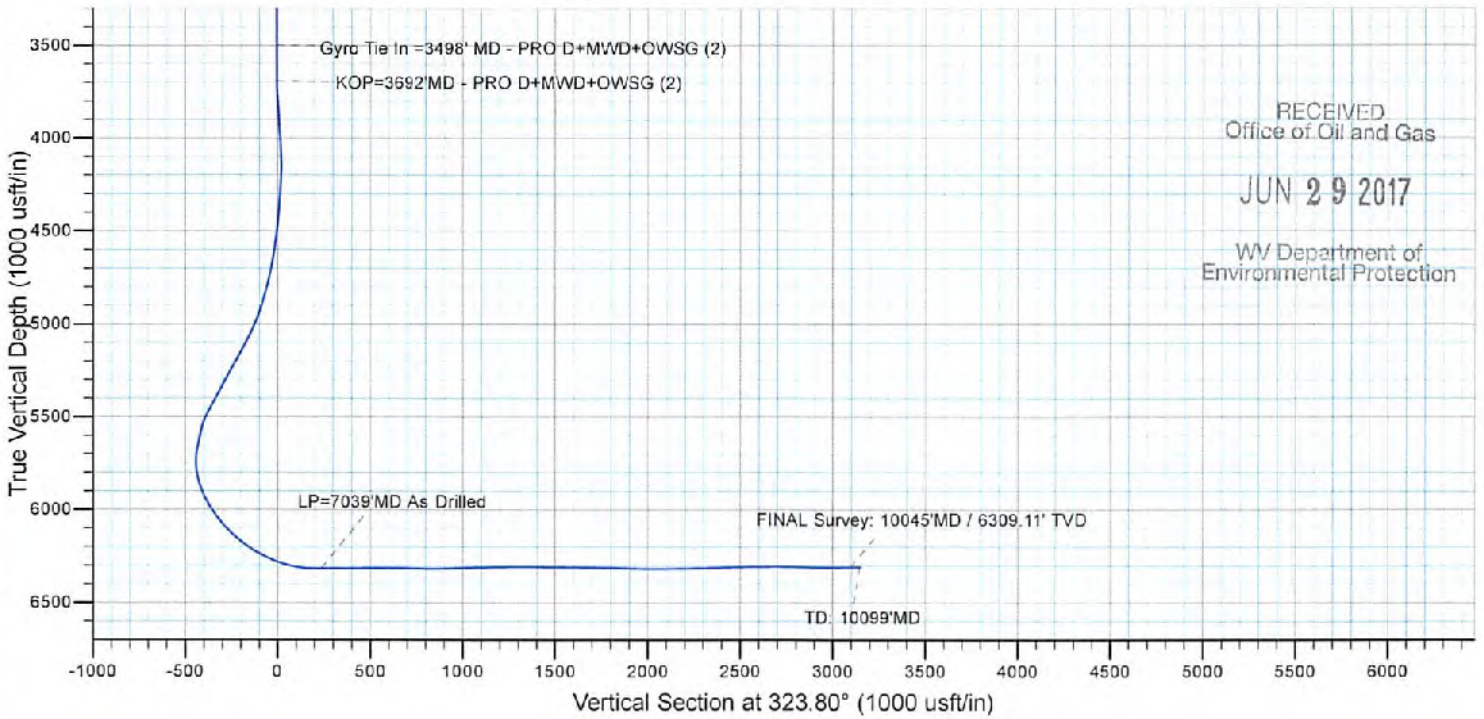


PRO DIRECTIONAL

RECEIVED
Office of Oil and Gas

JUN 29 2017

WV Department of
Environmental Protection



09/15/2017

Survey Report

RECEIVED
Office of Oil and Gas

JUN 29 2017

WV Department of
Environmental Protection

Company: EQT PRODUCTION	Local Co-ordinate Reference: Well Well #514478 - Slot 514478
Project: Ritchie County, WV	TVD Reference: KB@23 @ 1039.0usft
Site: PEN54	MD Reference: KB@23 @ 1039.0usft
Well: Well #514478	North Reference: Grid
Wellbore: Main Wellbore	Survey Calculation Method: Minimum Curvature
Design: 514478 As Drilled Surveys	Database: Well_Planner1

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

Site PEN54	
Site Position:	Northing: 279,215.27 usft Latitude: 39° 15' 28.054 N
From: Map	Easting: 1,595,775.03 usft Longitude: 80° 55' 39.233 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 " Grid Convergence: -0.91 °

Well Well #514478 - Slot 514478	
Well Position +N-S 0.0 usft	Northing: 279,160.89 usft Latitude: 39° 15' 27.521 N
+E-W 0.0 usft	Easting: 1,595,800.41 usft Longitude: 80° 55' 38.899 W
Position Uncertainty 0.0 usft	Wellhead Elevation: 0.0 usft Ground Level: 1,016.0 usft

Wellbore Main Wellbore					
Magnetics	Model Name HDGM	Sample Date 5/29/2016	Declination (-7.80)	Dip Angle (66.58)	Field Strength (52,006 nT)

Design 514478 As Drilled Surveys				
Audit Notes:				
Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.0		
Vertical Section:	Depth From (TVD) (usft) 0.0	+N-S (usft) 0.0	+E-W (usft) 0.0	Direction (°) 323.80

Survey Program		Date 7/12/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	3,498.0	514478 Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
3,580.0	10,099.0	#2 Pro 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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.23	120.87	100.0	-0.1	0.2	-0.2	0.23	0.23	0.00
200.0	0.26	135.58	200.0	-0.4	0.5	-0.6	0.07	0.03	14.71
300.0	0.24	150.87	300.0	-0.7	0.8	-1.0	0.07	-0.02	15.29
400.0	0.23	134.97	400.0	-1.0	1.0	-1.4	0.07	-0.01	-15.90
500.0	0.27	126.42	500.0	-1.3	1.3	-1.9	0.05	0.04	-8.55
600.0	0.28	151.34	600.0	-1.7	1.6	-2.3	0.12	0.01	24.92
700.0	0.21	171.40	700.0	-2.1	1.8	-2.7	0.11	-0.07	20.06
800.0	0.15	187.42	800.0	-2.4	1.8	-3.0	0.08	-0.06	16.02
900.0	0.11	233.47	900.0	-2.6	1.7	-3.1	0.11	-0.04	46.05

Survey Report

Company: EQT PRODUCTION
 Project: Ritchie County, WV
 Site: PEN54
 Well: Well #514478
 Wellbore: Main Wellbore
 Design: 514478 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514478 - Slot 514478
 TVD Reference: KB@23 @ 1039.0usft
 MD Reference: KB@23 @ 1039.0usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: Well_Planner1

RECEIVED
 Office of Oil and Gas

JUN 29 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)
1,000.0	0.25	215.90	1,000.0	-2.8	1.5	-3.1	0.15	0.14	-17.57
1,100.0	0.38	234.18	1,100.0	-3.2	1.1	-3.2	0.16	0.13	18.28
1,200.0	0.50	249.66	1,200.0	-3.5	0.4	-3.1	0.17	0.12	15.48
1,300.0	0.41	253.00	1,300.0	-3.8	-0.3	-2.9	0.09	-0.09	3.34
1,400.0	0.31	232.16	1,400.0	-4.0	-0.9	-2.7	0.16	-0.10	-20.84
1,500.0	0.40	230.25	1,500.0	-4.4	-1.4	-2.8	0.09	0.09	-1.91
1,600.0	0.39	235.36	1,600.0	-4.9	-1.9	-2.8	0.04	-0.01	5.11
1,700.0	0.31	240.52	1,700.0	-5.2	-2.4	-2.7	0.09	-0.08	5.16
1,800.0	0.41	239.37	1,800.0	-5.5	-3.0	-2.7	0.10	0.10	-1.15
1,900.0	0.42	239.83	1,900.0	-5.9	-3.6	-2.6	0.01	0.01	0.46
2,000.0	0.43	235.11	2,000.0	-6.3	-4.2	-2.6	0.04	0.01	-4.72
2,100.0	0.36	238.70	2,100.0	-6.6	-4.8	-2.5	0.07	-0.07	3.59
2,200.0	0.23	222.90	2,200.0	-6.9	-5.2	-2.5	0.15	-0.13	-15.80
2,300.0	0.25	241.40	2,300.0	-7.2	-5.5	-2.5	0.08	0.02	18.50
2,400.0	0.19	242.61	2,400.0	-7.4	-5.9	-2.5	0.06	-0.06	1.21
2,500.0	0.13	243.17	2,500.0	-7.5	-6.1	-2.4	0.06	-0.06	0.56
2,600.0	0.15	215.04	2,600.0	-7.7	-6.3	-2.5	0.07	0.02	-28.13
2,700.0	0.18	209.49	2,700.0	-7.9	-6.4	-2.6	0.03	0.03	-5.55
2,800.0	0.25	215.88	2,800.0	-8.2	-6.6	-2.7	0.07	0.07	6.39
2,900.0	0.24	233.42	2,900.0	-8.5	-6.9	-2.8	0.08	-0.01	17.54
3,000.0	0.22	231.60	3,000.0	-8.8	-7.3	-2.8	0.02	-0.02	-1.82
3,100.0	0.18	227.62	3,100.0	-9.0	-7.5	-2.8	0.04	-0.04	-3.98
3,200.0	0.11	170.00	3,200.0	-9.2	-7.6	-2.9	0.15	-0.07	-57.62
3,300.0	0.19	171.91	3,300.0	-9.5	-7.6	-3.1	0.08	0.08	1.91
3,400.0	0.15	203.72	3,400.0	-9.7	-7.6	-3.4	0.10	-0.04	31.81
3,498.0	0.12	223.98	3,498.0	-9.9	-7.7	-3.4	0.06	-0.03	20.67
Gyro Tie In =3498' MD - PRO D+MWD+OWSG (2)									
3,580.0	0.13	276.88	3,580.0	-10.0	-7.9	-3.4	0.14	0.01	64.51
3,605.0	0.08	283.46	3,605.0	-10.0	-7.9	-3.4	0.21	-0.20	26.32
3,637.0	0.08	290.44	3,637.0	-10.0	-8.0	-3.3	0.03	0.00	21.81
3,668.0	0.33	275.72	3,668.0	-9.9	-8.1	-3.2	0.82	0.81	-47.48
3,692.0	1.00	271.01	3,692.0	-9.9	-8.4	-3.1	2.79	2.78	-19.61
KOP=3692'MD - PRO D+MWD+OWSG (2)									
3,700.0	1.22	270.59	3,700.0	-9.9	-8.5	-3.0	2.79	2.79	-5.30
3,731.0	2.54	267.25	3,730.9	-10.0	-9.5	-2.4	4.27	4.26	-10.77
3,763.0	3.65	271.06	3,762.9	-10.0	-11.3	-1.4	3.53	3.47	11.91
3,795.0	4.75	275.85	3,794.8	-9.8	-13.6	0.1	3.81	3.44	14.97
3,826.0	5.73	277.00	3,825.7	-9.5	-16.4	2.0	3.18	3.16	3.71
3,857.0	6.61	274.23	3,856.5	-9.2	-19.7	4.2	3.00	2.84	-8.94
3,889.0	8.03	273.16	3,888.2	-8.9	-23.8	6.9	4.46	4.44	-3.34
3,920.0	9.10	268.12	3,918.9	-8.9	-28.4	9.6	4.21	3.45	-16.26
3,951.0	10.22	259.32	3,949.4	-9.5	-33.6	12.2	5.97	3.61	-28.39
3,983.0	11.03	256.37	3,980.9	-10.7	-39.3	14.6	3.05	2.53	-9.22

Survey Report

Company: EQT PRODUCTION
Project: Ritchie County, WV
Site: PEN54
Well: Well #514478
Wellbore: Main Wellbore
Design: 514478 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514478 - Slot 514478
TVD Reference: KB@23 @ 1039.0usft
MD Reference: KB@23 @ 1039.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Well_Planner1

RECEIVED
Office of Oil and Gas

JUN 29 2017

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)	
4,014.0	11.09	252.74	4,011.3	-12.3	-45.1	16.7	2.25	0.19	-11.71	
4,046.0	11.59	247.99	4,042.7	-14.4	-51.0	18.5	3.31	1.56	-14.84	
4,077.0	12.00	242.22	4,073.0	-17.1	-56.7	19.7	4.03	1.32	-18.61	
4,109.0	12.48	238.00	4,104.3	-20.5	-62.6	20.4	3.17	1.50	-13.19	
4,140.0	13.40	231.16	4,134.5	-24.5	-68.2	20.5	5.76	2.97	-22.06	
4,172.0	14.23	229.72	4,165.6	-29.4	-74.1	20.1	2.81	2.59	-4.50	
4,203.0	14.64	227.38	4,195.6	-34.5	-79.9	19.4	2.30	1.32	-7.55	
4,234.0	15.43	226.67	4,225.6	-40.0	-85.8	18.4	2.62	2.55	-2.29	
4,266.0	15.86	223.43	4,256.4	-46.1	-91.9	17.1	3.04	1.34	-10.13	
4,297.0	16.76	221.26	4,286.1	-52.5	-97.8	15.4	3.51	2.90	-7.00	
4,329.0	17.36	223.04	4,316.7	-59.5	-104.1	13.5	2.49	1.88	5.56	
4,360.0	17.86	220.66	4,346.3	-66.4	-110.3	11.5	2.83	1.61	-7.68	
4,392.0	18.36	216.57	4,376.7	-74.2	-116.5	8.9	4.27	1.56	-12.78	
4,423.0	18.69	219.12	4,406.1	-82.0	-122.6	6.2	2.82	1.06	8.23	
4,455.0	19.18	216.57	4,436.4	-90.2	-128.9	3.4	3.00	1.53	-7.97	
4,486.0	19.93	216.68	4,465.6	-98.5	-135.1	0.3	2.42	2.42	0.35	
4,518.0	20.61	216.98	4,495.6	-107.4	-141.8	-2.9	2.15	2.13	0.94	
4,549.0	21.13	216.73	4,524.6	-116.2	-148.4	-6.2	1.70	1.68	-0.81	
4,581.0	21.73	214.21	4,554.3	-125.7	-155.2	-9.8	3.43	1.88	-7.88	
4,612.0	22.11	214.31	4,583.1	-135.3	-161.7	-13.7	1.23	1.23	0.32	
4,644.0	22.34	212.00	4,612.7	-145.4	-168.3	-18.0	2.82	0.72	-7.22	
4,675.0	23.31	209.81	4,641.3	-155.8	-174.5	-22.7	4.16	3.13	-7.06	
4,707.0	24.61	206.86	4,670.5	-167.2	-180.6	-28.2	5.52	4.06	-9.22	
4,738.0	25.99	204.99	4,698.6	-179.1	-186.4	-34.4	5.14	4.45	-6.03	
4,770.0	27.18	205.76	4,727.2	-192.1	-192.5	-41.3	3.87	3.72	2.41	
4,801.0	28.24	203.74	4,754.6	-205.1	-198.6	-48.3	4.57	3.42	-6.52	
4,832.0	28.35	206.07	4,781.9	-218.5	-204.8	-55.4	3.58	0.35	7.52	
4,864.0	28.77	205.38	4,810.0	-232.3	-211.4	-62.6	1.67	1.31	-2.16	
4,895.0	29.96	206.46	4,837.0	-245.9	-218.1	-69.7	4.20	3.84	3.48	
4,927.0	30.51	204.42	4,864.7	-260.5	-225.0	-77.3	3.64	1.72	-6.38	
4,958.0	30.94	203.14	4,891.3	-275.0	-231.4	-85.2	2.52	1.39	-4.13	
4,990.0	31.79	200.55	4,918.7	-290.4	-237.5	-94.1	4.98	2.66	-8.09	
5,021.0	32.52	199.19	4,944.9	-305.9	-243.2	-103.3	3.32	2.35	-4.39	
5,053.0	33.89	197.16	4,971.7	-322.6	-248.6	-113.5	5.51	4.28	-6.34	
5,084.0	35.12	197.27	4,997.2	-339.4	-253.8	-124.0	3.97	3.97	0.35	
5,116.0	36.49	196.44	5,023.2	-357.3	-259.2	-135.2	4.54	4.28	-2.59	
5,147.0	38.24	195.93	5,047.8	-375.3	-264.5	-146.7	5.73	5.65	-1.65	
5,178.0	39.67	196.01	5,071.9	-394.1	-269.8	-158.6	4.62	4.61	0.26	
5,210.0	41.27	196.18	5,096.3	-414.0	-275.6	-171.3	5.01	5.00	0.53	
5,241.0	42.48	195.94	5,119.4	-433.9	-281.3	-184.0	3.94	3.90	-0.77	
5,273.0	42.78	196.77	5,142.9	-454.7	-287.4	-197.2	1.99	0.94	2.59	
5,304.0	42.46	196.70	5,165.7	-474.8	-293.5	-209.8	1.04	-1.03	-0.23	
5,439.0	42.30	197.50	5,265.4	-561.8	-320.2	-264.2	0.42	-0.12	0.59	
5,471.0	42.00	197.10	5,289.2	-582.3	-326.6	-277.0	1.26	-0.94	-1.25	

WV Department of
Environmental Protection

Survey Report

Company: EQT PRODUCTION
Project: Ritchie County, WV
Site: PEN54
Well: Well #514478
Wellbore: Main Wellbore
Design: 514478 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514478 - Slot 514478
TVD Reference: KB@23 @ 1039.0usft
MD Reference: KB@23 @ 1039.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Well_Planner1

RECEIVED
Office of Oil and Gas

JUN 29 2017

Survey										WV Department of Environmental Protection
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)	
5,565.0	41.00	195.00	5,359.6	-642.1	-343.8	-315.1	1.82	-1.06	-2.23	
5,596.0	40.80	194.50	5,383.0	-661.8	-349.0	-327.9	1.24	-0.65	-1.61	
5,659.0	39.80	193.00	5,431.0	-701.3	-358.7	-354.1	2.21	-1.59	-2.38	
5,722.0	38.90	192.40	5,479.8	-740.3	-367.5	-380.4	1.55	-1.43	-0.95	
5,753.0	38.00	197.60	5,504.0	-758.9	-372.5	-392.4	10.82	-2.90	16.77	
5,785.0	35.30	203.20	5,529.7	-776.8	-379.1	-403.0	13.42	-8.44	17.50	
5,816.0	31.70	210.80	5,555.6	-792.1	-386.8	-410.7	17.81	-11.61	24.52	
5,848.0	30.30	212.60	5,583.0	-806.1	-395.4	-416.9	5.25	-4.38	5.63	
5,879.0	29.80	210.60	5,609.8	-819.3	-403.6	-422.8	3.61	-1.61	-6.45	
5,911.0	28.30	211.40	5,637.8	-832.6	-411.6	-428.8	4.84	-4.69	2.50	
5,942.0	26.90	213.30	5,665.3	-844.8	-419.3	-434.1	5.33	-4.52	6.13	
5,974.0	25.50	216.60	5,694.0	-856.3	-427.3	-438.6	6.31	-4.38	10.31	
6,005.0	25.10	226.50	5,722.0	-866.2	-436.1	-441.5	13.69	-1.29	31.94	
6,036.0	25.90	234.60	5,750.0	-874.7	-446.4	-442.2	11.53	2.58	26.13	
6,068.0	26.10	243.90	5,778.8	-881.8	-458.4	-440.9	12.74	0.63	29.06	
6,099.0	25.90	254.90	5,806.7	-886.6	-471.1	-437.2	15.55	-0.65	35.48	
6,131.0	27.00	264.60	5,835.3	-889.1	-485.1	-431.0	13.92	3.44	30.31	
6,162.0	27.80	272.20	5,862.9	-889.5	-499.3	-422.9	11.57	2.58	24.52	
6,194.0	29.00	278.30	5,891.0	-888.1	-514.4	-412.8	9.81	3.75	19.06	
6,225.0	31.20	281.60	5,917.8	-885.4	-529.7	-401.6	8.88	7.10	10.65	
6,257.0	33.60	284.30	5,944.9	-881.5	-546.4	-388.6	8.76	7.50	8.44	
6,288.0	35.00	288.70	5,970.5	-876.5	-563.2	-374.7	9.18	4.52	14.19	
6,320.0	36.10	294.40	5,996.5	-869.7	-580.5	-359.0	10.91	3.44	17.81	
6,351.0	38.10	299.80	6,021.3	-861.2	-597.1	-342.3	12.33	6.45	17.42	
6,382.0	40.00	301.90	6,045.3	-851.2	-613.8	-324.3	7.47	6.13	6.77	
6,414.0	41.20	305.00	6,069.6	-839.7	-631.2	-304.8	7.33	3.75	9.69	
6,445.0	42.90	308.80	6,092.6	-827.2	-647.8	-284.9	9.87	5.48	12.26	
516208 LP 1055' VS										
6,477.0	45.50	314.10	6,115.6	-812.4	-664.5	-263.2	14.11	8.13	16.56	
6,508.0	48.30	318.40	6,136.8	-796.1	-680.1	-240.7	13.57	9.03	13.87	
6,540.0	50.30	321.40	6,157.6	-777.5	-695.7	-216.5	9.46	6.25	9.38	
6,571.0	52.70	323.80	6,176.9	-758.2	-710.5	-192.3	9.83	7.74	7.74	
6,602.0	55.30	324.90	6,195.2	-737.9	-725.1	-167.2	8.86	8.39	3.55	
6,634.0	57.50	326.20	6,212.9	-715.9	-740.1	-140.6	7.66	6.88	4.06	
6,665.0	60.20	329.10	6,228.9	-693.5	-754.3	-114.1	11.83	8.71	9.35	
6,683.2	62.07	330.47	6,237.7	-679.7	-762.3	-98.2	12.22	10.30	7.51	
516207 Plat LP										
6,696.0	63.40	331.40	6,243.6	-669.8	-767.9	-87.0	12.22	10.36	7.29	
6,728.0	66.30	333.70	6,257.2	-644.1	-781.2	-58.3	11.16	9.06	7.19	
6,759.0	68.30	334.20	6,269.1	-618.4	-793.8	-30.2	6.62	6.45	1.61	
6,790.0	70.40	334.60	6,280.1	-592.2	-806.3	-1.7	6.88	6.77	1.29	
6,822.0	73.60	335.40	6,289.9	-564.6	-819.2	28.2	10.28	10.00	2.50	
6,854.0	76.20	336.80	6,298.3	-536.4	-831.7	58.4	9.16	8.13	4.38	

Survey Report

Company: EQT PRODUCTION
Project: Ritchie County, WV
Site: PEN54
Well: Well #514478
Wellbore: Main Wellbore
Design: 514478 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514478 - Slot 514478
TVD Reference: KB@23 @ 1039.0usft
MD Reference: KB@23 @ 1039.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Well_Planner1

RECEIVED
Office of Oil and Gas

JUN 29 2017

WV Department of
Environmental Protection

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)
6,885.0	78.20	338.40	6,305.1	-508.4	-843.2	87.7	8.18	6.45	5.16
6,916.0	81.80	339.10	6,310.5	-480.0	-854.3	117.2	11.82	11.61	2.26
6,948.0	85.60	340.20	6,314.0	-450.2	-865.3	147.8	12.36	11.88	3.44
6,968.4	87.11	340.13	6,315.3	-431.0	-872.2	167.3	7.43	7.42	-0.32
514478 Plat LP P6									
6,979.0	87.90	340.10	6,315.8	-421.1	-875.8	177.5	7.43	7.42	-0.32
7,039.0	90.05	339.66	6,316.9	-364.7	-896.5	235.1	3.65	3.58	-0.74
LP=7039'MD As Drilled									
7,074.0	91.30	339.40	6,316.5	-331.9	-908.7	268.8	3.65	3.58	-0.74
7,167.0	90.50	339.80	6,315.0	-244.8	-941.1	358.3	0.96	-0.86	0.43
7,263.0	90.60	339.70	6,314.1	-154.7	-974.3	450.6	0.15	0.10	-0.10
7,357.0	90.50	337.50	6,313.2	-67.2	-1,008.6	541.5	2.34	-0.11	-2.34
7,452.0	89.40	339.60	6,313.3	21.2	-1,043.4	633.3	2.50	-1.16	2.21
7,546.0	88.50	342.00	6,315.0	109.9	-1,074.3	723.2	2.73	-0.96	2.55
7,640.0	88.90	342.60	6,317.1	199.5	-1,102.8	812.3	0.77	0.43	0.64
7,735.0	91.50	343.60	6,316.8	290.4	-1,130.5	902.0	2.93	2.74	1.05
7,829.0	92.30	343.40	6,313.7	380.4	-1,157.1	990.4	0.88	0.85	-0.21
7,924.0	91.20	342.00	6,310.8	471.1	-1,185.4	1,080.2	1.87	-1.16	-1.47
8,018.0	91.00	341.70	6,309.0	560.4	-1,214.7	1,169.6	0.38	-0.21	-0.32
8,113.0	90.80	342.00	6,307.5	650.7	-1,244.2	1,259.9	0.38	-0.21	0.32
8,207.0	89.20	341.60	6,307.5	740.0	-1,273.6	1,349.3	1.75	-1.70	-0.43
8,301.0	89.20	342.10	6,308.8	829.3	-1,302.9	1,438.7	0.53	0.00	0.53
8,396.0	90.30	343.10	6,309.2	919.9	-1,331.3	1,528.6	1.56	1.16	1.05
8,490.0	89.10	342.00	6,309.7	1,009.6	-1,359.5	1,617.6	1.73	-1.28	-1.17
8,584.0	90.10	346.80	6,310.3	1,100.1	-1,384.7	1,705.6	5.22	1.06	5.11
8,679.0	88.30	343.50	6,311.7	1,191.9	-1,409.1	1,794.0	3.96	-1.89	-3.47
8,773.0	88.00	344.10	6,314.7	1,282.1	-1,435.3	1,882.3	0.71	-0.32	0.64
8,867.0	88.60	341.70	6,317.5	1,371.9	-1,462.9	1,971.1	2.63	0.64	-2.55
8,962.0	90.90	342.80	6,317.9	1,462.4	-1,491.9	2,061.2	2.68	2.42	1.16
9,056.0	91.30	341.20	6,316.1	1,551.8	-1,520.9	2,150.5	1.75	0.43	-1.70
9,150.0	91.10	338.50	6,314.1	1,640.0	-1,553.3	2,240.8	2.88	-0.21	-2.87
9,245.0	91.20	337.60	6,312.2	1,728.1	-1,588.8	2,332.8	0.95	0.11	-0.95
9,339.0	91.10	339.20	6,310.3	1,815.5	-1,623.4	2,423.8	1.71	-0.11	1.70
9,433.0	91.10	340.10	6,308.5	1,903.6	-1,656.1	2,514.2	0.96	0.00	0.96
9,527.0	91.40	339.60	6,306.5	1,991.8	-1,688.5	2,604.5	0.62	0.32	-0.53
9,622.0	89.70	342.00	6,305.6	2,081.5	-1,719.7	2,695.3	3.10	-1.79	2.53
9,715.0	88.70	342.60	6,306.9	2,170.1	-1,748.0	2,783.5	1.25	-1.08	0.65
9,810.0	88.30	342.80	6,309.4	2,260.8	-1,776.2	2,873.4	0.47	-0.42	0.21
9,904.0	90.20	342.60	6,310.6	2,350.5	-1,804.2	2,962.3	2.03	2.02	-0.21
9,998.0	90.70	342.50	6,309.8	2,440.2	-1,832.3	3,051.3	0.54	0.53	-0.11
10,045.0	91.10	342.50	6,309.1	2,485.0	-1,846.5	3,095.8	0.85	0.85	0.00
FINAL Survey: 10045'MD / 6309.11' TVD									
10,099.0	90.70	342.50	6,308.3	2,536.5	-1,862.7	3,147.0	0.74	-0.74	0.00
TD: 10099'MD - 514478 Plat TD P6									

Survey Report

Company: EQT PRODUCTION
Project: Ritchie County, WV
Site: PEN54
Well: Well #514478
Wellbore: Main Wellbore
Design: 514478 As Drilled Surveys

Local Co-ordinate Reference: Well Well #514478 - Slot 514478
TVD Reference: KB@23 @ 1039.0usft
MD Reference: KB@23 @ 1039.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
-----------------------	-----------------	-------------	-----------------------	--------------	--------------	-------------------------	-------------------------	------------------------	-----------------------

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
TD=10099'MD - hit/miss target - Shape - Point	0.00	0.00	6,308.3	2,536.5	-1,862.7	281,697.37	1,593,937.70	39° 15' 52.286 N	80° 56' 3.092 W
LP=7039'MD As Drilled - actual wellpath hits target center - Point	0.00	360.00	6,316.9	-364.7	-896.5	278,786.15	1,594,903.95	39° 15' 23.775 N	80° 55' 50.221 W

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
3,498.0	3,498.0	-9.9	-7.7	Gyro Tie In =3498' MD - PRO D+MWD+OWSG (2)
3,692.0	3,692.0	-9.9	-8.4	KOP=3692'MD - PRO D+MWD+OWSG (2)
7,039.0	6,316.9	-364.7	-896.5	LP=7039'MD As Drilled
10,045.0	6,309.1	2,485.0	-1,846.5	FINAL Survey: 10045'MD / 6309.11' TVD
10,099.0	6,308.3	2,536.5	-1,862.7	TD: 10099'MD

Checked By: _____ Approved By: _____ Date: _____

RECEIVED
 Office of Oil and Gas
JUN 29 2017
 WV Department of
 Environmental Protection