



Where energy meets innovation.

# **EQT PRODUCTION**

**Wetzel County, WV**

**Big 190**

**Well #513504**

**Main Wellbore**

**Survey: ProDirectional**

## **Standard Survey Report**

**27 October, 2015**



10/28/2016



# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #513504
<b>Project:</b>	Wetzel County, WV	<b>TVD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Site:</b>	Big 190	<b>MD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Well:</b>	Well #513504	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled Surveys	<b>Database:</b>	Well_Planner1

<b>Project</b>	Wetzel 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>	Big 190				
<b>Site Position:</b>		<b>Northing:</b>	385,255.46 usft	<b>Latitude:</b>	39° 33' 8.94 N
<b>From:</b>	Map	<b>Easting:</b>	1,688,243.35 usft	<b>Longitude:</b>	80° 36' 20.34 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.71 °

<b>Well</b>	Well #513504					
<b>Well Position</b>	+N/-S	0.00 usft	<b>Northing:</b>	385,233.00 usft	<b>Latitude:</b>	39° 33' 8.72 N
	+E/-W	0.00 usft	<b>Easting:</b>	1,688,211.00 usft	<b>Longitude:</b>	80° 36' 20.75 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	1,495.00 usft	<b>Ground Level:</b>	1,472.00 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	10/15/2015	-8.23	67.03	52,519

<b>Design</b>	As Drilled Surveys				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	10.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	10.00	0.00	0.00	166.48	

<b>Survey Program</b>	<b>Date</b>	10/27/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
110.00	5,810.00	513504 VES Gyros (Main Wellbore)	VES ISCWSA-GYRO-3_08-C	Biaxial Semi-Cont. Gyro	
5,851.00	15,445.00	ProDirectional (Main Wellbore)	MWD+IGRF	MWD+IGRF v3:standard declination	

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)
5,800.00	0.77	55.84	5,799.81	31.68	1.00	-30.57	0.00	0.00	0.00
5,841.00	0.80	65.80	5,840.81	31.96	1.49	-30.72	0.34	0.07	24.29
5,873.00	1.00	62.10	5,872.80	32.18	1.94	-30.83	0.65	0.63	-11.56
5,904.00	3.00	5.40	5,903.78	33.11	2.28	-31.67	8.35	6.45	-182.90
5,936.00	6.50	352.40	5,935.67	35.74	2.10	-34.26	11.37	10.94	-40.63
5,968.00	9.10	345.80	5,967.37	39.99	1.24	-38.59	8.58	8.13	-20.63
5,999.00	11.50	341.20	5,997.87	45.29	-0.36	-44.12	8.18	7.74	-14.84
6,031.00	13.70	341.80	6,029.10	51.91	-2.57	-51.08	6.89	6.88	1.88
6,062.00	16.10	342.70	6,059.05	59.51	-5.00	-59.03	7.78	7.74	2.90
6,094.00	18.60	344.10	6,089.60	68.85	-7.71	-68.55	7.92	7.81	4.38



# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #513504
<b>Project:</b>	Wetzel County, WV	<b>TVD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Site:</b>	Big 190	<b>MD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Well:</b>	Well #513504	<b>North Reference:</b>	Grnd
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	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)
	6,125.00	20.40	344.80	6,118.82	78.62	-10.49	-78.90	5.86	5.81	2.26
	6,157.00	23.20	345.80	6,148.52	90.12	-13.49	-90.77	8.83	8.75	3.13
	6,189.00	26.50	347.70	6,177.56	103.21	-16.56	-104.22	10.61	10.31	5.94
	6,220.00	28.80	350.00	6,205.02	117.32	-19.33	-118.59	8.18	7.42	7.42
	6,252.00	31.00	350.60	6,232.76	133.04	-22.02	-134.50	6.94	6.88	1.88
	6,283.00	33.10	349.60	6,259.03	149.25	-24.85	-150.92	6.99	6.77	-3.23
	6,315.00	35.40	349.00	6,285.48	166.94	-28.20	-168.91	7.26	7.19	-1.88
	6,347.00	38.10	349.60	6,311.12	185.75	-31.75	-188.03	8.51	8.44	1.88
	6,378.00	40.40	350.60	6,335.12	205.07	-35.12	-207.60	7.69	7.42	3.23
	6,410.00	42.80	349.70	6,359.05	226.00	-38.75	-228.80	7.73	7.50	-2.81
	6,441.00	40.90	350.20	6,382.14	246.37	-42.36	-249.44	6.22	-6.13	1.61
	6,473.00	35.60	351.80	6,407.26	265.92	-45.48	-269.19	16.85	-16.56	5.00
	6,504.00	30.60	352.70	6,433.22	282.69	-47.77	-286.03	16.21	-16.13	2.90
	6,536.00	28.60	352.00	6,461.05	298.36	-49.87	-301.75	6.34	-6.25	-2.19
	6,568.00	27.10	350.50	6,489.34	313.13	-52.14	-316.64	5.17	-4.69	-4.69
	6,599.00	25.90	349.50	6,517.08	326.75	-54.54	-330.45	4.13	-3.87	-3.23
	6,631.00	24.40	347.90	6,546.05	340.09	-57.20	-344.04	5.15	-4.69	-5.00
	6,662.00	22.40	350.70	6,574.50	352.18	-59.49	-356.33	7.38	-6.45	9.03
	6,694.00	19.50	354.90	6,604.38	363.52	-60.96	-367.70	10.20	-9.06	13.13
	6,726.00	17.80	355.20	6,634.70	373.71	-61.84	-377.81	5.32	-5.31	0.94
	6,757.00	16.70	353.50	6,664.30	382.86	-62.74	-386.92	3.90	-3.55	-5.48
	6,789.00	14.20	352.90	6,695.15	391.33	-63.75	-395.38	7.83	-7.81	-1.88
	6,820.00	12.00	355.80	6,725.34	398.31	-64.45	-402.34	7.40	-7.10	9.35
	6,852.00	10.90	4.50	6,756.70	404.65	-64.46	-408.50	6.39	-3.44	27.19
	6,883.00	9.60	15.30	6,787.21	410.06	-63.55	-413.56	7.47	-4.19	34.84
	6,915.00	8.50	31.10	6,818.82	414.66	-61.62	-417.58	8.46	-3.44	49.38
	6,947.00	6.60	52.10	6,850.54	417.82	-58.95	-420.02	10.37	-5.94	65.63
	6,978.00	5.70	81.00	6,881.37	419.15	-56.02	-420.64	10.28	-2.90	93.23
	7,010.00	7.10	99.60	6,913.17	419.07	-52.50	-419.73	7.76	4.38	58.13
	7,041.00	9.50	113.30	6,943.85	417.74	-48.26	-417.45	9.98	7.74	44.19
	7,073.00	11.20	129.60	6,975.34	414.72	-43.44	-413.38	10.53	5.31	50.94
	7,105.00	12.00	145.90	7,006.69	409.98	-39.18	-407.78	10.51	2.50	50.94
	7,136.00	13.50	163.50	7,036.94	403.84	-36.34	-401.14	13.37	4.84	56.77
	7,168.00	15.70	167.80	7,067.90	396.02	-34.37	-393.08	7.66	6.88	13.44
	7,199.00	18.50	173.50	7,097.53	387.03	-32.92	-384.01	10.52	9.03	18.39
	7,231.00	21.00	175.60	7,127.65	376.27	-31.91	-373.30	8.12	7.81	6.56
	7,263.00	23.20	174.20	7,157.29	364.28	-30.83	-361.40	7.07	6.88	-4.38
	7,294.00	25.10	172.20	7,185.58	351.69	-29.32	-348.80	6.67	6.13	-6.45
	7,326.00	28.10	170.30	7,214.19	337.54	-27.13	-334.52	9.74	9.38	-5.94
	7,357.00	31.00	169.20	7,241.16	322.49	-24.40	-319.26	9.52	9.35	-3.55
	7,389.00	34.30	169.20	7,268.09	305.54	-21.17	-302.02	10.31	10.31	0.00
	7,420.00	37.00	170.20	7,293.28	287.76	-17.94	-283.98	8.91	8.71	3.23
	7,452.00	39.70	167.90	7,318.38	268.28	-14.16	-264.15	9.54	8.44	-7.19



# Professional Directional Survey Report



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<b>Project:</b>	Wetzel County, WV	<b>TVD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Site:</b>	Big 190	<b>MD Reference:</b>	GL 1472 + 23' KB @ 1495 00usft
<b>Well:</b>	Well #513504	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	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)	
7,484.00	43.10	166.60	7,342.38	247.64	-9.48	-243.00	10.96	10.63	-4.06	
7,515.00	46.90	167.40	7,364.29	226.29	-4.56	-221.08	12.39	12.26	2.58	
7,547.00	49.80	168.50	7,385.56	202.90	0.43	-197.18	9.42	9.06	3.44	
7,578.00	52.30	166.50	7,405.05	179.37	5.65	-173.08	9.50	8.06	-6.45	
7,610.00	53.70	164.10	7,424.31	154.66	12.14	-147.53	7.42	4.38	-7.50	
7,641.00	56.30	162.30	7,442.09	130.35	19.49	-122.19	9.64	8.39	-5.81	
7,673.00	59.20	163.40	7,459.16	104.50	27.46	-95.18	9.52	9.06	3.44	
7,704.00	62.70	163.20	7,474.21	78.54	35.25	-68.13	11.30	11.29	-0.65	
7,736.00	65.70	164.20	7,488.14	50.89	43.33	-39.35	9.79	9.38	3.13	
7,767.00	68.60	164.30	7,500.17	23.40	51.08	-10.81	9.36	9.35	0.32	
7,799.00	71.30	164.50	7,511.14	-5.55	59.17	19.23	8.46	8.44	0.63	
7,831.00	73.10	165.40	7,520.93	-34.97	67.08	49.68	6.23	5.63	2.81	
7,862.00	75.10	166.00	7,529.42	-63.86	74.44	79.49	6.71	6.45	1.94	
7,894.00	77.90	165.70	7,536.89	-94.03	82.04	110.60	8.80	8.75	-0.94	
7,925.00	80.40	164.90	7,542.72	-123.47	89.77	141.04	8.45	8.06	-2.58	
7,957.00	80.70	164.80	7,547.98	-153.94	98.02	172.59	0.99	0.94	-0.31	
7,989.00	82.80	165.10	7,552.57	-184.52	106.24	204.25	6.63	6.56	0.94	
8,020.00	85.20	165.90	7,555.81	-214.37	113.96	235.07	8.16	7.74	2.58	
8,050.00	85.50	166.10	7,558.24	-243.38	121.19	264.97	1.20	1.00	0.67	
8,145.00	85.50	165.90	7,565.69	-335.28	144.11	359.68	0.21	0.00	-0.21	
8,240.00	88.10	166.20	7,571.00	-427.32	166.97	454.52	2.75	2.74	0.32	
8,334.00	91.30	166.80	7,571.49	-518.71	188.91	548.50	3.46	3.40	0.64	
8,429.00	92.20	166.20	7,568.59	-611.04	211.08	643.46	1.14	0.95	-0.63	
8,524.00	89.10	167.60	7,567.51	-703.55	232.60	738.43	3.58	-3.28	1.47	
8,618.00	88.70	168.40	7,569.31	-795.48	252.14	832.38	0.95	-0.43	0.85	
8,713.00	88.30	168.60	7,571.80	-888.54	271.08	927.29	0.47	-0.42	0.21	
8,808.00	88.10	167.10	7,574.79	-981.36	291.06	1,022.21	1.59	-0.21	-1.58	
8,903.00	87.40	166.40	7,578.52	-1,073.76	312.82	1,117.14	1.04	-0.74	-0.74	
8,997.00	89.50	165.70	7,581.06	-1,164.95	335.47	1,211.10	2.35	2.23	-0.74	
9,092.00	89.80	165.50	7,581.64	-1,256.96	359.10	1,306.08	0.38	0.32	-0.21	
9,187.00	89.40	164.70	7,582.30	-1,348.77	383.52	1,401.05	0.94	-0.42	-0.84	
9,282.00	89.80	166.70	7,582.96	-1,440.82	406.99	1,496.04	2.15	0.42	2.11	
9,376.00	89.60	166.30	7,583.46	-1,532.22	428.93	1,590.03	0.48	-0.21	-0.43	
9,471.00	89.40	165.70	7,584.29	-1,624.39	451.91	1,685.03	0.67	-0.21	-0.63	
9,566.00	87.10	165.40	7,587.19	-1,716.34	475.60	1,779.96	2.44	-2.42	-0.32	
9,660.00	88.60	166.50	7,590.71	-1,807.46	498.41	1,873.89	1.98	1.60	1.17	
9,755.00	89.40	168.30	7,592.37	-1,900.15	519.13	1,968.86	2.07	0.84	1.89	
9,849.00	89.70	169.10	7,593.11	-1,992.32	537.54	2,062.78	0.91	0.32	0.85	
9,944.00	89.80	169.30	7,593.52	-2,085.64	555.34	2,157.68	0.24	0.11	0.21	
10,039.00	90.40	166.90	7,593.36	-2,178.59	574.93	2,252.63	2.60	0.63	-2.53	
10,133.00	90.20	166.90	7,592.87	-2,270.14	596.24	2,346.63	0.21	-0.21	0.00	
10,228.00	89.10	167.50	7,593.45	-2,362.78	617.28	2,441.61	1.32	-1.16	0.63	
10,323.00	89.50	168.40	7,594.61	-2,455.68	637.11	2,536.58	1.04	0.42	0.95	



# Professional Directional Survey Report



**Company:** EQT PRODUCTION  
**Project:** Wetzel County, WV  
**Site:** Big 190  
**Well:** Well #513504  
**Wellbore:** Main Wellbore  
**Design:** As Drilled Surveys

**Local Co-ordinate Reference:** Well Well #513504  
**TVD Reference:** GL 1472 + 23' KB @ 1495 00usft  
**MD Reference:** GL 1472 + 23' KB @ 1495 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)
10,418.00	89.60	167.70	7,595.35	-2,548.62	656.78	2,631.54	0.74	0.11	-0.74
10,512.00	89.20	167.00	7,596.34	-2,640.33	677.37	2,725.52	0.86	-0.43	-0.74
10,607.00	89.20	166.60	7,597.66	-2,732.81	699.06	2,820.51	0.42	0.00	-0.42
10,701.00	89.00	167.20	7,599.14	-2,824.35	720.36	2,914.49	0.67	-0.21	0.64
10,796.00	88.70	168.00	7,601.05	-2,917.12	740.76	3,009.46	0.90	-0.32	0.84
10,890.00	88.30	167.60	7,603.51	-3,008.96	760.62	3,103.40	0.60	-0.43	-0.43
10,985.00	87.90	166.90	7,606.66	-3,101.57	781.57	3,198.34	0.85	-0.42	-0.74
11,080.00	89.10	166.60	7,609.14	-3,194.00	803.34	3,293.30	1.30	1.26	-0.32
11,174.00	88.90	167.30	7,610.78	-3,285.56	824.56	3,387.28	0.77	-0.21	0.74
11,269.00	89.60	166.60	7,612.03	-3,378.10	846.01	3,482.27	1.04	0.74	-0.74
11,364.00	89.70	166.70	7,612.61	-3,470.53	867.94	3,577.27	0.15	0.11	0.11
11,459.00	89.90	166.80	7,612.94	-3,563.00	889.72	3,672.27	0.24	0.21	0.11
11,554.00	89.90	166.70	7,613.11	-3,655.47	911.49	3,767.27	0.11	0.00	-0.11
11,648.00	90.70	168.10	7,612.61	-3,747.20	931.99	3,861.25	1.72	0.85	1.49
11,743.00	88.90	168.30	7,612.95	-3,840.19	951.42	3,956.20	1.91	-1.89	0.21
11,838.00	88.30	168.70	7,615.27	-3,933.26	970.36	4,051.11	0.76	-0.63	0.42
11,933.00	88.00	168.00	7,618.33	-4,026.25	989.53	4,146.01	0.80	-0.32	-0.74
12,027.00	87.90	167.20	7,621.70	-4,118.00	1,009.70	4,239.93	0.86	-0.11	-0.85
12,122.00	88.00	168.00	7,625.09	-4,210.72	1,030.09	4,334.85	0.85	0.11	0.84
12,217.00	87.70	167.60	7,628.66	-4,303.51	1,050.15	4,429.76	0.53	-0.32	-0.42
12,311.00	90.90	170.40	7,629.81	-4,395.76	1,068.08	4,523.64	4.52	3.40	2.98
12,406.00	90.20	165.40	7,628.89	-4,488.81	1,087.99	4,618.58	5.31	-0.74	-5.26
12,501.00	90.10	164.90	7,628.65	-4,580.44	1,112.33	4,713.55	0.54	-0.11	-0.53
12,595.00	89.50	165.10	7,628.97	-4,671.23	1,136.66	4,807.52	0.67	-0.64	0.21
12,690.00	89.10	165.90	7,630.13	-4,763.20	1,160.45	4,902.50	0.94	-0.42	0.84
12,785.00	88.90	165.20	7,631.79	-4,855.18	1,184.15	4,997.47	0.77	-0.21	-0.74
12,880.00	88.80	165.00	7,633.70	-4,946.97	1,208.57	5,092.42	0.24	-0.11	-0.21
12,975.00	88.10	164.10	7,636.27	-5,038.50	1,233.87	5,187.33	1.20	-0.74	-0.95
13,069.00	89.20	166.10	7,638.48	-5,129.31	1,258.03	5,281.27	2.43	1.17	2.13
13,164.00	89.40	167.40	7,639.64	-5,221.77	1,279.80	5,376.26	1.38	0.21	1.37
13,259.00	91.70	171.30	7,638.73	-5,315.10	1,297.35	5,471.11	4.77	2.42	4.11
13,354.00	90.70	168.40	7,636.74	-5,408.58	1,314.09	5,565.92	3.23	-1.05	-3.05
13,448.00	89.90	168.10	7,636.25	-5,500.81	1,333.23	5,659.87	0.91	-0.85	-0.32
13,543.00	90.10	168.60	7,636.25	-5,593.66	1,352.42	5,754.82	0.57	0.21	0.53
13,638.00	89.80	167.60	7,636.33	-5,686.61	1,372.00	5,849.78	1.10	-0.32	-1.05
13,733.00	89.60	167.80	7,636.83	-5,779.43	1,392.24	5,944.76	0.30	-0.21	0.21
13,827.00	89.40	168.10	7,637.65	-5,871.36	1,411.87	6,038.72	0.38	-0.21	0.32
13,922.00	89.40	168.90	7,638.65	-5,964.44	1,430.80	6,133.66	0.84	0.00	0.84
14,017.00	88.80	169.80	7,640.14	-6,057.79	1,448.36	6,228.53	1.14	-0.63	0.95
14,111.00	87.90	168.70	7,642.84	-6,150.10	1,465.88	6,322.38	1.51	-0.96	-1.17
14,206.00	87.80	168.60	7,646.57	-6,243.17	1,484.57	6,417.23	0.33	-0.32	-0.11
14,301.00	88.90	165.30	7,649.48	-6,335.66	1,506.00	6,512.17	3.73	1.37	-3.47
14,395.00	90.30	165.30	7,650.13	-6,428.58	1,529.86	6,606.15	1.49	1.49	0.00
14,489.00	89.70	163.30	7,650.13	-6,517.07	1,555.29	6,700.07	2.22	-0.64	-2.13



## Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #513504
<b>Project:</b>	Wetzel County, WV	<b>TVD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Site:</b>	Big 190	<b>MD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Well:</b>	Well #513504	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	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)
14,585.00	89.90	162.90	7,650.47	-6,608.92	1,583.20	6,795.91	0.47	0.21	-0.42
14,679.00	91.60	162.30	7,649.24	-6,698.61	1,611.30	6,889.68	1.92	1.81	-0.64
14,774.00	91.70	165.60	7,646.50	-6,789.86	1,637.56	6,984.53	3.47	0.11	3.47
14,869.00	91.90	165.50	7,643.52	-6,881.80	1,661.25	7,079.47	0.24	0.21	-0.11
14,964.00	89.70	164.30	7,642.19	-6,973.51	1,685.99	7,174.42	2.64	-2.32	-1.26
15,057.00	89.40	163.60	7,642.92	-7,062.88	1,711.70	7,267.33	0.82	-0.32	-0.75
15,152.00	89.10	165.20	7,644.16	-7,154.37	1,737.25	7,362.25	1.71	-0.32	1.68
15,247.00	89.50	165.30	7,645.32	-7,246.23	1,761.43	7,457.22	0.43	0.42	0.11
15,341.00	90.00	165.60	7,645.73	-7,337.22	1,785.05	7,551.21	0.62	0.53	0.32
15,390.00	90.50	166.00	7,645.52	-7,384.72	1,797.07	7,600.20	1.31	1.02	0.82
15,400.00	90.50	166.00	7,645.43	-7,394.42	1,799.49	7,610.20	0.00	0.00	0.00
<b>Last Survey: 15390'MD / 7645.52'TVD</b>									
15,445.00	90.50	166.00	7,645.04	-7,438.08	1,810.37	7,655.20	0.00	0.00	0.00





# Professional Directional Survey Report



<b>Company:</b>	EQT PRODUCTION	<b>Local Co-ordinate Reference:</b>	Well Well #513504
<b>Project:</b>	Wetzel County, WV	<b>TVD Reference:</b>	GL 1472 + 23' KB @ 1495.00usft
<b>Site:</b>	Big 190	<b>MD Reference:</b>	GL 1472 + 23' KB @ 1495 00usft
<b>Well:</b>	Well #513504	<b>North Reference:</b>	Gnd
<b>Wellbore:</b>	Main Wellbore	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled Surveys	<b>Database:</b>	Well_Planner1

### Design Targets

Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
513505 Top of Perf - survey misses target center by 2075.96usft at 8067.57usft MD (7559.62 TVD, -260.39 N, 125.41 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	0.00	7,541.00	-784.01	-1,888.45	384,468.99	1,686,322.55	39° 33' 0.94 N	80° 36' 44.73 W
513508 Top of Perf - survey misses target center by 1391.02usft at 8114.73usft MD (7563.32 TVD, -306.00 N, 136.77 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	0.00	7,542.00	-644.11	-1,212.36	384,588.89	1,686,998.64	39° 33' 2.20 N	80° 36' 36.12 W
513504 LP - survey misses target center by 28.53usft at 8358.60usft MD (7570.88 TVD, -542.64 N, 194.56 E) - Point	0.00	0.00	7,542.45	-541.28	196.52	384,691.72	1,688,407.52	39° 33' 3.39 N	80° 36' 18.15 W
513507 Top of Perf - survey misses target center by 660.99usft at 8248.19usft MD (7571.19 TVD, -433.33 N, 168.44 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	360.00	7,547.00	-567.66	-473.82	384,645.34	1,687,737.18	39° 33' 2.85 N	80° 36' 26.70 W
513504 TD2 - survey misses target center by 85.74usft at 15445.00usft MD (7645.04 TVD, -7438.08 N, 1810.37 E) - Point	0.00	360.00	7,562.00	-7,443.54	1,789.74	377,789.46	1,690,000.74	39° 31' 55.37 N	80° 35' 56.74 W
513504 LP 245' VS - survey misses target center by 8.70usft at 8029.61usft MD (7556.60 TVD, -223.66 N, 116.29 E) - Point	0.00	360.00	7,562.00	-221.59	122.79	385,011.41	1,688,333.79	39° 33' 6.54 N	80° 36' 19.14 W
513927 Top of Perf - survey misses target center by 1275.33usft at 7684.54usft MD (7464.96 TVD, 94.94 N, 30.32 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	0.00	7,562.00	511.69	1,231.72	385,744.69	1,689,442.72	39° 33' 13.92 N	80° 36' 5.10 W
513504 LP 125' VS - survey misses target center by 24.10usft at 7912.23usft MD (7540.48 TVD, -111.33 N, 86.53 E) - Point	0.00	360.00	7,562.00	-104.79	95.19	385,128.20	1,688,306.19	39° 33' 7.69 N	80° 36' 19.51 W
513504 Plat LP - survey misses target center by 3.45usft at 8221.95usft MD (7570.32 TVD, -409.81 N, 162.66 E) - Point	0.00	0.00	7,570.00	-409.00	166.00	384,824.00	1,688,377.00	39° 33' 4.70 N	80° 36' 18.56 W
513923 Plat LP 3 - survey misses target center by 197.76usft at 7606.24usft MD (7422.08 TVD, 157.57 N, 11.32 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	360.00	7,570.00	283.00	50.00	385,516.00	1,688,261.00	39° 33' 11.52 N	80° 36' 20.15 W
513504 TD - survey misses target center by 37.66usft at 11002.19usft MD (7607.25 TVD, -3118.30 N, 785.47 E) - Point	0.00	360.00	7,570.00	-3,118.00	791.00	382,115.00	1,689,002.00	39° 32' 38.00 N	80° 36' 10.16 W
513924 Plat LP - survey misses target center by 591.12usft at 7634.92usft MD (7438.69 TVD, 135.16 N, 17.97 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	360.00	7,581.00	394.00	530.00	385,627.00	1,688,741.00	39° 33' 12.68 N	80° 36' 14.04 W
513930 LP 321' VS plan - survey misses target center by 738.28usft at 8015.79usft MD (7555.44 TVD, -210.30 N, 112.93 E) - Rectangle (sides W1,000.00 H1,000.00 D0.00)	0.00	0.00	7,600.70	-21.21	825.15	385,211.79	1,689,036.15	39° 33' 8.61 N	80° 36' 10.21 W

### Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
15,400.00	7,655.52	-7,384.65	1,797.19	Last Survey: 15390'MD / 7645.52'TVD
15,455.00	7,655.04	-7,438.02	1,810.49	PTB: 15445'MD



Where energy meets innovation.

**EQT PRODUCTION**  
 Big 190  
 Wetzel County, WV  
 Well #513504  
**Plan 7 - AVP FINAL (Grid)**  
 GL 1472 + 23' KB @ 1495.00usft

Geocoid: System: US State Plane 1927 (Estate 1495.00)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1858  
 Prime Meridian: Greenwich  
 System Datum: Mean Sea Level



**Azimuth Corrections**

To convert a Magnetic Direction to a Grid Direction, Subtract 7.58°

PKB Elevation:	GL 1472 + 23' KB @ 1495.00usft
+N/S	0.00
+E/W	0.00
Northing	282328.00
Easting	168231.00
Latitude	39° 59' 6.72" N
Longitude	80° 56' 20.75" W

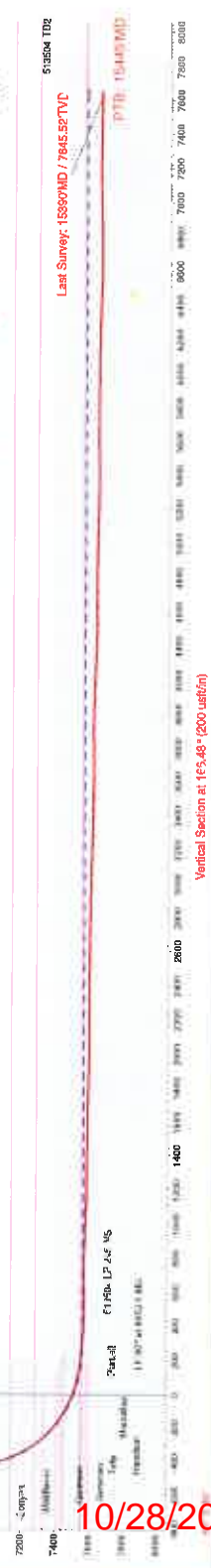
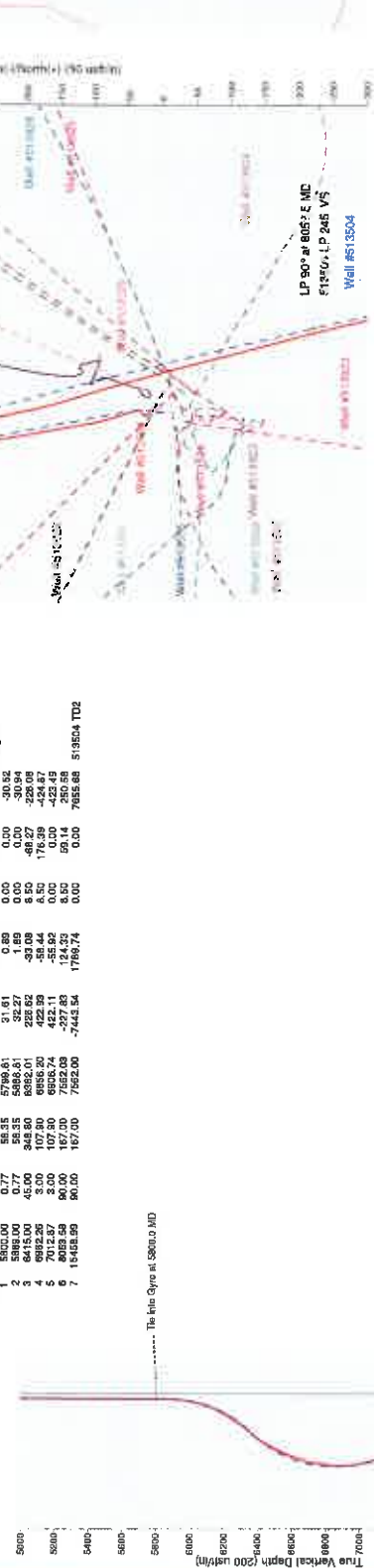
**DESIGN TARGET DETAILS**

Name	TVD	+N/S	Northing	Easting	Latitude	Longitude
513504 LP 245 VS	7862.00	-221.59	385011.41	168833.79	39° 33' 8.54" N	80° 38' 19.14" W
513504 TD2	7362.00	-7443.34	377789.46	169000.74	39° 31' 56.37" N	80° 55' 56.74" W

**SECTION DETAILS**

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Diag	TFace	VSecl	Target
1	5900.00	0.77	56.35	5799.61	21.61	0.00	0.00	0.00	-30.92	
2	6145.00	45.00	845.80	6882.01	228.62	-33.09	8.50	-48.27	-220.08	
3	6982.26	3.00	107.80	6985.20	422.99	-58.44	6.50	176.39	-424.87	
4	7023.57	3.00	107.30	6995.74	422.11	-55.82	0.00	0.00	-422.49	
5	7158.25	90.00	167.00	7158.25	-544.52	116.74	0.00	0.00	-116.74	
6	7522.00	90.00	167.00	7522.00	-7443.54	1769.74	0.00	0.00	7655.68	513504 TD2

..... This line Gyro at 5900.0 MD



Vertical Section at 165.48° (200 usft/m)

10/28/2016