

**APPROVED**  
NAME: John Fl...  
DATE: 1/27/16

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

County DODDRIDGE District Southwest  
Quad OXFORD 7.5' Pad Name OXFORD 159 Field/Pool Name                       
Farm name JUSTIN L. HENDERSON ET AL Well Number 513154  
Operator (as registered with the OOG) EQT Production Company  
Address 625 Liberty Ave. EQT Plaza, Suite 1700 City Pittsburgh State PA Zip 15222

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,339,878 Easting 520,537  
Landing Point of Curve Northing 4,339,291 Easting 519,818  
Bottom Hole Northing 4,340,406 Easting 519,276

Elevation (ft) 1,252 GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other                       
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other                       
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additive(s)  
Water base Mud 12.5 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 7/30/2014 Date drilling commenced 11/21/2014 Date drilling ceased 5/3/2015  
Date completion activities began 6/19/2015 Date completion activities ceased 6/27/2015  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 264, 325, 401 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1312, 1379 Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 246, 313, 474, 616, 732, 735 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:

02/12/2016

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API 47-017 - 6502 Farm name JUSTIN L. HENDERSON ET AL Well number 513154

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	40'	NEW	A-500 40LB/FT	NONE	Y
Surface	17.5"	13.375"	1,110'	NEW	J-55 54.5LB/FT	None	Y
Coal							
Intermediate 1	12.375"	9.625"	5,253'	NEW	P-110 40LB/FT	1,564', 3,190'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	13304	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	38	15.6	1.18	44.84	0	8
Surface	CLASS A	835	15.6	1.20	1,002	0	8
Coal							
Intermediate 1	CLASS A / A / A	447 / 380 / 1,205	14.2 / 15.6 / 15.6	1.24 / 1.18 / 1.18	2,424.58	0	8
Intermediate 2							
Intermediate 3							
Production	Class A 50/50 POZ / H	970/560	14.2 / 15.2	1.26 / 1.97	2325.40	4163	8
Tubing							

Drillers TD (ft) 13310' Loggers TD (ft) 13310'  
 Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

Kick off depth (ft) 5317'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No  Conventional  Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_  
CONDUCTOR- NONE  
SURFACE- JOINTS: 1,12,23  
INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1, 12, 23, 35, 48, 59, 71, 83, 95, 107, 119  
PRODUCTION- 190 centralizers ran every joint from 13302' to 5158'

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WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS WV Department of Environmental Protection

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_





API 47- 017 - 6502 Farm name JUSTIN L. HENDERSON ET AL Well number 513154

Drilling Contractor Patterson UTI  
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company Phoenix Technology Services  
Address 1805 Brittmoore Road City Houston State TX Zip 77043

Logging Company Gyro Data Inc.  
Address 601 Mayer St. City Bridgeville State PA Zip 15017

Cementing Company C & J Energy Services (Nabors)  
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

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**Well #513154 Final Formations**

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	1	1	411	411
SAND/SHALE	1	1	256	256
WASHINGTON COAL	256	256	258	258
SAND/SHALE	258	258	323	323
WAYNESBURG A COAL	323	323	325	325
SAND/SHALE	325	325	484	484
UNIONTOWN COAL	484	484	486	486
SAND/SHALE	486	486	626	626
SEWICKLEY	626	626	628	628
SAND/SHALE	628	628	742	742
REDSTONE COAL	742	742	743	743
SAND/SHALE	743	743	745	745
PITTSBURGH COAL	745	745	749	749
SAND/SHALE	749	749	2,030.00	2,029.70
BIG LIME	2,030.00	2,029.70	2,174.00	2,173.60
SAND/SHALE	2,174.00	2,173.60	2,323.00	2,322.60
WEIR	2,323.00	2,322.60	2,437.00	2,436.50
SAND/SHALE	2,437.00	2,436.50	2,531.00	2,530.50
GANTZ	2,531.00	2,530.50	2,608.00	2,607.40
50F	2,608.00	2,607.40	2,684.00	2,683.40
SAND/SHALE	2,684.00	2,683.40	2,730.00	2,729.30
30F	2,730.00	2,729.30	2,765.00	2,764.30
SAND/SHALE	2,765.00	2,764.30	2,779.00	2,778.30
GORDON	2,779.00	2,778.30	2,870.00	2,869.20
4TH SAND	2,870.00	2,869.20	3,051.00	3,050.00
BAYARD	3,051.00	3,050.00	3,151.00	3,149.90
SAND/SHALE	3,151.00	3,149.90	3,388.00	3,386.70
WARREN	3,388.00	3,386.70	3,447.00	3,445.60
SAND/SHALE	3,447.00	3,445.60	3,459.00	3,457.60
SPEECHLEY	3,459.00	3,457.60	3,703.00	3,701.20
SAND/SHALE	3,703.00	3,701.20	4,139.00	4,135.50
BALLTOWN A	4,139.00	4,135.50	4,253.00	4,248.70
SAND/SHALE	4,253.00	4,248.70	4,338.00	4,333.10
RILEY	4,338.00	4,333.10	4,484.00	4,478.00
SAND/SHALE	4,484.00	4,478.00	5,009.00	4,998.80
BENSON	5,009.00	4,998.80	5,049.00	5,038.50
SAND/SHALE	5,049.00	5,038.50	5,180.00	5,168.50
ALEXANDER	5,180.00	5,168.50	6,211.00	5,916.40
RHINESTREET UPPER	6,211.00	5,916.40	6,362.00	5,954.70
RHINESTREET	6,362.00	5,954.70	7,920.00	6,852.10
SONYEA	7,920.00	6,352.10	8,578.00	6,472.90
MIDDLESEX	8,378.00	6,472.90	8,550.00	6,525.30
GENESSEE	8,550.00	6,525.30	8,766.00	6,585.70
GENESEO	8,766.00	6,585.70	8,930.00	6,627.80
TULLY	8,930.00	6,627.80	9,015.00	6,645.80
HAMILTON	9,015.00	6,645.80	9,141.00	6,667.70
MARCELLUS	9,141.00	6,667.70		

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# **EQT Production - Marcellus**

**Doddridge County, WV Grid**

**Doddridge County 513154**

**Well #513154**

**Main Wellbore**

**Design: 513154 AS Drilled Surveys**

## **Standard Survey Report**

**11 May, 2015**



Where energy meets innovation.



PHX  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 513154
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB@23 @ 1275.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB@23 @ 1275.0usft
<b>Site:</b>	Doddridge County 513154	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #513154	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	513154 AS Drilled Surveys		

**Project** Doddridge County, WV Grid

<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		Using geodetic scale factor

**Site** Doddridge County 513154

<b>Site Position:</b>		<b>Northing:</b>	260,322.60 usft	<b>Latitude:</b>	39.21
<b>From:</b>	Map	<b>Easting:</b>	1,642,311.70 usft	<b>Longitude:</b>	-80.76
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.81 °

**Well** Well #513154

<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	260,322.60 usft	<b>Latitude:</b>	39° 12' 28.222 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,642,311.70 usft	<b>Longitude:</b>	80° 45' 44.284 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,252.0 usft

**Wellbore** Main Wellbore

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/20/2015	-7.78	66.68	52,236

**Design** 513154 AS Drilled Surveys

**Audit Notes:**

<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
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Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	293.68

**Survey Program** Date 5/11/2015

From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	5,262.0	513154 Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0.00	13,310.0	513154 PHX MWD (Main Wellbore)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

**Survey**

Measure d	Inclination	Azimuth (°)	Vertical Depth (usft)	Subsea 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	-1,275.0	0.0	0.0	0.0	0.00	0.00	0.00
23.0	0.00	0.00	23.0	-1,252.0	0.0	0.0	0.0	0.00	0.00	0.00
123.0	0.51	282.49	123.0	-1,152.0	0.1	-0.4	0.4	0.51	0.51	0.00
223.0	0.40	304.11	223.0	-1,052.0	0.4	-1.2	1.2	0.20	-0.17	21.62
323.0	0.34	292.64	323.0	-952.0	0.7	-1.7	1.9	0.10	-0.06	-11.47
423.0	0.17	301.03	423.0	-852.0	0.9	-2.1	2.3	0.17	-0.17	8.39
523.0	0.23	293.93	523.0	-752.0	1.0	-2.4	2.6	0.06	0.06	-7.10

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WV Department of Environmental Protection



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<b>Site:</b>	Doddridge County 513154	<b>North Reference:</b>	Grd
<b>Well:</b>	Well #513154	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	513154 AS Drilled Surveys		

Survey											
Measure d	Inclination	Azimuth	Vertical Depth	Subsea Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate	
Depth	n	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	
623.0	0.24	288.60	623.0	-652.0	1.2	-2.8	3.1	0.02	0.01		-5.33
723.0	0.25	272.87	723.0	-552.0	1.3	-3.2	3.5	0.07	0.01		-15.73
823.0	0.36	293.41	823.0	-452.0	1.4	-3.7	4.0	0.15	0.11		20.54
923.0	0.50	290.42	923.0	-352.0	1.7	-4.4	4.7	0.14	0.14		-2.99
1,023.0	0.79	272.50	1,023.0	-252.0	1.9	-5.5	5.8	0.35	0.29		-17.92
1,123.0	0.74	276.07	1,123.0	-152.0	2.0	-6.9	7.1	0.07	-0.05		3.57
1,223.0	0.91	282.23	1,223.0	-52.0	2.2	-8.3	8.5	0.19	0.17		6.16
1,323.0	1.41	282.83	1,322.9	47.9	2.6	-10.3	10.5	0.50	0.50		0.60
1,423.0	1.58	285.66	1,422.9	147.9	3.3	-12.8	13.0	0.19	0.17		2.83
1,523.0	1.57	283.08	1,522.9	247.9	4.0	-15.4	15.7	0.07	-0.01		-2.58
1,623.0	1.52	280.26	1,622.8	347.8	4.5	-18.1	18.4	0.09	-0.05		-2.82
1,723.0	1.43	272.63	1,722.8	447.8	4.8	-20.6	20.8	0.22	-0.09		-7.63
1,823.0	1.58	275.72	1,822.8	547.8	5.0	-23.3	23.3	0.17	0.15		3.09
1,923.0	1.47	273.70	1,922.7	647.7	5.2	-25.9	25.8	0.12	-0.11		-2.02
2,023.0	1.49	276.86	2,022.7	747.7	5.5	-28.5	28.3	0.08	0.02		3.16
2,123.0	1.64	279.70	2,122.7	847.7	5.9	-31.2	30.9	0.17	0.15		2.84
2,223.0	1.72	282.05	2,222.6	947.6	6.4	-34.1	33.8	0.11	0.08		2.35
2,323.0	1.80	283.75	2,322.6	1,047.6	7.1	-37.1	36.8	0.10	0.08		1.70
2,423.0	1.80	286.34	2,422.5	1,147.5	7.9	-40.1	39.9	0.08	0.00		2.59
2,523.0	2.02	285.52	2,522.5	1,247.5	8.8	-43.3	43.2	0.22	0.22		-0.82
2,623.0	2.10	284.24	2,622.4	1,347.4	9.8	-46.8	46.7	0.09	0.08		-1.28
2,723.0	2.33	283.30	2,722.3	1,447.3	10.7	-50.5	50.5	0.23	0.23		-0.94
2,823.0	2.31	286.09	2,822.2	1,547.2	11.7	-54.4	54.5	0.11	-0.02		2.79
2,923.0	2.39	288.16	2,922.2	1,647.2	12.9	-58.3	58.6	0.12	0.08		2.07
3,023.0	2.50	288.08	3,022.1	1,747.1	14.2	-62.4	62.9	0.11	0.11		-0.08
3,123.0	2.65	285.08	3,122.0	1,847.0	15.5	-66.7	67.3	0.20	0.15		-3.00
3,223.0	2.67	283.98	3,221.9	1,946.9	16.7	-71.2	71.9	0.05	0.02		-1.10
3,323.0	2.84	285.47	3,321.7	2,046.7	17.9	-75.8	76.7	0.18	0.17		1.49
3,423.0	2.86	285.80	3,421.6	2,146.6	19.2	-80.6	81.6	0.03	0.02		0.33
3,523.0	2.97	284.36	3,521.5	2,246.5	20.6	-85.5	86.6	0.13	0.11		-1.44
3,623.0	3.06	287.22	3,621.4	2,346.4	22.0	-90.6	91.8	0.18	0.09		2.86
3,723.0	3.16	288.55	3,721.2	2,446.2	23.7	-95.8	97.2	0.12	0.10		1.33
3,823.0	3.57	289.60	3,821.0	2,546.0	25.6	-101.3	103.1	0.41	0.41		1.05
3,923.0	5.20	293.51	3,920.7	2,645.7	28.4	-108.4	110.7	1.66	1.63		3.91
4,023.0	6.13	297.59	4,020.2	2,745.2	32.7	-117.3	120.6	1.01	0.93		4.08
4,123.0	6.62	298.47	4,119.6	2,844.6	37.9	-127.1	131.6	0.50	0.49		0.88
4,223.0	6.80	300.54	4,218.9	2,943.9	43.7	-137.3	143.2	0.30	0.18		2.07
4,323.0	7.06	303.58	4,318.2	3,043.2	50.1	-147.5	155.2	0.45	0.26		3.04
4,423.0	7.14	304.51	4,417.4	3,142.4	57.0	-157.7	167.3	0.14	0.08		0.93
4,523.0	7.21	309.08	4,516.7	3,241.7	64.5	-167.7	179.5	0.57	0.07		4.57

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Wellbore:	Main Wellbore		
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4,623.0	7.36	315.06	4,615.9	3,340.9	73.0	-177.1	191.5	0.77	0.15	5.98
4,723.0	7.33	318.51	4,715.0	3,440.0	82.3	-185.9	203.3	0.44	-0.03	3.45
4,823.0	7.15	322.34	4,814.2	3,539.2	92.0	-193.9	214.5	0.52	-0.18	3.83
4,923.0	7.20	323.76	4,913.5	3,638.5	102.0	-201.4	225.4	0.18	0.05	1.42
5,023.0	7.03	327.79	5,012.7	3,737.7	112.2	-208.4	235.9	0.53	-0.17	4.03
5,123.0	6.92	331.70	5,111.9	3,836.9	122.7	-214.5	245.7	0.49	-0.11	3.91
5,223.0	6.73	335.69	5,211.2	3,936.2	133.3	-219.7	254.8	0.51	-0.19	3.99
Gyro Tie In=5252' MD										
5,262.0	6.97	336.32	5,250.0	3,975.0	137.6	-221.6	258.2	0.64	0.62	1.62
5,319.0	6.00	323.80	5,306.6	4,031.6	143.2	-224.8	263.4	3.00	-1.70	-21.96
5,350.0	6.60	290.30	5,337.4	4,062.4	145.1	-227.4	266.5	11.84	1.94	-108.06
5,382.0	8.30	266.60	5,369.2	4,094.2	145.6	-231.4	270.4	10.86	5.31	-74.06
5,413.0	10.90	251.30	5,399.7	4,124.7	144.5	-236.5	274.6	11.68	8.39	-49.35
5,445.0	13.70	241.90	5,431.0	4,156.0	141.8	-242.7	279.2	10.73	8.75	-29.38
5,477.0	16.00	234.90	5,461.9	4,186.9	137.4	-249.6	283.8	9.10	7.19	-21.88
5,508.0	17.60	228.40	5,491.6	4,216.6	131.9	-256.6	288.0	7.95	5.16	-20.97
5,540.0	19.30	222.30	5,522.0	4,247.0	124.7	-263.8	291.7	8.03	5.31	-19.06
5,571.0	21.50	219.10	5,551.0	4,276.0	116.5	-270.8	294.8	7.95	7.10	-10.32
5,602.0	24.70	216.50	5,579.5	4,304.5	106.9	-278.3	297.8	10.83	10.32	-8.39
5,634.0	28.00	214.40	5,608.2	4,333.2	95.4	-286.5	300.7	10.71	10.31	-6.56
5,666.0	30.80	213.30	5,636.1	4,361.1	82.3	-295.2	303.4	8.91	8.75	-3.44
5,697.0	34.10	213.70	5,662.2	4,387.2	68.4	-304.4	306.3	10.67	10.65	1.29
5,728.0	37.40	214.20	5,687.4	4,412.4	53.4	-314.5	309.5	10.69	10.65	1.61
5,760.0	40.70	214.80	5,712.2	4,437.2	36.8	-326.0	313.3	10.38	10.31	1.88
5,791.0	44.10	215.10	5,735.1	4,460.1	19.7	-337.9	317.4	10.99	10.97	0.97
5,823.0	47.70	215.30	5,757.4	4,482.4	0.9	-351.2	322.0	11.26	11.25	0.63
5,854.0	51.10	214.50	5,777.6	4,502.6	-18.4	-364.6	326.5	11.14	10.97	-2.58
5,886.0	54.50	213.10	5,796.9	4,521.9	-39.6	-378.8	331.0	11.18	10.63	-4.38
5,917.0	57.60	212.10	5,814.2	4,539.2	-61.2	-392.7	335.0	10.35	10.00	-3.23
5,949.0	60.60	211.40	5,830.6	4,555.6	-84.6	-407.1	338.9	9.56	9.38	-2.19
5,980.0	64.00	210.70	5,845.1	4,570.1	-108.1	-421.2	342.4	11.15	10.97	-2.26
6,012.0	67.40	210.30	5,858.2	4,583.2	-133.2	-436.0	345.8	10.69	10.63	-1.25
6,043.0	70.00	209.90	5,869.5	4,594.5	-158.2	-450.5	349.1	8.47	8.39	-1.29
6,075.0	73.30	210.40	5,879.6	4,604.6	-184.5	-465.8	352.5	10.42	10.31	1.56
6,138.0	74.40	210.50	5,897.1	4,622.1	-236.6	-496.5	359.6	1.75	1.75	0.16
6,232.0	75.00	209.90	5,921.9	4,646.9	-315.0	-542.1	369.9	0.89	0.64	-0.64
6,326.0	75.70	209.50	5,945.7	4,670.7	-394.0	-587.1	379.5	0.85	0.74	-0.43
6,420.0	74.30	209.40	5,970.0	4,695.0	-473.1	-631.8	388.6	1.49	-1.49	-0.11
6,514.0	74.90	208.70	5,994.9	4,719.9	-552.3	-675.8	397.1	0.96	0.64	-0.74
6,609.0	75.90	208.10	6,018.9	4,743.9	-633.2	-719.5	404.7	1.22	1.05	-0.63



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Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 513154
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1275.0usft
Project:	Doddridge County, WV Grd	MD Reference:	KB@23 @ 1275.0usft
Site:	Doddridge County 513154	North Reference:	Grd
Well:	Well #513154	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513154 AS Drilled Surveys		

Measure d Depth	Inclinatio n	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,703.0	75.20	211.80	6,042.4	4,767.4	-712.0	-764.9	414.6	3.88	-0.74	3.94
6,798.0	76.10	211.50	6,065.9	4,790.9	-790.4	-813.2	427.4	1.00	0.95	-0.32
6,892.0	74.20	211.40	6,090.0	4,815.0	-867.9	-860.6	439.7	2.02	-2.02	-0.11
6,987.0	75.10	211.20	6,115.1	4,840.1	-946.1	-908.2	451.8	0.97	0.95	-0.21
7,081.0	75.60	210.80	6,138.9	4,863.9	-1,024.1	-955.0	463.4	0.67	0.53	-0.43
7,176.0	74.20	210.70	6,163.7	4,888.7	-1,102.9	-1,001.9	474.7	1.48	-1.47	-0.11
7,270.0	74.60	210.30	6,188.9	4,913.9	-1,180.9	-1,047.9	485.4	0.59	0.43	-0.43
7,364.0	74.80	210.50	6,213.7	4,938.7	-1,259.1	-1,093.8	496.1	0.30	0.21	0.21
7,458.0	75.20	210.90	6,238.1	4,963.1	-1,337.2	-1,140.1	507.2	0.59	0.43	0.43
7,553.0	74.80	208.60	6,262.7	4,987.7	-1,416.9	-1,185.7	516.9	2.38	-0.42	-2.42
7,647.0	75.50	208.60	6,286.8	5,011.8	-1,496.6	-1,229.2	524.7	0.74	0.74	0.00
7,741.0	76.50	208.30	6,309.5	5,034.5	-1,576.8	-1,272.6	532.3	1.11	1.06	-0.32
7,836.0	76.00	210.60	6,332.1	5,057.1	-1,657.2	-1,318.0	541.5	2.41	-0.53	2.42
7,930.0	76.40	210.00	6,354.5	5,079.5	-1,736.0	-1,364.0	552.1	0.75	0.43	-0.64
8,025.0	74.60	210.30	6,378.3	5,103.3	-1,815.5	-1,410.2	562.4	1.92	-1.89	0.32
8,057.0	74.90	210.30	6,386.7	5,111.7	-1,842.2	-1,425.8	566.0	0.94	0.94	0.00
8,088.0	75.30	210.30	6,394.7	5,119.7	-1,868.0	-1,440.9	569.4	1.29	1.29	0.00
8,119.0	75.70	212.10	6,402.4	5,127.4	-1,893.7	-1,456.5	573.4	5.77	1.29	5.81
8,151.0	75.40	215.20	6,410.4	5,135.4	-1,919.5	-1,473.6	578.7	9.43	-0.94	9.69
8,182.0	75.10	218.70	6,418.3	5,143.3	-1,943.5	-1,491.6	585.6	10.96	-0.97	11.29
8,214.0	74.40	221.60	6,426.7	5,151.7	-1,967.1	-1,511.5	594.4	9.01	-2.19	9.06
8,246.0	73.70	224.70	6,435.5	5,160.5	-1,989.5	-1,532.6	604.6	9.57	-2.19	9.69
8,277.0	73.30	228.30	6,444.3	5,169.3	-2,010.0	-1,554.1	616.2	11.21	-1.29	11.61
8,309.0	73.50	231.70	6,453.5	5,178.5	-2,029.7	-1,577.6	629.8	10.20	0.63	10.63
8,341.0	73.80	234.50	6,462.5	5,187.5	-2,048.1	-1,602.2	644.8	8.45	0.94	8.75
8,372.0	73.50	237.50	6,471.2	5,196.2	-2,064.7	-1,626.8	660.7	9.34	-0.97	9.68
8,403.0	73.50	240.10	6,480.0	5,205.0	-2,080.1	-1,652.3	677.8	8.04	0.00	8.39
8,435.0	73.50	243.10	6,489.1	5,214.1	-2,094.7	-1,679.2	696.7	8.99	0.00	9.38
8,466.0	72.70	246.00	6,498.1	5,223.1	-2,107.5	-1,706.0	716.1	9.32	-2.58	9.35
8,498.0	71.20	248.50	6,508.0	5,233.0	-2,119.2	-1,734.1	737.1	8.78	-4.69	7.81
8,529.0	70.30	252.10	6,518.3	5,243.3	-2,129.1	-1,761.6	758.3	11.34	-2.90	11.61
8,560.0	70.40	255.80	6,528.7	5,253.7	-2,137.2	-1,789.7	780.8	11.24	0.32	11.94
8,592.0	71.30	258.30	6,539.2	5,264.2	-2,143.9	-1,819.1	805.0	7.90	2.81	7.81
8,623.0	72.90	260.70	6,548.7	5,273.7	-2,149.3	-1,848.1	829.4	8.99	5.16	7.74
8,654.0	75.00	263.20	6,557.3	5,282.3	-2,153.5	-1,877.6	854.8	10.29	6.77	8.06
8,686.0	75.90	265.90	6,565.3	5,290.3	-2,156.4	-1,908.5	881.8	8.64	2.81	8.44
8,717.0	75.70	269.50	6,572.9	5,297.9	-2,157.6	-1,938.5	908.8	11.28	-0.66	11.61
8,748.0	74.60	272.90	6,580.9	5,305.9	-2,157.0	-1,968.4	936.5	11.18	-3.55	10.97
8,780.0	74.10	276.00	6,589.5	5,314.5	-2,154.6	-1,999.1	965.6	9.46	-1.56	9.69
8,811.0	74.20	280.60	6,598.0	5,323.0	-2,150.3	-2,028.6	994.4	14.28	0.32	14.84

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NOV 30 2015

WV Department of Environmental Protection

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 513154
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB@23 @ 1275.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB@23 @ 1275.0usft
<b>Site:</b>	Doddridge County 513154	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #513154	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	513154 AS Drilled Surveys		

Measure d	Inclinatio n	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,842.0	75.50	284.40	6,606.1	5,331.1	-2,143.8	-2,057.9	1,023.7	12.55	4.19	12.26
8,874.0	75.30	287.90	6,614.2	5,339.2	-2,135.2	-2,087.6	1,054.4	10.60	-0.63	10.94
8,905.0	76.00	291.70	6,621.9	5,346.9	-2,125.0	-2,115.8	1,084.4	12.09	2.26	12.26
8,936.0	76.80	295.10	6,629.1	5,354.1	-2,113.1	-2,143.5	1,114.5	10.97	2.58	10.97
8,968.0	77.80	297.80	6,636.2	5,361.2	-2,099.2	-2,171.4	1,145.7	8.80	3.13	8.44
9,000.0	78.30	301.00	6,642.8	5,367.8	-2,083.8	-2,198.7	1,176.8	9.91	1.56	10.00
9,031.0	78.90	304.80	6,648.9	5,373.9	-2,067.3	-2,224.2	1,206.8	12.17	1.94	12.26
9,063.0	79.70	308.60	6,654.9	5,379.9	-2,048.5	-2,249.4	1,237.4	11.93	2.50	11.88
9,094.0	80.00	312.10	6,660.3	5,385.3	-2,028.8	-2,272.7	1,266.7	11.16	0.97	11.29
9,125.0	81.40	314.90	6,665.4	5,390.4	-2,007.7	-2,294.9	1,295.4	9.99	4.52	9.03
9,157.0	82.60	317.70	6,669.8	5,394.8	-1,984.8	-2,316.8	1,324.7	9.44	3.75	8.75
9,188.0	83.40	319.80	6,673.6	5,398.6	-1,961.7	-2,337.0	1,352.5	7.20	2.58	6.77
9,220.0	85.20	322.40	6,676.8	5,401.8	-1,936.9	-2,357.0	1,380.8	9.85	5.63	8.13
9,252.0	86.70	325.10	6,679.0	5,404.0	-1,911.1	-2,375.9	1,408.4	9.63	4.69	8.44
9,283.0	88.60	328.80	6,680.3	5,405.3	-1,885.2	-2,392.8	1,434.3	13.41	6.13	11.94
9,315.0	89.80	330.70	6,680.7	5,405.7	-1,857.6	-2,408.9	1,460.2	7.02	3.75	5.94
LP=9348' MD/8681' TVD										
9,346.0	90.60	333.90	6,680.6	5,405.6	-1,830.1	-2,423.3	1,484.4	10.64	2.58	10.32
9,441.0	91.70	334.70	6,678.7	5,403.7	-1,744.5	-2,464.5	1,556.5	1.43	1.16	0.84
9,535.0	92.00	333.60	6,675.7	5,400.7	-1,660.0	-2,505.5	1,628.0	1.21	0.32	-1.17
9,630.0	89.90	334.70	6,674.1	5,399.1	-1,574.5	-2,546.9	1,700.2	2.50	-2.21	1.16
9,724.0	90.90	333.60	6,673.5	5,398.5	-1,489.9	-2,587.9	1,771.7	1.58	1.06	-1.17
9,818.0	88.30	335.50	6,674.1	5,399.1	-1,405.0	-2,628.3	1,842.8	3.43	-2.77	2.02
9,912.0	89.10	335.20	6,676.3	5,401.3	-1,319.6	-2,667.4	1,913.0	0.91	0.85	-0.32
10,006.0	89.80	334.00	6,677.2	5,402.2	-1,234.7	-2,707.8	1,984.0	1.48	0.74	-1.28
10,101.0	90.80	333.20	6,676.7	5,401.7	-1,149.6	-2,750.0	2,056.8	1.35	1.05	-0.84
10,196.0	90.40	336.40	6,675.7	5,400.7	-1,063.7	-2,790.4	2,128.4	3.39	-0.42	3.37
10,290.0	91.10	334.80	6,674.4	5,399.4	-978.1	-2,829.3	2,198.3	1.86	0.74	-1.70
10,384.0	91.80	333.60	6,672.1	5,397.1	-893.5	-2,870.2	2,269.8	1.48	0.74	-1.28
10,479.0	91.50	333.90	6,669.3	5,394.3	-808.3	-2,912.2	2,342.4	0.45	-0.32	0.32
10,574.0	89.80	336.70	6,668.2	5,393.2	-722.0	-2,951.9	2,413.4	3.45	-1.79	2.95
10,669.0	89.40	334.80	6,668.9	5,393.9	-635.4	-2,990.9	2,483.9	2.04	-0.42	-2.00
10,764.0	90.40	333.60	6,669.1	5,394.1	-549.9	-3,032.2	2,556.1	1.64	1.05	-1.26
10,858.0	90.30	333.20	6,668.5	5,393.5	-465.9	-3,074.3	2,628.4	0.44	-0.11	-0.43
10,952.0	91.30	332.40	6,667.2	5,392.2	-382.3	-3,117.3	2,701.4	1.36	1.06	0.85
11,046.0	90.80	334.80	6,665.5	5,390.5	-298.1	-3,159.1	2,773.4	2.61	-0.53	2.55
11,141.0	91.10	333.30	6,663.9	5,388.9	-212.7	-3,200.6	2,845.8	1.61	0.32	1.58
11,235.0	91.20	334.90	6,662.0	5,387.0	-128.1	-3,241.7	2,917.3	1.71	0.11	1.70
11,330.0	91.00	338.30	6,660.2	5,385.2	-41.0	-3,279.4	2,986.9	3.58	-0.21	3.58
11,424.0	91.50	337.50	6,658.1	5,383.1	46.1	-3,314.7	3,054.2	1.00	0.53	-0.85

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Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 513154
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB@23 @ 1275.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB@23 @ 1275.0usft
<b>Site:</b>	Doddridge County 513154	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #513154	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	513154 AS Drilled Surveys		

Measure d Depth	Inclination	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,519.0	92.70	336.00	6,654.6	5,379.6	133.3	-3,352.2	3,123.6	2.02	1.26	-1.58
11,613.0	89.80	338.20	6,652.6	5,377.6	219.9	-3,368.8	3,191.8	3.87	-3.09	2.34
11,708.0	90.40	337.40	6,652.4	5,377.4	307.8	-3,424.7	3,260.0	1.05	0.63	-0.84
11,802.0	89.60	337.80	6,652.4	5,377.4	394.7	-3,460.5	3,327.7	0.95	-0.85	0.43
11,897.0	90.10	337.20	6,652.7	5,377.7	482.5	-3,496.8	3,396.3	0.82	0.53	-0.63
11,991.0	90.40	334.70	6,652.3	5,377.3	568.3	-3,535.1	3,465.8	2.68	0.32	-2.66
12,086.0	91.00	332.20	6,651.1	5,376.1	653.3	-3,577.6	3,538.8	2.71	0.63	-2.63
12,180.0	90.60	336.10	6,649.8	5,374.8	737.9	-3,618.6	3,610.3	4.17	-0.43	4.15
12,275.0	91.80	335.30	6,647.8	5,372.8	824.4	-3,657.7	3,680.8	1.52	1.26	-0.84
12,369.0	90.00	337.90	6,646.3	5,371.3	910.7	-3,695.0	3,749.7	3.36	-1.91	2.77
12,464.0	89.10	339.10	6,647.1	5,372.1	999.1	-3,729.8	3,817.0	1.58	-0.95	1.26
12,558.0	90.40	339.10	6,647.5	5,372.5	1,086.9	-3,763.3	3,883.0	1.38	1.38	0.00
12,653.0	91.10	338.60	6,646.2	5,371.2	1,175.5	-3,797.6	3,950.0	0.91	0.74	-0.53
12,747.0	88.00	338.60	6,647.0	5,372.0	1,263.0	-3,831.9	4,016.5	3.30	-3.30	0.00
12,841.0	89.00	338.90	6,649.4	5,374.4	1,350.6	-3,866.0	4,082.9	1.11	1.06	0.32
12,936.0	88.80	333.60	6,651.3	5,376.3	1,437.5	-3,904.2	4,152.8	5.58	-0.21	-5.58
13,030.0	89.10	333.30	6,653.0	5,378.0	1,521.5	-3,946.2	4,225.0	0.45	0.32	-0.32
13,125.0	89.10	332.60	6,654.5	5,379.5	1,606.1	-3,989.4	4,298.6	0.74	0.00	-0.74
13,178.0	89.10	332.20	6,655.3	5,380.3	1,653.1	-4,014.0	4,339.9	0.75	0.00	-0.75
13,219.0	88.90	332.30	6,656.0	5,381.0	1,689.4	-4,033.0	4,372.0	0.55	-0.49	0.24
Final Survey=13257' MD/ 6657' TVD										
13,257.0	88.80	332.20	6,656.8	5,381.8	1,723.0	-4,050.7	4,401.7	0.37	-0.26	-0.26
Projection to TD=13310' MD/ 6658' TVD										
13,310.0	88.80	332.20	6,657.9	5,382.9	1,769.9	-4,075.4	4,443.1	0.00	0.00	0.00

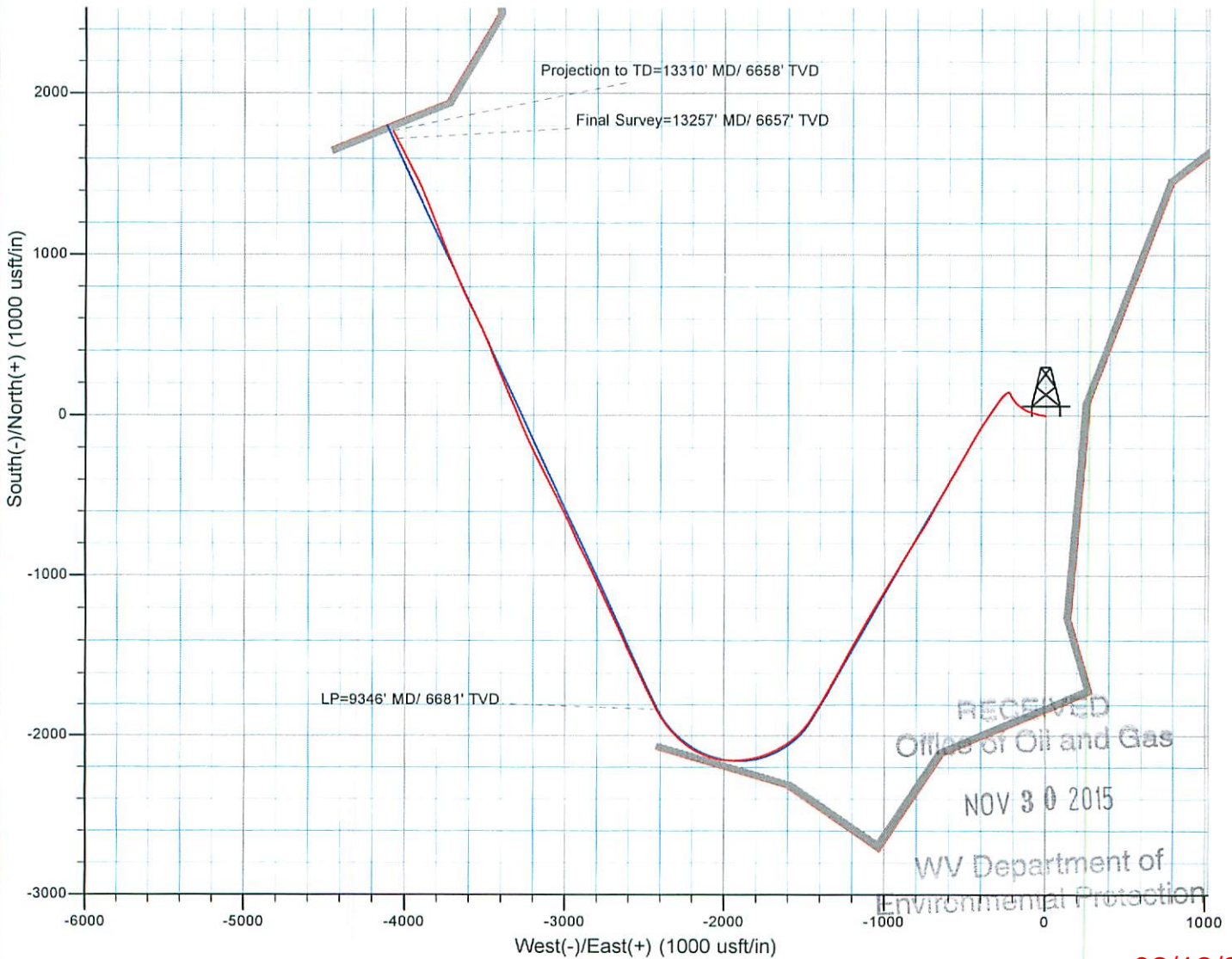
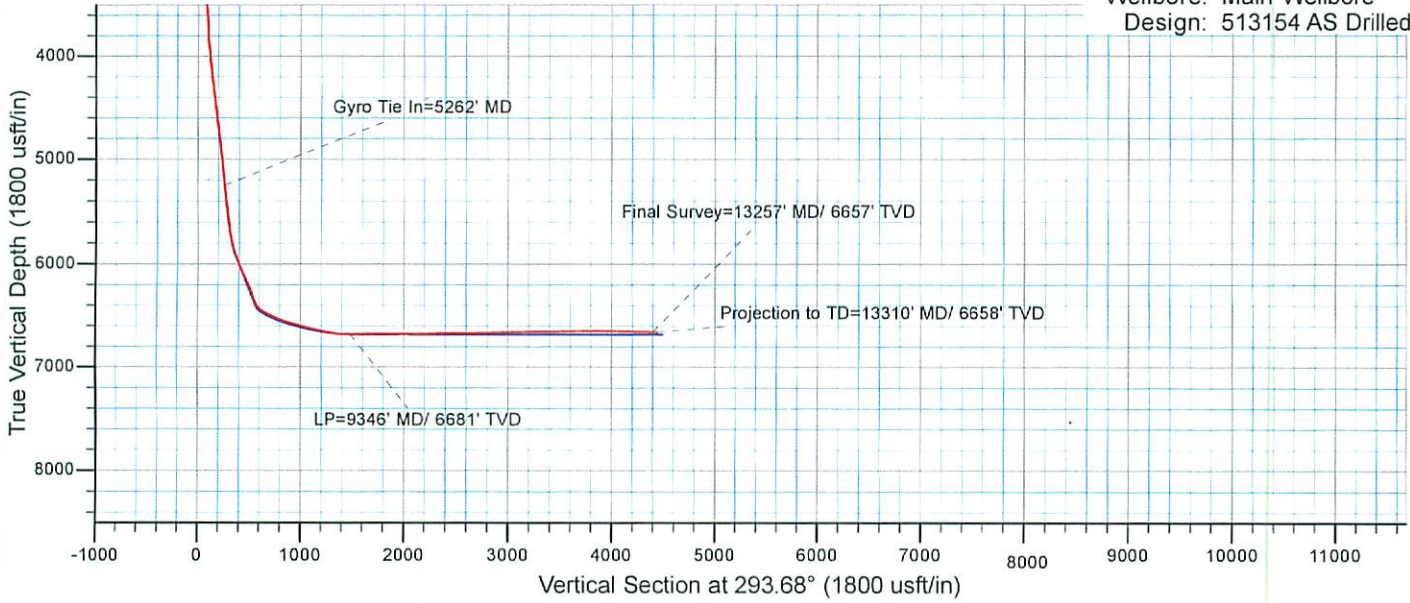
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,262.0	5,250.0	137.6	-221.6	Gyro Tie In=5262' MD
9,346.0	6,680.6	-1,830.1	-2,423.3	LP=9346' MD/ 6681' TVD
13,257.0	6,656.8	1,723.0	-4,050.7	Final Survey=13257' MD/ 6657' TVD
13,310.0	6,657.9	1,769.9	-4,075.4	Projection to TD=13310' MD/ 6658' TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



# EQT Production - Marcellus

Project: Doddridge County, WV Grid  
 Site: Doddridge County 513154  
 Well: Well #513154  
 Wellbore: Main Wellbore  
 Design: 513154 AS Drilled Surveys



02/12/2016

**513154 - 47-017-06502-0000- Perforations**

<b>Stage Number</b>	<b>Perforation Date</b>	<b>Top Perf Depth (ftKB)</b>	<b>Bottom Perf Depth (ftKB)</b>	<b>Number of Shots</b>	<b>Formation</b>
<b>Initiation Sleeve</b>	6/20/2015	13,302.00	13,304.00	10	MARCELLUS
<b>1</b>	6/20/2015	13,151.00	13,277.00	42	MARCELLUS
<b>2</b>	6/22/2015	12,971.00	13,093.00	42	MARCELLUS
<b>3</b>	6/23/2015	12,791.00	12,913.00	42	MARCELLUS
<b>4</b>	6/23/2015	12,611.00	12,733.00	42	MARCELLUS
<b>5</b>	6/23/2015	12,431.00	12,553.00	42	MARCELLUS
<b>6</b>	6/23/2015	12,251.00	12,373.00	42	MARCELLUS
<b>7</b>	6/23/2015	12,071.00	12,193.00	42	MARCELLUS
<b>8</b>	6/24/2015	11,891.00	12,011.00	42	MARCELLUS
<b>9</b>	6/24/2015	11,711.00	11,833.00	42	MARCELLUS
<b>10</b>	6/24/2015	11,530.00	11,653.00	42	MARCELLUS
<b>11</b>	6/24/2015	11,351.00	11,473.00	42	MARCELLUS
<b>12</b>	6/24/2015	11,171.00	11,293.00	42	MARCELLUS
<b>13</b>	6/25/2015	10,991.00	11,113.00	42	MARCELLUS
<b>14</b>	6/25/2015	10,811.00	10,930.00	42	MARCELLUS
<b>15</b>	6/25/2015	10,633.00	10,753.00	42	MARCELLUS
<b>16</b>	6/25/2015	10,451.00	10,573.00	42	MARCELLUS
<b>17</b>	6/25/2015	10,271.00	10,378.00	42	MARCELLUS
<b>18</b>	6/26/2015	10,091.00	10,211.00	42	MARCELLUS
<b>19</b>	6/26/2015	9,911.00	10,033.00	42	MARCELLUS
<b>20</b>	6/26/2015	9,731.00	9,853.00	42	MARCELLUS
<b>21</b>	6/26/2015	9,551.00	9,668.00	42	MARCELLUS
<b>22</b>	6/27/2015	9,371.00	9,493.00	42	MARCELLUS
<b>23</b>	6/27/2015	9,193.00	9,313.00	42	MARCELLUS
<b>24</b>	6/27/2015	9,011.00	9,133.00	42	MARCELLUS
<b>25</b>	6/27/2015	8,831.00	8,953.00	42	MARCELLUS

FACE VIEW  
 of Oil and Gas  
 Formation  
 of  
 Perforation

**513154 - 47-017-06502-0000- Stimulated Stages**

Stage Number	Stimulation Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/others (units)
Initiation Sleeve	6/19/2015	15.5	7,491.00	8,605.00	4,852.00	0	609	
1	6/20/2015	86.9	7,939.00	9,941.00	5,024.00	299,634	7254	
1.02	6/20/2015	1.9	4,768.00	8,619.00	5,257.00	0	935	
1.03	6/21/2015	10	5,893.00	8,871.00	4,533.00	0	14310	
2	6/22/2015	90	7,566.00	7,905.00	3,685.00	301,879	7763	
3	6/23/2015	85.8	7,668.00	8,544.00	4,936.00	294,053	7583	
4	6/23/2015	98.9	7,768.00	8,042.00	5,102.00	299,986	7717	
5	6/23/2015	97.2	7,828.00	8,147.00	5,002.00	298,695	7480	
6	6/23/2015	97	7,875.00	9,332.00	5,228.00	329,001	7704	
7	6/23/2015	99.7	7,946.00	8,353.00	4,513.00	365,897	8979	
8	6/24/2015	96.1	7,792.00	8,596.00	5,037.00	364,254	8015	
9	6/24/2015	94.1	7,798.00	8,354.00	5,138.00	356,630	8768	
10	6/24/2015	95.9	7,721.00	8,395.00	4,765.00	356,241	8326	
11	6/24/2015	94.3	7,695.00	8,097.00	5,030.00	365,861	8049	
12	6/25/2015	96.1	7,847.00	8,672.00	5,316.00	363,448	8000	
13	6/25/2015	90.7	7,525.00	8,779.00	5,330.00	342,001	8716	
14	6/25/2015	99.5	7,797.00	8,643.00	4,936.00	356,186	8329	
15	6/25/2015	91.8	7,684.00	9,088.00	5,164.00	357,896	8614	
16	6/25/2015	98.3	7,453.00	8,176.00	5,271.00	356,232	7751	
17	6/26/2015	100.1	7,566.00	8,004.00	5,351.00	364,144	7771	
18	6/26/2015	100.5	7,620.00	8,103.00	4,985.00	357,043	8326	
19	6/26/2015	97.1	7,736.00	8,941.00	5,349.00	359,140	9,354	
20	6/26/2015	97.20	7,493.00	8,340.00	5,523	362,812	7,751	
21	6/26/2015	100.70	7,325.00	7,654.00	5,277	365,290	7,481	
22	6/27/2015	99.40	7,329.00	7,697.00	5,269	363,230	7,623	
23	6/27/2015	100.80	7,523.00	8,436.00	4,948	358,374	7831	
24	6/27/2015	98.50	7,415.00	7,711.00	5,033	358,245	7934	
25	6/27/2015	100.2	6,807.00	7,881.00	3,580.00	357,860	7827	

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 W. B. Bester, Director  
 Environmental Protection



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/19/2015
Job End Date:	6/27/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06502-00-00
Operator Name:	EQT Production
Well Name and Number:	513154
Longitude:	-80.76230100
Latitude:	39.20783900
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,668
Total Base Water Volume (gal):	9,105,600
Total Base Non Water Volume:	0



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## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	FTS International	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.42805	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	10.18491	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05741	None
FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02516	None
			Alkyl Alcohol	Proprietary	10.00000	0.00839	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00419	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02680	None
CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10.00000	0.00253	None
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00095	None
			Guar gum	9000-30-0	50.00000	0.00087	None
			Surfactant	68439-51-0	2.00000	0.00003	None

			Clay	14808-60-7	2.00000	0.00003	None
FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55.00000	0.00060	None
CI-150	FTS International	Acid Corrosion Inhibitor					
			Ethylene glycol	107-21-1	30.00000	0.00010	None
			Organic amine resin salt	Proprietary	30.00000	0.00010	None
			Isopropanol	67-63-0	30.00000	0.00010	None
			Dimethylformamide	68-12-2	10.00000	0.00003	None
			Aromatic aldehyde	Proprietary	10.00000	0.00003	None
			Quaternary ammonium compound	Proprietary	10.00000	0.00003	None
NE-100	FTS International	Non-emulsifier					
			2-Butoxyethanol	111-76-2	10.00000	0.00003	None
			2-Propanol	67-63-0	10.00000	0.00003	None
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001	None
B-10	FTS International	High pH buffer					
			Potassium carbonate	584-08-7	48.00000	0.00002	None
			Potassium hydroxide	1310-58-3	20.00000	0.00001	None
APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95.00000	0.00002	None

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

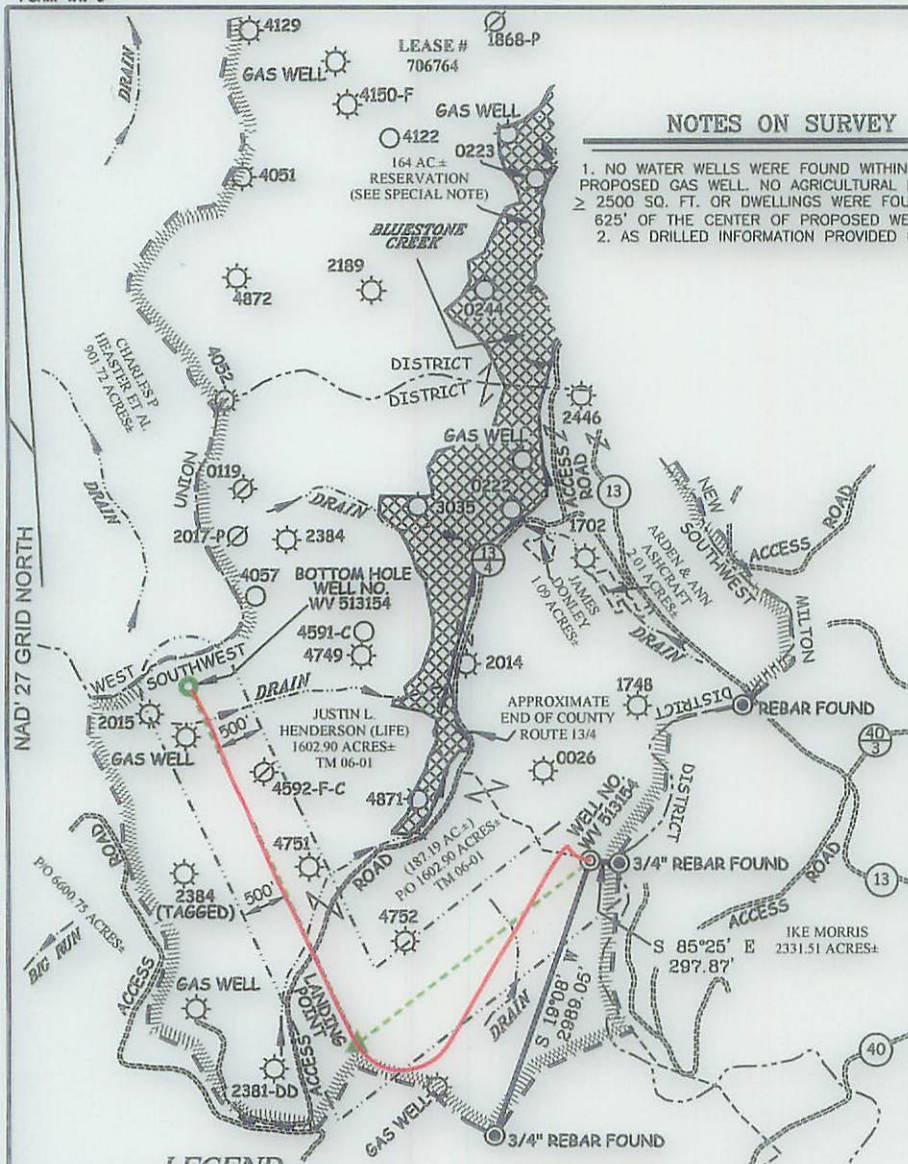
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Environmental Protection

THERE IS NO SURVEY OR LEGAL DESCRIPTION DEFINING THE ACTUAL LOCATION OF THE 164 ACRE MEADOWLAND RESERVATION. DUE TO THE PASSAGE OF TIME SINCE THE RESERVATION WAS CREATED IT APPEARS THERE IS NO LIVING PERSON(S) WITH KNOWLEDGE OF ITS TRUE LOCATION. LOCATION OF RESERVATION SHOWN HEREON COMPILED FROM: "A" A MAP TITLED "CARNAGIE NATURAL GAS CO. LEEMAN MAXWELL LEASES, DODDRIDGE COUNTY, WEST VA" "B" PERIMETER OF RESERVATION AS SHOWN BY GLENN TRADER "CARETAKER OF HENDERSONS' PORTION OF MAXWELL LANDS" WHICH WAS LOCATED USING A MAPPING GRADE GPS RECEIVER "C" DETAILS SHOWN ON 1939 USDA AERIAL PHOTOGRAPHY OBTAINED FROM THE WV GEOLOGICAL SURVEY. SLS RECOMMENDS THAT PROPER LEGAL STEPS BE TAKEN TO CONFIRM CONCURRENCE OF ALL APPROPRIATE PARTIES RELATIVE TO THE RESERVATION AS SHOWN HEREON. THIS PLAT IS SUBJECT TO ANY ADDITIONAL INFORMATION (UNDISCOVERED TO DATE) WHICH MAY CHANGE THE LOCATION AND/OR CONFIGURATION OF THE RESERVATION AS SHOWN HEREON.

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. AS DRILLED INFORMATION PROVIDED BY EQT.



**EQT PRODUCTION COMPANY  
LEEMAN MAXWELL LEASE  
2,164 ACRES ±  
WELL NO. WV 513154**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 260,322.6	E. 1,642,311.7
NAD'27 GEO.	LAT-(N) 39.207840	LONG-(W) 80.762301
NAD'83 UTM (M)	N. 4,339,877.6	E. 520,537.4

**LANDING POINT**

NAD'27 S.P.C.(FT)	N. 258,436.8	E. 1,639,920.2
NAD'27 GEO.	LAT-(N) 39.202570	LONG-(W) 80.770646
NAD'83 UTM (M)	N. 4,339,290.9	E. 519,818.4

**BOTTOM HOLE**

NAD'27 S.P.C.(FT)	N. 262,125.5	E. 1,638,200.1
NAD'27 GEO.	LAT-(N) 39.212630	LONG-(W) 80.776899
NAD'83 UTM (M)	N. 4,340,405.9	E. 519,275.7

LEGEND

LEASE LINE	---
SURFACE LINE	----
PROPOSED PATH	---
AS DRILLED PATH	---
OFFSET LINE	---
TIE LINE	---
CREEK	~ ~ ~
ROAD	==
COUNTY ROUTE	⊕
PROPOSED WELL	⊙
EXISTING WELL	⊙
PERMITTED WELL	⊙
PLUGGED WELL	⊙
TAX MAP-PARCEL	00-00

**Professional Energy Consultants**  
A DIVISION OF SMITH LAND SURVEYING, INC.  
**SLS**  
SURVEYORS  
ENGINEERS  
ENVIRONMENTAL  
PROJECT MGMT.  
(304) 462-8634  
WWW.SLSURVEYS.COM

**AS DRILLED COORDINATES  
FOR WELL NO. WV 513154**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

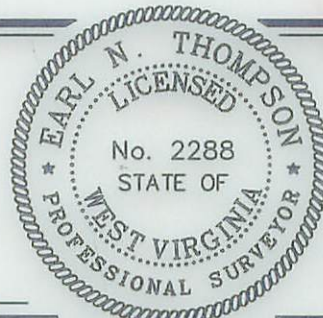
NAD'27 S.P.C.(FT)	N. 260,322.6	E. 1,642,311.7
NAD'27 GEO.	LAT-(N) 39.207840	LONG-(W) 80.762301
NAD'83 UTM (M)	N. 4,339,877.6	E. 520,537.4

**BOTTOM HOLE**

NAD'27 S.P.C.(FT)	N. 262,092.4	E. 1,638,236.4
NAD'27 GEO.	LAT-(N) 39.212540	LONG-(W) 80.776770
NAD'83 UTM (M)	N. 4,340,396.0	E. 519,286.9

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 2288 *Earl N. Thompson*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE JANUARY 06, 20 14  
REVISED 3/24/14, 07/25/14 & 05/26/15  
OPERATORS WELL NO. WV 513154  
API WELL NO. 47-017-06502H  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7889AD513154  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

STATE OF WEST VIRGINIA  
DIVISION OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION 1,272'(GROUND) 1,252'(PROPOSED) WATERSHED BLUESTONE CREEK  
DISTRICT SOUTHWEST COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'  
SURFACE OWNER JUSTIN L. HENDERSON (LIFE) ACREAGE 187.19 OF 1,602.90±  
ROYALTY OWNER LEEMAN MAXWELL HRS ACREAGE 2,164±  
PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER   
PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
ESTIMATED DEPTH TVD 6,663'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY  
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

02/12/2016

