

# APPROVED

NAME: *Jul A. Sp...*

DATE: *1/26/16*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514141

API: 47 - 017 - 06587

Submission:  Initial  Amended

Notes: Correction to Production Cement Top (MD)

RECEIVED  
Office of Oil and Gas

DEC 21 2015

WV Department of  
Environmental Protection

W02/05/2016

APPROVED

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

NAME:  
DATE:

API 47 - 017 - 06587 County DODDRIDGE District New Milton  
Quad 611 Pad Name SMI28 Field/Pool Name \_\_\_\_\_  
Farm name Sue Ann Spiker Well Number 514141  
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 4,345,991 Easting 522,584  
Landing Point of Curve Northing 4,345,495 Easting 521,862  
Bottom Hole Northing 4,344,144 Easting 522,520

Elevation (ft) 1,254 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)  
Synthetic base Mud 12.4 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 12/26/2014 Date drilling commenced 1/12/2015 Date drilling ceased 4/14/2015  
Date completion activities began 5/13/2015 Date completion activities ceased 5/23/2015  
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 35, 92, 113, 136, 273, 298, 379, 403, 440, 491, 513, 583 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft N/A Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 45, 281, 557, 628, 1207, 1376 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
WS Spiker AXd

02/05/2016

API 47-017 - 06587 Farm name Sue Ann Spiker Well number 514141

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"	72'	NEW	A-500 81.3LB/FT	NONE	Y
Surface	17.5"	13.375"	666'	NEW	J-55 54.5LB/FT	206', 455'	Y
Coal							
Intermediate 1	12.375"	9.625"	5,333'	NEW	P-110 40LB/FT	1080', 3015'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	13,850'	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	69	15.6	1.18	81.54	0	8
Surface	CLASS A	635	15.6	1.20	762	0	8
Coal							
Intermediate 1	CLASS A / A / A	421 / 354 / 1080	14.2 / 15.6 / 15.6	1.24 / 1.18 / 1.18	522 / 417.7 / 1274.4	0	8
Intermediate 2							
Intermediate 3							
Production	Class A 50/50 POZ / H	660/670	14.2 / 15.2	1.26 / 1.97	2151.5	4,528'	72
Tubing							

Drillers TD (ft) 13,883' Loggers TD (ft) N/A  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,578'

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, 7, 13

INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1, 10, 22, 34, 46, 58, 70, 82, 94, 106, 118, 130

PRODUCTION- Composite body centralizers run every joint from bottom to 5,290 ft.

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

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

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





API 47- 017 - 6588 Farm name Sue Ann Spiker Well number 514139

Drilling Contractor Orion Drilling  
Address 601 Aviation Way City Reynoldsville State PA Zip 15851

Logging Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Logging Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company CJ Energy Services  
Address 2504 Smith Creek Road City Waynesburg State PA Zip 15370

**514141 Final Formations API#47-017-06587**

<b>Formation Name</b>	<b>Final Top MD (ftGL) (ft)</b>	<b>Final Top TVD (ft)</b>	<b>Final Btm MD (ftGL) (ft)</b>	<b>Final Btm TVD (ft)</b>
FRESH WATER ZONE	1		570	
SAND / SHALE	1		55	
COAL	55		60	
SAND / SHALE	60		281	
COAL	281		285	
SAND / SHALE	285		557	
COAL	557		560	
SAND / SHALE	560		628	
COAL	628		633	
SAND / SHALE	633		1,207.00	
COAL	1,207.00		1,210.00	
SAND / SHALE	1,210.00		1,376.00	
COAL	1,376.00		1,381.00	
SAND / SHALE	1,381.00		1,753.00	
MAXTON	1,753.00		1,954.00	
BIG LIME	1,954.00		2,048.00	
BIG INJUN	2,048.00		2,251.00	
WEIR	2,251.00		2,351.00	
SAND / SHALE	2,351.00		2,458.00	
GANTZ	2,458.00		2,580.00	
FIFTY FOOT	2,580.00		2,664.00	
GORDON	2,664.00		3,264.00	
WARREN	3,264.00		3,343.00	
SPEECHLEY	3,343.00		4,006.00	
BALLTOWN B	4,006.00		4,216.00	
BRADFORD	4,216.00		4,516.00	
RILEY	4,516.00		4,931.00	
BENSON	4,931.00		5,190.00	
ALEXANDER	5,190.00		6,363.00	6,039.40
RHINESTREET	6,363.00	6,039.40	7,376.00	6,361.00
SONYEA	7,376.00	6,361.00	7,885.00	6,523.10
MIDDLESEX	7,885.00	6,523.10	8,049.00	6,576.10
GENESEE	8,049.00	6,576.10	8,299.00	6,652.10
GENESEO	8,299.00	6,652.10	8,491.00	6,696.10
TULLY	8,491.00	6,696.10	8,635.00	6,721.80
HAMILTON	8,635.00	6,721.80	8,778.00	6,747.70
MARCELLUS	8,778.00	6,747.70		





## **EQT Production - Marcellus**

**Doddridge County, WV Grid**

**Doddridge County 514141**

**Well #514141**

API 47-1706587

**Main Wellbore**

**Design: 514141 As Drilled Surveys**

## **Standard Survey Report**

28 April, 2015



Where energy meets innovation.





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Mercatus	TVD Reference:	KB@23 @ 1277.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1277.0usft
Site:	Doddridge County 514141	North Reference:	Grid
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Project	Doddridge County, WV Grid		
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		Using geodetic scale factor

Site	Doddridge County 514141				
Site Position:		Northing:	280,273.30 usft	Latitude:	39.26
From:	Map	Easting:	1,649,362.70 usft	Longitude:	-80.74
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.79 °

Well	Well #514141					
Well Position	+N-S	0.0 usft	Northing:	280,273.30 usft	Latitude:	39° 15' 46.370 N
	+E-W	0.0 usft	Easting:	1,649,362.70 usft	Longitude:	80 44' 18.209 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,254.0 usft	

Wellbore	Main Wellbore				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/7/2015	-7.82	66.75	52,307

Design	514141 As Drilled Surveys				
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**Audit Notes:**

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	182.95	

Survey Program	Date	From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
	4/28/2015	0.00	5,349.8	514141 Gyrodatta Gyros (Main Wellbore)	GYD_DP_MS	Gyrodatta gyro-compassing and drop
		0.00	13,863.0	514141 PHX MWD Curve and Lateral (Ma	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

Measured Depth (usft)	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	-1,277.0	0.0	0.0	0.0	0.00	0.00	0.00
110.0	0.13	267.90	110.0	-1,167.0	0.0	-0.1	0.0	0.12	0.12	0.00
210.0	0.18	247.53	210.0	-1,067.0	-0.1	-0.4	0.1	0.07	0.05	-20.37
310.0	0.27	276.02	310.0	-967.0	-0.1	-0.8	0.1	0.14	0.09	28.49
410.0	0.26	272.21	410.0	-867.0	-0.1	-1.2	0.1	0.02	-0.01	-3.81
510.0	0.10	307.01	510.0	-767.0	0.0	-1.5	0.1	0.19	-0.16	34.80
610.0	0.08	348.98	610.0	-667.0	0.1	-1.6	0.0	0.07	-0.02	41.97
710.0	0.05	349.94	710.0	-567.0	0.2	-1.6	-0.1	0.03	-0.03	0.96



PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1277.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1277.0usft
Site:	Doddridge County 514141	North Reference:	Grid
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Survey											
Measured Depth (usft)	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)	
810.0	0.09	298.73	810.0	-467.0	0.3	-1.7	-0.2	0.07	0.04	-51.21	
910.0	0.19	319.60	910.0	-367.0	0.5	-1.9	-0.4	0.11	0.10	20.87	
1,010.0	0.23	346.54	1,010.0	-267.0	0.8	-2.0	-0.7	0.11	0.04	26.94	
1,110.0	0.36	31.32	1,110.0	-167.0	1.3	-1.9	-1.2	0.25	0.13	44.78	
1,210.0	0.39	51.12	1,210.0	-67.0	1.7	-1.5	-1.7	0.13	0.03	19.80	
1,310.0	0.41	66.01	1,310.0	33.0	2.1	-0.9	-2.0	0.11	0.02	14.89	
1,410.0	0.48	94.91	1,410.0	133.0	2.2	-0.2	-2.2	0.23	0.07	28.90	
1,510.0	0.50	96.70	1,510.0	233.0	2.1	0.7	-2.2	0.03	0.02	1.79	
1,610.0	0.48	123.61	1,610.0	333.0	1.8	1.5	-1.9	0.23	-0.02	26.91	
1,710.0	0.58	144.84	1,710.0	433.0	1.2	2.1	-1.3	0.22	0.10	21.23	
1,810.0	0.63	149.71	1,810.0	533.0	0.3	2.7	-0.4	0.07	0.05	4.87	
1,910.0	0.64	157.15	1,910.0	633.0	-0.7	3.2	0.5	0.08	0.01	7.44	
2,010.0	0.63	161.33	2,010.0	733.0	-1.7	3.6	1.5	0.05	-0.01	4.18	
2,110.0	0.62	165.78	2,110.0	833.0	-2.8	3.9	2.6	0.05	-0.01	4.45	
2,210.0	0.55	174.72	2,209.9	932.9	-3.8	4.1	3.6	0.11	-0.07	8.94	
2,310.0	0.55	180.74	2,309.9	1,032.9	-4.7	4.1	4.5	0.06	0.00	6.02	
2,410.0	0.80	237.13	2,409.9	1,132.9	-5.6	3.5	5.4	0.67	0.25	56.39	
2,510.0	4.65	274.54	2,509.8	1,232.8	-5.6	-1.1	5.7	4.04	3.85	37.41	
2,610.0	8.66	282.03	2,609.1	1,332.1	-3.8	-12.5	4.4	4.09	4.01	7.49	
2,710.0	9.64	282.73	2,707.8	1,430.8	-0.3	-28.1	1.8	0.99	0.98	0.70	
2,810.0	6.36	274.91	2,806.9	1,529.9	2.0	-41.7	0.2	3.45	-3.28	-7.82	
2,910.0	4.04	265.28	2,906.4	1,629.4	2.2	-50.8	0.5	2.47	-2.32	-9.63	
3,010.0	2.22	253.16	3,006.3	1,729.3	1.3	-56.1	1.6	1.93	-1.82	-12.12	
3,110.0	0.89	235.67	3,106.3	1,829.3	0.3	-58.6	2.7	1.40	-1.33	-17.49	
3,210.0	0.62	218.28	3,206.2	1,929.2	-0.6	-59.6	3.6	0.35	-0.27	-17.39	
3,310.0	0.56	215.41	3,306.2	2,029.2	-1.4	-60.2	4.5	0.07	-0.06	-2.87	
3,410.0	0.53	218.49	3,406.2	2,129.2	-2.1	-60.8	5.3	0.04	-0.03	3.08	
3,510.0	0.54	223.28	3,506.2	2,229.2	-2.8	-61.4	6.0	0.05	0.01	4.79	
3,610.0	0.47	236.77	3,606.2	2,329.2	-3.4	-62.1	6.6	0.14	-0.07	13.49	
3,710.0	0.44	241.93	3,706.2	2,429.2	-3.8	-62.8	7.0	0.05	-0.03	5.16	
3,810.0	0.47	259.41	3,806.2	2,529.2	-4.1	-63.5	7.3	0.14	0.03	17.48	
3,910.0	0.64	275.66	3,906.2	2,629.2	-4.1	-64.5	7.4	0.23	0.17	16.25	
4,010.0	0.68	285.15	4,006.2	2,729.2	-3.9	-65.6	7.2	0.12	0.04	9.49	
4,110.0	0.80	295.93	4,106.2	2,829.2	-3.4	-66.8	6.8	0.18	0.12	10.78	
4,210.0	0.98	306.56	4,206.2	2,929.2	-2.6	-68.1	6.1	0.24	0.18	10.63	
4,310.0	1.04	308.42	4,306.2	3,029.2	-1.5	-69.5	5.1	0.07	0.06	1.86	
4,410.0	1.26	315.40	4,406.2	3,129.2	-0.2	-71.0	3.8	0.26	0.22	6.98	
4,510.0	1.47	323.01	4,506.1	3,229.1	1.6	-72.5	2.1	0.28	0.21	7.61	
4,610.0	1.89	326.32	4,606.1	3,329.1	4.0	-74.2	-0.2	0.43	0.42	3.31	
4,710.0	2.15	327.88	4,706.0	3,429.0	7.0	-76.1	-3.1	0.27	0.26	1.56	
4,810.0	2.50	327.70	4,805.9	3,528.9	10.4	-78.3	-6.4	0.35	0.35	-0.18	
4,910.0	2.69	327.58	4,905.8	3,628.8	14.2	-80.7	-10.1	0.19	0.19	-0.12	





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1277 East
Project:	Doddridge County, WV G&M	MD Reference:	KB@23 @ 1277.0usft
Site:	Doddridge County 514141	North Reference:	Grid
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Survey

Measured Depth (usft)	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)
5,010.0	2.86	328.84	5,005.7	3,728.7	18.4	-83.3	-14.1	0.18	0.17	1.26
5,110.0	3.10	329.72	5,105.6	3,828.6	22.8	-85.9	-18.4	0.24	0.24	0.88
5,210.0	3.73	330.92	5,205.4	3,928.4	28.0	-88.9	-23.4	0.63	0.63	1.20
5,310.0	4.28	330.78	5,305.2	4,028.2	34.1	-92.3	-29.3	0.55	0.55	-0.14
GYS-TIP-5350 MD										
5,349.8	4.41	329.17	5,344.8	4,067.8	36.7	-93.8	-31.8	0.45	0.33	-4.05
5,412.0	4.30	330.20	5,406.9	4,129.9	40.8	-96.2	-35.8	0.22	-0.18	1.66
5,444.0	4.00	325.00	5,438.8	4,161.8	42.7	-97.4	-37.7	1.50	-0.94	-16.25
KOP-5475 MD										
5,476.0	5.90	285.50	5,470.7	4,193.7	44.1	-99.6	-38.9	11.84	5.94	-123.44
5,507.0	10.00	269.70	5,501.4	4,224.4	44.5	-103.9	-39.1	14.87	13.23	-50.97
5,539.0	13.80	266.50	5,532.7	4,255.7	44.3	-110.4	-38.5	12.05	11.88	-10.00
5,570.0	15.50	265.80	5,562.7	4,285.7	43.7	-118.3	-37.6	5.51	5.48	-2.26
5,602.0	16.60	261.40	5,593.4	4,316.4	42.7	-127.0	-36.2	5.12	3.44	-13.75
5,634.0	19.50	258.40	5,623.8	4,346.8	41.0	-136.8	-33.9	9.51	9.06	-9.38
5,665.0	22.90	254.00	5,652.7	4,375.7	38.3	-147.7	-30.6	12.10	10.97	-14.19
5,697.0	26.90	252.00	5,681.8	4,404.8	34.3	-160.5	-26.0	12.77	12.50	-6.25
5,729.0	29.70	253.10	5,709.9	4,432.9	29.8	-175.0	-20.7	8.90	8.75	3.44
5,760.0	32.60	253.00	5,736.5	4,459.5	25.1	-190.4	-15.3	9.36	9.35	-0.32
5,792.0	35.60	251.20	5,763.0	4,486.0	19.6	-207.4	-8.9	9.89	9.38	-5.63
5,823.0	39.00	249.40	5,787.6	4,510.6	13.2	-225.1	-1.7	11.52	10.97	-5.81
5,855.0	42.50	247.30	5,811.9	4,534.9	5.5	-244.5	7.1	11.75	10.94	-6.56
5,886.0	45.80	246.30	5,834.1	4,557.1	-3.0	-264.3	16.6	10.88	10.65	-3.23
5,918.0	48.30	247.90	5,855.9	4,578.9	-12.1	-285.9	26.8	8.63	7.81	5.00
5,950.0	50.90	246.50	5,876.6	4,599.6	-21.5	-308.4	37.4	8.78	8.13	-4.38
5,982.0	53.60	244.30	5,896.2	4,619.2	-32.1	-331.4	49.1	10.04	8.44	-6.88
6,013.0	56.70	243.30	5,913.9	4,636.9	-43.3	-354.2	61.5	10.34	10.00	-3.23
6,045.0	60.70	242.80	5,930.6	4,653.6	-55.7	-378.6	75.1	12.57	12.50	-1.56
6,076.0	63.80	243.70	5,945.0	4,668.0	-68.1	-403.1	88.7	10.32	10.00	2.90
6,108.0	66.40	245.00	5,958.5	4,681.5	-80.6	-429.2	102.6	8.92	8.13	4.06
6,140.0	68.80	246.00	5,970.7	4,693.7	-92.9	-456.1	116.2	8.04	7.50	3.13
6,171.0	70.20	246.20	5,981.5	4,704.5	-104.6	-482.7	129.3	4.56	4.52	0.65
6,266.0	73.80	246.70	6,010.9	4,733.9	-140.7	-565.5	169.6	3.82	3.79	0.53
6,361.0	72.00	245.70	6,038.8	4,761.8	-177.4	-648.6	210.5	2.15	-1.89	-1.05
6,456.0	71.60	245.60	6,068.5	4,791.5	-214.6	-730.8	251.8	0.43	-0.42	-0.11
6,551.0	71.30	243.20	6,098.7	4,821.7	-253.5	-812.0	294.9	2.42	-0.32	-2.53
6,646.0	71.10	245.10	6,129.3	4,852.3	-292.7	-892.9	338.2	1.90	-0.21	2.00
6,741.0	71.70	244.70	6,159.6	4,882.6	-330.9	-974.5	380.5	0.75	0.63	-0.42
6,836.0	72.30	244.30	6,189.0	4,912.0	-369.8	-1,056.0	423.6	0.75	0.63	-0.42
6,931.0	70.50	245.40	6,219.3	4,942.3	-408.1	-1,137.5	466.0	2.19	-1.89	1.16
7,026.0	71.20	244.90	6,250.4	4,973.4	-445.8	-1,219.0	507.8	0.89	0.74	-0.53
7,121.0	72.30	244.90	6,280.2	5,003.2	-484.0	-1,300.7	550.2	1.16	1.16	0.00
7,216.0	70.90	245.80	6,310.2	5,033.2	-521.6	-1,382.6	592.0	1.73	-1.47	0.95



PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1277.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1277.0usft
Site:	Doddridge County 514141	North Reference:	Grid
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Survey											
Measured Depth (usft)	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)	
7,311.0	71.90	245.80	6,340.5	5,063.5	-558.5	-1,464.7	633.1	1.05	1.05	0.00	
7,406.0	70.80	244.40	6,370.9	5,093.9	-596.4	-1,546.3	675.1	1.81	-1.16	-1.47	
7,500.0	71.70	244.30	6,401.1	5,124.1	-635.0	-1,626.6	717.7	0.96	0.96	-0.11	
7,595.0	72.30	244.90	6,430.4	5,153.4	-673.7	-1,708.2	760.6	0.87	0.63	0.63	
7,690.0	70.70	244.70	6,460.6	5,183.6	-712.1	-1,789.7	803.1	1.70	-1.68	-0.21	
7,785.0	71.20	245.00	6,491.6	5,214.6	-750.2	-1,871.0	845.4	0.61	0.53	0.32	
7,880.0	72.00	245.10	6,521.6	5,244.6	-788.3	-1,952.7	887.6	0.85	0.84	0.11	
7,975.0	70.80	244.60	6,551.9	5,274.9	-826.5	-2,034.2	930.0	1.36	-1.26	-0.53	
8,039.0	70.90	245.00	6,572.9	5,295.9	-852.3	-2,088.9	958.5	0.61	0.16	0.63	
8,070.0	71.30	245.00	6,582.9	5,305.9	-864.7	-2,115.5	972.2	1.29	1.29	0.00	
8,102.0	71.70	242.00	6,593.1	5,316.1	-878.2	-2,142.7	987.2	8.98	1.25	-9.38	
8,134.0	71.30	237.10	6,603.2	5,326.2	-893.6	-2,168.8	1,003.9	14.57	-1.25	-15.31	
8,165.0	71.80	233.20	6,613.0	5,336.0	-910.4	-2,193.0	1,021.9	12.04	1.61	-12.58	
8,197.0	72.30	230.40	6,622.9	5,345.9	-929.2	-2,216.9	1,041.9	8.47	1.56	-8.75	
8,229.0	72.50	227.30	6,632.6	5,355.6	-949.3	-2,239.8	1,063.1	9.26	0.63	-9.69	
8,260.0	73.60	224.30	6,641.6	5,364.6	-969.9	-2,261.1	1,084.9	9.91	3.55	-9.68	
8,292.0	74.90	221.00	6,650.3	5,373.3	-992.6	-2,281.9	1,108.6	10.72	4.06	-10.31	
8,323.0	75.90	218.10	6,658.1	5,381.1	-1,015.7	-2,301.0	1,132.6	9.61	3.23	-9.35	
8,355.0	75.70	215.30	6,666.0	5,389.0	-1,040.6	-2,319.6	1,158.4	8.51	-0.63	-8.75	
8,387.0	76.50	211.90	6,673.7	5,396.7	-1,066.5	-2,336.8	1,185.1	10.61	2.50	-10.63	
8,418.0	77.40	209.20	6,680.7	5,403.7	-1,092.5	-2,352.1	1,211.9	8.97	2.90	-8.71	
8,450.0	77.60	207.30	6,687.6	5,410.6	-1,120.0	-2,366.9	1,240.1	5.83	0.63	-5.94	
8,482.0	78.20	204.60	6,694.3	5,417.3	-1,148.1	-2,380.6	1,268.9	8.46	1.88	-8.44	
8,513.0	78.90	200.90	6,700.4	5,423.4	-1,176.1	-2,392.3	1,297.5	11.91	2.26	-11.94	
8,545.0	79.40	197.50	6,706.5	5,429.5	-1,205.8	-2,402.7	1,327.7	10.55	1.56	-10.63	
8,577.0	79.90	194.10	6,712.2	5,435.2	-1,236.1	-2,411.2	1,358.4	10.57	1.56	-10.63	
8,608.0	80.70	190.70	6,717.4	5,440.4	-1,265.9	-2,417.8	1,388.5	11.11	2.58	-10.97	
8,640.0	80.20	187.80	6,722.8	5,445.8	-1,297.1	-2,422.9	1,419.9	9.07	-1.56	-9.06	
8,671.0	79.80	184.50	6,728.1	5,451.1	-1,327.4	-2,426.1	1,450.3	10.56	-1.29	-10.65	
8,703.0	79.00	181.30	6,734.0	5,457.0	-1,358.8	-2,427.7	1,481.8	10.14	-2.50	-10.00	
8,735.0	78.90	178.40	6,740.2	5,463.2	-1,390.2	-2,427.7	1,513.2	8.90	-0.31	-9.06	
8,766.0	80.30	175.80	6,745.8	5,468.8	-1,420.7	-2,426.1	1,543.5	9.40	4.52	-8.39	
8,797.0	80.10	172.20	6,751.0	5,474.0	-1,451.1	-2,422.9	1,573.7	11.46	-0.65	-11.61	
8,829.0	81.00	169.50	6,756.3	5,479.3	-1,482.2	-2,417.9	1,604.5	8.79	2.81	-8.44	
8,861.0	82.80	166.80	6,760.8	5,483.8	-1,513.2	-2,411.4	1,635.1	10.07	5.63	-8.44	
8,892.0	85.20	163.90	6,764.0	5,487.0	-1,543.0	-2,403.6	1,664.5	12.10	7.74	-9.35	
8,924.0	87.50	160.60	6,766.1	5,489.1	-1,573.5	-2,393.9	1,694.4	12.55	7.19	-10.31	
8,955.0	89.30	157.70	6,766.9	5,489.9	-1,602.4	-2,382.8	1,722.7	11.01	5.81	-9.35	
LP#9019 MD/4768 TVD											
9,019.0	89.40	156.20	6,767.7	5,490.7	-1,661.3	-2,357.8	1,780.3	2.35	0.16	-2.34	
9,113.0	89.90	156.30	6,768.2	5,491.2	-1,747.3	-2,319.9	1,864.2	0.54	0.53	0.11	
9,208.0	90.70	156.40	6,767.8	5,490.8	-1,834.3	-2,281.8	1,949.2	0.85	0.84	0.11	
9,303.0	89.60	155.30	6,767.5	5,490.5	-1,921.0	-2,242.9	2,033.8	1.64	-1.16	-1.16	





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Marcatus	TVD Reference:	KB@23 @ 1277.Dust
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1277.Dust
Site:	Doddridge County 514141	North Reference:	Grid
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Measured Depth (usft)	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)
9,398.0	90.40	156.40	6,767.5	5,490.5	-2,007.7	-2,204.1	2,118.3	1.43	0.84	1.16
9,493.0	91.10	155.80	6,766.3	5,489.3	-2,094.6	-2,165.6	2,203.1	0.97	0.74	-0.63
9,588.0	87.90	153.60	6,767.1	5,490.1	-2,180.4	-2,125.0	2,286.7	4.09	-3.37	-2.32
9,683.0	88.50	153.60	6,770.1	5,493.1	-2,265.5	-2,082.8	2,369.5	0.63	0.63	0.00
9,778.0	89.70	154.30	6,771.6	5,494.6	-2,350.8	-2,041.1	2,452.6	1.46	1.26	0.74
9,873.0	91.40	155.70	6,770.7	5,493.7	-2,436.9	-2,000.9	2,536.5	2.32	1.79	1.47
9,968.0	92.10	155.60	6,767.8	5,490.8	-2,523.4	-1,961.8	2,620.9	0.74	0.74	-0.11
10,063.0	91.20	155.00	6,765.0	5,488.0	-2,609.7	-1,922.1	2,705.0	1.14	-0.95	-0.63
10,158.0	89.80	153.80	6,764.2	5,487.2	-2,695.4	-1,881.1	2,788.5	1.94	-1.47	-1.26
10,253.0	90.30	152.70	6,764.1	5,487.1	-2,780.2	-1,838.3	2,871.0	1.27	0.53	-1.16
10,348.0	91.20	155.10	6,762.9	5,485.9	-2,865.5	-1,796.5	2,954.0	2.70	0.95	2.53
10,443.0	90.10	155.70	6,761.8	5,484.8	-2,951.9	-1,757.0	3,038.2	1.32	-1.16	0.63
10,538.0	88.90	155.80	6,762.6	5,485.6	-3,038.5	-1,717.9	3,122.7	1.27	-1.26	0.11
10,632.0	88.80	155.50	6,764.5	5,487.5	-3,124.1	-1,679.2	3,206.2	0.34	-0.11	-0.32
10,727.0	88.70	153.90	6,766.6	5,489.6	-3,210.0	-1,638.6	3,289.9	1.69	-0.11	-1.68
10,822.0	89.60	154.30	6,768.0	5,491.0	-3,295.4	-1,597.1	3,373.1	1.04	0.95	0.42
10,917.0	90.40	154.50	6,768.0	5,491.0	-3,381.1	-1,556.1	3,456.6	0.87	0.84	0.21
11,012.0	89.10	155.00	6,768.4	5,491.4	-3,467.0	-1,515.5	3,540.3	1.47	-1.37	0.53
11,107.0	89.40	154.60	6,769.6	5,492.6	-3,552.9	-1,475.1	3,624.1	0.53	0.32	-0.42
11,202.0	90.20	155.00	6,770.0	5,493.0	-3,638.9	-1,434.7	3,707.8	0.94	0.84	0.42
11,297.0	88.30	154.20	6,771.2	5,494.2	-3,724.7	-1,393.9	3,791.4	2.17	-2.00	-0.84
11,392.0	89.00	154.60	6,773.5	5,496.5	-3,810.4	-1,352.9	3,874.8	0.85	0.74	0.42
11,486.0	89.90	154.90	6,774.4	5,497.4	-3,895.4	-1,312.8	3,957.7	1.01	0.96	0.32
11,581.0	90.50	155.10	6,774.0	5,497.0	-3,981.5	-1,272.6	4,041.6	0.67	0.63	0.21
11,676.0	91.40	155.20	6,772.4	5,495.4	-4,067.7	-1,232.7	4,125.6	0.95	0.95	0.11
11,771.0	90.00	155.50	6,771.3	5,494.3	-4,154.0	-1,193.1	4,209.8	1.51	-1.47	0.32
11,866.0	90.20	154.70	6,771.1	5,494.1	-4,240.2	-1,153.1	4,293.8	0.87	0.21	-0.84
11,961.0	91.60	155.80	6,769.6	5,492.6	-4,326.4	-1,113.3	4,377.9	1.87	1.47	1.16
12,056.0	90.40	156.60	6,768.0	5,491.0	-4,413.3	-1,075.0	4,462.7	1.52	-1.26	0.84
12,151.0	89.00	156.80	6,768.5	5,491.5	-4,500.6	-1,037.4	4,547.9	1.49	-1.47	0.21
12,246.0	88.10	155.90	6,770.9	5,493.9	-4,587.6	-999.3	4,632.9	1.34	-0.95	-0.95
12,341.0	88.60	156.00	6,773.6	5,496.6	-4,674.3	-960.6	4,717.5	0.54	0.53	0.11
12,436.0	89.40	155.80	6,775.3	5,498.3	-4,761.0	-921.8	4,802.1	0.87	0.84	-0.21
12,531.0	88.90	155.70	6,776.7	5,499.7	-4,847.6	-882.8	4,886.6	0.54	-0.53	-0.11
12,625.0	89.20	156.00	6,778.2	5,501.2	-4,933.4	-844.4	4,970.2	0.45	0.32	0.32
12,720.0	88.70	154.30	6,780.0	5,503.0	-5,019.5	-804.5	5,054.3	1.86	-0.53	-1.79
12,815.0	89.60	154.80	6,781.4	5,504.4	-5,105.3	-763.6	5,137.8	1.08	0.95	0.53
12,910.0	89.10	154.30	6,782.5	5,505.5	-5,191.1	-722.8	5,221.4	0.74	-0.53	-0.53
13,005.0	90.10	154.90	6,783.1	5,506.1	-5,276.9	-682.1	5,305.0	1.23	1.05	0.63
13,100.0	89.10	155.30	6,783.8	5,506.8	-5,363.1	-642.1	5,389.0	1.13	-1.05	0.42
13,195.0	89.90	155.70	6,784.6	5,507.6	-5,449.5	-602.7	5,473.3	0.94	0.84	0.42
13,290.0	88.90	155.50	6,785.6	5,508.6	-5,536.0	-563.4	5,557.7	1.07	-1.05	-0.21



PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514141
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1277.0usft
Project:	Doddridge County, WV Gas	MD Reference:	KB@23 @ 1277.0usft
Site:	Doddridge County 514141	North Reference:	Gpd
Well:	Well #514141	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	514141 As Drilled Surveys		

Measured Depth (usft)	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)
13,384.0	89.80	156.60	6,786.7	5,509.7	-5,621.9	-525.3	5,641.5	1.51	0.96	1.17
13,479.0	90.00	154.80	6,786.8	5,509.8	-5,708.5	-486.2	5,725.9	1.91	0.21	-1.89
13,574.0	90.60	154.70	6,786.3	5,509.3	-5,794.4	-445.7	5,809.7	0.64	0.63	-0.11
13,669.0	89.10	151.50	6,786.6	5,509.6	-5,879.1	-402.7	5,892.1	3.72	-1.58	-3.37
13,764.0	89.80	153.40	6,787.5	5,510.5	-5,963.3	-358.8	5,973.9	2.13	0.74	2.00
Final Survey/Deepest Point of Well=13810' MD/ 6788' TVD										
13,810.0	90.20	154.40	6,787.5	5,510.5	-6,004.7	-338.5	6,014.1	2.34	0.87	2.17
Projection to TD=13863' MD/ 6787' TVD										
13,863.0	90.20	154.40	6,787.3	5,510.3	-6,052.5	-315.6	6,060.7	0.00	0.00	0.00

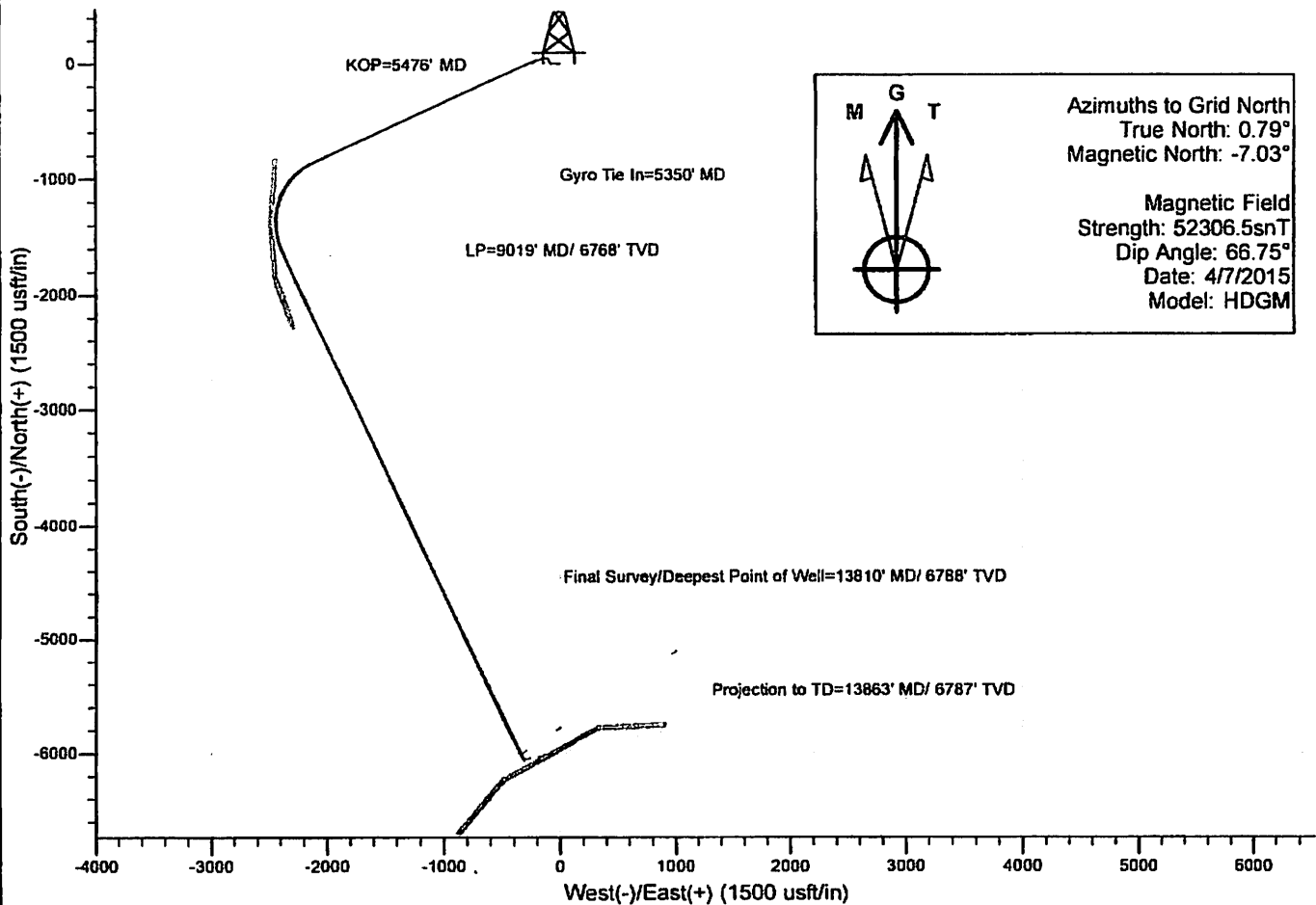
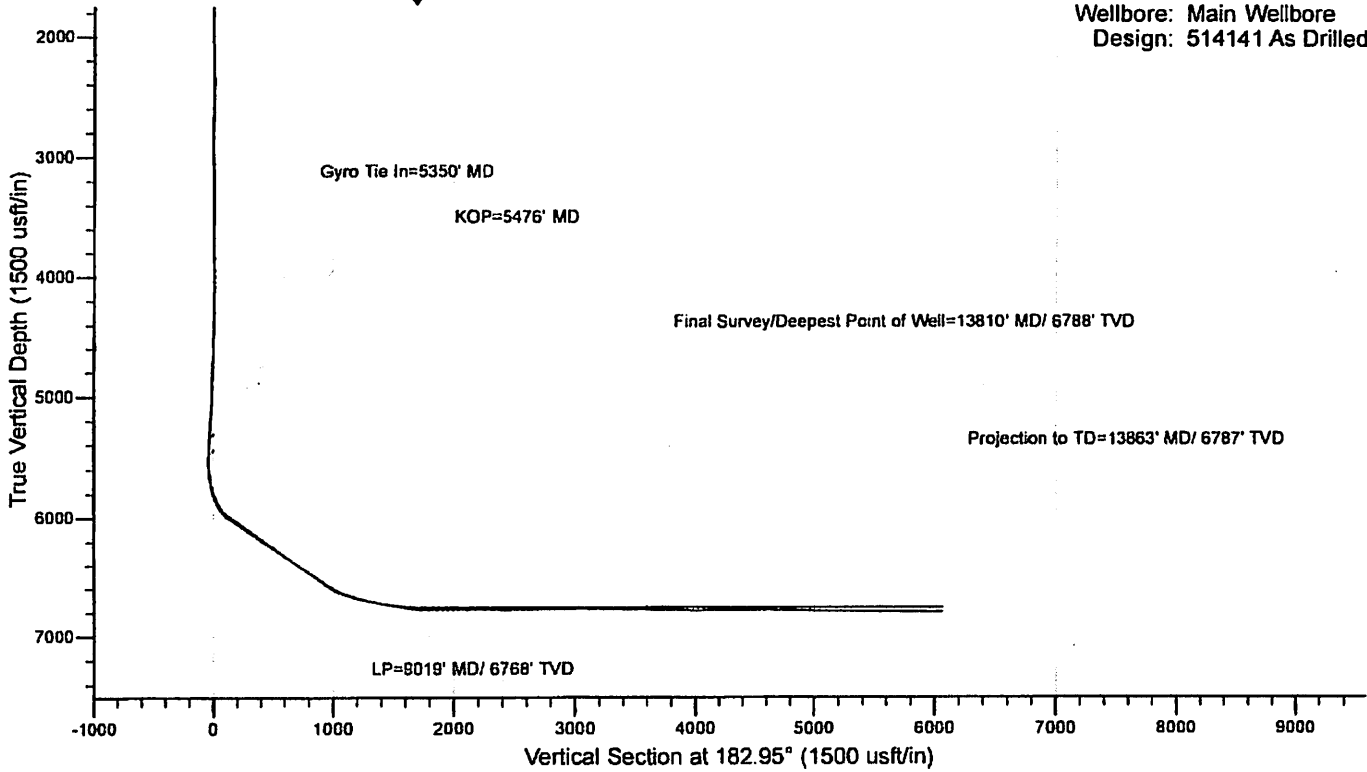
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,349.8	5,344.8	36.7	-93.8	Gyro Tie In=5350' MD
5,476.0	5,470.7	44.1	-99.6	KOP=5476' MD
9,019.0	6,767.7	-1,661.3	-2,357.8	LP=9019' MD/ 6768' TVD
13,810.0	6,787.5	-6,004.7	-338.5	Final Survey/Deepest Point of Well=13810' MD/ 6788' TVD
13,863.0	6,787.3	-6,052.5	-315.6	Projection to TD=13863' MD/ 6787' TVD

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



# EQT Production - Marcellus

Project: Doddridge County, WV Grid  
 Site: Doddridge County 514141  
 Well: Well #514141  
 Wellbore: Main Wellbore  
 Design: 514141 As Drilled Surveys





**514141 - 47-017-06587-0000 -- 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>	4/28/2015	13,848.00	13,850.00	10	MARCELLUS
<b>1</b>	5/13/2015	13,703.00	13,793.00	32	MARCELLUS
<b>1.1</b>	5/15/2015	13,663.00	13,780.00	40	MARCELLUS
<b>2</b>	5/16/2015	13,513.00	13,635.00	40	MARCELLUS
<b>3</b>	5/17/2015	13,363.00	13,482.00	40	MARCELLUS
<b>4</b>	5/17/2015	13,213.00	13,335.00	40	MARCELLUS
<b>5</b>	5/17/2015	13,063.00	13,183.00	40	MARCELLUS
<b>6</b>	5/17/2015	12,910.00	13,033.00	40	MARCELLUS
<b>7</b>	5/17/2015	12,763.00	12,885.00	40	MARCELLUS
<b>8</b>	5/17/2015	12,613.00	12,735.00	40	MARCELLUS
<b>9</b>	5/18/2015	12,463.00	12,585.00	40	MARCELLUS
<b>10</b>	5/19/2015	12,313.00	12,435.00	40	MARCELLUS
<b>11</b>	5/19/2015	12,163.00	12,285.00	40	MARCELLUS
<b>12</b>	5/19/2015	12,013.00	12,133.00	40	MARCELLUS
<b>13</b>	5/19/2015	11,865.00	11,985.00	40	MARCELLUS
<b>14</b>	5/19/2015	11,713.00	11,835.00	40	MARCELLUS
<b>15</b>	5/20/2015	11,563.00	11,683.00	40	MARCELLUS
<b>16</b>	5/20/2015	11,413.00	11,533.00	40	MARCELLUS
<b>17</b>	5/20/2015	11,263.00	11,383.00	40	MARCELLUS
<b>18</b>	5/20/2015	11,112.00	11,223.00	40	MARCELLUS
<b>19</b>	5/20/2015	10,963.00	11,085.00	40	MARCELLUS
<b>20</b>	5/21/2015	10,813.00	10,935.00	40	MARCELLUS
<b>21</b>	5/21/2015	10,663.00	10,783.00	40	MARCELLUS
<b>22</b>	5/21/2015	10,513.00	10,631.00	40	MARCELLUS
<b>23</b>	5/21/2015	10,363.00	10,485.00	40	MARCELLUS
<b>24</b>	5/21/2015	10,213.00	10,335.00	40	MARCELLUS
<b>25</b>	5/21/2015	10,061.00	10,185.00	40	MARCELLUS
<b>26</b>	5/22/2015	9,913.00	10,035.00	40	MARCELLUS
<b>27</b>	5/22/2015	9,763.00	9,885.00	40	MARCELLUS
<b>28</b>	5/22/2015	9,613.00	9,735.00	40	MARCELLUS
<b>29</b>	5/22/2015	9,463.00	9,585.00	40	MARCELLUS
<b>30</b>	5/22/2015	9,313.00	9,435.00	40	MARCELLUS
<b>31</b>	5/22/2015	9,163.00	9,285.00	40	MARCELLUS
<b>32</b>	5/23/2015	9,013.00	9,135.00	40	MARCELLUS
<b>33</b>	5/23/2015	8,863.00	8,985.00	40	MARCELLUS

**514141 - 47-017-06587-0000 -- Stimulated Stages**

<b>Stage Number</b>	<b>Stimulation Date</b>	<b>Ave Pump Rate (BPM)</b>	<b>Ave Treatment Pressure (PSI)</b>	<b>Max Breakdown Pressure (PSI)</b>	<b>ISIP (PSI)</b>	<b>Amount of Proppant (lbs)</b>	<b>Amount of Water (bbls)</b>	<b>Amount of Nitrogen/other (units)</b>
Initiation Sleeve	5/13/2015	11.70	6,469.00	9,948.00	4,443.00	0	723	0
1	5/13/2015	68.5	9,191	9,735	6,446.00	6,175	4,008	0
1:02	5/13/2015	3.1	8,564	9,065	5,133.00	0	6,368	0
1:1	5/15/2015	64.4	8,119	9,153	6,086.00	1,525	3,401	0
2	5/16/2015	96.3	8,505	9,153	3,782.00	393,273	10,730	0
3	5/17/2015	94.5	8,240	8,597	4,771.00	202,972	6,006	0
4	5/17/2015	96.4	8,344	8,645	4,232.00	201,315	6,417	0
5	5/17/2015	100.6	8,449	8,945	5,256.00	201,974	6,975	0
6	5/17/2015	96.3	8,211	9,055	4,980.00	200,533	6,148	0
7	5/17/2015	92.0	8,456	9,032	5,462.00	200,746	6,065	0
8	5/18/2015	94.7	8,020	9,768	5,938.00	200,422	10,366	0
8:02	5/18/2015	8.0	4,818	6,421	5,151.00	0	2,135	0
9	5/19/2015	95.9	8,174	8,881	5,474.00	201,361	5,610	0
10	5/19/2015	99.2	7,998	8,218	5,361.00	188,351	5,635	0
11	5/19/2015	95.7	8,296	8,558	4,399.00	197,434	5,712	0
12	5/19/2015	99.3	8,133	8,483	5,156.00	198,538	5,771	0
13	5/19/2015	100.0	8,090	8,273	3,956.00	200,922	5,515	0
14	5/20/2015	100.1	8,320	8,683	5,325.00	198,673	5,963	0
15	5/20/2015	99.9	7,838	8,381	4,933.00	199,680	5,469	0
16	5/20/2015	97.9	7,799	8,172	5,118.00	199,176	5,534	0
17	5/20/2015	97.2	7,911	8,262	4,271.00	197,727	5,534	0
18	5/20/2015	100.3	8,010	8,305	5,224.00	200,793	5,604	0
19	5/20/2015	100.0	8,031	8,676	5,395.00	200,652	5,394	0
20	5/21/2015	100.1	8,079	8,341	4,908.00	199,365	5,445	0
21	5/21/2015	96.8	7,970	8,580	5,163.00	198,741	5,111	0
22	5/21/2015	97.3	8,039	8,306	4,248.00	199,580	5,294	0
23	5/21/2015	97.6	8,069	8,415	4,606.00	198,805	5,498	0
24	5/21/2015	96.0	8,170	9,126	5,288.00	199,424	5,446	0
25	5/21/2015	99.9	7,943	8,944	5,191.00	200,823	5,383	0
26	5/22/2015	100.8	8,176	8,627	5,355	199,263	5,793	0
27	5/22/2015	97.7	7,577	7,836	5,140	198,950	5,177	0
28	5/22/2015	99.2	7,516	8,342	4,888	198,179	5,133	0
29	5/22/2015	95.3	7,338	8,180	4,748	198,260	4,850	0
30	5/22/2015	100.9	7,794	8,179	5,030	200,869	5,313	0
31	5/22/2015	100.1	7,711	7,996	5,039	201,918	5,411	0
32	5/23/2015	100.2	7,591	7,800	4,308	201,859	5,330	0
33	5/23/2015	99.3	7,531	8,425	4,815	197,612	5,907	0

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/13/2015
Job End Date:	5/23/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06587-00-00
Operator Name:	EQT Production
Well Name and Number:	514141
Longitude:	-80.73839100
Latitude:	39.26288100
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,748
Total Base Water Volume (gal):	8,610,336
Total Base Non Water Volume:	0



## 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	95.80139	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	3.10813	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.12500	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.06070	None
FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02430	None
			Alkyl Alcohol	Proprietary	10.00000	0.00810	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00405	None
B-10	FTS International	High pH Buffer	Potassium carbonate	584-08-7	48.00000	0.00641	None
			Potassium hydroxide	1310-58-3	20.00000	0.00267	None
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00254	None
			Guar gum	9000-30-0	50.00000	0.00231	None

			Clay	14808-60-7	2.00000	0.00009	None
			Surfactant	68439-51-0	2.00000	0.00009	None
CS-500-SI	FTS International	Scale Inhibitor					
			Ethylene glycol	107-21-1	10.00000	0.00272	None
FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55.00000	0.00240	None
CI-160	FTS International	Acid Corrosion Inhibitor					
			Isopropanol	67-63-0	30.00000	0.00048	None
			Organic amine resin salt	Proprietary	30.00000	0.00048	None
			Ethylene glycol	107-21-1	30.00000	0.00048	None
			Aromatic aldehyde	Proprietary	10.00000	0.00016	None
			Quaternary ammonium compound	Proprietary	10.00000	0.00016	None
			Dimethylformamide	68-12-2	10.00000	0.00016	None
Hydrochloric Acid (7.5%)	FTS International	Acidizing					
			Hydrochloric Acid	7647-01-0	7.50000	0.00179	None
APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95.00000	0.00003	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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**Hydraulic Fracturing**  
DISCLOSURE



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**Hydraulic Fracturing Data**

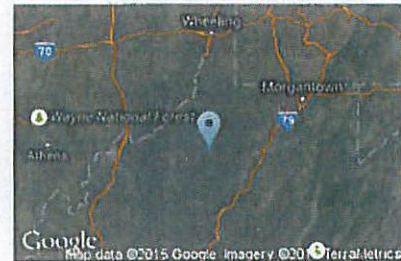
[Edit](#)

Job Start Date: 5/13/2015    Job End Date: 5/23/2015    API Number: 47-017-06587-00-00    State & County: West Virginia --- Doddridge

Well Name: 514141

Longitude: -80.738391    Latitude: 39.262881    Datum: NAD83    Federal/Tribal Well?:

True Vertical Depth (ft): 6747.7    Total Water Vol (gal): 8610336    Total Non Water Vol: 0    Total Mass (lbs): 75002312



**MSDS Chemical Ingredients**

[New Additive](#)    [Select Additive](#)    [Add Additive](#)

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<a href="#">Edit</a>	Water	FTS International	Carrier/Base Fluid	Water	7732-18-5	100%	95.801385661%	None	71853253.92
<a href="#">Edit</a>	Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100%	3.1081321976%	None	2331171
<a href="#">Edit</a>	Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15%	.125004247%	None	93756.075
<a href="#">Edit</a>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0606962808%	None	45523.614
<a href="#">Edit</a>	FRW-900	FTS International	Friction Reducer	Hydrotreated light distillate	64742-47-8	30%	.0242966199%	None	18223.027
				Alkyl Alcohol	Proprietary	10%	.0080988733%	None	6074.342
				Oxyalkylated alcohol A	Proprietary	5%	.0040494366%	None	3037.171
<a href="#">Edit</a>	B-10	FTS International	High pH Buffer	Potassium carbonate	584-08-7	48%	.0064119668%	None	4809.123
				potassium hydroxide	1310-58-3	20%	.0026716529%	None	2003.801



<input type="button" value="Edit"/>	HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55%	.0025392774%	None	1904.517
				Guar gum	9000-30-0	50%	.002308434%	None	1731.379
				Clay	14808-60-7	2%	.0000923374%	None	69.255
				Surfactant	68439-51-0	2%	.0000923374%	None	69.255
<input type="button" value="Edit"/>	CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10%	.0027173654%	None	2038.087
<input type="button" value="Edit"/>	FE-100L	FTS International	Iron control	Citric acid	77-92-9	55%	.0024045877%	None	1803.496
<input type="button" value="Edit"/>	CI-150	FTS International	Acid Corrosion Inhibitor	Isopropanol	67-63-0	30%	.0004824596%	None	361.856
				Organic amine resin salt	Proprietary	30%	.0004824596%	None	361.856
				Ethylene glycol	107-21-1	30%	.0004824596%	None	361.856
				Aromatic aldehyde	Proprietary	10%	.0001608199%	None	120.619
				Quaternary ammonium compound	Proprietary	10%	.0001608199%	None	120.619
				Dimethylformamide	68-12-2	10%	.0001608199%	None	120.619
<input type="button" value="Edit"/>	Hydrochloric Acid (7.5%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	7.5%	.001785775%	None	1339.373
<input type="button" value="Edit"/>	APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95%	.0000303991%	None	22.8

**Non-MSDS Chemical Ingredients**

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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