

# APPROVED

NAME: *Chel G. M.*

DATE: *2/10/2016*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 513700

API: 47 - 017 - 06505

Submission:  Initial  Amended *and WJB*

Notes: Add'l Injection test: 2.01, 2.02, 6.01, 18.01, 27.01, 28.01

Reperf's: 1.1, 17.1, 22.1, 26.1, 37.1, 38.1

Waiting on Flowback

Correction to Production Cement Top (MD)

RECEIVED  
Office of Oil and Gas

DEC 21 2015

WV Department of  
Environmental Protection

02/12/2016

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

API 47-017-06505 County DODDRIDGE District Southwest  
Quad OXFORD 7.5' Pad Name OXFORD 159 Field/Pool Name \_\_\_\_\_  
Farm name JUSTIN L. HENDERSON ET AL Well Number 513700  
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 4,339,877 Easting 520,547  
Landing Point of Curve Northing 4,339,415 Easting 520,436  
Bottom Hole Northing 4,341,818 Easting 519,266

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 W/O Flowback  
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 4/11/2015  
Date completion activities began 5/26/2015 Date completion activities ceased 6/12/2015  
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

API 47-017 - 06505 Farm name JUSTIN L. HENDERSON ET AL Well number 513700

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"	1,087'	NEW	J-55 54.5LB/FT	None	N
Coal							
Intermediate 1	12.375"	9.625"	5,287'	NEW	P-110 40LB/FT	None	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	14,416'	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set							

Comment Details Grouted to surface through 1" grout tubing with 350 sks of 15.6 ppg Neat Class A cement to get cement to surface on 13 3/8" cement job.

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	866	15.6	1.20	1,021.88	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	610 / 915 / 1525	14.2 / 15.2	1.26 / 1.97	2571.15	3,512'	8
Tubing							

Drillers TD (ft) 14,420 Loggers TD (ft) N/A  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,345

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: 1,10,20

INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1, 11, 21, 34, 46, 59, 69, 81, 94, 105, 117, 125

PRODUCTION- Centralizer on every joint from 4959' to 14414'

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 - 6505 Farm name JUSTIN L. HENDERSON ET AL Well number 513700

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 Nabors  
Address 2504 Smith Creek Road City Waynesburg State PA Zip 15370

### Well #513700 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	2,029.60
BIG LIME	2,030.00	2,029.60	2,174.00	2,173.60
SAND/SHALE	2,174.00	2,173.60	2,323.00	2,322.50
WEIR	2,323.00	2,322.50	2,437.00	2,436.40
SAND/SHALE	2,437.00	2,436.40	2,531.00	2,530.30
GANTZ	2,531.00	2,530.30	2,608.00	2,607.30
50F	2,608.00	2,607.30	2,684.00	2,683.20
SAND/SHALE	2,684.00	2,683.20	2,730.00	2,729.20
30F	2,730.00	2,729.20	2,765.00	2,764.10
SAND/SHALE	2,765.00	2,764.10	2,779.00	2,778.10
GORDON	2,779.00	2,778.10	2,870.00	2,869.00
4TH SAND	2,870.00	2,869.00	3,051.00	3,049.90
BAYARD	3,051.00	3,049.90	3,151.00	3,149.80
SAND/SHALE	3,151.00	3,149.80	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	3,701.50
SAND/SHALE	3,703.00	3,701.50	4,139.00	4,136.90
BALLTOWN A	4,139.00	4,136.90	4,253.00	4,250.60
SAND/SHALE	4,253.00	4,250.60	4,338.00	4,335.30
RILEY	4,338.00	4,335.30	4,484.00	4,480.50
SAND/SHALE	4,484.00	4,480.50	5,009.00	5,001.00
BENSON	5,009.00	5,001.00	5,049.00	5,040.70
SAND/SHALE	5,049.00	5,040.70	5,180.00	5,170.60
ALEXANDER	5,180.00	5,170.60	6,211.00	6,068.90
RHINESTREET UPPER	6,211.00	6,068.90	6,362.00	6,186.60
RHINESTREET	6,362.00	6,186.60	6,571.00	6,354.80
SONYEA	6,571.00	6,354.80	6,750.00	6,491.80
MIDDLESEX	6,750.00	6,491.80	6,842.00	6,555.70
GENESSEE	6,842.00	6,555.70	6,950.00	6,619.20
GENESE0	6,950.00	6,619.20	7,032.00	6,658.80
TULLY	7,032.00	6,658.80	7,088.00	6,680.10
HAMILTON	7,088.00	6,680.10	7,178.00	6,704.60
MARCELLUS	7,178.00	6,704.60		



## **EQT Production - Marcellus**

**Doddridge County, WV Grid**

**Doddridge County 513700**

**Well #513700**

**Main Wellbore**

**Design: 513700 As Drilled**

## **Standard Survey Report**

**14 April, 2015**



**Where energy meets innovation.**





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 513700
Company:	EQT Production -Marcellus	TVD Reference:	KB@23 @ 1275.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1275.0usft
Site:	Doddridge County 513700	North Reference:	Grid
Well:	Well #513700	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513700 As Drilled		

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 513700			
Site Position:	From: Map	Northing: 260,321.40 usft	Latitude: 39.21
		Easting: 1,642,341.60 usft	Longitude: -80.76
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.80 °

Well: Well #513700			
Well Position	+N-S: 0.0 usft	Northing: 260,321.40 usft	Latitude: 39° 12' 28.215 N
	+E-W: 0.0 usft	Easting: 1,642,341.60 usft	Longitude: 80° 45' 43.903 W
Position Uncertainty	0.0 usft	Wellhead Elevation: usft	Ground Level: 1,252.0 usft

Wellbore: Main Wellbore					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/16/2015	-8.45	66.70	52,146

Design: 513700 As Drilled	
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Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	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	327.54

Survey Program		Date			
From (')	To (usft)	4/14/2015	Survey (Wellbore)	Tool Name	Description
0.00	5,270.0		513700 Gyrodatta Gyros (Main Wellbore)	GYD_DP_MS	Gyrodatta gyro-compassing and drop
0.00	14,420.0		513700 PHX MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3 standard declination

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	-1,275.0	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	0.23	271.44	123.0	-1,152.0	0.0	-0.2	0.1	0.23	0.23	0.00
223.0	0.25	197.95	223.0	-1,052.0	-0.2	-0.5	0.1	0.29	0.02	-73.49
323.0	0.10	255.71	323.0	-952.0	-0.4	-0.6	0.0	0.21	-0.15	57.76
423.0	0.14	282.63	423.0	-852.0	-0.4	-0.8	0.1	0.07	0.04	26.92
523.0	0.18	270.50	523.0	-752.0	-0.4	-1.1	0.3	0.05	0.04	-12.13
623.0	0.26	274.94	623.0	-652.0	-0.4	-1.5	0.5	0.08	0.08	4.44



PHX  
Survey Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	
Company:	EQT Production - Marcellus	TVD Reference:	
Project:	Doddridge Co. WV Grid	MD Reference:	
Site:	00	North Reference:	
Well:		Survey Calculation Method:	
Wellbore:			
Design:			

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)
723.0	0.32	278.00	723.0	-552.0	-0.3	-2.0	0.8	0.06	0.06	3.06
823.0	0.33	262.49	823.0	-452.0	-0.3	-2.5	1.1	0.09	0.01	-15.51
923.0	0.35	274.81	923.0	-352.0	-0.3	-3.1	1.4	0.08	0.02	12.32
1,023.0	0.80	284.15	1,023.0	-252.0	-0.1	-4.1	2.1	0.46	0.45	9.34
1,123.0	0.66	287.67	1,123.0	-152.0	0.2	-5.3	3.1	0.15	-0.14	3.52
1,223.0	1.26	273.22	1,223.0	-52.0	0.5	-7.0	4.1	0.64	0.60	-14.45
1,323.0	1.59	275.14	1,322.9	47.9	0.6	-9.5	5.6	0.33	0.33	1.92
1,423.0	1.71	278.60	1,422.9	147.9	1.0	-12.3	7.4	0.16	0.12	3.46
1,523.0	1.61	277.61	1,522.9	247.9	1.4	-15.2	9.3	0.10	-0.10	-0.99
1,623.0	1.40	274.10	1,622.8	347.8	1.7	-17.8	11.0	0.23	-0.21	-3.51
1,723.0	1.66	275.22	1,722.8	447.8	1.9	-20.5	12.6	0.26	0.26	1.12
1,823.0	1.95	278.06	1,822.7	547.7	2.3	-23.6	14.6	0.30	0.29	2.84
1,923.0	1.57	283.64	1,922.7	647.7	2.8	-26.6	16.7	0.42	-0.38	5.58
2,023.0	1.57	274.52	2,022.6	747.6	3.3	-29.3	18.5	0.25	0.00	-9.12
2,123.0	1.86	274.31	2,122.6	847.6	3.5	-32.3	20.3	0.29	0.29	-0.21
2,223.0	1.95	273.38	2,222.5	947.5	3.7	-35.6	22.2	0.10	0.09	-0.93
2,323.0	2.30	270.09	2,322.5	1,047.5	3.8	-39.3	24.3	0.37	0.35	-3.29
2,423.0	2.35	276.94	2,422.4	1,147.4	4.1	-43.4	26.7	0.28	0.05	6.85
2,523.0	2.18	284.21	2,522.3	1,247.3	4.8	-47.2	29.4	0.33	-0.17	7.27
2,623.0	2.21	284.96	2,622.2	1,347.2	5.7	-50.9	32.2	0.04	0.03	0.75
2,723.0	2.36	286.10	2,722.2	1,447.2	6.8	-54.8	35.1	0.16	0.15	1.14
2,823.0	2.38	286.46	2,822.1	1,547.1	8.0	-58.8	38.3	0.02	0.02	0.36
2,923.0	2.23	288.47	2,922.0	1,647.0	9.2	-62.6	41.3	0.17	-0.15	2.01
3,023.0	2.17	291.06	3,021.9	1,746.9	10.5	-66.2	44.4	0.12	-0.06	2.59
3,123.0	2.11	291.00	3,121.9	1,846.9	11.8	-69.7	47.4	0.06	-0.06	-0.06
3,223.0	2.08	295.01	3,221.8	1,946.8	13.2	-73.0	50.4	0.15	-0.03	4.01
3,323.0	2.07	294.69	3,321.7	2,046.7	14.6	-76.3	53.4	0.02	-0.01	-0.32
3,423.0	2.09	297.49	3,421.7	2,146.7	16.4	-79.6	56.5	0.10	0.02	2.80
3,523.0	2.12	300.68	3,521.6	2,246.6	18.1	-82.8	59.7	0.12	0.03	3.19
3,623.0	2.01	301.11	3,621.5	2,346.5	20.0	-85.9	63.0	0.11	-0.11	0.43
3,723.0	2.10	302.31	3,721.5	2,446.5	21.9	-88.9	66.2	0.10	0.09	1.20
3,823.0	2.22	302.73	3,821.4	2,546.4	23.9	-92.1	69.6	0.12	0.12	0.42
3,923.0	2.79	303.15	3,921.3	2,646.3	26.3	-95.8	73.6	0.57	0.57	0.42
4,023.0	3.26	303.05	4,021.2	2,746.2	29.2	-100.2	78.4	0.47	0.47	-0.10
4,123.0	3.72	302.11	4,121.0	2,846.0	32.4	-105.3	83.9	0.46	0.46	-0.94
4,223.0	4.36	299.03	4,220.7	2,945.7	36.0	-111.4	90.2	0.68	0.64	-3.08
4,323.0	5.10	297.62	4,320.4	3,045.4	39.9	-118.7	97.4	0.75	0.74	-1.41
4,423.0	6.40	297.00	4,419.9	3,144.9	44.5	-127.6	106.0	1.30	1.30	-0.62
4,523.0	7.25	300.09	4,519.2	3,244.2	50.2	-138.0	116.4	0.93	0.85	3.09
4,623.0	7.42	303.40	4,618.3	3,343.3	56.9	-148.9	127.9	0.46	0.17	3.31
4,723.0	7.51	306.51	4,717.5	3,442.5	64.4	-159.5	139.9	0.41	0.09	3.11
4,823.0	7.54	307.23	4,816.6	3,541.6	72.2	-170.0	152.2	0.10	0.03	0.72





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Survey Report



Database:	EDM 5000-1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 513700
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1275.0usft
Project:	Doddridge County, WV Grd	MD Reference:	KB@23 @ 1275.0usft
Site:	Doddridge County 513700	North Reference:	Grid
Well:	Well #513700	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513700 As Drilled		

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)	
4,923.0	7.51	311.76	4,915.8	3,640.8	80.5	-180.1	164.6	0.59	-0.03	4.53	
5,023.0	7.49	313.39	5,014.9	3,739.9	89.4	-189.7	177.2	0.21	-0.02	1.63	
5,123.0	7.58	315.50	5,114.1	3,839.1	98.5	-199.0	190.0	0.29	0.09	2.11	
5,223.0	7.72	316.37	5,213.2	3,938.2	108.1	-208.3	203.0	0.18	0.14	0.87	
Gyro Tie In= 6297' MD											
5,297.0	7.68	318.17	5,286.5	4,011.5	115.4	-215.0	212.8	0.33	-0.05	2.43	
KOP=5392' MD											
5,382.0	6.60	301.40	5,370.8	4,095.8	122.2	-223.0	222.8	2.75	-1.27	-19.73	
5,414.0	8.40	276.70	5,402.6	4,127.6	123.4	-226.9	225.9	11.41	5.63	-77.19	
5,445.0	10.90	263.80	5,433.1	4,158.1	123.3	-232.0	228.6	10.62	8.06	-41.61	
5,476.0	13.00	256.00	5,463.5	4,188.5	122.2	-238.3	231.0	8.53	6.77	-25.16	
5,507.0	14.80	247.00	5,493.6	4,218.6	119.8	-245.4	232.8	9.06	5.81	-29.03	
5,539.0	16.20	236.30	5,524.4	4,249.4	115.7	-252.8	233.4	9.93	4.38	-33.44	
5,570.0	17.80	225.70	5,554.1	4,279.1	110.0	-259.8	232.3	11.23	5.16	-34.19	
5,602.0	20.30	220.60	5,584.3	4,309.3	102.4	-267.0	229.7	9.38	7.81	-15.94	
5,633.0	22.30	217.40	5,613.2	4,338.2	93.6	-274.0	226.1	7.46	6.45	-10.32	
5,664.0	25.10	215.40	5,641.6	4,366.6	83.6	-281.4	221.6	9.40	9.03	-6.45	
5,696.0	28.40	214.50	5,670.1	4,395.1	71.8	-289.7	216.0	10.39	10.31	-2.81	
5,727.0	32.20	215.20	5,696.9	4,421.9	59.0	-298.6	210.0	12.31	12.26	2.26	
5,759.0	35.70	214.20	5,723.4	4,448.4	44.3	-308.8	203.1	11.08	10.94	-3.13	
5,853.0	41.30	208.50	5,797.0	4,522.0	-5.7	-339.0	177.1	7.05	5.96	-6.06	
5,947.0	41.20	213.00	5,867.7	4,592.7	-59.0	-370.7	149.2	3.16	-0.11	4.79	
6,042.0	39.70	211.20	5,940.0	4,665.0	-111.2	-403.4	122.7	2.00	-1.58	-1.89	
6,136.0	40.80	211.40	6,011.7	4,736.7	-163.1	-435.0	95.9	1.18	1.17	0.21	
6,199.0	40.00	211.00	6,059.7	4,784.7	-198.0	-456.1	77.8	1.33	-1.27	-0.63	
6,230.0	39.70	209.90	6,083.5	4,808.5	-215.1	-466.2	68.7	2.47	-0.97	-3.55	
6,261.0	39.10	212.60	6,107.5	4,832.5	-231.9	-476.4	60.0	5.86	-1.94	8.71	
6,293.0	38.40	217.40	6,132.4	4,857.4	-248.3	-487.9	52.3	9.64	-2.19	15.00	
6,324.0	38.30	223.30	6,156.7	4,881.7	-263.0	-500.3	46.7	11.81	-0.32	19.03	
6,355.0	38.20	228.30	6,181.1	4,906.1	-276.4	-514.1	42.8	9.99	-0.32	16.13	
6,387.0	37.70	232.00	6,206.3	4,931.3	-289.0	-529.2	40.2	7.28	-1.56	11.56	
6,418.0	36.90	237.20	6,231.0	4,956.0	-299.8	-544.5	39.3	10.48	-2.58	16.77	
6,450.0	36.00	243.00	6,256.7	4,981.7	-309.3	-560.9	40.1	11.13	-2.81	18.13	
6,481.0	35.90	248.60	6,281.8	5,006.8	-316.8	-577.5	42.7	10.61	-0.32	18.06	
6,513.0	35.90	252.50	6,307.8	5,032.8	-323.0	-595.2	46.9	7.15	0.00	12.19	
6,544.0	35.70	255.90	6,332.9	5,057.9	-328.0	-612.6	52.1	6.45	-0.65	10.97	
6,576.0	35.90	260.10	6,358.9	5,083.9	-331.8	-630.9	58.7	7.70	0.63	13.13	
6,607.0	37.30	265.40	6,383.8	5,108.8	-334.2	-649.3	66.6	11.15	4.52	17.10	
6,639.0	39.30	270.50	6,408.9	5,133.9	-334.9	-669.1	76.6	11.68	6.25	15.94	
6,670.0	41.00	275.40	6,432.6	5,157.6	-333.8	-689.0	86.2	11.57	5.48	15.81	
6,702.0	42.00	280.00	6,456.6	5,181.6	-331.0	-710.0	101.9	10.02	3.13	14.38	
6,734.0	43.10	284.90	6,480.1	5,205.1	-326.3	-731.1	117.1	10.91	3.44	15.31	
6,765.0	44.20	288.90	6,502.6	5,227.6	-320.1	-751.6	133.4	9.59	3.55	12.90	



PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 513700
Company:	BOT Production - Marcellus	TVD Reference:	KB@23 @ 1275 Oust
Project:	Doddridge County, WV Grid	MD Reference:	KB@23 @ 1275 Oust
Site:	Doddridge County 513700	North Reference:	Grid
Well:	Well #513700	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513700 As Drilled		

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)
6,797.0	45.50	293.00	6,525.3	5,250.3	-312.0	-772.7	151.5	9.91	4.06	12.81
6,828.0	48.10	296.50	6,546.5	5,271.5	-302.5	-793.2	170.5	11.75	8.39	11.29
6,859.0	50.60	299.00	6,566.7	5,291.7	-291.6	-814.0	190.9	10.12	8.06	8.06
6,891.0	53.70	301.90	6,586.3	5,311.3	-278.7	-835.7	213.4	12.04	9.69	9.06
6,922.0	56.30	303.80	6,604.1	5,329.1	-265.0	-857.1	236.5	9.77	8.39	6.13
6,954.0	58.50	307.00	6,621.3	5,346.3	-249.4	-879.0	261.4	10.87	6.88	10.00
6,985.0	60.30	308.50	6,637.1	5,362.1	-233.0	-900.1	286.5	7.15	5.81	4.84
7,016.0	63.30	309.50	6,651.8	5,376.8	-215.8	-921.4	312.4	10.09	9.68	3.23
7,048.0	66.60	312.70	6,665.3	5,390.3	-196.8	-943.2	340.2	13.73	10.31	10.00
7,080.0	69.30	315.70	6,677.3	5,402.3	-176.1	-964.4	369.1	12.11	8.44	9.38
7,111.0	72.60	319.00	6,687.5	5,412.5	-154.5	-984.3	397.9	14.65	10.65	10.65
7,143.0	75.10	320.50	6,696.4	5,421.4	-131.1	-1,004.1	428.4	9.02	7.81	4.69
7,175.0	77.40	323.30	6,704.0	5,429.0	-106.6	-1,023.3	459.3	11.13	7.19	8.75
7,206.0	79.40	327.30	6,710.2	5,435.2	-81.7	-1,040.6	489.6	14.19	6.45	12.90
7,238.0	82.20	329.90	6,715.3	5,440.3	-54.7	-1,057.0	521.2	11.87	8.75	8.13
7,269.0	84.80	330.80	6,718.8	5,443.8	-27.9	-1,072.3	552.0	8.87	8.39	2.90
7,300.0	86.40	331.50	6,721.2	5,446.2	-0.9	-1,087.2	582.8	5.63	5.16	2.26
LP=7331 MD/ 6723 TVD										
7,331.0	88.40	332.60	6,722.6	5,447.6	26.5	-1,101.7	613.7	7.36	6.45	3.55
Deepest Point of Well=7383 MD/ 6733 TVD										
7,363.0	91.20	335.40	6,722.7	5,447.7	55.3	-1,115.7	645.5	12.37	8.75	8.75
7,458.0	93.80	336.70	6,718.6	5,443.6	142.0	-1,154.3	739.3	3.06	2.74	1.37
7,553.0	91.70	335.40	6,714.0	5,439.0	228.7	-1,192.8	833.2	2.60	-2.21	-1.37
7,647.0	91.30	335.50	6,711.6	5,436.6	314.2	-1,231.8	926.3	0.44	-0.43	0.11
7,742.0	90.90	336.00	6,709.7	5,434.7	400.8	-1,270.8	1,020.3	0.67	-0.42	0.53
7,836.0	90.20	335.60	6,708.8	5,433.8	486.5	-1,309.4	1,113.3	0.86	-0.74	-0.43
7,930.0	89.40	334.60	6,709.2	5,434.2	571.8	-1,348.9	1,206.5	1.36	-0.85	-1.06
8,024.0	91.80	334.00	6,708.2	5,433.2	656.5	-1,389.7	1,299.8	2.63	2.55	-0.64
8,119.0	91.30	332.80	6,705.6	5,430.6	741.4	-1,432.2	1,394.3	1.37	-0.53	-1.26
8,213.0	91.10	332.00	6,703.6	5,428.6	824.6	-1,475.8	1,487.9	0.88	-0.21	-0.85
8,308.0	93.80	332.80	6,699.6	5,424.6	908.8	-1,519.7	1,582.5	2.96	2.84	0.84
8,403.0	93.70	331.70	6,693.4	5,418.4	992.6	-1,563.9	1,676.9	1.16	-0.11	-1.16
8,498.0	93.40	333.40	6,687.5	5,412.5	1,076.8	-1,607.6	1,771.4	1.81	-0.32	1.79
8,592.0	93.10	336.30	6,682.1	5,407.1	1,161.7	-1,647.4	1,864.5	3.10	-0.32	3.09
8,687.0	91.70	334.70	6,678.2	5,403.2	1,248.1	-1,686.8	1,958.5	2.24	-1.47	-1.68
8,780.0	91.30	333.10	6,675.7	5,400.7	1,331.6	-1,727.7	2,050.9	1.77	-0.43	-1.72
8,875.0	91.10	334.40	6,673.7	5,398.7	1,416.8	-1,769.7	2,145.3	1.38	-0.21	1.37
8,970.0	91.60	337.80	6,671.5	5,396.5	1,503.6	-1,808.2	2,239.2	3.62	0.53	3.58
9,064.0	91.30	335.60	6,669.1	5,394.1	1,589.9	-1,845.4	2,331.9	2.36	-0.32	-2.34
9,158.0	91.20	336.00	6,667.1	5,392.1	1,675.6	-1,883.9	2,424.9	0.44	-0.11	0.43
9,252.0	90.80	334.20	6,665.4	5,390.4	1,760.8	-1,923.4	2,518.1	1.96	-0.43	-1.91
9,347.0	90.20	335.00	6,664.6	5,389.6	1,846.7	-1,964.2	2,612.4	1.05	-0.63	0.84
9,442.0	91.00	336.80	6,663.6	5,388.6	1,933.4	-2,003.0	2,706.4	2.07	0.84	1.89





PHX  
Survey Report



<b>Database:</b> EDM 5000.1 Single User Db <b>Company:</b> EQT Production - Marcellus <b>Project:</b> Doddridge County, WV Grid <b>Site:</b> Doddridge County 513700 <b>Well:</b> Well #513700 <b>Wellbore:</b> Main Wellbore <b>Design:</b> 513700 As Drilled	<b>Local Co-ordinate Reference:</b> <b>TVD Reference:</b> <b>MD Reference:</b> <b>North Reference:</b> <b>Survey Calculation Method:</b>	<b>Site Doddridge County 513700</b> KB@23 @ 1275.0usft KB@23 @ 1275.0usft Grid Minimum Curvature
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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)
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9,536.0	90.70	335.70	6,662.2	5,387.2	2,019.4	-2,040.8	2,799.3	1.21 -0.32	-1.17
9,630.0	90.60	335.90	6,661.1	5,386.1	2,105.1	-2,079.4	2,892.3	0.24 -0.11	0.21
9,725.0	90.70	335.40	6,660.1	5,385.1	2,191.7	-2,118.5	2,966.3	0.54 0.11	-0.53
9,819.0	90.60	335.50	6,659.0	5,384.0	2,277.2	-2,157.6	3,079.4	0.15 -0.11	0.11
9,914.0	90.40	335.70	6,658.2	5,383.2	2,363.7	-2,196.8	3,173.5	0.30 -0.21	0.21
10,009.0	90.00	335.80	6,657.8	5,382.8	2,450.3	-2,235.8	3,267.5	0.43 -0.42	0.11
10,103.0	91.60	337.10	6,656.5	5,381.5	2,536.5	-2,273.4	3,360.4	2.19 1.70	1.38
10,198.0	91.70	336.70	6,653.8	5,378.8	2,623.8	-2,310.7	3,454.1	0.43 0.11	-0.42
10,292.0	91.40	337.10	6,651.3	5,376.3	2,710.2	-2,347.5	3,546.8	0.53 -0.32	0.43
10,387.0	91.50	336.00	6,648.9	5,373.9	2,797.4	-2,385.3	3,640.6	1.16 0.11	-1.16
10,483.0	91.30	336.40	6,646.5	5,371.5	2,885.2	-2,424.0	3,735.4	0.47 -0.21	0.42
10,577.0	90.60	334.20	6,644.9	5,369.9	2,970.5	-2,463.3	3,828.6	2.46 -0.74	-2.34
10,671.0	90.60	334.60	6,644.0	5,369.0	3,055.3	-2,503.9	3,921.9	0.43 0.00	0.43
10,766.0	90.60	334.00	6,643.0	5,368.0	3,140.9	-2,545.1	4,016.2	0.63 0.00	-0.63
10,860.0	90.40	333.30	6,642.1	5,367.1	3,225.1	-2,586.8	4,109.7	0.77 -0.21	-0.74
10,954.0	90.70	331.70	6,641.2	5,366.2	3,308.5	-2,630.2	4,203.3	1.73 0.32	-1.70
11,048.0	92.40	333.60	6,638.7	5,363.7	3,392.0	-2,673.4	4,296.9	2.71 1.81	2.02
11,143.0	92.10	335.50	6,635.0	5,360.0	3,477.7	-2,714.2	4,391.1	2.02 -0.32	2.00
11,238.0	90.70	335.70	6,632.7	5,357.7	3,564.2	-2,753.4	4,485.1	1.49 -1.47	0.21
11,332.0	90.40	333.30	6,631.7	5,356.7	3,649.0	-2,793.9	4,578.4	2.57 -0.32	-2.55
11,427.0	90.50	332.30	6,631.0	5,356.0	3,733.5	-2,837.3	4,673.0	1.06 0.11	-1.05
11,521.0	90.40	334.90	6,630.3	5,355.3	3,817.7	-2,879.1	4,766.5	2.77 -0.11	2.77
11,616.0	90.20	334.30	6,629.8	5,354.8	3,903.5	-2,919.9	4,860.8	0.67 -0.21	-0.63
11,710.0	89.90	333.50	6,629.7	5,354.7	3,987.9	-2,961.2	4,954.2	0.91 -0.32	-0.85
11,805.0	89.90	336.20	6,629.8	5,354.8	4,073.9	-3,001.6	5,048.4	2.84 0.00	2.84
11,899.0	90.20	335.50	6,629.8	5,354.8	4,159.7	-3,040.0	5,141.4	0.81 0.32	-0.74
11,993.0	89.30	336.20	6,630.2	5,355.2	4,245.4	-3,078.5	5,234.4	1.21 -0.96	0.74
12,088.0	89.50	336.00	6,631.2	5,356.2	4,332.3	-3,117.0	5,328.4	0.30 0.21	-0.21
12,182.0	90.30	335.30	6,631.3	5,356.3	4,417.9	-3,155.7	5,421.4	1.13 0.85	-0.74
12,276.0	90.50	334.40	6,630.7	5,355.7	4,503.0	-3,195.7	5,514.7	0.98 0.21	-0.96
12,370.0	90.50	334.20	6,629.9	5,354.9	4,587.7	-3,236.4	5,608.0	0.21 0.00	-0.21
12,465.0	90.00	334.40	6,629.4	5,354.4	4,673.3	-3,277.6	5,702.3	0.57 -0.53	0.21
12,559.0	89.80	333.00	6,629.6	5,354.6	4,757.6	-3,319.3	5,795.8	1.50 -0.21	-1.49
12,654.0	89.90	333.30	6,629.9	5,354.9	4,842.3	-3,362.2	5,890.3	0.33 0.11	0.32
12,748.0	89.20	335.80	6,630.6	5,355.6	4,927.2	-3,402.6	5,983.6	2.76 -0.74	2.66
12,842.0	88.80	334.90	6,632.2	5,357.2	5,012.6	-3,441.8	6,076.7	1.05 -0.43	-0.96
12,937.0	88.00	335.30	6,634.9	5,359.9	5,098.8	-3,481.8	6,170.9	0.94 -0.84	0.42
13,031.0	87.60	334.30	6,638.5	5,363.5	5,183.7	-3,521.8	6,264.0	1.15 -0.43	-1.06
13,126.0	87.40	332.90	6,642.6	5,367.6	5,268.8	-3,564.0	6,358.4	1.49 -0.21	-1.47
13,221.0	88.90	335.70	6,645.7	5,370.7	5,354.3	-3,605.1	6,452.7	3.34 1.58	2.95
13,315.0	89.10	334.10	6,647.4	5,372.4	5,439.4	-3,645.0	6,545.9	1.72 0.21	-1.70
13,409.0	89.90	336.40	6,648.2	5,373.2	5,524.8	-3,684.3	6,639.0	2.59 0.85	2.45
13,504.0	90.10	336.30	6,648.2	5,373.2	5,611.8	-3,722.5	6,732.9	0.24 0.21	-0.11



PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 513700
Company:	EQT Production - Marcellus	TVD Reference:	KB@23 @ 1275.0usft
Project:	Doddridge County, WY Grid	MD Reference:	KB@23 @ 1275.0usft
Site:	Doddridge County 513700	North Reference:	Grid
Well:	Well #513700	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513700 As Drilled		

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)
13,598.0	90.20	335.60	6,647.9	5,372.9	5,697.7	-3,760.6	6,825.9	0.54	0.11	-0.53
13,694.0	89.30	332.40	6,648.3	5,373.3	5,784.0	-3,802.5	6,921.2	3.65	-0.94	-3.54
13,788.0	89.90	333.60	6,649.0	5,374.0	5,867.8	-3,845.2	7,014.8	1.43	0.64	1.28
13,882.0	89.00	336.30	6,649.9	5,374.9	5,952.9	-3,885.0	7,108.0	3.03	-0.96	2.87
13,976.0	88.80	336.40	6,651.7	5,376.7	6,039.0	-3,922.7	7,200.9	0.24	-0.21	0.11
14,071.0	88.50	336.60	6,653.9	5,378.9	6,126.1	-3,960.6	7,294.7	0.38	-0.32	0.21
14,166.0	88.80	337.80	6,656.2	5,381.2	6,213.7	-3,997.4	7,388.3	1.30	0.32	1.26
14,260.0	89.20	337.60	6,657.8	5,382.8	6,300.6	-4,033.0	7,480.8	0.48	0.43	-0.21
Final TD=14354' MD/ 6659' TVD										
14,354.0	89.10	338.10	6,659.2	5,384.2	6,387.7	-4,068.5	7,573.3	0.54	-0.11	0.53
Projection to TD=14420' MD/ 6660' TVD										
14,420.0	89.10	338.10	6,660.3	5,385.3	6,448.9	-4,093.1	7,638.2	0.00	0.00	0.00

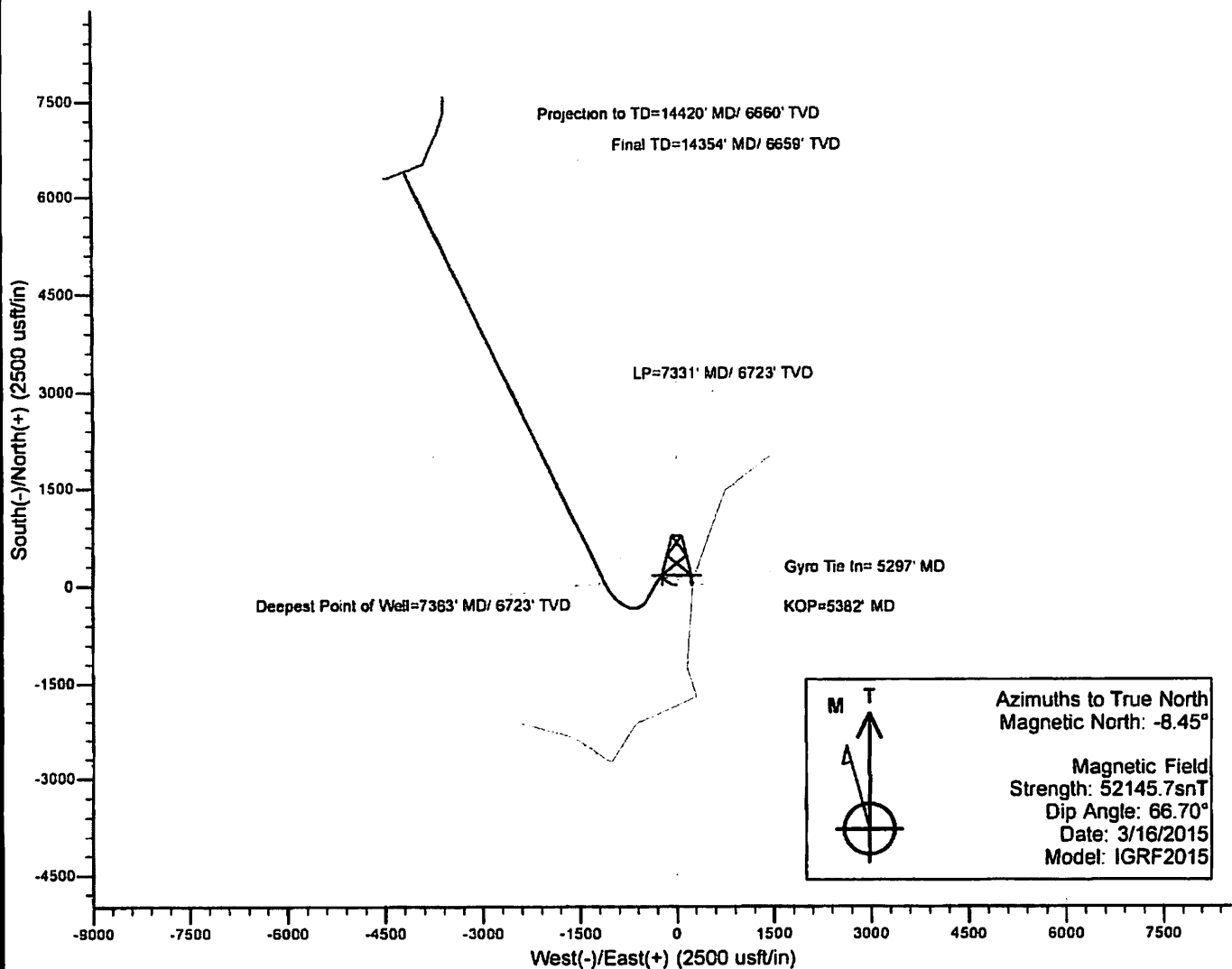
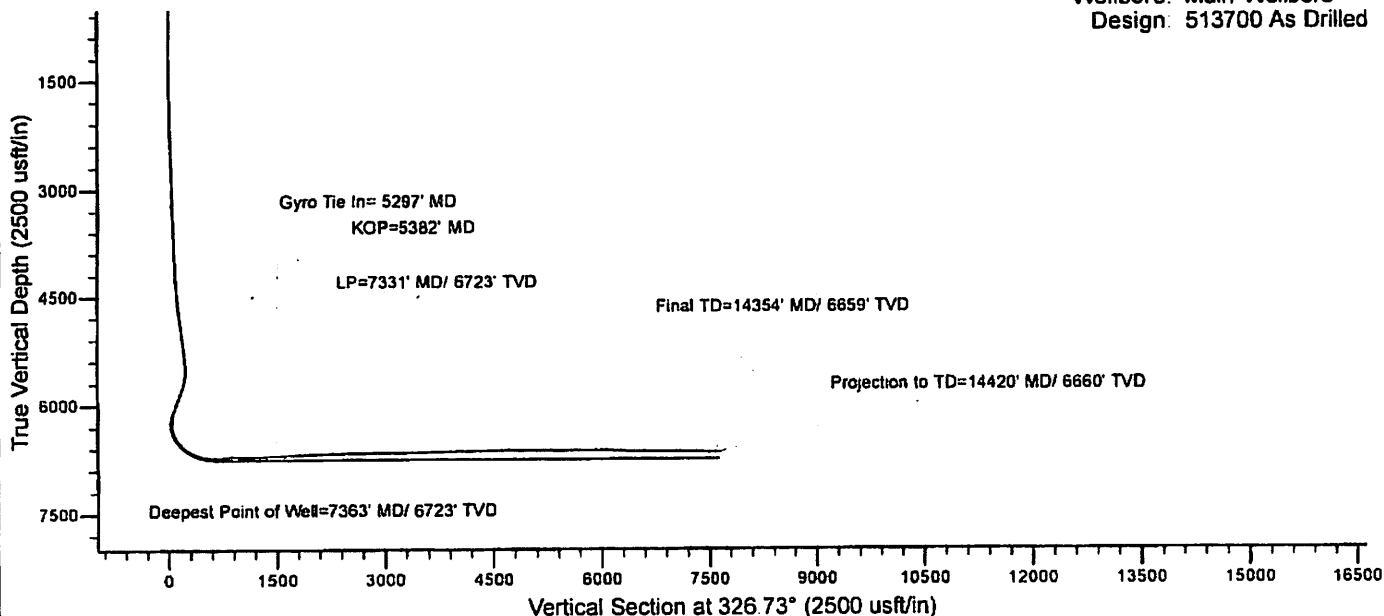
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,297.0	5,286.5	115.4	-215.0	Gyro Tie In= 5297' MD
5,382.0	5,370.8	122.2	-223.0	KOP=5382' MD
7,331.0	6,722.6	26.5	-1,101.7	LP=7331' MD/ 6723' TVD
7,363.0	6,722.7	55.3	-1,115.7	Deepest Point of Well=7363' MD/ 6723' TVD
14,354.0	6,659.2	6,387.7	-4,068.5	Final TD=14354' MD/ 6659' TVD
14,420.0	6,660.3	6,448.9	-4,093.1	Projection to TD=14420' MD/ 6660' TVD

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



# EQT Production - Marcellus

Project: Doddridge County, WV Grid  
 Site: Doddridge County 513700  
 Well: Well #513700  
 Wellbore: Main Wellbore  
 Design: 513700 As Drilled



**Azimuths to True North**  
 Magnetic North: -8.45°  
  
**Magnetic Field**  
 Strength: 52145.7snT  
 Dip Angle: 66.70°  
 Date: 3/16/2015  
 Model: IGRF2015



**513700 - 47-017-06505-0000 - Perforations**

<i>Stage Number</i>	<i>Perforation Date</i>	<i>Top Perf Depth (ftKB)</i>	<i>Bottom Perf Depth (ftKB)</i>	<i>Number of Shots</i>	<i>Formation</i>
Initiation Sleeve	5/20/2015	14,414.00	14,416.00	10	MARCELLUS
1	5/26/2015	14,270.00	14,391.00	28	MARCELLUS
1.1	5/27/2015	14,250.00	14,276.00	28	MARCELLUS
2	5/27/2015	14,090.00	14,212.00	42	MARCELLUS
2.01	5/27/2015	14,090.00	14,291.00	0	MARCELLUS
3	5/30/2015	13,910.00	14,032.00	42	MARCELLUS
4	5/30/2015	13,730.00	13,852.00	42	MARCELLUS
5	5/30/2015	13,550.00	13,672.00	42	MARCELLUS
6	5/30/2015	13,370.00	13,492.00	42	MARCELLUS
7	5/31/2015	13,190.00	13,312.00	42	MARCELLUS
8	6/1/2015	13,010.00	13,132.00	42	MARCELLUS
9	6/1/2015	12,830.00	12,952.00	42	MARCELLUS
10	6/1/2015	12,650.00	12,772.00	42	MARCELLUS
11	6/1/2015	12,470.00	12,592.00	42	MARCELLUS
12	6/1/2015	12,290.00	12,412.00	42	MARCELLUS
13	6/2/2015	12,110.00	12,232.00	42	MARCELLUS
14	6/2/2015	11,930.00	12,052.00	42	MARCELLUS
15	6/2/2015	11,750.00	11,872.00	42	MARCELLUS
16	6/2/2015	11,570.00	11,692.00	42	MARCELLUS
17	6/3/2015	11,390.00	11,512.00	42	MARCELLUS
17.1	6/3/2015	11,360.00	11,448.00	42	MARCELLUS
18	6/3/2015	11,210.00	11,330.00	42	MARCELLUS
19	6/5/2015	11,030.00	11,152.00	42	MARCELLUS
20	6/6/2015	10,850.00	10,972.00	42	MARCELLUS
21	6/6/2015	10,670.00	10,792.00	42	MARCELLUS
22	6/6/2015	10,490.00	10,612.00	42	MARCELLUS
22.1	6/6/2015	10,520.00	10,591.00	42	MARCELLUS
23	6/6/2015	10,310.00	10,432.00	42	MARCELLUS
24	6/7/2015	10,130.00	10,252.00	42	MARCELLUS
25	6/7/2015	9,950.00	10,072.00	42	MARCELLUS
26	6/7/2015	9,770.00	9,892.00	42	MARCELLUS
26.1	6/7/2015	9,762.00	9,823.00	42	MARCELLUS
27	6/7/2015	9,584.00	9,702.00	42	MARCELLUS
27.01	6/7/2015	9,595.00	9,706.00	0	MARCELLUS
28	6/8/2015	9,402.00	9,522.00	42	MARCELLUS
29	6/9/2015	9,222.00	9,344.00	42	MARCELLUS
30	6/9/2015	9,042.00	9,162.00	42	MARCELLUS
31	6/9/2015	8,862.00	8,982.00	42	MARCELLUS
32	6/10/2015	8,682.00	8,804.00	42	MARCELLUS
33	6/10/2015	8,502.00	8,624.00	42	MARCELLUS
34	6/10/2015	8,322.00	8,444.00	42	MARCELLUS
35	6/10/2015	8,144.00	8,264.00	42	MARCELLUS
36	6/11/2015	7,962.00	8,084.00	42	MARCELLUS
37	6/11/2015	7,782.00	7,904.00	42	MARCELLUS
37.1	6/11/2015	7,770.00	7,884.00	42	MARCELLUS
38	6/11/2015	7,602.00	7,724.00	42	MARCELLUS
38.1	6/11/2015	7,587.00	7,709.00	42	MARCELLUS
39	6/11/2015	7,422.00	7,544.00	42	MARCELLUS
40	6/12/2015	7,242.00	7,364.00	42	MARCELLUS





# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/26/2015
Job End Date:	6/12/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06505-00-00
Operator Name:	EQT Production
Well Name and Number:	513700
Longitude:	-80.76219500
Latitude:	39.20783800
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,705
Total Base Water Volume (gal):	16,126,320
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	90.63267	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	8.87969	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.06022	None
FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02616	None
			Alkyl Alcohol	Proprietary	10.00000	0.00872	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00436	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.03676	None
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.01160	None
			Guar gum	9000-30-0	50.00000	0.01055	None
			Surfactant	68439-51-0	2.00000	0.00042	None
			Clay	14808-60-7	2.00000	0.00042	None
B-10	FTS International	High pH buffer					

			Potassium carbonate	584-08-7	48.00000	0.00277	None
			Potassium hydroxide	1310-58-3	20.00000	0.00116	None
CS-500-SI	FTS International	Scale inhibitor					
			Ethylene glycol	107-21-1	10.00000	0.00257	None
FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55.00000	0.00076	None
CI-150	FTS International	Acid Corrosion Inhibitor					
			Isopropanol	67-63-0	30.00000	0.00014	None
			Ethylene glycol	107-21-1	30.00000	0.00014	None
			Organic amine resin salt	Proprietary	30.00000	0.00014	None
			Aromatic aldehyde	Proprietary	10.00000	0.00005	None
			Dimethylformamide	68-12-2	10.00000	0.00005	None
			Quaternary ammonium compound	Proprietary	10.00000	0.00005	None
APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95.00000	0.00026	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	0.00002	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)



Welcome Michelle N., Operator - OpNo. E1210363 [ Log Out ]



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**Hydraulic Fracturing Data**

[Edit](#)

<b>Job Start Date</b> 5/26/2015	<b>Job End Date</b> 6/12/2015	<b>API Number</b> 47-017-06505-00-00	<b>State &amp; County</b> West Virginia --- Doddridge
<b>Well Name</b> 513700			
<b>Longitude</b> -80.762195	<b>Latitude</b> 39.207838	<b>Datum</b> NAD83	<b>Federal/Tribal Well?</b>
<b>True Vertical Depth (ft)</b> 6705	<b>Total Water Vol (gal)</b> 16126320	<b>Total Non Water Vol</b> 0	<b>Total Mass (lbs)</b> 148483042



**MSDS Chemical Ingredients**

[New 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%	90.6326663304%	None	134574140.4
<a href="#">Edit</a>	Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100%	8.8796860466%	None	13184828
<a href="#">Edit</a>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0602233326%	None	89421.436
<a href="#">Edit</a>	FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30%	.0261630285%	None	38847.661
				Alkyl Alcohol	Proprietary	10%	.0087210095%	None	12949.22
				Oxyalkylated alcohol A	Proprietary	5%	.0043605047%	None	6474.61
<a href="#">Edit</a>	Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15%	.036758022%	None	54579.429
<a href="#">Edit</a>	HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55%	.0116003338%	None	17224.529
				Guar gum	9000-30-0	50%	.010545758%	None	15658.662
				Surfactant	68439-51-0	2%	.0004218303%	None	626.346
				Clay	14808-60-7	2%	.0004218303%	None	626.346
<a href="#">Edit</a>	B-10								

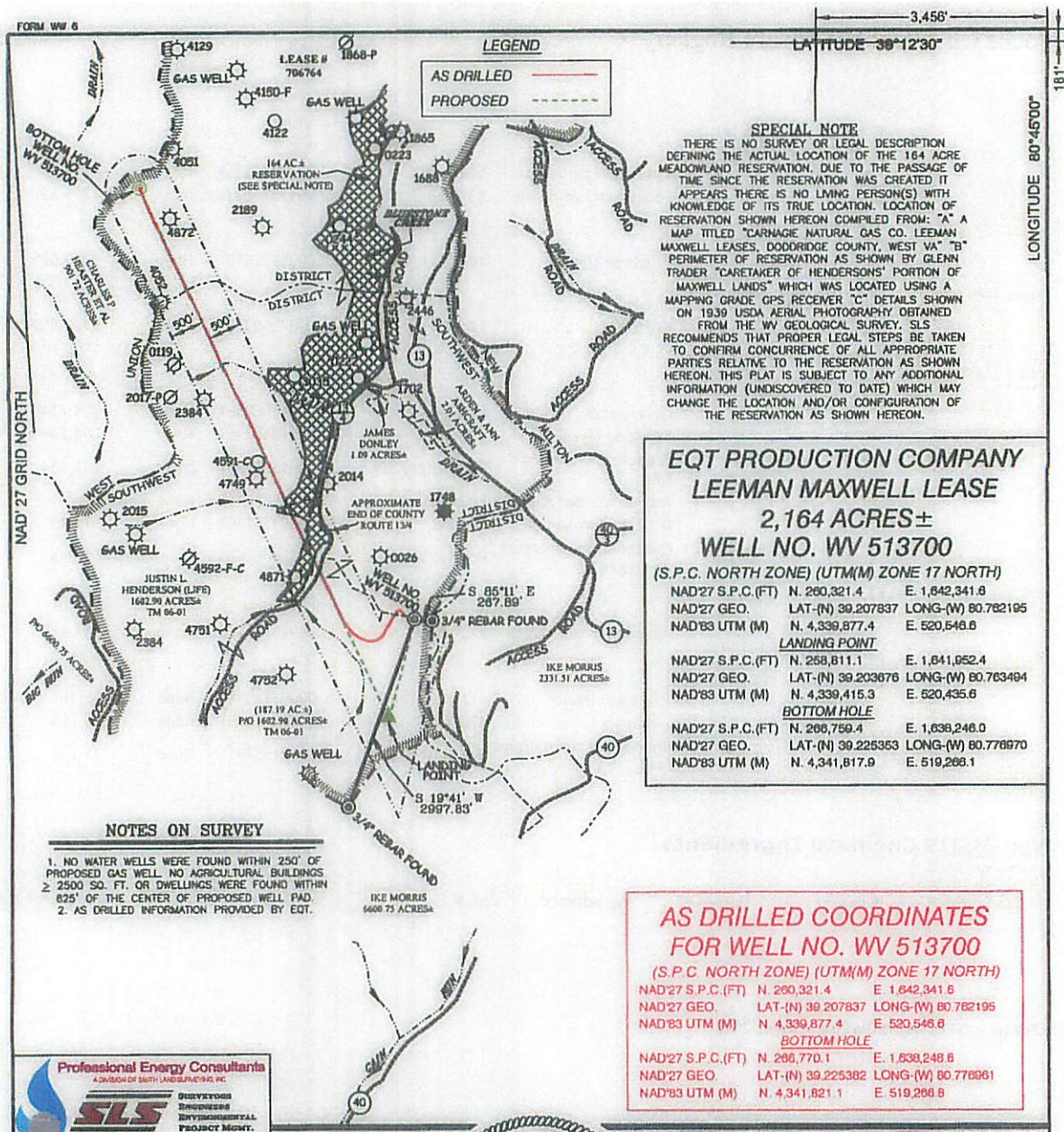
		FTS International	High pH buffer	Potassium carbonate	584-08-7	48%	.0027731575%	None	4117.669
				Potassium hydroxide	1310-58-3	20%	.0011554823%	None	1715.695
<input type="button" value="Edit"/>	CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10%	.002572751%	None	3820.099
<input type="button" value="Edit"/>	FE-100L	FTS International	Iron control	Citric acid	77-92-9	55%	.0007550306%	None	1121.092
<input type="button" value="Edit"/>	CI-150	FTS International	Acid Corrosion Inhibitor	Isopropanol	67-63-0	30%	.0001368736%	None	203.234
				Ethylene glycol	107-21-1	30%	.0001368736%	None	203.234
				Organic amine resin salt	Proprietary	30%	.0001368736%	None	203.234
				Aromatic aldehyde	Proprietary	10%	.0000456245%	None	67.745
				Dimethylformamide	68-12-2	10%	.0000456245%	None	67.745
				Quaternary ammonium compound	Proprietary	10%	.0000456245%	None	67.745
<input type="button" value="Edit"/>	APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95%	.0002610399%	None	387.6
<input type="button" value="Edit"/>	NE-100	FTS International	Non-emulsifier	2-Butoxyethanol	111-76-2	10%	.0000311582%	None	46.265
				2-Propanol	67-63-0	10%	.0000311582%	None	46.265
				Dodecylbenzenesulfonic acid	27176-87-0	5%	.0000155791%	None	23.132

**Non-MSDS Chemical Ingredients**

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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**SPECIAL NOTE**  
 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 "CARNEGIE 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.

**EQT PRODUCTION COMPANY  
 LEEMAN MAXWELL LEASE  
 2,164 ACRES±  
 WELL NO. WV 513700**

(S.P.C. NORTH ZONE) (UTM/M ZONE 17 NORTH)  
 NAD27 S.P.C.(FT) N. 260,321.4 E. 1,642,341.6  
 NAD27 GEO. LAT-(N) 39.207837 LONG-(W) 80.782195  
 NAD83 UTM (M) N. 4,339,877.4 E. 520,548.6

**LANDING POINT**  
 NAD27 S.P.C.(FT) N. 258,811.1 E. 1,641,952.4  
 NAD27 GEO. LAT-(N) 39.203676 LONG-(W) 80.763484  
 NAD83 UTM (M) N. 4,339,415.3 E. 520,435.6

**BOTTOM HOLE**  
 NAD27 S.P.C.(FT) N. 266,750.4 E. 1,638,246.0  
 NAD27 GEO. LAT-(N) 39.225353 LONG-(W) 80.778870  
 NAD83 UTM (M) N. 4,341,817.9 E. 519,266.1

**NOTES ON SURVEY**

- 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.
- AS DRILLED INFORMATION PROVIDED BY EQT.

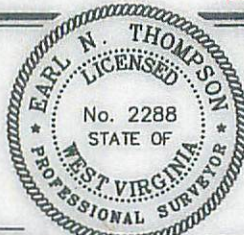
**AS DRILLED COORDINATES  
 FOR WELL NO. WV 513700**

(S.P.C. NORTH ZONE) (UTM/M ZONE 17 NORTH)  
 NAD27 S.P.C.(FT) N. 260,321.4 E. 1,642,341.6  
 NAD27 GEO. LAT-(N) 39.207837 LONG-(W) 80.782195  
 NAD83 UTM (M) N. 4,339,877.4 E. 520,548.6

**BOTTOM HOLE**  
 NAD27 S.P.C.(FT) N. 266,770.1 E. 1,638,246.0  
 NAD27 GEO. LAT-(N) 39.225382 LONG-(W) 80.778891  
 NAD83 UTM (M) N. 4,341,821.1 E. 519,266.8



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.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE JANUARY 06, 20 14  
 REVISED 03/24/14 & 04/17/15  
 OPERATORS WELL NO. WV 513700  
 API WELL NO. 47-017-06505-H  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7889AD513700  
 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 1,276(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 6,863'

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

02/12/2016