

**APPROVED**

NAME: *John A. Fink*

DATE: *1/27/14*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514662

API: 47 - 017 - 06386

Submission:  Initial  Amended *2nd Amended JFB*

Notes: **Reperf - stg 38 (38.1)**

**Flowback complete**

RECEIVED  
Office of Oil and Gas

DEC 21 2015

WV Department of  
Environmental Protection

02/05/2016

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

API 47 - 017 - 06386 County Doddridge District West Union  
Quad West Union 7.5' Pad Name WEU51 Field/Pool Name \_\_\_\_\_  
Farm name Jane Hardin Trustee/Mary Well Number 514662  
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 4,345,181 Easting 520,437  
Landing Point of Curve Northing 4,344,956 Easting 520,368  
Bottom Hole Northing 4,342,710 Easting 521,462

Elevation (ft) 1208 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)  
SBM 12.5ppg – powdered hydrocarbon resin, calcium carbonate, ground almond hulls, barium sulfate, calcium chloride, lecithin liquid, organophilic clay, polyaminated fatty acid, calcium hydroxide, polyimide surfactant, modified fatty acid, dimer.trimer fatty acid, ground walnut hulls, refined base oil.

Date permit issued 1/31/2014 Date drilling commenced 5/29/2014 Date drilling ceased 10/20/2014  
Date completion activities began 3/2/2015 Date completion activities ceased 3/15/2015  
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 334 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft \_\_\_\_\_ Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 101,170,294,314,486,555 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by: \_\_\_\_\_

02/05/2016

API 47-017 - 06386 Farm name Jane Hardin Trustee/Mary Well number 514662

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	30"	26"	40'	New	82.6#/ft	None	Y
Surface	17-1/2"	13-3/8"	1,169'	New	54.5#/ft	279', 481'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	5,293'	New	40#/ft	3150'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	15,598'	New	20#/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	49	15.6	1.18	57.82	0	8
Surface	Class A	1030	15.6	1.19	1,225.7	0	8
Coal							
Intermediate 1	Class A	375/340/1165	14.2/15.6/15.6	1.26/1.18/1.18	2,248.4	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	310/1120	14.2/15.2	1.26/1.97	2,597	4,371'	72
Tubing							

Drillers TD (ft) 15,598' Loggers TD (ft) N/A  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,571'

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-N/A  
 Surface-bow spring centralizers set at 1125', 686', 159'  
 Intermediate-bow spring centralizers set at 5247', 4811', 4287', 3806', 3500', 3107', 2869', 2301', 1821', 1297', 814', 333'  
 Production- Composite bodied centralizers on every joint from TD up to 5,000'

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 -06385

Drilling Contractor: Savanna Drilling

Address: 2204 Timberloch Place Suite 230 City: Woodlands State: TX Zip: 77380

02/05/2016

API 47- 017 - 06385

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FESH WATER ZONE	0	0	334	334
SAND / SHALE	0	0	101	101
WASHINGTON COAL	101	101	104	104
SAND / SHALE	104	104	170	170
WAYNESBURG A COAL	170	170	172	172
SAND / SHALE	172	172	294	294
COAL	294	294	298	298
SAND / SHALE	298	298	314	314
UNIONTOWN COAL	314	314	317	317
SAND / SHALE	317	317	486	486
REDSTONE COAL	486	486	487	487
SAND / SHALE	487	487	555	555
PITTSBURGH COAL	555	555	558	558
SAND / SHALE	558	558	1,478	1,478
MAXTON	1,478	1,478	1,874	1,874
BIG LIME	1,874	1,874	1,943	1,943
KEENER	1,943	1,943	2,173	2,173
WEIR	2,173	2,173	2,369	2,369
BEREA	2,369	2,369	2,375	2,375
GANTZ	2,375	2,375	2,489	2,489
50F	2,489	2,489	2,579	2,579
30F	2,579	2,579	2,723	2,723
4TH	2,723	2,723	2,916	2,916
BAYARD	2,916	2,916	3,233	3,233
WARREN	3,233	3,233	3,294	3,294
SPEECHLEY	3,294	3,294	3,965	3,965
BALLTOWN A	3,965	3,965	4,241	4,241
BRADFORD	4,241	4,241	4,447	4,447
RILEY	4,447	4,447	4,884	4,884
BENSON	4,884	4,884	5,131	5,131
ALEXANDER	5,131	5,131	6,386	6,305
SONYEA	6,381	6,301	6,562	6,455
MIDDLESEX	6,562	6,455	6,635	6,511
GENESEE	6,635	6,511	6,763	6,596
GENESEO	6,763	6,596	6,808	6,622
TULLY	6,808	6,622	6,859	6,650
HAMILTON	6,859	6,650	6,911	6,675
MARCELLUS	6,911	6,675	15,598	6,745

02/05/2016

API 47- 017 - 06385



Where energy meets innovation.

## **EQT Production - Marcellus**

Doddridge County, WV Grid

Doddridge County 514662

Well #514662

Main Wellbore

Design: As Drilled Surveys

## **Standard Survey Report**

20 October, 2014



Where energy meets innovation.

02/05/2016





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# Phoenix Technology Services Survey Report



Where energy meets innovation.

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514662
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514662	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514662	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	As Drilled Surveys		

### Project

<b>Project:</b>	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

<b>Site:</b>	Doddridge County 514662		
<b>Site Position:</b>		<b>Northing:</b>	277,730.20 usft
<b>From:</b>	Map	<b>Easting:</b>	1,642,273.20 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.26
		<b>Longitude:</b>	-80.76
		<b>Grid Convergence:</b>	-0.81 °

### Well

<b>Well:</b>	Well #514662		
<b>Well Position:</b>	+N/-S	0.0 usft	<b>Northing:</b> 277,730.20 usft
	+E/-W	0.0 usft	<b>Easting:</b> 1,642,273.20 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	39° 15' 20.260 N
		<b>Longitude:</b>	80° 45' 47.862 W
		<b>Ground Level:</b>	1,208.0 usft

### Wellbore

<b>Wellbore:</b>	Main Wellbore		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/2/2014	-8.49	66.75	52,238

### Design

<b>Design:</b>	As Drilled Surveys		
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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	158.44

### Survey Program

From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	5,300.0	514662 Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0.00	15,598.0	514662 Phx MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3 standard declination

### 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)
0.0	0.00	0.00	0.0	-1,224.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.33	294.05	100.0	-1,124.0	0.1	-0.3	-0.2	0.33	0.33	0.00
200.0	0.13	176.41	200.0	-1,024.0	0.1	-0.5	-0.3	0.41	-0.20	-117.64
300.0	0.27	158.30	300.0	-924.0	-0.2	-0.4	0.0	0.15	0.14	-18.11
400.0	0.20	162.65	400.0	-824.0	-0.6	-0.3	0.4	0.07	-0.07	4.35
500.0	0.14	102.20	500.0	-724.0	-0.8	-0.1	0.7	0.18	-0.06	-60.45
600.0	0.07	112.98	600.0	-624.0	-0.8	0.1	0.8	0.07	-0.07	10.78
700.0	0.07	128.23	700.0	-524.0	-0.9	0.2	0.9	0.02	0.00	15.25

02/05/2016

<b>Database:</b>	EM 5000 06 03 01 01 01	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514862
<b>Company:</b>	EQT Production Services	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County 17 3 814	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514862	<b>North Reference:</b>	Grid
<b>Well:</b>	Well 7514002	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	As Directed Run-ins		

**Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Builde Rate (°/100usft)	Turn Rate (°/100usft)
800.0	0.05	224.39	800.0	-424.0	-1.0	0.2	1.0	0.09	-0.02	96.16
900.0	0.12	254.07	900.0	-324.0	-1.0	0.1	1.0	0.08	0.07	29.68
1,000.0	0.12	246.82	1,000.0	-224.0	-1.1	-0.1	1.0	0.02	0.00	-7.25
1,100.0	0.30	115.78	1,100.0	-124.0	-1.3	0.0	1.2	0.39	0.18	-131.04
1,200.0	0.55	101.55	1,200.0	-24.0	-1.5	0.7	1.6	0.27	0.25	-14.23
1,300.0	0.76	90.44	1,300.0	76.0	-1.6	1.8	2.1	0.24	0.21	-11.11
1,400.0	0.85	86.20	1,400.0	176.0	-1.5	3.2	2.6	0.11	0.09	-4.24
1,500.0	0.82	95.85	1,500.0	276.0	-1.5	4.7	3.2	0.14	-0.03	9.65
1,600.0	0.88	99.27	1,600.0	376.0	-1.7	6.2	3.9	0.08	0.06	3.42
1,700.0	0.83	106.25	1,699.9	475.9	-2.1	7.6	4.7	0.12	-0.05	6.98
1,800.0	0.79	119.64	1,799.9	575.9	-2.6	8.9	5.7	0.19	-0.04	13.39
1,900.0	0.61	128.40	1,899.9	675.9	-3.3	9.9	6.7	0.21	-0.18	8.76
2,000.0	0.61	131.64	1,999.9	775.9	-4.0	10.7	7.6	0.03	0.00	3.24
2,100.0	0.52	140.05	2,099.9	875.9	-4.7	11.4	8.5	0.12	-0.09	8.41
2,200.0	0.54	146.79	2,199.9	975.9	-5.4	12.0	9.4	0.07	0.02	6.74
2,300.0	0.46	141.57	2,299.9	1,075.9	-6.1	12.5	10.3	0.09	-0.08	-5.22
2,400.0	0.31	149.67	2,399.9	1,175.9	-6.7	12.9	10.9	0.16	-0.15	8.10
2,500.0	0.34	146.50	2,499.9	1,275.9	-7.1	13.2	11.5	0.03	0.03	-3.17
2,600.0	0.24	155.53	2,599.9	1,375.9	-7.6	13.4	12.0	0.11	-0.10	9.03
2,700.0	0.31	166.30	2,699.9	1,475.9	-8.0	13.6	12.5	0.09	0.07	10.77
2,800.0	0.27	153.61	2,799.9	1,575.9	-8.5	13.7	13.0	0.08	-0.04	-12.69
2,900.0	0.30	173.51	2,899.9	1,675.9	-9.0	13.9	13.5	0.10	0.03	19.90
3,000.0	0.37	158.65	2,999.9	1,775.9	-9.5	14.0	14.0	0.11	0.07	-14.85
3,100.0	0.41	174.24	3,099.9	1,875.9	-10.2	14.2	14.7	0.11	0.04	15.59
3,200.0	0.44	171.47	3,199.9	1,975.9	-10.9	14.3	15.4	0.04	0.03	-2.77
3,300.0	0.46	162.24	3,299.9	2,075.9	-11.7	14.4	16.2	0.08	0.02	-9.23
3,400.0	0.46	170.50	3,399.9	2,175.9	-12.5	14.6	17.0	0.07	0.00	8.26
3,500.0	0.57	165.27	3,499.9	2,275.9	-13.4	14.8	17.9	0.12	0.11	-5.23
3,600.0	0.54	166.65	3,599.9	2,375.9	-14.3	15.1	18.8	0.03	-0.03	1.38
3,700.0	0.56	174.50	3,699.9	2,475.9	-15.2	15.2	19.8	0.08	0.02	7.85
3,800.0	0.64	161.74	3,799.9	2,575.9	-16.3	15.4	20.8	0.16	0.08	-12.76
3,900.0	0.56	171.58	3,899.9	2,675.9	-17.3	15.7	21.8	0.13	-0.08	9.84
4,000.0	0.71	180.83	3,999.9	2,775.9	-18.4	15.8	22.9	0.18	0.15	9.25
4,100.0	0.75	200.40	4,099.8	2,875.8	-19.6	15.5	23.9	0.25	0.04	19.57
4,200.0	1.01	217.77	4,199.8	2,975.8	-20.9	14.7	24.9	0.37	0.26	17.37
4,300.0	1.08	228.45	4,299.8	3,075.8	-22.2	13.5	25.6	0.21	0.07	10.68
4,400.0	1.08	239.16	4,399.8	3,175.8	-23.3	12.0	26.1	0.20	0.00	10.71
4,500.0	1.23	257.60	4,499.8	3,275.8	-24.1	10.1	26.1	0.40	0.15	18.44
4,600.0	1.43	267.26	4,599.8	3,375.8	-24.4	7.8	25.5	0.30	0.20	9.66
4,700.0	1.50	276.24	4,699.7	3,475.7	-24.3	5.3	24.5	0.24	0.07	8.98
4,800.0	1.45	282.67	4,799.7	3,575.7	-23.8	2.8	23.2	0.17	-0.05	6.43
4,900.0	1.49	290.76	4,899.7	3,675.7	-23.1	0.3	21.6	0.21	0.04	8.09

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514882
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514882	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514862	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	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)
5,000.0	1.37	298.96	4,999.6	3,775.6	-22.1	-2.0	19.8	0.24	-0.12	8.20
5,100.0	1.52	298.73	5,099.6	3,875.6	-20.9	-4.2	17.9	0.15	0.15	-0.23
5,200.0	1.67	301.54	5,199.6	3,975.6	-19.5	-6.6	15.7	0.17	0.15	2.81
Gyro. Rate = 6300°/MD										
5,300.0	1.97	307.37	5,299.5	4,075.5	-17.6	-9.2	13.0	0.35	0.30	5.83
5,430.0	2.10	313.20	5,429.4	4,205.4	-14.7	-12.7	9.0	0.19	0.10	4.48
5,461.0	2.30	314.90	5,460.4	4,236.4	-13.8	-13.5	7.9	0.68	0.65	5.48
5,493.0	2.10	312.40	5,492.4	4,268.4	-13.0	-14.4	6.8	0.69	-0.63	-7.81
5,525.0	1.80	310.00	5,524.4	4,300.4	-12.3	-15.3	5.8	0.97	-0.94	-7.50
5,556.0	2.10	309.30	5,555.3	4,331.3	-11.6	-16.1	4.9	0.97	0.97	-2.26
5,588.0	3.60	310.10	5,587.3	4,363.3	-10.6	-17.3	3.5	4.69	4.69	2.50
5,619.0	5.60	305.90	5,618.2	4,394.2	-9.1	-19.3	1.3	6.54	6.45	-13.55
5,651.0	7.00	304.70	5,650.0	4,426.0	-7.0	-22.1	-1.6	4.39	4.38	-3.75
5,682.0	8.10	298.60	5,680.7	4,456.7	-4.9	-25.6	-4.8	4.39	3.55	-19.68
5,745.0	10.70	290.70	5,742.9	4,518.9	-0.7	-35.0	-12.2	4.60	4.13	-12.54
5,777.0	12.90	291.10	5,774.2	4,550.2	1.6	-41.1	-16.6	6.88	6.88	1.25
5,808.0	15.00	290.90	5,804.3	4,580.3	4.3	-48.1	-21.7	6.78	6.77	-0.65
5,840.0	16.20	289.30	5,835.1	4,611.1	7.2	-56.1	-27.4	3.98	3.75	-5.00
5,871.0	18.10	290.10	5,864.7	4,640.7	10.3	-64.7	-33.4	6.18	6.13	2.58
5,903.0	20.30	290.50	5,895.0	4,671.0	14.0	-74.6	-40.4	6.89	6.88	1.25
5,935.0	22.40	293.70	5,924.8	4,700.8	18.4	-85.4	-48.5	7.50	6.56	10.00
5,966.0	23.50	296.30	5,953.3	4,729.3	23.5	-96.3	-57.3	4.82	3.55	8.39
5,998.0	25.80	294.90	5,982.4	4,758.4	29.2	-108.4	-67.0	7.42	7.19	-4.38
6,029.0	28.70	293.60	6,009.9	4,785.9	35.1	-121.3	-77.2	9.55	9.35	-4.19
6,061.0	31.20	293.40	6,037.7	4,813.7	41.4	-136.0	-88.5	7.82	7.81	-0.63
6,092.0	33.50	293.30	6,063.9	4,839.9	48.0	-151.2	-100.2	7.42	7.42	-0.32
6,124.0	36.50	289.90	6,090.1	4,866.1	54.7	-168.3	-112.8	11.18	9.38	-10.63
6,155.0	39.00	283.90	6,114.6	4,890.6	60.2	-186.4	-124.5	14.33	8.06	-19.35
6,187.0	38.90	275.90	6,139.5	4,915.5	63.7	-206.2	-135.0	15.71	-0.31	-25.00
6,218.0	37.90	268.60	6,163.8	4,939.8	64.5	-225.4	-142.8	14.97	-3.23	-23.55
6,250.0	35.80	260.20	6,189.4	4,965.4	62.6	-244.5	-148.1	17.04	-6.56	-26.25
6,281.0	33.70	255.80	6,214.9	4,990.9	59.0	-261.7	-151.0	10.55	-6.77	-14.19
6,313.0	31.60	249.40	6,241.8	5,017.8	53.8	-278.2	-152.3	12.62	-6.56	-20.00
6,345.0	30.60	244.70	6,269.2	5,045.2	47.4	-293.4	-151.9	8.20	-3.13	-14.69
6,376.0	29.50	237.70	6,296.1	5,072.1	40.0	-307.0	-150.0	11.84	-3.55	-22.58
6,408.0	29.50	232.70	6,323.9	5,099.9	31.0	-319.9	-146.4	7.69	0.00	-15.63
6,440.0	30.10	228.00	6,351.7	5,127.7	20.8	-332.2	-141.4	7.53	1.88	-14.69
6,471.0	30.80	223.00	6,378.4	5,154.4	9.8	-343.4	-135.3	8.48	2.26	-16.13
6,503.0	32.20	217.10	6,405.7	5,181.7	-3.0	-354.1	-127.4	10.58	4.36	-18.44
6,534.0	34.00	211.40	6,431.7	5,207.7	-17.0	-363.6	-117.8	11.59	5.81	-18.39
6,566.0	36.40	206.90	6,457.9	5,233.9	-33.1	-372.6	-106.2	11.04	7.50	-14.06
6,597.0	39.00	202.60	6,482.4	5,258.4	-50.3	-380.5	-93.1	11.92	8.39	-13.87
6,629.0	41.70	200.30	6,506.8	5,282.8	-69.6	-388.0	-77.9	9.63	8.44	-7.19



Where energy meets innovation.

# Phoenix Technology Services Survey Report



Where energy meets innovation.

<b>Database:</b>	EDM 5000.1 Single User Da	<b>Local Co-ordinate Reference:</b>	Site: Doddridge County 514862
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514862	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514862	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	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)
6,660.0	45.00	196.80	6,529.3	5,305.3	-89.8	-394.8	-61.6	13.16	10.65	-11.29
6,692.0	48.40	193.20	6,551.3	5,327.3	-112.2	-400.8	-42.9	13.41	10.63	-11.25
6,724.0	50.70	189.00	6,572.0	5,348.0	-136.1	-405.5	-22.4	12.30	7.19	-13.13
6,755.0	53.00	185.10	6,591.2	5,367.2	-160.3	-408.4	-1.0	12.36	7.42	-12.58
6,787.0	54.20	181.00	6,610.2	5,386.2	-186.0	-409.8	22.4	10.97	3.75	-12.81
6,818.0	56.40	177.90	6,627.8	5,403.8	-211.5	-409.5	46.2	10.86	7.10	-10.00
6,850.0	58.20	173.90	6,645.1	5,421.1	-238.4	-407.6	71.9	11.93	5.63	-12.50
6,881.0	59.80	171.00	6,661.1	5,437.1	-264.7	-404.1	97.6	9.54	5.16	-9.35
6,913.0	64.10	170.40	6,676.1	5,452.1	-292.6	-399.6	125.2	13.54	13.44	-1.88
6,945.0	67.80	171.00	6,689.2	5,465.2	-321.4	-394.8	153.8	11.69	11.56	1.88
6,976.0	72.40	170.70	6,699.7	5,475.7	-350.2	-390.2	182.2	14.87	14.84	-0.97
7,008.0	76.70	169.00	6,708.2	5,484.2	-380.5	-384.8	212.5	14.38	13.44	-5.31
7,039.0	79.80	166.30	6,714.6	5,490.6	-410.1	-378.3	242.4	13.14	10.00	-8.71
7,070.0	83.60	163.90	6,719.0	5,495.0	-439.8	-370.4	272.9	14.45	12.26	-7.74
7,100.0	88.20	162.60	6,721.2	5,497.2	-468.4	-361.8	302.7	15.93	15.33	-4.33
LP=7132 MD: 6721 TVD										
7,132.0	91.20	159.80	6,721.3	5,497.3	-498.7	-351.4	334.6	12.82	9.38	-8.75
7,195.0	90.30	152.20	6,720.5	5,496.5	-556.2	-325.8	397.5	12.15	-1.43	-12.06
7,257.0	90.90	150.80	6,719.9	5,495.9	-610.7	-296.3	459.1	2.46	0.97	-2.26
7,318.0	91.50	151.20	6,718.6	5,494.6	-664.0	-266.7	519.6	1.18	0.98	0.66
7,380.0	90.40	154.20	6,717.6	5,493.6	-719.1	-238.3	581.2	5.15	-1.77	4.84
7,443.0	90.20	155.20	6,717.2	5,493.2	-776.1	-211.3	644.1	1.62	-0.32	1.59
7,506.0	90.50	156.00	6,716.8	5,492.8	-833.4	-185.3	707.0	1.36	0.48	1.27
7,569.0	91.20	156.60	6,715.9	5,491.9	-891.1	-160.0	770.0	1.46	1.11	0.95
7,633.0	91.20	156.00	6,714.6	5,490.6	-949.7	-134.3	833.9	0.94	0.00	-0.94
7,695.0	91.40	156.90	6,713.2	5,489.2	-1,006.5	-109.5	895.8	1.49	0.32	1.45
7,758.0	91.40	154.70	6,711.6	5,487.6	-1,064.0	-83.7	958.8	3.49	0.00	-3.49
7,821.0	91.70	152.30	6,709.9	5,485.9	-1,120.3	-55.6	1,021.5	3.84	0.48	-3.81
7,884.0	92.20	152.10	6,707.8	5,483.8	-1,176.0	-26.2	1,084.1	0.85	0.79	-0.32
7,946.0	91.60	152.10	6,705.7	5,481.7	-1,230.8	2.8	1,145.7	0.97	-0.97	0.00
8,009.0	91.30	151.30	6,704.1	5,480.1	-1,286.2	32.6	1,208.2	1.36	-0.48	-1.27
8,072.0	90.80	152.40	6,703.0	5,479.0	-1,341.8	62.3	1,270.8	1.92	-0.79	1.75
8,134.0	90.00	153.30	6,702.5	5,478.5	-1,397.0	90.6	1,332.5	1.94	-1.29	1.45
8,197.0	90.40	155.00	6,702.3	5,478.3	-1,453.6	118.1	1,395.3	2.77	0.63	2.70
8,260.0	90.20	155.10	6,702.0	5,478.0	-1,510.8	144.7	1,458.2	0.35	-0.32	0.16
8,322.0	90.30	155.00	6,701.7	5,477.7	-1,567.0	170.8	1,520.1	0.23	0.16	-0.16
8,385.0	90.50	154.90	6,701.3	5,477.3	-1,624.1	197.5	1,583.0	0.35	0.32	-0.16
8,448.0	90.80	154.60	6,700.6	5,476.6	-1,681.0	224.4	1,645.8	0.67	0.48	-0.48
8,511.0	91.20	156.30	6,699.5	5,475.5	-1,738.3	250.5	1,708.7	2.77	0.63	2.70
8,575.0	91.00	157.60	6,698.2	5,474.2	-1,797.2	275.6	1,772.7	2.05	-0.31	2.03
8,638.0	91.00	157.20	6,697.1	5,473.1	-1,855.4	299.8	1,835.7	0.63	0.00	-0.63
8,700.0	90.80	156.60	6,696.2	5,472.2	-1,912.4	324.1	1,897.7	1.02	-0.32	-0.97
8,763.0	90.60	155.50	6,695.4	5,471.4	-1,969.9	349.7	1,960.6	1.77	-0.32	-1.75

<b>Database:</b>	EDM 5000 1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514662
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514662	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514662	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	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)
8,826.0	90.40	154.30	6,694.8	5,470.8	-2,027.0	376.4	2,023.5	1.93	-0.32	-1.90
8,889.0	90.50	153.70	6,694.3	5,470.3	-2,083.6	404.0	2,086.3	0.97	0.16	-0.95
8,952.0	90.20	154.50	6,694.0	5,470.0	-2,140.3	431.6	2,149.1	1.36	-0.48	1.27
9,015.0	90.20	158.10	6,693.7	5,469.7	-2,198.0	456.9	2,212.0	5.71	0.00	5.71
9,078.0	90.50	159.40	6,693.4	5,469.4	-2,256.7	479.7	2,275.0	2.12	0.48	2.06
9,141.0	91.20	161.00	6,692.4	5,468.4	-2,315.9	501.0	2,338.0	2.77	1.11	2.54
9,204.0	91.20	159.70	6,691.1	5,467.1	-2,375.3	522.2	2,401.0	2.06	0.00	-2.06
9,267.0	90.00	156.40	6,690.4	5,466.4	-2,433.7	545.8	2,463.9	5.57	-1.90	-5.24
9,330.0	90.40	156.60	6,690.2	5,466.2	-2,491.5	570.9	2,526.9	0.71	0.63	0.32
9,393.0	90.50	158.20	6,689.7	5,465.7	-2,549.6	595.1	2,589.9	2.54	0.16	2.54
9,456.0	91.20	158.00	6,688.8	5,464.8	-2,608.1	618.6	2,652.9	1.16	1.11	-0.32
9,519.0	91.50	155.40	6,687.3	5,463.3	-2,665.9	643.5	2,715.8	4.15	0.48	-4.13
9,582.0	91.30	154.70	6,685.8	5,461.8	-2,723.0	670.1	2,778.7	1.16	-0.32	-1.11
9,645.0	91.00	153.80	6,684.5	5,460.5	-2,779.7	697.4	2,841.5	1.51	-0.48	-1.43
9,708.0	91.30	152.90	6,683.2	5,459.2	-2,836.0	725.7	2,904.3	1.51	0.48	-1.43
9,771.0	91.50	152.60	6,681.7	5,457.7	-2,892.0	754.5	2,966.9	0.57	0.32	-0.48
9,834.0	90.50	154.30	6,680.6	5,456.6	-2,948.4	782.7	3,029.7	3.13	-1.59	2.70
9,897.0	90.50	155.50	6,680.1	5,456.1	-3,005.4	809.4	3,092.6	1.90	0.00	1.90
9,960.0	90.90	155.20	6,679.3	5,455.3	-3,062.7	835.7	3,155.5	0.79	0.63	-0.48
10,024.0	91.00	154.70	6,678.2	5,454.2	-3,120.6	862.8	3,219.3	0.80	0.16	-0.78
10,087.0	88.80	152.50	6,678.3	5,454.3	-3,177.1	890.8	3,282.1	4.94	-3.49	-3.49
10,150.0	88.30	152.60	6,679.9	5,455.9	-3,233.0	919.8	3,344.7	0.81	-0.79	0.16
10,213.0	88.50	153.50	6,681.7	5,457.7	-3,289.1	948.3	3,407.4	1.46	0.32	1.43
10,276.0	88.40	153.20	6,683.4	5,459.4	-3,345.4	976.6	3,470.2	0.50	-0.16	-0.48
10,339.0	88.50	153.30	6,685.1	5,461.1	-3,401.6	1,004.9	3,532.9	0.22	0.16	0.16
10,402.0	88.30	153.00	6,686.9	5,462.9	-3,457.8	1,033.4	3,595.6	0.57	-0.32	-0.48
10,466.0	90.40	153.20	6,687.6	5,463.6	-3,514.9	1,062.3	3,659.3	3.30	3.28	0.31
10,529.0	91.20	153.20	6,686.7	5,462.7	-3,571.1	1,090.7	3,722.0	1.27	1.27	0.00
10,592.0	90.90	152.50	6,685.5	5,461.5	-3,627.1	1,119.5	3,784.7	1.21	-0.48	-1.11
10,655.0	90.80	152.50	6,684.6	5,460.6	-3,683.0	1,148.6	3,847.4	0.16	-0.16	0.00
10,718.0	91.20	151.80	6,683.5	5,459.5	-3,738.7	1,178.0	3,910.0	1.28	0.63	-1.11
10,781.0	91.20	152.20	6,682.2	5,458.2	-3,794.3	1,207.6	3,972.6	0.63	0.00	0.63
10,844.0	91.40	152.00	6,680.8	5,456.8	-3,850.0	1,237.0	4,035.2	0.45	0.32	-0.32
10,907.0	91.40	151.70	6,679.2	5,455.2	-3,905.5	1,266.8	4,097.7	0.48	0.00	-0.48
10,971.0	91.60	151.60	6,677.5	5,453.5	-3,961.8	1,297.1	4,161.3	0.35	0.31	-0.16
11,034.0	92.10	152.60	6,675.5	5,451.5	-4,017.5	1,326.6	4,223.9	1.77	0.79	1.59
11,097.0	92.00	153.30	6,673.3	5,449.3	-4,073.5	1,355.2	4,286.5	1.12	-0.16	1.11
11,160.0	91.20	154.70	6,671.5	5,447.5	-4,130.1	1,382.8	4,349.3	2.56	-1.27	2.22
11,223.0	89.80	155.30	6,670.9	5,446.9	-4,187.2	1,409.5	4,412.2	2.42	-2.22	0.95
11,286.0	88.70	154.70	6,671.8	5,447.8	-4,244.3	1,436.1	4,475.1	1.99	-1.75	-0.95
11,349.0	87.00	155.20	6,674.1	5,450.1	-4,301.4	1,462.7	4,537.9	2.81	-2.70	0.79
11,412.0	86.70	154.60	6,677.6	5,453.6	-4,358.3	1,489.4	4,600.7	1.06	-0.48	-0.95



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# Phoenix Technology Services Survey Report



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<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514662
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514662	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514662	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	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)
11,475.0	86.70	154.50	6,681.2	5,457.2	-4,415.1	1,516.4	4,663.5	0.16	0.00	-0.16
11,539.0	87.00	154.70	6,684.7	5,460.7	-4,472.8	1,543.9	4,727.2	0.56	0.47	0.31
11,602.0	87.40	153.80	6,687.8	5,463.8	-4,529.5	1,571.2	4,790.0	1.56	0.63	-1.43
11,665.0	87.40	153.80	6,690.7	5,466.7	-4,586.0	1,599.0	4,852.7	0.00	0.00	0.00
11,728.0	89.30	154.90	6,692.5	5,468.5	-4,642.8	1,626.2	4,915.5	3.48	3.02	1.75
11,791.0	90.70	156.10	6,692.5	5,468.5	-4,700.1	1,652.4	4,978.4	2.93	2.22	1.90
11,854.0	90.50	155.70	6,691.8	5,467.8	-4,757.6	1,678.1	5,041.4	0.71	-0.32	-0.63
11,917.0	90.60	156.90	6,691.2	5,467.2	-4,815.3	1,703.4	5,104.3	1.91	0.16	1.90
11,980.0	89.10	155.90	6,691.4	5,467.4	-4,873.0	1,728.6	5,167.3	2.86	-2.38	-1.59
12,043.0	85.60	156.20	6,694.3	5,470.3	-4,930.5	1,754.2	5,230.1	5.58	-5.56	0.48
12,107.0	85.20	155.60	6,699.4	5,475.4	-4,988.7	1,780.2	5,293.9	1.12	-0.63	-0.94
12,170.0	86.80	156.80	6,703.8	5,479.8	-5,046.2	1,805.6	5,356.7	3.17	2.54	1.90
12,233.0	87.30	156.80	6,707.1	5,483.1	-5,104.1	1,830.4	5,419.5	0.79	0.79	0.00
12,296.0	87.80	156.90	6,709.8	5,485.8	-5,161.9	1,855.1	5,482.5	0.81	0.79	0.16
12,360.0	89.70	156.40	6,711.2	5,487.2	-5,220.7	1,880.5	5,546.4	3.07	2.97	-0.78
12,422.0	89.20	155.70	6,711.8	5,487.8	-5,277.3	1,905.6	5,608.4	1.39	-0.81	-1.13
12,485.0	88.10	154.30	6,713.2	5,489.2	-5,334.4	1,932.2	5,671.2	2.83	-1.75	-2.22
12,548.0	88.60	154.30	6,715.1	5,491.1	-5,391.2	1,959.6	5,734.0	0.79	0.79	0.00
12,612.0	91.40	156.60	6,715.1	5,491.1	-5,449.4	1,986.1	5,797.9	5.66	4.38	3.59
12,675.0	91.50	156.00	6,713.5	5,489.5	-5,507.0	2,011.5	5,860.9	0.97	0.16	-0.95
12,738.0	92.00	156.20	6,711.5	5,487.5	-5,564.6	2,037.0	5,923.8	0.85	0.79	0.32
12,801.0	91.10	156.90	6,709.8	5,485.8	-5,622.4	2,062.0	5,986.7	1.81	-1.43	1.11
12,864.0	89.40	157.00	6,709.6	5,485.6	-5,680.3	2,086.7	6,049.7	2.70	-2.70	0.16
12,927.0	88.40	156.70	6,710.8	5,486.8	-5,738.3	2,111.5	6,112.7	1.66	-1.59	-0.48
12,990.0	87.80	156.10	6,712.9	5,488.9	-5,796.0	2,136.7	6,175.6	1.35	-0.95	-0.95
13,053.0	87.50	156.20	6,715.4	5,491.4	-5,853.5	2,162.1	6,238.5	0.50	-0.48	0.16
13,115.0	88.00	156.10	6,717.9	5,493.9	-5,910.2	2,187.2	6,300.4	0.82	0.81	-0.16
13,178.0	88.80	156.90	6,719.6	5,495.6	-5,967.9	2,212.3	6,363.3	1.80	1.27	1.27
13,241.0	89.60	158.10	6,720.5	5,496.5	-6,026.1	2,236.4	6,426.3	2.29	1.27	1.90
13,304.0	89.90	158.40	6,720.8	5,496.8	-6,084.7	2,259.7	6,489.3	0.67	0.48	0.48
13,367.0	90.60	159.40	6,720.5	5,496.5	-6,143.4	2,282.4	6,552.3	1.94	1.11	1.59
13,430.0	90.50	158.10	6,719.9	5,495.9	-6,202.1	2,305.2	6,615.3	2.07	-0.16	-2.06
13,494.0	90.10	158.50	6,719.6	5,495.6	-6,261.6	2,328.9	6,679.3	0.88	-0.63	0.63
13,557.0	89.80	158.10	6,719.6	5,495.6	-6,320.1	2,352.2	6,742.3	0.79	-0.48	-0.63
13,620.0	88.00	158.60	6,720.8	5,496.8	-6,378.7	2,375.4	6,805.3	2.97	-2.86	0.79
13,683.0	87.60	157.90	6,723.3	5,499.3	-6,437.2	2,398.8	6,868.2	1.28	-0.63	-1.11
13,746.0	87.40	157.90	6,726.0	5,502.0	-6,495.5	2,422.4	6,931.2	0.32	-0.32	0.00
13,809.0	87.70	157.70	6,728.7	5,504.7	-6,553.7	2,446.2	6,994.1	0.57	0.48	-0.32
13,872.0	87.10	157.40	6,731.6	5,507.6	-6,611.9	2,470.3	7,057.0	1.06	-0.95	-0.48
13,935.0	86.40	157.10	6,735.1	5,511.1	-6,669.9	2,494.6	7,119.9	1.21	-1.11	-0.48
13,998.0	87.50	156.50	6,738.5	5,514.5	-6,727.7	2,519.4	7,182.8	1.99	1.75	-0.95
14,061.0	88.70	157.10	6,740.6	5,516.6	-6,785.6	2,544.2	7,245.8	2.13	1.90	0.95
14,124.0	91.80	156.90	6,740.3	5,516.3	-6,843.6	2,568.8	7,308.7	4.93	4.92	-0.32



Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514662
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Grid	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514662	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514662	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	As Billed 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)
14,187.0	92.00	156.40	6,738.2	5,514.2	-6,901.4	2,593.7	7,371.7	0.85	0.32	-0.79
14,250.0	91.50	156.70	6,736.3	5,512.3	-6,959.2	2,618.8	7,434.6	0.93	-0.79	0.48
14,313.0	91.30	156.90	6,734.7	5,510.7	-7,017.1	2,643.6	7,497.6	0.45	-0.32	0.32
14,376.0	90.70	156.30	6,733.6	5,509.6	-7,074.9	2,668.6	7,560.5	1.35	-0.95	-0.95
14,439.0	90.40	156.10	6,733.0	5,509.0	-7,132.5	2,694.0	7,623.5	0.57	-0.48	-0.32
14,502.0	89.30	154.00	6,733.2	5,509.2	-7,189.6	2,720.6	7,686.3	3.76	-1.75	-3.33
14,565.0	89.40	153.90	6,733.9	5,509.9	-7,246.2	2,748.3	7,749.1	0.22	0.16	-0.16
14,629.0	89.10	153.70	6,734.8	5,510.8	-7,303.6	2,776.5	7,812.9	0.56	-0.47	-0.31
14,692.0	88.70	153.20	6,736.0	5,512.0	-7,360.0	2,804.7	7,875.7	1.02	-0.63	-0.79
14,755.0	88.70	153.80	6,737.4	5,513.4	-7,416.4	2,832.8	7,938.4	0.95	0.00	0.95
14,818.0	89.10	155.10	6,738.6	5,514.6	-7,473.4	2,859.5	8,001.3	3.70	0.63	3.65
14,881.0	88.50	154.20	6,739.9	5,515.9	-7,530.6	2,885.9	8,064.2	3.16	-0.95	-3.02
14,944.0	88.80	154.50	6,741.4	5,517.4	-7,587.3	2,913.2	8,127.0	0.67	0.48	0.48
15,007.0	89.80	155.40	6,742.2	5,518.2	-7,644.4	2,939.9	8,189.9	2.14	1.59	1.43
15,070.0	90.50	155.70	6,742.0	5,518.0	-7,701.8	2,965.9	8,252.8	1.21	1.11	0.48
15,133.0	90.60	156.30	6,741.4	5,517.4	-7,759.3	2,991.6	8,315.7	0.97	0.16	0.95
15,195.0	90.10	155.30	6,741.0	5,517.0	-7,815.9	3,017.0	8,377.7	1.80	-0.81	-1.61
15,258.0	89.70	154.30	6,741.1	5,517.1	-7,872.9	3,043.8	8,440.5	1.71	-0.63	-1.59
15,321.0	89.10	153.10	6,741.8	5,517.8	-7,929.3	3,071.7	8,503.3	2.13	-0.95	-1.90
15,383.0	89.00	153.80	6,742.8	5,518.8	-7,984.8	3,099.4	8,565.1	1.14	-0.16	1.13
15,446.0	89.10	152.90	6,743.9	5,519.9	-8,041.1	3,127.7	8,627.8	1.44	0.16	-1.43
15,509.0	89.20	151.80	6,744.8	5,520.8	-8,096.9	3,156.9	8,690.5	1.75	0.16	-1.75
Final Survey=15547' MD/6746' TVD										
15,547.0	90.20	152.50	6,745.0	5,521.0	-8,130.5	3,174.7	8,728.2	3.21	2.63	1.84
Projection to TD=15598' MD/6745' TVD										
15,598.0	90.20	152.50	6,744.8	5,520.8	-8,175.7	3,198.2	8,779.0	0.00	0.00	0.00

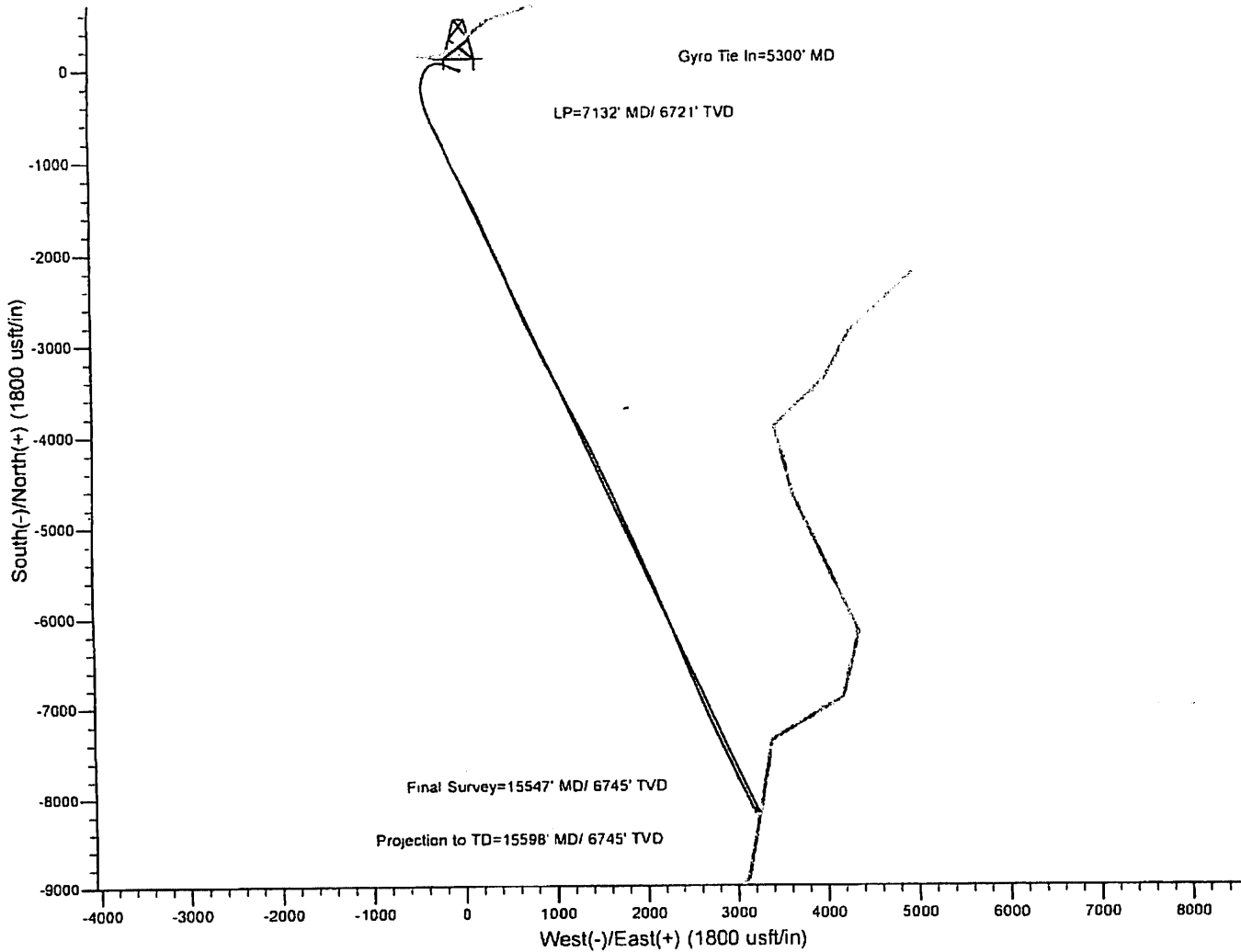
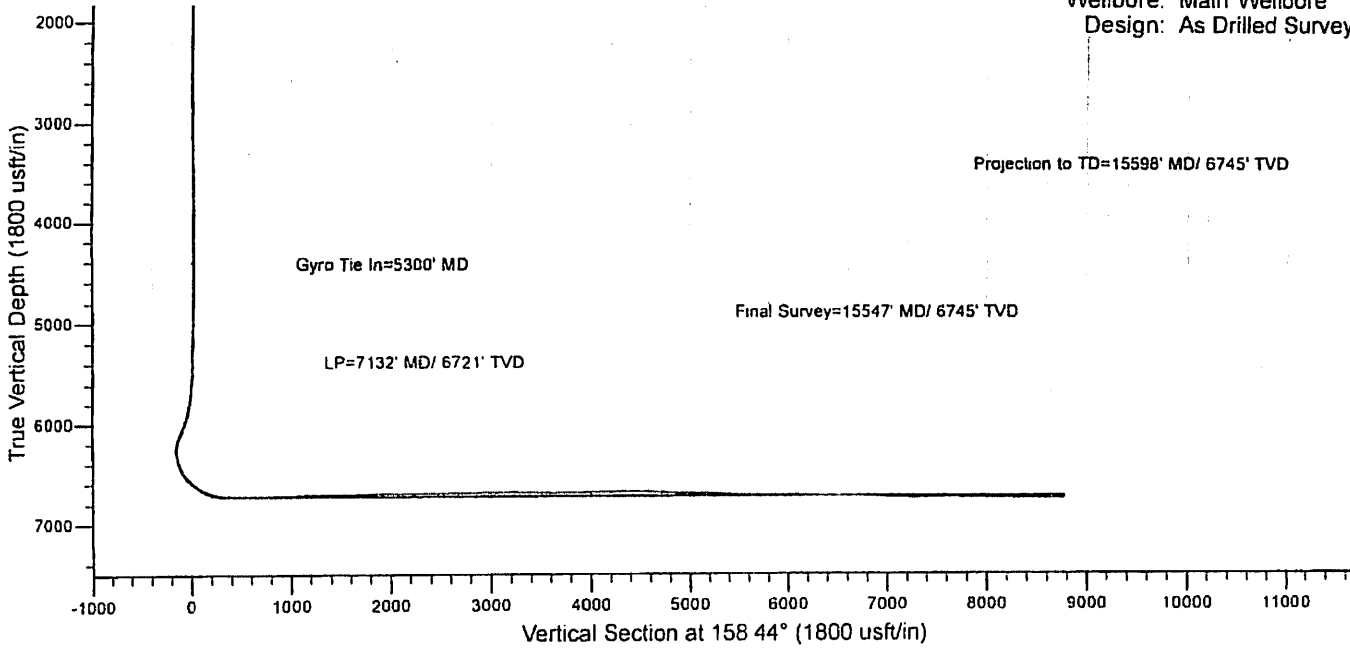
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,300.0	5,299.5	-17.6	-9.2	Gyro Tie in=5300' MD
7,132.0	6,721.3	-498.7	-351.4	LP=7132' MD/ 6721' TVD
15,547.0	6,745.0	-8,130.5	3,174.7	Final Survey=15547' MD/ 6745' TVD
15,598.0	6,744.8	-8,175.7	3,198.2	Projection to TD=15598' MD/ 6745' TVD

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



# EQT Production - Marcellus

Project: Doddridge County, WV Grid  
Site: Doddridge County 514662  
Well: Well #514662  
Wellbore: Main Wellbore  
Design: As Drilled Surveys





**514662 - 47-017-06386-0000 - 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/other (units)
Initiation Sleeve	3/2/2015	11.1	6,325	7,590	4,766	0	846	0
1	3/2/2015	78.2	8,418	8,758	4,932	299,332	12,377	0
2	3/3/2015	100.0	8,480	8,741	5,691	300,797	7,975	0
3	3/3/2015	100.0	8,480	8,682	4,531	296,815	7,957	0
4	3/3/2015	92.8	8,499	8,691	4,885	297,229	7,714	0
5	3/3/2015	93.6	8,435	8,635	5,092	300,844	7,777	0
6	3/3/2015	91.1	8,321	8,659	5,144	298,150	7,824	0
7	3/4/2015	90.7	8,330	8,773	4,789	296,239	8,212	0
8	3/6/2015	90.2	8,412	8,687	5,319	297,626	9,961	0
9	3/6/2015	94.5	8,471	8,741	5,259	298,694	8,021	0
10	3/7/2015	91.4	8,511	9,425	5,313	299,157	7,942	0
11	3/7/2015	91.2	8,474	8,924	5,326	299,500	7,432	0
12	3/7/2015	92.8	8,325	8,749	5,121	297,635	7,541	0
13	3/7/2015	91.7	8,218	8,549	5,277	299,948	7,843	0
14	3/8/2015	99.9	8,371	8,706	5,449	299,394	8,146	0
15	3/8/2015	96.3	8,513	9,057	5,576	301,232	8,968	0
16	3/8/2015	99.0	8,149	8,515	5,062	303,028	7,625	0
17	3/8/2015	97.0	8,298	9,146	5,381	305,445	7,716	0
18	3/9/2015	98.5	8,225	8,741	5,040	298,624	7,598	0
19	3/9/2015	98.6	8,337	8,670	5,221	300,265	7,528	0
20	3/9/2015	99.0	8,445	8,739	5,133	301,065	7,498	0
21	3/9/2015	99.7	8,267	8,921	4,988	300,771	7,381	0
22	3/10/2015	100.4	8,315	8,553	5,330	299,570	7,615	0
23	3/10/2015	99.6	8,198	8,561	4,111	300,560	7,054	0
24	3/10/2015	94.6	8,428	9,164	4,618	237,417	6,962	0
25	3/10/2015	99.8	8,210	8,563	4,274	307,129	7,544	0
26	3/11/2015	100.0	8,121	8,375	4,826	300,449	7,244	0
27	3/11/2015	100.7	7,971	8,394	4,887	295,337	7,446	0
28	3/11/2015	101.2	7,917	8,168	4,515	298,287	7,497	0
29	3/11/2015	100.0	7,895	8,254	5,107	300,058	7,273	0
30	3/11/2015	101.3	7,890	8,240	4,594	302,120	7,142	0
31	3/12/2015	101.2	7,637	8,049	5,025	306,421	7,690	0
32	3/12/2015	102.0	7,645	8,143	4,765	299,695	7,346	0
33	3/12/2015	99.9	7,568	7,812	4,834	298,849	7,215	0
34	3/12/2015	100.4	7,641	8,002	5,209	302,893	7,619	0
35	3/12/2015	100.6	7,958	8,328	5,244	304,921	6,979	0
36	3/13/2015	100.4	7,763	8,049	4,967	303,022	7,085	0
37	3/13/2015	100.4	7,800	8,323	5,054	302,410	7,346	0
38	3/13/2015	74.6	8,195	9,301	5,090	5,442	3,347	0
38.1	3/13/2015	99.9	7,638	8,600	5,189	302,176	7,497	0
39	3/13/2015	100.3	7,426	8,067	5,014	300,947	7,092	0
40	3/14/2015	98.0	7,263	7,605	4,995	304,104	7,155	0
41	3/14/2015	100.2	7,386	8,879	4,882	300,848	6,756	0
42	3/14/2015	100.9	7,489	8,222	4,821	298,629	7,015	0
43	3/14/2015	99.9	7,494	8,811	4,842	301,561	7,228	0
44	3/14/2015	99.9	7,505	8,811	4,667	299,481	7,439	0
45	3/14/2015	100.6	7,667	7,908	4,909	298,635	7,555	0
46	3/15/2015	101.0	7,217	8,001	4,520	297,261	6,871	0
47	3/15/2015	99.0	7,154	7,480	4,668	299,708	6,974	0

**514662 - 47-017-06386-0000 - 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	1/29/2015	15,596.00	15,598.00	10	MARCELLUS
1	3/2/2015	15,453.00	15,511.00	28	MARCELLUS
2	3/2/2015	15,271.00	15,391.00	42	MARCELLUS
3	3/3/2015	15,091.00	15,211.00	42	MARCELLUS
4	3/3/2015	14,911.00	15,033.00	42	MARCELLUS
5	3/3/2015	14,731.00	14,853.00	42	MARCELLUS
6	3/3/2015	14,551.00	14,673.00	42	MARCELLUS
7	3/3/2015	14,371.00	14,493.00	42	MARCELLUS
8	3/5/2015	14,191.00	14,313.00	42	MARCELLUS
9	3/6/2015	14,011.00	14,133.00	42	MARCELLUS
10	3/7/2015	13,831.00	13,953.00	42	MARCELLUS
11	3/7/2015	13,651.00	13,773.00	42	MARCELLUS
12	3/7/2015	13,471.00	13,598.00	42	MARCELLUS
13	3/7/2015	13,291.00	13,413.00	42	MARCELLUS
14	3/8/2015	13,111.00	13,233.00	42	MARCELLUS
15	3/8/2015	12,931.00	13,053.00	42	MARCELLUS
16	3/8/2015	12,751.00	12,873.00	42	MARCELLUS
17	3/8/2015	12,571.00	12,693.00	42	MARCELLUS
18	3/9/2015	12,391.00	12,513.00	42	MARCELLUS
19	3/9/2015	12,211.00	12,333.00	42	MARCELLUS
20	3/9/2015	12,031.00	12,157.00	42	MARCELLUS
21	3/9/2015	11,851.00	11,973.00	42	MARCELLUS
22	3/9/2015	11,674.00	11,793.00	42	MARCELLUS
23	3/10/2015	11,491.00	11,613.00	42	MARCELLUS
24	3/10/2015	11,311.00	11,433.00	42	MARCELLUS
25	3/10/2015	11,131.00	11,253.00	42	MARCELLUS
26	3/10/2015	10,951.00	11,073.00	42	MARCELLUS
27	3/11/2015	10,771.00	10,893.00	42	MARCELLUS
28	3/11/2015	10,593.00	10,713.00	42	MARCELLUS
29	3/11/2015	10,411.00	10,533.00	42	MARCELLUS
30	3/11/2015	10,231.00	10,353.00	42	MARCELLUS
31	3/12/2015	10,051.00	10,173.00	42	MARCELLUS
32	3/12/2015	9,871.00	9,993.00	42	MARCELLUS
33	3/12/2015	9,691.00	9,817.00	42	MARCELLUS
34	3/12/2015	9,511.00	9,633.00	42	MARCELLUS
35	3/13/2015	9,331.00	9,451.00	42	MARCELLUS
36	3/13/2015	9,151.00	9,273.00	42	MARCELLUS
37	3/13/2015	8,971.00	9,093.00	42	MARCELLUS
38	3/13/2015	8,791.00	8,913.00	42	MARCELLUS
38.1	3/13/2015	8,791.00	8,913.00	42	MARCELLUS
39	3/14/2015	8,611.00	8,733.00	42	MARCELLUS
40	3/14/2015	8,431.00	8,553.00	42	MARCELLUS
41	3/14/2015	8,251.00	8,373.00	42	MARCELLUS
42	3/14/2015	8,071.00	8,193.00	42	MARCELLUS
43	3/14/2015	7,891.00	8,015.00	42	MARCELLUS
44	3/14/2015	7,713.00	7,832.00	42	MARCELLUS
45	3/14/2015	7,531.00	7,653.00	42	MARCELLUS
46	3/14/2015	7,351.00	7,473.00	42	MARCELLUS
47	3/15/2015	7,174.00	7,293.00	42	MARCELLUS

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	3/2/2015
Job End Date	3/15/2015
State	West Virginia
County	Doddridge
API Number	47-017-06386-00-00
Operator Name	EQT Production
Well Name and Number	514662
Longitude	-80.76330100
Latitude	39.25562800
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	6,745
Total Base Water Volume (gal)	15,282,456
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	89.74040	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	9.89339	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05680	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02545	None
FRW-600	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02000	None
			Ammonium acetate	631-61-8	6.00000	0.00400	None
CI-150	FTS International	Acid Corrosion Inhibitor	Isopropanol	67-63-0	30.00000	0.00726	None
			Dimethylformamide	68-12-2	10.00000	0.00243	None
			Ethylene glycol	107-21-1	30.00000	0.00009	None
			Organic amine resin salt	Proprietary	30.00000	0.00009	None
			Aromatic aldehyde	Proprietary	10.00000	0.00003	None

B-10	FTS International	High pH buffer	Quaternary ammonium compound	Proprietary	10.00000	0.00003	None					
			Potassium carbonate	584-08-7	48.00000	0.00424	None					
			Potassium hydroxide	1310-58-3	20.00000	0.00177	None					
CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10.00000	0.00243	None					
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00027	None					
			Guar gum	9000-30-0	50.00000	0.00024	None					
			Surfactant	68439-51-0	2.00000	0.00001	None					
			Clay	14808-60-7	2.00000	0.00001	None					
APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95.00000	0.00029	None					
FE-100L	FTS International	Iron control	Citric acid	77-92-9	55.00000	0.00017	None					
NE-100	FTS International	Non-emulsifier	2-Butoxyethanol	1111-76-2	10.00000	0.00010	None					
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001	None					
			2-Propanol	67-63-0	10.00000	0.00000	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 ]

**Hydraulic Fracturing**  
DISCLOSURE



Please use the FracFocus XML submission process or create disclosures online.

**FIND A WELL BY STATE**

**ABOUT PROJECT PARTNERS**

(Note: Clicking the FracFocus, FIND A WELL links will open a new window.)

**Prepare Disclosure for FracFocus Submission**

[Disclosure Lists](#) | [Dashboard](#)

Disclosure has been submitted.

Note: This window expires with 10 minutes of inactivity. After that you will be taken back to the dashboard.

**Hydraulic Fracturing Data**

Job Start Date 3/2/2015	Job End Date 3/15/2015	API Number 47-017-06386-00-00	State & County West Virginia --- Doddridge
Well Name 514662			
Longitude -80.763301	Latitude 39.255628	Datum NAD83	Federal/Tribal Well?
True Vertical Depth (ft) 6745	Total Water Vol (gal) 15282456	Total Non Water Vol 0	Total Mass (lbs) 142111193



**MSDS Chemical Ingredients**

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<input type="button" value="Edit"/>	Water	FTS International	Carrier/Base Fluid	Water	7732-18-5	100%	89.7410630683%	None	127532095.32
<input type="button" value="Edit"/>	Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100%	9.8927605244%	None	14058720
<input type="button" value="Edit"/>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0568046578%	None	80725.777
<input type="button" value="Edit"/>	Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15%	.0254470156%	None	36163.058
<input type="button" value="Edit"/>	FRW-600	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30%	.0199974258%	None	28418.58
<input type="button" value="Edit"/>	CI-150	FTS International	Acid Corrosion Inhibitor	Ammonium acetate	631-61-8	6%	.0039994852%	None	5683.716
				Isopropanol	67-63-0	30%	.0072716014%	None	10333.76
				Dimethylformamide	68-12-2	10%	.0024238671%	None	3444.587
				Organic amine resin salt	Proprietary	30%	.0000906897%	None	128.88
				Ethylene glycol	107-21-1	30%	.0000906897%	None	128.88

			Aromatic aldehyde	Proprietary	10%	.0000302299%	None	42.96
			Quaternary ammonium compound	Proprietary	10%	.0000302299%	None	42.96
<input type="button" value="Edit"/>	B-10	FTS International	High pH buffer					
			Potassium carbonate	584-08-7	48%	.0042376417%	None	6022.163
			Potassium hydroxide	1310-58-3	20%	.0017656841%	None	2509.235
<input type="button" value="Edit"/>	CS-500-SI	FTS International	Scale inhibitor					
			Ethylene glycol	107-21-1	10%	.0024238671%	None	3444.587
<input type="button" value="Edit"/>	HVG-1	FTS International	Gelling agent					
			Petroleum distillate	64742-47-8	55%	.0002673375%	None	379.917
			Guar gum	9000-30-0	50%	.0002430341%	None	345.379
			Surfactant	68439-51-0	2%	.0000097214%	None	13.815
			Clay	14808-60-7	2%	.0000097214%	None	13.815
<input type="button" value="Edit"/>	APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95%	.000287184%	None	408.121
<input type="button" value="Edit"/>	FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55%	.0001662644%	None	236.28
<input type="button" value="Edit"/>	NE-100	FTS International	Non-emulsifier					
			2-Butoxyethanol	111-76-2	10%	.0001049766%	None	149.184
			Dodecylbenzenesulfonic acid	27176-87-0	5%	.0000142429%	None	20.241
			2-Propanol	67-63-0	10%	.0000007037%	None	1

**Non-MSDS Chemical Ingredients**

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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# EQT PRODUCTION COMPANY LEEMAN MAXWELL LEASE 1000 ACRES± WELL NO. WV 514662

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

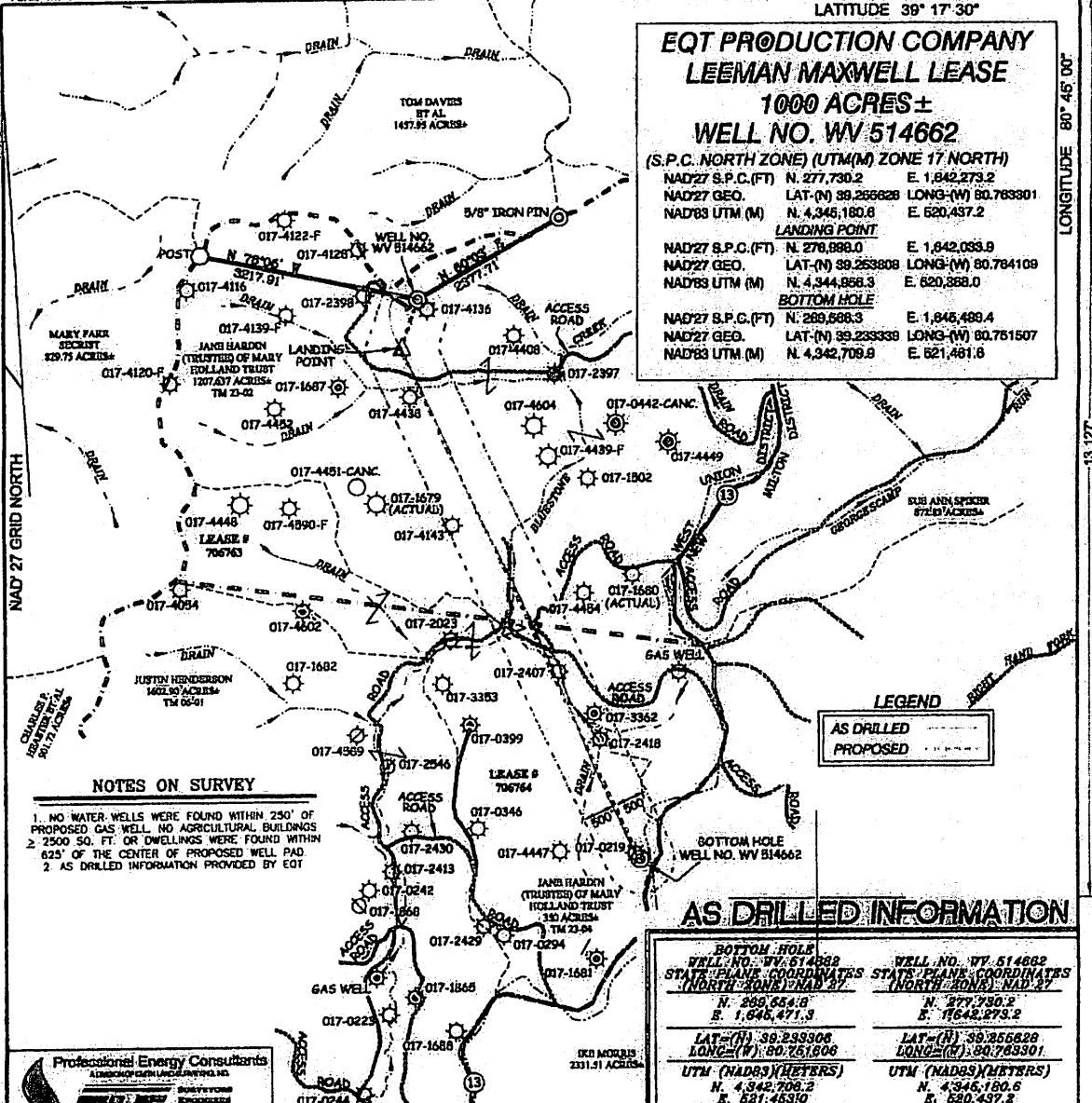
NAD27 S.P.C.(FT)	N. 277,730.2	E. 1,642,273.2
NAD27 GEO.	LAT-(N) 39.293908	LONG-(W) 80.763301
NAD83 UTM (M)	N. 4,345,180.6	E. 620,437.2

**LANDING POINT**

NAD27 S.P.C.(FT)	N. 278,889.0	E. 1,642,083.9
NAD27 GEO.	LAT-(N) 39.263808	LONG-(W) 80.764109
NAD83 UTM (M)	N. 4,344,868.3	E. 620,368.0

**BOTTOM HOLE**

NAD27 S.P.C.(FT)	N. 269,688.3	E. 1,645,489.4
NAD27 GEO.	LAT-(N) 39.233339	LONG-(W) 80.761507
NAD83 UTM (M)	N. 4,342,709.9	E. 621,461.6



### 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

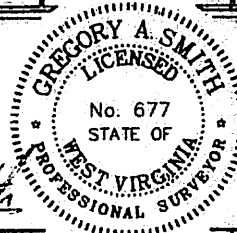
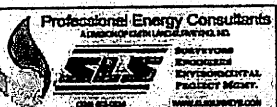
**LEGEND**

AS DRILLED (solid line)

PROPOSED (dashed line)

### AS DRILLED INFORMATION

<b>BOTTOM HOLE</b>	
WELL NO. WV 514662	WELL NO. WV 514662
STATE PLANE COORDINATES (NORTH ZONE) NAD 27	STATE PLANE COORDINATES (NORTH ZONE) NAD 27
N. 269,688.3	N. 277,730.2
E. 1,645,471.9	E. 1,642,273.2
LAT-(N) 39.233308	LAT-(N) 39.263808
LONG-(W) 80.761808	LONG-(W) 80.763301
UTM (NAD83) (METERS)	UTM (NAD83) (METERS)
N. 4,342,709.2	N. 4,345,180.6
E. 621,463.0	E. 620,437.2



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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.  
677 *Gregory A. Smith*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE OCTOBER 1 20 13

REVISED 02/25/14 & 10/29/14

OPERATORS WELL NO. WV 514662


API WELL NO. 47

STATE            COUNTY            PERMIT           

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8051ASDRILLED514662

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE-TIE TO CORS NETWORK) SCALE 1" = 2,000'

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 1,224 (GROUND) 1,208 (PROPOSED) WATERSHED BLUESTONE CREEK

DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE WEST UNION 7.5'

SURFACE OWNER JANE HARDIN (TRUSTEE) OF MARY HOLLAND TRUST ACREAGE 1207.637±

ROYALTY OWNER LEEMAN MAXWELL HEIRS (1000 AC.±) (2184 AC.±)

PROPOSED WORK: LEASE NO. 706783 / 706764

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 6681'

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 WEST UNION PERMIT