

# APPROVED

NAME: *Jul Flunk*

DATE: *1/27/16*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514661

API: 47 - 017 - 06381

Submission:  Initial  Amended

Notes: Flowback complete

Correction to Production Cement Top  
(MD)

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 - 06381 County Doddridge District West Union  
Quad West Union 7.5' Pad Name WEU51 Field/Pool Name \_\_\_\_\_  
Farm name Jane Hardin Trustee/Mary Well Number 514661  
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 4,345,177 Easting 520,439  
Landing Point of Curve Northing 4,344,949 Easting 520,073  
Bottom Hole Northing 4,342,344 Easting 521,342

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 11/04/2014  
Date completion activities began 2/9/2015 Date completion activities ceased 3/1/2015  
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 - 06381 Farm name Jane Hardin Trustee/Mary Well number 514661

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/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"	1,129'	New	54.5#/ft	301', 877'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	5,291'	New	40#/ft	3190', 4503'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	17,682'	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	965	15.6	1.19	1225.7	0	8
Coal							
Intermediate 1	Class A	373/337/1165	14.2/15.6/15.6	1.26/1.18/1.18	2251.62	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	450/1295	14.2/15.2	1.26/1.97	3118.15	4,207'	72
Tubing							

Drillers TD (ft) 17,682' Loggers TD (ft) N/A  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,500'

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', 3808', 3500', 3107', 2869', 2301', 1821', 1287', 814', 333'

Production- Composite bodied centralizers on every joint from TD up to 5,025'

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 - 06381 Farm name Jane Hardin Trustee/Mary Well number 514661

PERFORATION RECORD

Stage No	Perforation date	Perforated from MD ft	Perforated to MD ft	Number of Perforations	Formation(s)
					Please See Attached

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No	Stimulations 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)
						Please	See	Attached

Please insert additional pages as applicable.

API 47- 017 - 06381 Farm name Jane Hardin Trustee/Mary Well number 514661

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6,675'</u>	<u>TVD</u>	<u>7,677'</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump  
 SHUT-IN PRESSURE Surface 2,163 psi Bottom Hole N/A psi DURATION OF TEST 138.5 hrs  
 OPEN FLOW Gas 12,073 mcfpd Oil 0 bpd NGL 39.0 bpd Water 1,619.3 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

<u>LITHOLOGY/ FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H<sub>2</sub>S, ETC)</u>
	<u>DEPTH IN FT NAME TVD</u>	<u>DEPTH IN FT TVD</u>	<u>DEPTH IN FT MD</u>	<u>DEPTH IN FT MD</u>	
	<u>0</u>		<u>0</u>		

Please insert additional pages as applicable.

Drilling Contractor Alpha Hunter 4  
 Address 28407 State Route 7 City Marietta State OH Zip 45750  
 Logging Company Hoss Co. Services LLC  
 Address 814 Trotters Lane City Charleston State WV Zip 25312  
 Cementing Company Nabors  
 Address 380 Southpointe Boulevard Suite 210 City Canonsburg State PA Zip 15317  
 Stimulating Company FTSI  
 Address 301 E 18th Street City Cisco State TX Zip 76437

Please insert additional pages as applicable.

Completed by Brad Maddox Telephone 412-395-7053  
 Signature *Brad Maddox* Title Director of Drilling Date 12/9/2015

API 47- 017 - 06381

Drilling Contractor: Savanna Drilling

Address: 2204 Timberloch Place Suite 230

City: Woodlands

State: TX

Zip: 77380

02/05/2016

API 47- 017 - 06381

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	5,130
ALEXANDER	5,131	5,130	6,750	6,314
SONYEA	6,750	6,314	7,087	6,456
MIDDLESEX	7,087	6,456	7,207	6,508
GENESEE	7,207	6,508	7,405	6,594
GENESEO	7,405	6,594	7,488	6,624
TULLY	7,488	6,624	7,583	6,650
HAMILTON	7,583	6,650	7,677	6,675
MARCELLUS	7,677	6,675	17,682	6,753

02/05/2016



## **EQT Production - Marcellus**

Doddridge County, WV Grid

Doddridge County 514661

Well #514661

Main Wellbore

Design: As Drilled Surveys

## **Standard Survey Report**

03 November, 2014



Where energy meets innovation.





Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514661
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	KB @ 1224.0usft
<b>Project:</b>	Doddridge County, WV Gnd	<b>MD Reference:</b>	KB @ 1224.0usft
<b>Site:</b>	Doddridge County 514661	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514661	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	As Drilled Surveys		

**Project** Doddridge County, WV Grid

<b>Map System:</b>	US State Plans 1927 (Exac solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	West Virginia North 4701		Using geodetic scale factor

**Site** Doddridge County 514661

<b>Site Position:</b>		<b>Northing:</b>	277,717.00 usft	<b>Latitude:</b>	39.26
<b>From:</b>	Map	<b>Easting:</b>	1,642,280.20 usft	<b>Longitude:</b>	-80.76
<b>Position Uncertainty:</b>	0 0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.81 "

**Well** Well #514661

<b>Well Position</b>	+N/-S	0 0 usft	<b>Northing:</b>	277 717 00 usft	<b>Latitude:</b>	39° 15' 20.131 N
	+E/-W	0 0 usft	<b>Easting:</b>	1 642 280 20 usft	<b>Longitude:</b>	8 45' 47.791 W
<b>Position Uncertainty</b>		0 0 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1 208 0 usft

**Wellbore** Main Wellbore

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/13/2014	-8.49	66.75	52,234

**Design** As Drilled Surveys

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	163.29

**Survey Program** Date 11/3/2014

From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
0 00	5,450.0	514661 Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0 00	17,682.0	514661 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 19	291 63	100 0	-1 124 0	0 1	-0 2	-0 1	0 19	0 19	0 00
200 0	0 17	178 60	200 0	-1 024 0	0 0	-0 3	-0 1	0 30	-0 02	-113 03
300 0	0 15	157 58	300 0	-924 0	-0 3	-0 3	0 2	0 06	-0 02	-21 02
400 0	0 13	163 88	400 0	-824 0	-0 5	-0 2	0 5	0 03	-0 02	6 30
500 0	0 10	134 99	500 0	-724 0	-0 7	-0 1	0 6	0 06	-0 03	-28 89
600 0	0 11	113 88	600 0	-624 0	-0 8	0 1	0 8	0 04	0 01	-21 11
700 0	0 11	131 34	700 0	-524 0	-0 9	0 2	0 9	0 03	0 00	17 46



Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514661
<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 514661	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514661	<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)
800.0	0.05	110.28	800.0	-424.0	-1.0	0.4	1.0	0.06	-0.05	-21.06
900.0	0.05	57.30	900.0	-324.0	-1.0	0.4	1.1	0.05	-0.01	-52.98
1,000.0	0.07	38.55	1,000.0	-224.0	-0.9	0.5	1.0	0.03	0.02	-18.74
1,100.0	0.04	138.70	1,100.0	-124.0	-0.9	0.6	1.0	0.09	-0.03	100.14
1,200.0	0.30	83.39	1,200.0	-24.0	-0.9	0.9	1.1	0.28	0.26	-55.31
1,300.0	0.95	83.64	1,300.0	76.0	-0.8	1.9	1.3	0.65	0.65	0.25
1,400.0	1.17	89.16	1,400.0	176.0	-0.6	3.8	1.7	0.24	0.22	5.52
1,500.0	1.16	97.13	1,500.0	276.0	-0.8	5.8	2.4	0.16	-0.01	7.97
1,600.0	1.22	102.67	1,599.9	375.9	-1.1	7.9	3.3	0.13	0.06	5.54
1,700.0	1.23	106.24	1,699.9	475.9	-1.7	9.9	4.4	0.08	0.01	3.57
1,800.0	1.08	110.89	1,799.9	575.9	-2.3	11.8	5.6	0.18	-0.15	4.65
1,900.0	1.09	115.60	1,899.9	675.9	-3.0	13.6	6.8	0.09	0.01	4.71
2,000.0	1.05	119.40	1,999.9	775.9	-3.9	15.2	8.1	0.08	-0.04	3.80
2,100.0	1.03	118.20	2,099.8	875.8	-4.8	16.8	9.4	0.03	-0.02	-1.20
2,200.0	1.08	117.64	2,199.8	975.8	-5.6	18.4	10.7	0.05	0.05	-0.56
2,300.0	1.02	119.89	2,299.8	1,075.8	-6.5	20.1	12.0	0.07	-0.06	2.25
2,400.0	0.97	119.62	2,399.8	1,175.8	-7.4	21.6	13.3	0.05	-0.05	-0.27
2,500.0	0.99	123.38	2,499.8	1,275.8	-8.3	23.0	14.5	0.07	0.02	3.76
2,600.0	0.78	128.44	2,599.8	1,375.8	-9.2	24.3	15.8	0.22	-0.21	5.06
2,700.0	0.68	132.17	2,699.8	1,475.8	-10.0	25.2	16.8	0.11	-0.10	3.73
2,800.0	0.68	129.37	2,799.7	1,575.7	-10.8	26.1	17.8	0.03	0.00	-2.80
2,900.0	0.67	130.55	2,899.7	1,675.7	-11.5	27.0	18.8	0.02	-0.01	1.18
3,000.0	0.71	130.26	2,999.7	1,775.7	-12.3	28.0	19.8	0.04	0.04	-0.29
3,100.0	0.72	140.40	3,099.7	1,875.7	-13.2	28.8	20.9	0.13	0.01	10.14
3,200.0	0.74	149.47	3,199.7	1,975.7	-14.2	29.6	22.1	0.12	0.02	9.07
3,300.0	0.78	150.46	3,299.7	2,075.7	-15.4	30.2	23.4	0.04	0.04	0.99
3,400.0	0.77	153.17	3,399.7	2,175.7	-16.6	30.9	24.7	0.04	-0.01	2.71
3,500.0	0.75	158.30	3,499.7	2,275.7	-17.8	31.4	26.1	0.07	-0.02	5.13
3,600.0	0.76	155.00	3,599.7	2,375.7	-19.0	31.9	27.4	0.04	0.01	-3.30
3,700.0	0.85	164.30	3,699.7	2,475.7	-20.3	32.4	28.8	0.16	0.09	9.30
3,800.0	0.95	163.26	3,799.7	2,575.7	-21.8	32.9	30.3	0.10	0.10	-1.04
3,900.0	1.02	185.70	3,899.6	2,675.6	-23.5	33.0	32.0	0.39	0.07	22.44
4,000.0	1.03	194.65	3,999.6	2,775.6	-25.2	32.7	33.6	0.16	0.01	8.95
4,100.0	1.05	203.34	4,099.6	2,875.6	-27.0	32.1	35.0	0.16	0.02	8.69
4,200.0	1.02	211.04	4,199.6	2,975.6	-28.6	31.3	36.3	0.14	-0.03	7.70
4,300.0	1.09	225.66	4,299.6	3,075.6	-30.0	30.1	37.4	0.28	0.07	14.62
4,400.0	1.10	238.19	4,399.6	3,175.6	-31.2	28.6	38.1	0.24	0.01	12.53
4,500.0	1.15	244.49	4,499.5	3,275.5	-32.1	26.9	38.5	0.13	0.05	6.30
4,600.0	1.20	246.49	4,599.5	3,375.5	-32.9	25.1	38.8	0.06	0.05	2.00
4,700.0	1.09	260.94	4,699.5	3,475.5	-33.5	23.2	38.8	0.31	-0.11	14.45
4,800.0	1.04	270.88	4,799.5	3,575.5	-33.6	21.3	38.4	0.19	-0.05	9.94
4,900.0	1.04	281.62	4,899.5	3,675.5	-33.4	19.5	37.6	0.19	0.00	10.74



Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Dr	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514661
<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 514661	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514661	<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	1.22	280.81	4,999.4	3,775.4	-33.1	17.6	36.7	0.18	0.18	-0.81
5,100.0	1.03	283.74	5,099.4	3,875.4	-32.7	15.7	35.8	0.20	-0.19	2.93
5,200.0	1.15	281.97	5,199.4	3,975.4	-32.2	13.8	34.8	0.12	0.12	-1.77
5,300.0	1.43	284.56	5,299.4	4,075.4	-31.7	11.6	33.7	0.29	0.28	2.59
5,400.0	1.87	295.41	5,399.3	4,175.3	-30.7	8.9	32.0	0.54	0.44	10.85

Cym Tie In=6460' MD

5,450.0	1.91	295.40	5,449.3	4,225.3	-30.0	7.4	30.9	0.08	0.08	-0.02
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KOP=6600' MD

5,500.0	2.89	304.01	5,499.3	4,275.3	-28.9	5.6	29.3	2.08	1.96	17.23
5,545.0	3.80	307.90	5,544.2	4,320.2	-27.4	3.5	27.2	2.08	2.02	8.64
5,577.0	6.90	303.60	5,576.1	4,352.1	-25.7	1.1	24.9	9.76	9.69	-13.44
5,608.0	10.00	300.10	5,606.7	4,382.7	-23.3	-2.8	21.5	10.13	10.00	-11.29
5,640.0	12.70	295.90	5,638.1	4,414.1	-20.3	-8.4	17.1	8.82	8.44	-13.13
5,671.0	15.10	290.30	5,668.2	4,444.2	-17.5	-15.2	12.3	8.87	7.74	-18.06
5,702.0	16.90	285.90	5,698.0	4,474.0	-14.8	-23.3	7.5	7.00	5.81	-14.19
5,734.0	19.20	283.80	5,728.4	4,504.4	-12.3	-32.9	2.3	7.47	7.19	-6.56
5,765.0	21.10	284.30	5,757.5	4,533.5	-9.7	-43.3	-3.2	6.15	6.13	1.61
5,797.0	23.90	285.30	5,787.1	4,563.1	-6.6	-55.1	-9.6	8.83	8.75	3.13
5,828.0	26.90	286.50	5,815.1	4,591.1	-2.9	-67.9	-16.7	9.82	9.68	3.87
5,860.0	30.50	286.30	5,843.1	4,619.1	1.4	-82.6	-25.1	11.25	11.25	-0.63
5,891.0	33.10	286.10	5,869.5	4,645.5	6.0	-98.3	-34.0	8.39	8.39	-0.65
5,923.0	34.50	285.40	5,896.1	4,672.1	10.8	-115.5	-43.5	4.54	4.38	-2.19
5,954.0	35.90	285.40	5,921.4	4,697.4	15.6	-132.7	-53.0	4.52	4.52	0.00
5,985.0	37.00	286.60	5,946.3	4,722.3	20.6	-150.4	-63.0	4.23	3.55	3.87
6,017.0	38.40	287.20	5,971.6	4,747.6	26.3	-169.1	-73.8	4.52	4.38	1.88
6,049.0	40.20	288.10	5,996.4	4,772.4	32.5	-188.4	-85.3	5.90	5.63	2.81
6,080.0	42.50	287.50	6,019.7	4,795.7	38.7	-207.9	-96.9	7.53	7.42	-1.94
6,112.0	45.10	287.50	6,042.8	4,818.8	45.4	-229.0	-109.3	8.13	8.13	0.00
6,143.0	48.40	287.20	6,064.0	4,840.0	52.1	-250.6	-122.0	10.67	10.65	-0.97
6,174.0	51.40	287.50	6,084.0	4,860.0	59.2	-273.2	-135.2	9.71	9.68	0.97
6,206.0	54.30	287.80	6,103.3	4,879.3	66.9	-297.5	-149.6	9.09	9.06	0.94
6,238.0	56.60	287.50	6,121.4	4,897.4	74.9	-322.6	-164.5	7.23	7.19	-0.94
6,270.0	58.10	286.10	6,138.7	4,914.7	82.7	-348.4	-179.4	5.96	4.69	-4.38
6,301.0	59.40	285.10	6,154.8	4,930.8	89.8	-374.0	-193.5	5.02	4.19	-3.23
6,333.0	62.20	285.30	6,170.4	4,946.4	97.1	-400.9	-208.3	8.77	8.75	0.63
6,365.0	65.60	285.20	6,184.5	4,960.5	104.7	-428.6	-223.5	10.63	10.63	-0.31
6,395.0	67.80	285.70	6,196.3	4,972.3	112.0	-455.2	-238.2	7.49	7.33	1.67
6,427.0	69.20	285.90	6,208.1	4,984.1	120.2	-483.8	-254.2	4.41	4.38	0.63
6,458.0	69.70	286.30	6,219.0	4,995.0	128.2	-511.7	-269.9	2.02	1.61	1.29
6,489.0	70.10	286.10	6,229.6	5,005.6	136.3	-539.7	-285.7	1.43	1.29	-0.65
6,553.0	70.90	285.90	6,251.0	5,027.0	153.0	-597.7	-318.3	1.28	1.25	-0.31
6,616.0	71.50	285.30	6,271.3	5,047.3	169.0	-655.1	-350.2	1.31	0.95	-0.95
6,679.0	72.30	285.20	6,290.8	5,066.8	184.7	-712.9	-381.9	1.28	1.27	-0.16



Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514661
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1224.0usft
Project:	Doddridge County, WV Grd	MD Reference:	KB @ 1224.0usft
Site:	Doddridge County 514661	North Reference:	Grd
Well:	Well #514661	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	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)
6,710.0	71.10	282.90	6,300.6	5,076.6	191.9	-741.4	-396.9	8.04	-3.87	-7.42
6,742.0	69.30	278.80	6,311.4	5,087.4	197.6	-771.0	-410.9	13.30	-5.63	-12.81
6,773.0	67.90	275.20	6,322.7	5,098.7	201.1	-799.6	-422.5	11.72	-4.52	-11.61
6,805.0	67.00	272.20	6,335.0	5,111.0	203.0	-829.1	-432.8	9.10	-2.81	-9.38
6,837.0	66.40	268.60	6,347.7	5,123.7	203.2	-858.5	-441.4	10.50	-1.88	-11.25
6,868.0	66.40	265.00	6,360.1	5,136.1	201.6	-886.9	-448.1	10.64	0.00	-11.61
6,900.0	65.90	261.80	6,373.0	5,149.0	198.2	-915.9	-453.2	9.28	-1.56	-10.00
6,931.0	65.20	258.50	6,385.9	5,161.9	193.4	-943.7	-456.6	9.95	-2.26	-10.65
6,963.0	64.40	255.90	6,399.5	5,175.5	187.0	-972.0	-458.6	7.76	-2.50	-8.13
6,994.0	63.30	253.10	6,413.2	5,189.2	179.6	-998.8	-459.1	8.85	-3.55	-9.03
7,026.0	62.80	249.80	6,427.7	5,203.7	170.5	-1,025.8	-458.2	9.32	-1.56	-10.31
7,057.0	62.90	246.70	6,441.8	5,217.8	160.3	-1,051.4	-455.8	8.90	0.32	-10.00
7,089.0	63.00	243.70	6,456.4	5,232.4	148.3	-1,077.3	-451.8	8.36	0.31	-9.38
7,120.0	63.70	240.50	6,470.3	5,246.3	135.4	-1,101.8	-446.4	9.50	2.26	-10.32
7,152.0	64.30	237.80	6,484.3	5,260.3	120.6	-1,126.5	-439.4	7.81	1.88	-8.44
7,184.0	64.30	234.20	6,498.2	5,274.2	104.5	-1,150.4	-430.8	10.14	0.00	-11.25
7,215.0	64.10	231.30	6,511.7	5,287.7	87.6	-1,172.6	-421.0	8.45	-0.65	-9.35
7,247.0	64.10	227.40	6,525.7	5,301.7	68.9	-1,194.4	-409.3	10.96	0.00	-12.19
7,279.0	64.00	224.10	6,539.7	5,315.7	48.8	-1,215.0	-396.0	9.28	-0.31	-10.31
7,310.0	64.50	221.00	6,553.1	5,329.1	28.2	-1,233.9	-381.8	9.15	1.61	-10.00
7,342.0	64.30	218.30	6,567.0	5,343.0	6.0	-1,252.3	-365.8	7.63	-0.63	-8.44
7,374.0	65.00	215.00	6,580.7	5,356.7	-17.2	-1,269.6	-348.5	9.57	2.19	-10.31
7,405.0	66.00	211.60	6,593.5	5,369.5	-40.8	-1,285.0	-330.4	10.49	3.23	-10.97
7,437.0	66.10	208.30	6,606.0	5,382.0	-66.3	-1,299.7	-310.2	11.54	6.56	-10.31
7,468.0	70.00	205.20	6,617.1	5,393.1	-92.1	-1,312.8	-289.2	11.17	6.13	-10.00
LP=7487 MD/6823 TVD										
7,487.0	71.06	202.99	6,623.4	5,399.4	-108.5	-1,320.1	-275.6	12.29	5.58	-11.61
7,500.0	71.80	201.50	6,627.6	5,403.6	-119.9	-1,324.7	-266.0	12.29	5.69	-11.49
7,531.0	73.90	197.90	6,636.7	5,412.7	-147.8	-1,334.7	-242.2	13.00	6.77	-11.61
7,563.0	75.00	194.70	6,645.3	5,421.3	-177.4	-1,343.4	-216.3	10.23	3.44	-10.00
7,595.0	75.20	192.10	6,653.5	5,429.5	-207.4	-1,350.5	-189.6	7.88	0.63	-8.13
7,626.0	75.10	188.80	6,661.5	5,437.5	-236.9	-1,356.0	-162.9	10.29	-0.32	-10.65
7,657.0	75.20	185.20	6,669.4	5,445.4	-266.6	-1,359.6	-135.5	11.23	0.32	-11.61
7,689.0	75.30	183.10	6,677.6	5,453.6	-297.5	-1,361.9	-106.6	6.35	0.31	-6.56
7,721.0	75.50	180.20	6,685.6	5,461.6	-328.5	-1,362.8	-77.2	8.79	0.63	-9.06
7,752.0	77.60	177.10	6,692.8	5,468.8	-358.6	-1,362.0	-48.1	11.85	6.77	-10.00
7,784.0	80.70	174.70	6,698.9	5,474.9	-389.9	-1,359.8	-17.5	12.17	9.69	-7.50
7,815.0	84.70	172.70	6,702.8	5,478.8	-420.5	-1,356.4	12.8	14.40	12.90	-6.45
7,847.0	87.30	169.20	6,705.0	5,481.0	-452.0	-1,351.4	44.4	13.60	8.13	-10.94
7,878.0	87.80	166.00	6,706.4	5,482.4	-482.3	-1,344.7	75.3	10.44	1.61	-10.32
7,910.0	86.50	161.90	6,708.0	5,484.0	-513.0	-1,335.9	107.2	13.43	-4.06	-12.81
7,941.0	86.60	157.60	6,709.8	5,485.8	-542.0	-1,325.2	138.1	13.85	0.32	-13.87
7,973.0	87.40	154.00	6,711.5	5,487.5	-571.1	-1,312.1	169.8	11.51	2.50	-11.25



Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User D5	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514661
<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 514661	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514661	<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)
8,004.0	89.60	153.00	6,712.3	5,488.3	-598.9	-1,298.3	200.3	7.79	7.10	-3.23
8,067.0	90.50	153.00	6,712.2	5,488.2	-655.0	-1,269.7	262.3	1.43	1.43	0.00
8,130.0	90.90	152.50	6,711.5	5,487.5	-711.0	-1,240.8	324.2	1.02	0.63	-0.79
8,194.0	89.40	153.20	6,711.3	5,487.3	-767.9	-1,211.6	387.2	2.59	-2.34	1.09
8,257.0	89.20	154.60	6,712.1	5,488.1	-824.5	-1,183.9	449.3	2.24	-0.32	2.22
8,320.0	88.90	153.20	6,713.1	5,489.1	-881.1	-1,156.2	511.5	2.27	-0.48	-2.22
8,383.0	88.50	152.50	6,714.6	5,490.6	-937.1	-1,127.5	573.4	1.28	-0.63	-1.11
8,447.0	90.20	154.50	6,715.3	5,491.3	-994.4	-1,098.9	636.5	4.10	2.66	3.13
8,510.0	92.40	155.80	6,713.9	5,489.9	-1,051.5	-1,072.4	698.8	4.06	3.49	2.06
8,573.0	92.90	155.70	6,710.9	5,486.9	-1,108.9	-1,046.6	761.2	0.81	0.79	-0.16
8,636.0	92.70	154.10	6,707.9	5,483.9	-1,165.9	-1,019.9	823.5	2.56	-0.32	-2.54
8,699.0	92.40	153.00	6,705.1	5,481.1	-1,222.2	-991.9	885.5	1.81	-0.48	-1.75
8,763.0	92.40	155.10	6,702.4	5,478.4	-1,279.7	-963.9	948.6	3.28	0.00	3.28
8,826.0	91.70	155.70	6,700.1	5,476.1	-1,337.0	-937.7	1,011.0	1.46	-1.11	0.95
8,889.0	90.20	155.40	6,699.1	5,475.1	-1,394.3	-911.6	1,073.4	2.43	-2.38	-0.48
8,952.0	89.50	156.30	6,699.2	5,475.2	-1,451.8	-885.8	1,135.8	1.81	-1.11	1.43
9,016.0	89.50	156.30	6,699.8	5,475.8	-1,510.4	-860.1	1,199.4	0.00	0.00	0.00
9,079.0	89.30	155.50	6,700.5	5,476.5	-1,567.9	-834.4	1,261.8	1.31	-0.32	-1.27
9,142.0	89.00	155.90	6,701.4	5,477.4	-1,625.3	-808.5	1,324.3	0.79	-0.48	0.63
9,204.0	89.40	155.30	6,702.3	5,478.3	-1,681.8	-782.9	1,385.7	1.16	0.65	-0.97
9,267.0	91.50	156.90	6,701.8	5,477.8	-1,739.4	-757.3	1,448.2	4.19	3.33	2.54
9,330.0	91.60	156.10	6,700.1	5,476.1	-1,797.1	-732.2	1,510.7	1.28	0.16	-1.27
9,393.0	91.90	154.70	6,698.1	5,474.1	-1,854.4	-706.0	1,573.1	2.27	0.48	-2.22
9,456.0	92.10	154.30	6,695.9	5,471.9	-1,911.2	-678.9	1,635.3	0.71	0.32	-0.63
9,519.0	90.50	154.30	6,694.5	5,470.5	-1,968.0	-651.6	1,697.5	2.54	-2.54	0.00
9,583.0	89.60	153.90	6,694.5	5,470.5	-2,025.5	-623.6	1,760.7	1.54	-1.41	-0.63
9,646.0	89.40	152.80	6,695.0	5,471.0	-2,081.8	-595.4	1,822.8	1.77	-0.32	-1.75
9,709.0	89.50	153.40	6,695.6	5,471.6	-2,138.0	-566.9	1,884.8	0.97	0.16	0.95
9,772.0	90.90	154.30	6,695.4	5,471.4	-2,194.6	-539.1	1,946.9	2.64	2.22	1.43
9,835.0	91.70	156.10	6,694.0	5,470.0	-2,251.7	-512.7	2,009.3	3.13	1.27	2.86
9,898.0	92.00	156.90	6,691.9	5,467.9	-2,309.5	-487.6	2,071.8	1.36	0.48	1.27
9,961.0	92.00	156.00	6,689.7	5,465.7	-2,367.2	-462.4	2,134.3	1.43	0.00	-1.43
10,024.0	92.10	155.40	6,687.5	5,463.5	-2,424.6	-436.5	2,196.7	0.96	0.16	-0.95
10,087.0	92.40	154.30	6,685.0	5,461.0	-2,481.6	-409.8	2,259.0	1.81	0.48	-1.75
10,150.0	92.70	154.50	6,682.2	5,458.2	-2,538.3	-382.6	2,321.2	0.57	0.48	0.32
10,213.0	91.40	154.70	6,679.9	5,455.9	-2,595.2	-355.6	2,383.4	2.09	-2.06	0.32
10,275.0	90.40	152.50	6,679.0	5,455.0	-2,650.7	-328.0	2,444.5	3.90	-1.61	-3.55
10,338.0	90.20	151.30	6,678.6	5,454.6	-2,706.3	-298.3	2,506.3	1.93	-0.32	-1.90
10,401.0	90.60	151.60	6,678.2	5,454.2	-2,761.6	-268.2	2,567.9	0.79	0.63	0.48
10,464.0	90.90	152.90	6,677.4	5,453.4	-2,817.4	-238.9	2,629.7	2.12	0.48	2.06
10,528.0	90.70	150.40	6,676.5	5,452.5	-2,873.7	-208.5	2,692.4	3.92	-0.31	-3.91
10,591.0	89.40	151.10	6,676.4	5,452.4	-2,928.7	-177.7	2,753.9	2.34	-2.06	1.11



Phoenix Technology Services  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Site Doddridge County 514661
<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 514661	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #514661	<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)
10,653.0	89.60	151.80	6,677.0	5,453.0	-2,983.1	-148.1	2,814.6	1.17	0.32	1.13
10,716.0	90.40	152.50	6,677.0	5,453.0	-3,038.8	-118.7	2,876.4	1.69	1.27	1.11
10,779.0	91.20	152.20	6,676.1	5,452.1	-3,094.6	-89.4	2,938.2	1.36	1.27	-0.48
10,842.0	91.20	154.30	6,674.8	5,450.8	-3,150.9	-61.1	3,000.3	3.33	0.00	3.33
10,906.0	91.00	156.70	6,673.5	5,449.5	-3,209.1	34.6	3,063.7	3.76	-0.31	3.75
10,969.0	90.10	156.90	6,672.9	5,448.9	-3,267.0	-9.7	3,126.3	1.46	-1.43	0.32
11,032.0	89.50	157.80	6,673.2	5,449.2	-3,325.1	14.5	3,188.9	1.72	-0.95	1.43
11,095.0	90.50	159.50	6,673.2	5,449.2	-3,383.8	37.5	3,251.7	3.13	1.59	2.70
11,158.0	90.00	158.00	6,672.9	5,448.9	-3,442.5	60.3	3,314.5	2.51	-0.79	-2.38
11,221.0	87.40	155.60	6,674.3	5,450.3	-3,500.4	85.1	3,377.1	5.62	-4.13	-3.81
11,284.0	87.30	155.70	6,677.2	5,453.2	-3,557.7	111.0	3,439.4	0.22	-0.16	0.16
11,347.0	89.00	154.80	6,679.3	5,455.3	-3,614.9	137.4	3,501.8	3.05	2.70	-1.43
11,410.0	90.60	154.50	6,679.5	5,455.5	-3,671.8	164.4	3,564.1	2.58	2.54	-0.48
11,473.0	90.70	153.30	6,678.8	5,454.8	-3,728.4	192.1	3,626.2	1.91	0.16	-1.90
11,536.0	90.70	152.50	6,678.0	5,454.0	-3,784.5	220.8	3,688.2	1.27	0.00	-1.27
11,600.0	90.60	151.80	6,677.3	5,453.3	-3,841.1	250.7	3,751.0	1.10	-0.16	-1.09
11,663.0	90.90	153.00	6,676.4	5,452.4	-3,896.9	279.9	3,812.8	1.96	0.48	1.90
11,726.0	89.80	151.00	6,676.1	5,452.1	-3,952.5	309.4	3,874.6	3.62	-1.75	-3.17
11,789.0	89.60	150.20	6,676.4	5,452.4	-4,007.4	340.4	3,936.1	1.31	-0.32	-1.27
11,852.0	91.10	150.10	6,676.0	5,452.0	-4,062.0	371.7	3,997.4	2.39	2.38	-0.16
11,915.0	93.40	152.20	6,673.5	5,449.5	-4,117.2	402.1	4,059.0	4.94	3.65	3.33
11,979.0	93.10	154.00	6,669.9	5,445.9	-4,174.2	431.0	4,121.8	2.85	-0.47	2.81
12,042.0	92.50	155.70	6,666.8	5,442.8	-4,231.1	457.7	4,184.1	2.86	-0.95	2.70
12,105.0	91.30	156.80	6,664.7	5,440.7	-4,288.7	483.1	4,246.6	2.58	-1.90	1.75
12,168.0	89.70	158.10	6,664.2	5,440.2	-4,346.9	507.3	4,309.2	3.27	-2.54	2.06
12,231.0	89.50	159.40	6,664.6	5,440.6	-4,405.6	530.1	4,372.0	2.09	-0.32	2.06
12,294.0	89.70	160.40	6,665.1	5,441.1	-4,464.8	551.7	4,434.9	1.62	0.32	1.59
12,357.0	89.80	161.90	6,665.3	5,441.3	-4,524.4	572.1	4,497.9	2.39	0.16	2.38
12,420.0	89.90	161.20	6,665.5	5,441.5	-4,584.2	592.0	4,560.8	1.12	0.16	-1.11
12,484.0	90.50	160.20	6,665.3	5,441.3	-4,644.6	613.2	4,624.8	1.82	0.94	-1.56
12,544.0	90.90	160.40	6,664.5	5,440.5	-4,701.1	633.4	4,684.7	0.75	0.67	0.33
12,568.0	91.20	159.90	6,664.1	5,440.1	-4,723.6	641.6	4,708.6	2.43	1.25	-2.08
12,631.0	90.20	157.60	6,663.3	5,439.3	-4,782.3	664.4	4,771.4	3.98	-1.59	-3.65
12,694.0	89.60	156.90	6,663.4	5,439.4	-4,840.4	688.8	4,834.1	1.46	-0.95	-1.11
12,756.0	89.00	154.80	6,664.2	5,440.2	-4,897.0	714.1	4,895.6	3.52	-0.97	-3.39
12,819.0	88.90	154.40	6,665.4	5,441.4	-4,953.9	741.1	4,957.8	0.65	-0.16	-0.63
12,881.0	88.90	153.70	6,666.6	5,442.6	-5,009.6	768.3	5,019.0	1.13	0.00	-1.13
12,944.0	89.70	156.40	6,667.3	5,443.3	-5,066.7	794.8	5,081.3	4.47	1.27	4.29
13,008.0	89.90	156.00	6,667.5	5,443.5	-5,125.3	820.7	5,144.9	0.70	0.31	-0.63
13,071.0	89.10	154.10	6,668.1	5,444.1	-5,182.4	847.2	5,207.2	3.27	-1.27	-3.02
13,134.0	88.40	153.50	6,669.5	5,445.5	-5,238.9	875.0	5,269.3	1.46	-1.11	-0.95
13,197.0	89.10	155.00	6,670.8	5,446.8	-5,295.7	902.4	5,331.5	2.63	1.11	2.38
13,259.0	89.70	158.10	6,671.5	5,447.5	-5,352.5	927.1	5,393.1	5.09	0.97	5.00



Phoenix Technology Services  
Survey Report



Database:	EDM 5000 - Single User Db	Local Co-ordinate Reference:	Site Doddridge County 514861
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1224.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1224.0usft
Site:	Doddridge County 514861	North Reference:	Grid
Well:	Well #514861	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	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)	
13,322.0	89.90	157.30	6,671.7	5,447.7	-5,410.8	951.0	5,455.8	1.31	0.32	-1.27	
13,385.0	88.90	155.70	6,672.4	5,448.4	-5,468.6	976.1	5,518.3	2.99	-1.59	-2.54	
13,448.0	88.30	155.90	6,673.9	5,449.9	-5,526.0	1,001.9	5,580.8	1.00	-0.95	0.32	
13,511.0	89.30	159.50	6,675.2	5,451.2	-5,584.3	1,025.8	5,643.5	5.93	1.59	5.71	
13,574.0	89.10	159.80	6,676.1	5,452.1	-5,643.4	1,047.7	5,706.3	0.57	-0.32	0.48	
13,637.0	88.00	157.40	6,677.7	5,453.7	-5,702.0	1,070.7	5,769.1	4.19	-1.75	-3.81	
13,700.0	88.30	156.90	6,679.7	5,455.7	-5,760.0	1,095.1	5,831.7	0.93	0.48	-0.79	
13,763.0	89.10	158.10	6,681.2	5,457.2	-5,818.2	1,119.2	5,894.3	2.29	1.27	1.90	
13,826.0	89.90	158.10	6,681.7	5,457.7	-5,876.7	1,142.7	5,957.1	1.27	1.27	0.00	
13,889.0	90.40	160.70	6,681.6	5,457.6	-5,935.6	1,164.9	6,019.9	4.20	0.79	4.13	
13,952.0	90.00	157.20	6,681.3	5,457.3	-5,994.4	1,187.5	6,082.7	5.59	-0.63	-5.56	
14,015.0	89.80	156.20	6,681.4	5,457.4	-6,052.3	1,212.4	6,145.3	1.62	-0.32	-1.59	
14,078.0	89.80	155.00	6,681.7	5,457.7	-6,109.6	1,238.5	6,207.8	1.90	0.00	-1.90	
14,141.0	88.30	153.20	6,682.7	5,458.7	-6,166.3	1,266.0	6,269.9	3.72	-2.38	-2.86	
14,204.0	88.10	153.40	6,684.7	5,460.7	-6,222.6	1,294.3	6,332.0	0.45	-0.32	0.32	
14,267.0	87.60	152.20	6,687.0	5,463.0	-6,278.6	1,323.1	6,393.9	2.06	-0.79	-1.90	
14,330.0	88.30	152.90	6,689.3	5,465.3	-6,334.4	1,352.1	6,455.7	1.57	1.11	1.11	
14,393.0	89.20	153.20	6,690.7	5,466.7	-6,390.6	1,380.6	6,517.7	1.51	1.43	0.48	
14,457.0	89.50	153.20	6,691.4	5,467.4	-6,447.7	1,409.5	6,580.7	0.47	0.47	0.00	
14,519.0	90.50	152.80	6,691.4	5,467.4	-6,502.9	1,437.6	6,641.7	1.74	1.61	-0.65	
14,583.0	90.40	153.20	6,690.9	5,466.9	-6,560.0	1,466.7	6,704.7	0.64	-0.16	0.63	
14,646.0	90.60	152.40	6,690.4	5,466.4	-6,616.0	1,495.5	6,766.6	1.31	0.32	-1.27	
14,710.0	89.90	151.80	6,690.1	5,466.1	-6,672.5	1,525.4	6,829.4	1.44	-1.09	-0.94	
14,773.0	89.50	150.40	6,690.4	5,466.4	-6,727.7	1,555.9	6,891.0	2.31	-0.63	-2.22	
14,836.0	88.00	149.90	6,691.8	5,467.8	-6,782.3	1,587.2	6,952.3	2.51	-2.38	-0.79	
14,899.0	87.60	149.60	6,694.2	5,470.2	-6,836.7	1,618.9	7,013.5	0.79	-0.63	-0.48	
14,962.0	87.00	148.90	6,697.2	5,473.2	-6,890.8	1,651.1	7,074.6	1.46	-0.95	-1.11	
15,025.0	86.70	149.10	6,700.6	5,476.6	-6,944.7	1,683.5	7,135.5	0.57	-0.48	0.32	
15,088.0	87.80	149.20	6,703.6	5,479.6	-6,998.7	1,715.8	7,196.5	1.75	1.75	0.16	
15,150.0	86.40	150.20	6,705.7	5,481.7	-7,052.2	1,747.0	7,256.8	1.88	0.97	1.61	
15,213.0	88.80	150.30	6,707.2	5,483.2	-7,106.9	1,778.3	7,318.1	0.65	0.63	0.16	
15,276.0	88.00	149.30	6,709.0	5,485.0	-7,161.3	1,810.0	7,379.4	2.03	-1.27	-1.59	
15,339.0	88.20	149.10	6,711.1	5,487.1	-7,215.4	1,842.2	7,440.4	0.45	0.32	-0.32	
15,402.0	88.60	149.30	6,712.8	5,488.8	-7,269.5	1,874.4	7,501.5	0.71	0.63	0.32	
15,464.0	89.20	149.60	6,714.0	5,490.0	-7,322.9	1,906.0	7,561.7	1.08	0.97	0.48	
15,527.0	89.80	149.40	6,714.6	5,490.6	-7,377.2	1,937.9	7,622.9	1.00	0.95	-0.32	
15,589.0	89.90	149.50	6,714.8	5,490.8	-7,430.6	1,969.4	7,683.1	0.23	0.16	0.16	
15,652.0	90.20	149.70	6,714.7	5,490.7	-7,484.9	2,001.3	7,744.3	0.57	0.48	0.32	
15,714.0	90.50	151.10	6,714.3	5,490.3	-7,538.8	2,031.9	7,804.7	2.31	0.48	2.26	
15,776.0	90.80	152.70	6,713.6	5,489.6	-7,593.5	2,061.1	7,865.5	2.63	0.48	2.58	
15,839.0	90.40	154.00	6,713.0	5,489.0	-7,649.8	2,089.4	7,927.5	2.16	-0.63	2.06	
15,901.0	89.70	154.50	6,712.9	5,488.9	-7,705.6	2,116.3	7,988.8	1.39	-1.13	0.81	



Phoenix Technology Services  
Survey Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	WGS 1984 North American Datum
Company:	EQT Production Services	TVD Reference:	KOP=5500' MD
Project:	Wellbore Survey - 10' Grid	MD Reference:	LP=7487' MD/ 6623' TVD
Site:	Wellbore Survey - 651	North Reference:	True
Well:	Wellbore Survey	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore Survey		
Design:	ed		

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)
15,964.0	88.00	155.40	6,714.2	5,490.2	-7,762.7	2,143.0	8,051.1	3.05	-2.70	1.43
16,026.0	88.10	155.40	6,716.3	5,492.3	-7,819.0	2,168.8	8,112.5	0.16	0.16	0.00
16,089.0	88.30	155.20	6,718.3	5,494.3	-7,876.3	2,195.1	8,174.8	0.45	0.32	-0.32
16,152.0	88.70	154.90	6,719.9	5,495.9	-7,933.4	2,221.7	8,237.1	0.79	0.63	-0.48
16,215.0	88.50	154.90	6,721.4	5,497.4	-7,990.4	2,248.4	8,299.5	0.32	-0.32	0.00
16,277.0	88.90	156.10	6,722.8	5,498.8	-8,046.8	2,274.1	8,360.9	2.04	0.65	1.94
16,340.0	89.30	156.40	6,723.8	5,499.8	-8,104.4	2,299.5	8,423.4	0.79	0.63	0.48
16,403.0	88.30	155.40	6,725.2	5,501.2	-8,161.9	2,325.2	8,485.8	2.24	-1.59	-1.59
16,466.0	89.00	156.50	6,726.6	5,502.6	-8,219.5	2,350.9	8,548.3	2.07	1.11	1.75
16,528.0	89.70	157.40	6,727.3	5,503.3	-8,276.5	2,375.1	8,609.9	1.84	1.13	1.45
16,592.0	89.80	156.90	6,727.6	5,503.6	-8,335.5	2,400.0	8,673.6	0.80	0.16	-0.78
16,654.0	89.30	155.60	6,728.1	5,504.1	-8,392.2	2,425.0	8,735.1	2.25	-0.81	-2.10
16,717.0	86.30	155.00	6,729.4	5,505.4	-8,449.4	2,451.3	8,797.5	1.85	-1.59	-0.95
16,780.0	88.40	155.20	6,731.2	5,507.2	-8,506.6	2,477.8	8,859.8	0.35	0.16	0.32
16,843.0	89.50	157.50	6,732.4	5,508.4	-8,564.3	2,503.0	8,922.3	4.05	1.75	3.65
16,905.0	90.60	158.00	6,732.3	5,508.3	-8,621.6	2,526.5	8,984.0	1.95	1.77	0.81
16,969.0	91.30	157.60	6,731.3	5,507.3	-8,680.9	2,550.7	9,047.7	1.26	1.09	-0.63
17,031.0	92.20	158.00	6,729.4	5,505.4	-8,738.3	2,574.1	9,109.4	1.59	1.45	0.65
17,094.0	91.50	158.30	6,727.4	5,503.4	-8,796.7	2,597.6	9,172.1	1.21	-1.11	0.48
17,157.0	87.40	159.00	6,728.0	5,504.0	-8,855.4	2,620.5	9,234.9	6.60	-6.51	1.11
17,220.0	87.70	159.20	6,730.7	5,506.7	-8,914.2	2,642.9	9,297.7	0.57	0.48	0.32
17,283.0	87.90	159.90	6,733.1	5,509.1	-8,973.2	2,664.9	9,360.5	1.15	0.32	1.11
17,345.0	86.40	159.00	6,736.2	5,512.2	-9,031.1	2,686.7	9,422.3	2.82	-2.42	-1.45
17,408.0	86.90	159.30	6,739.8	5,515.8	-9,089.9	2,709.1	9,485.0	0.93	0.79	0.48
17,471.0	87.10	159.20	6,743.1	5,519.1	-9,148.7	2,731.3	9,547.8	0.35	0.32	-0.16
17,533.0	87.20	158.60	6,746.2	5,522.2	-9,206.5	2,753.6	9,609.5	0.98	0.16	-0.97
17,596.0	87.30	159.00	6,749.2	5,525.2	-9,265.2	2,776.4	9,672.2	0.65	0.16	0.63
Final Survey=17624' MD/ 6751' TVD										
17,624.0	87.50	159.00	6,750.5	5,526.5	-9,291.3	2,786.4	9,700.1	0.71	0.71	0.00
Projection to TD=17682' MD/ 6753' TVD										
17,682.0	87.50	159.00	6,753.0	5,529.0	-9,345.4	2,807.2	9,757.9	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
5,450.0	5,449.3	-30.0	7.4	Gyro Tie In=5450' MD
5,500.0	5,499.3	-28.9	5.6	KOP=5500' MD
7,487.0	6,623.4	-108.5	-1,320.1	LP=7487' MD/ 6623' TVD
17,624.0	6,750.5	-9,291.3	2,786.4	Final Survey=17624' MD/ 6751' TVD
17,682.0	6,753.0	-9,345.4	2,807.2	Projection to TD=17682' MD/ 6753' TVD





Phoenix Technology Services  
Survey Report



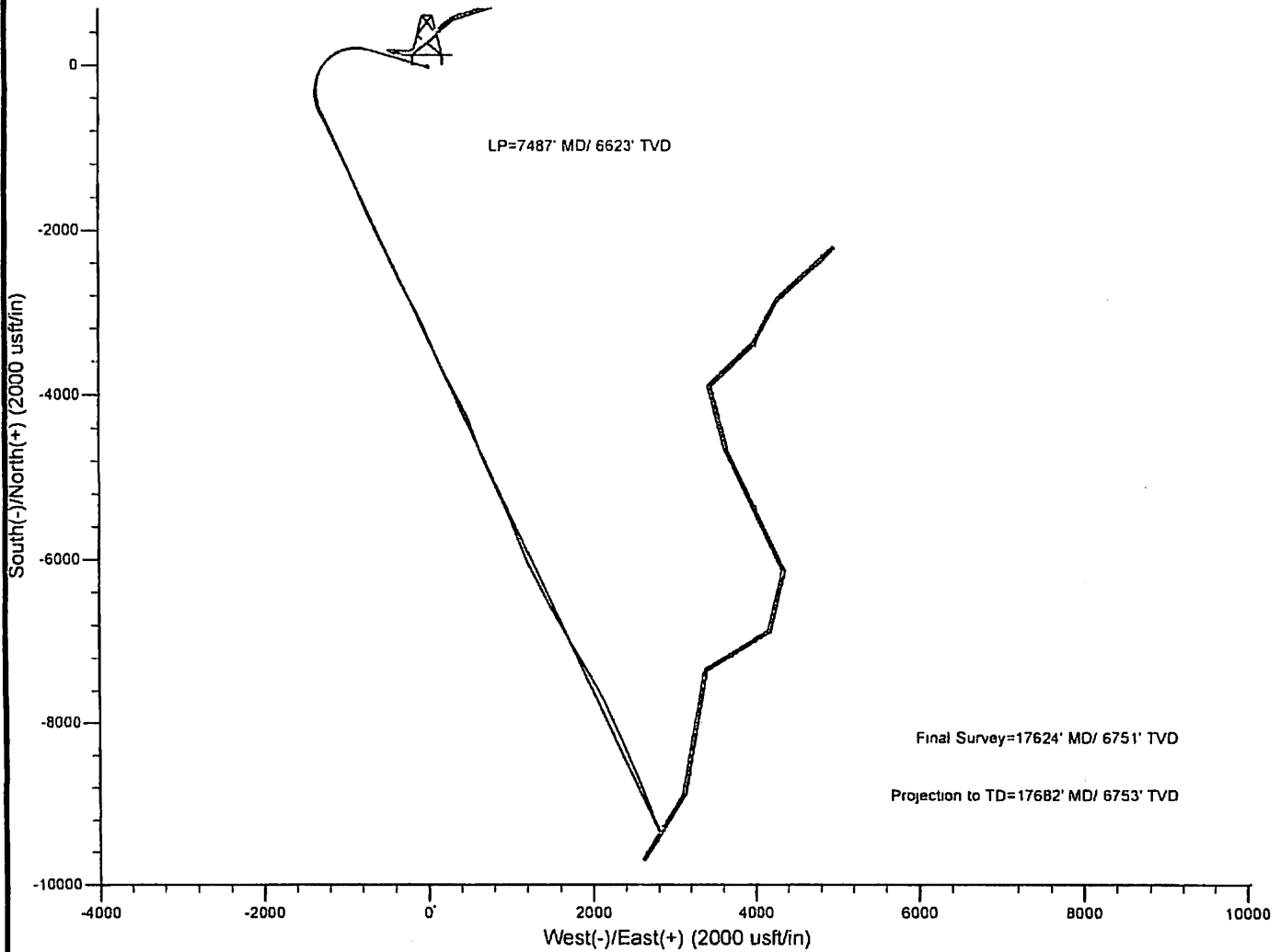
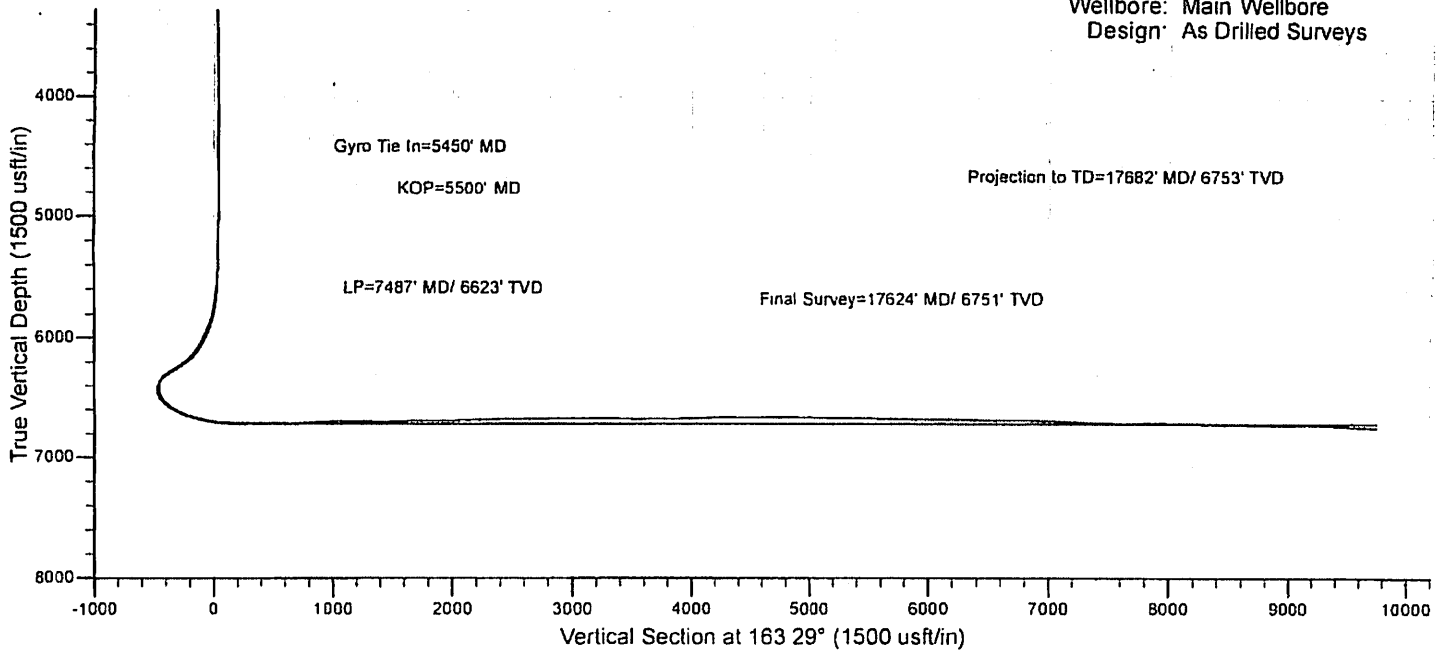
<b>Database:</b> EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b> Site Doddridge County 514651
<b>Company:</b> EQT Production - Marcellus	<b>TVD Reference:</b> KB @ 1224.0usft
<b>Project:</b> Doddridge County, WV Gnd	<b>MD Reference:</b> KB @ 1224.0usft
<b>Site:</b> Doddridge County 514651	<b>North Reference:</b> Gnd
<b>Well:</b> Well #514651	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Wellbore:</b> Main Wellbore	
<b>Design:</b> As Drilled Surveys	

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



# EQT Production - Marcellus

Project: Doddridge County, WV Grid  
Site: Doddridge County 514661  
Well: Well #514661  
Wellbore: Main Wellbore  
Design: As Drilled Surveys



## 514661 - 47-017-06381-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	1/29/2015	17,656.00	17,659.00	10	MARCELLUS
1	2/10/2015	17,535.00	17,656.00	32	MARCELLUS
2	2/10/2015	17,355.00	17,477.00	40	MARCELLUS
3	2/11/2015	17,175.00	17,297.00	40	MARCELLUS
4	2/11/2015	16,995.00	17,117.00	40	MARCELLUS
5	2/11/2015	16,815.00	16,938.00	40	MARCELLUS
6	2/11/2015	16,635.00	16,754.00	40	MARCELLUS
7	2/12/2015	16,457.00	16,577.00	40	MARCELLUS
8	2/12/2015	16,275.00	16,397.00	40	MARCELLUS
9	2/12/2015	16,095.00	16,217.00	40	MARCELLUS
10	2/13/2015	15,915.00	16,035.00	40	MARCELLUS
11	2/13/2015	15,735.00	15,857.00	40	MARCELLUS
12	2/13/2015	15,555.00	15,677.00	40	MARCELLUS
13	2/14/2015	15,375.00	15,492.00	40	MARCELLUS
14	2/14/2015	15,195.00	15,317.00	40	MARCELLUS
15	2/15/2015	15,017.00	15,137.00	40	MARCELLUS
16	2/16/2015	14,834.00	14,957.00	40	MARCELLUS
17	2/16/2015	14,655.00	14,777.00	40	MARCELLUS
18	2/16/2015	14,475.00	14,597.00	40	MARCELLUS
19	2/17/2015	14,295.00	14,417.00	40	MARCELLUS
20	2/17/2015	14,115.00	14,237.00	40	MARCELLUS
21	2/18/2015	13,935.00	14,059.00	40	MARCELLUS
22	2/18/2015	13,760.00	13,877.00	40	MARCELLUS
23	2/18/2015	13,575.00	13,697.00	40	MARCELLUS
24	2/19/2015	13,395.00	13,517.00	40	MARCELLUS
25	2/19/2015	13,215.00	13,337.00	40	MARCELLUS
26	2/19/2015	13,035.00	13,157.00	40	MARCELLUS
27	2/19/2015	12,855.00	12,977.00	40	MARCELLUS
28	2/20/2015	12,672.00	12,797.00	40	MARCELLUS
29	2/20/2015	12,485.00	12,598.00	40	MARCELLUS
30	2/21/2015	12,315.00	12,437.00	40	MARCELLUS
31	2/21/2015	12,135.00	12,257.00	40	MARCELLUS
32	2/21/2015	11,955.00	12,078.00	40	MARCELLUS
33	2/22/2015	11,772.00	11,897.00	40	MARCELLUS
34	2/22/2015	11,595.00	11,717.00	40	MARCELLUS
35	2/23/2015	11,405.00	11,535.00	40	MARCELLUS
36	2/23/2015	11,235.00	11,357.00	40	MARCELLUS
37	2/23/2015	11,055.00	11,177.00	40	MARCELLUS
38	2/23/2015	10,875.00	11,000.00	40	MARCELLUS
39	2/24/2015	10,696.00	10,817.00	40	MARCELLUS
40	2/24/2015	10,519.00	10,637.00	40	MARCELLUS
41	2/25/2015	10,335.00	10,457.00	40	MARCELLUS
42	2/25/2015	10,155.00	10,277.00	40	MARCELLUS
43	2/25/2015	9,975.00	10,097.00	40	MARCELLUS
44	2/27/2015	9,795.00	9,917.00	40	MARCELLUS
45	2/27/2015	9,615.00	9,737.00	40	MARCELLUS
46	2/27/2015	9,435.00	9,557.00	40	MARCELLUS
47	2/27/2015	9,259.00	9,377.00	40	MARCELLUS
48	2/28/2015	9,075.00	9,197.00	40	MARCELLUS
49	2/28/2015	8,895.00	9,017.00	40	MARCELLUS
50	2/28/2015	8,715.00	8,837.00	40	MARCELLUS
51	2/28/2015	8,535.00	8,657.00	40	MARCELLUS
52	3/1/2015	8,355.00	8,477.00	40	MARCELLUS
53	3/1/2015	8,174.00	8,298.00	40	MARCELLUS
54	3/1/2015	7,995.00	8,117.00	40	MARCELLUS
55	3/1/2015	7,815.00	7,937.00	40	MARCELLUS

02/05/2016

## 514661 - 47-017-06381-0000 - 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	1/29/2015	11.7	6,200	8,012	5,297	0	686	0
1	2/10/2015	79.0	9,083	9,083	4,899	221,087	9,361	0
2	2/10/2015	86.8	8,518	8,766	5,831	298,733	8,303	0
3	2/11/2015	86.8	8,655	9,271	5,535	299,444	9,762	0
4	2/11/2015	87.2	8,221	8,587	4,998	299,714	8,912	0
5	2/11/2015	95.6	8,737	8,911	5,249	297,868	8,272	0
6	2/12/2015	89.2	8,856	9,080	5,084	298,435	8,244	0
7	2/12/2015	85.5	8,194	8,992	5,232	299,159	10,225	0
8	2/12/2015	88.4	8,509	9,123	5,478	300,125	9,741	0
9	2/13/2015	89.2	8,450	9,027	5,491	301,027	9,973	0
10	2/13/2015	86.8	8,417	9,012	5,268	301,333	9,001	0
11	2/13/2015	90.0	8,561	8,857	5,163	299,680	8,482	0
12	2/14/2015	89.7	8,615	8,979	5,263	298,368	8,133	0
13	2/14/2015	85.1	8,523	9,010	5,307	302,244	8,608	0
14	2/15/2015	85.5	8,603	9,090	5,796	298,351	8,229	0
15	2/15/2015	85.9	8,626	8,877	5,463	300,229	8,712	0
16	2/16/2015	83.6	8,521	8,966	4,820	298,234	7,797	0
17	2/16/2015	87.8	8,550	8,998	4,785	300,937	7,929	0
18	2/17/2015	87.3	8,517	8,939	4,899	298,936	7,855	0
19	2/17/2015	89.6	8,565	8,923	5,149	300,009	7,834	0
20	2/18/2015	87.9	8,636	8,887	4,738	298,965	7,779	0
21	2/18/2015	96.2	8,240	8,683	5,212	297,508	7,597	0
22	2/18/2015	97.1	8,363	8,685	5,022	298,473	7,842	0
23	2/18/2015	100.7	8,225	8,519	5,249	296,975	7,599	0
24	2/19/2015	96.5	8,249	8,606	5,184	301,311	7,423	0
25	2/19/2015	97.7	8,200	8,612	5,133	299,293	7,051	0
26	2/19/2015	93.8	8,573	8,901	5,212	297,155	6,856	0
27	2/20/2015	95.9	8,461	9,119	4,315	295,123	8,979	0
28	2/20/2015	87.7	8,634	9,148	5,225	298,075	6,669	0
29	2/21/2015	98.2	8,097	8,370	5,145	294,999	7,228	0
30	2/21/2015	92.3	8,592	9,077	5,348	302,201	7,966	0
31	2/21/2015	84.3	8,519	9,072	5,146	300,333	7,470	0
32	2/22/2015	96.3	8,400	9,063	5,197	300,396	6,921	0
33	2/22/2015	95.5	8,494	8,824	5,094	297,289	7,209	0
34	2/22/2015	99.1	8,499	8,966	5,106	296,995	7,288	0
35	2/23/2015	96.3	8,530	8,767	5,167	296,815	6,909	0
36	2/23/2015	99.7	8,567	8,846	5,023	298,725	6,463	0
37	2/23/2015	99.5	8,750	9,139	5,311	299,041	6,823	0
38	2/24/2015	98.2	8,673	8,913	5,207	299,408	6,602	0
39	2/24/2015	95.2	8,631	9,143	5,364	298,999	7,205	0
40	2/24/2015	99.1	8,495	8,882	5,312	298,999	7,032	0
41	2/25/2015	100.0	8,372	8,768	5,342	298,609	7,148	0
42	2/25/2015	100.0	8,557	8,802	4,986	296,535	6,538	0
43	2/26/2015	99.5	8,348	8,622	4,193	298,676	7,449	0
44	2/27/2015	99.5	7,961	8,220	5,319	298,827	7,193	0
45	2/27/2015	99.6	8,110	8,575	5,009	299,366	6,513	0
46	2/27/2015	99.9	8,163	8,833	5,054	298,654	6,826	0
47	2/27/2015	98.9	8,421	8,585	4,966	299,055	7,236	0
48	2/28/2015	98.5	8,451	8,667	4,981	301,531	7,282	0
49	2/28/2015	99.6	8,056	8,690	5,262	300,336	7,857	0
50	2/28/2015	95.1	8,540	8,616	4,985	298,526	6,690	0
51	2/28/2015	100.2	8,358	8,648	4,880	300,733	7,270	0
52	3/1/2015	100.0	8,338	8,681	5,019	300,575	6,938	0
53	3/1/2015	100.0	8,018	8,640	5,276	299,429	6,307	0
54	3/1/2015	100.1	8,206	8,424	5,078	298,425	6,230	0
55	3/1/2015	100.2	8,421	8,699	5,298	297,490	6,123	0

02/05/2016

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/9/2015
Job End Date:	3/1/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06381-00-00
Operator Name:	EQT Production
Well Name and Number:	514661
Longitude:	-80.76327500
Latitude:	39.25559200
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,753
Total Base Water Volume (gal):	17,747,940
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					
			W	7732-18-5	100.00000	89.71345	None
Sand (Proppant)	FTS International	Proppant					
			Crystallin		100.00000	9.91454	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution					
			Calcium nitrate	10124-3	60.00000	0.05404	None
FRW-600	FTS International	Friction reducer					
			Hydrotreated light distillate	64742-47-	30.00000	0.02266	None
			Ammonium acetate	631-61-8	6.00000	0.00453	None
Hydrochloric Acid (15%)	FTS International	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.02434	None
CI-150	FTS International	Acid Corrosion Inhibitor					
			Isopropanol	67-63-0	30.00000	0.00736	None
			Dimethylformamide	68-12-2	10.00000	0.00245	None
			Organic amine resin salt	Proprietary	30.00000	0.00009	None
			Ethylene glycol	107-21-1	30.00000	0.00009	None
			Aromatic aldehyde	Proprietary	10.00000	0.00003	None

			Quaternary ammonium compound	Proprietary	10.00000	0.00003	None
B-10	FTS International	High pH buffer					
			Potassium carbonate	584-08-7	48.00000	0.00649	None
			Potassium hydroxide	1310-58-3	20.00000	0.00270	None
HVG-1	FTS International	Gelling agent					
			Petroleum distillate	64742-47-8	55.00000	0.00245	None
			Guar gum	9000-30-0	50.00000	0.00223	None
			Surfactant	58439-51-0	2.00000	0.00009	None
			Clay	14808-60-7	2.00000	0.00009	None
CS-500-SI	FTS International	Scale inhibitor					
			Ethylene glycol	107-21-1	10.00000	0.00245	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	111-76-2	10.00000	0.00010	None
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001	None
			2-Propanol	67-63-0	10.00000	0.00001	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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**i** 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: 2/9/2015    Job End Date: 3/1/2015    API Number: 47-017-06381-00-00    State & County: West Virginia --- Doddridge

Well Name: 514661

Longitude: -80.763275    Latitude: 39.255592    Datum: NAD83    Federal/Tribal Well?:

True Vertical Depth (ft): 6753    Total Water Vol (gal): 17747940    Total Non Water Vol: 0    Total Mass (lbs): 165088469



**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%	89.7134487121%	None	148106559.3
<input type="button" value="Edit"/>	Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100%	9.9145373764%	None	16367758
<input type="button" value="Edit"/>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0540355951%	None	89206.537
<input type="button" value="Edit"/>	FRW-600	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30%	.0226569685%	None	37404.042
<input type="button" value="Edit"/>	Hydrochloric Acid (15%)	FTS International	Acidizing	Ammonium acetate	631-61-8	6%	.0045313937%	None	7480.808
<input type="button" value="Edit"/>	CI-150	FTS International	Acid Corrosion Inhibitor	Hydrochloric Acid	7647-01-0	15%	.0243391771%	None	40181.175
				Isopropanol	67-63-0	30%	.0073603719%	None	12151.125
				Dimethylformamide	68-12-2	10%	.0024534573%	None	4050.375
				Organic amine resin salt	Proprietary	30%	.000091579%	None	151.186
				Ethylene glycol	107-21-1	30%	.000091579%	None	151.186

<input type="button" value="Edit"/>	B-10	FTS International	High pH buffer	Aromatic aldehyde	Proprietary	10%	.0000305263%	None	50.395
				Quaternary ammonium compound	Proprietary	10%	.0000305263%	None	50.395
<input type="button" value="Edit"/>	HVG-1	FTS International	Gelling agent	Potassium carbonate	584-08-7	48%	.0064877928%	None	10710.598
				Potassium hydroxide	1310-58-3	20%	.002703247%	None	4462.749
				Petroleum distillate	64742-47-8	55%	.0024477365%	None	4040.931
<input type="button" value="Edit"/>	CS-500-SI	FTS International	Scale inhibitor	Guar gum	9000-30-0	50%	.002225215%	None	3673.573
				Surfactant	68439-51-0	2%	.0000890086%	None	146.943
				Clay	14808-60-7	2%	.0000890086%	None	146.943
				Ethylene glycol	107-21-1	10%	.0024534573%	None	4050.375
<input type="button" value="Edit"/>	APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95%	.0002900002%	None	478.757
<input type="button" value="Edit"/>	FE-100L	FTS International	Iron control	Citric acid	77-92-9	55%	.0001678948%	None	277.175
<input type="button" value="Edit"/>	NE-100	FTS International	Non-emulsifier	2-Butoxyethanol	111-76-2	10%	.0001028918%	None	169.862
				Dodecylbenzenesulfonic acid	27176-87-0	5%	.0000140121%	None	23.132
				2-Propanol	67-63-0	10%	.0000054516%	None	9

**Non-MSDS Chemical Ingredients**

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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LATITUDE 39° 17' 30"

LONGITUDE 80° 45' 00"

**EQT PRODUCTION COMPANY  
LEEMAN MAXWELL LEASE  
1000 ACRES±  
WELL NO. WV 514661**

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

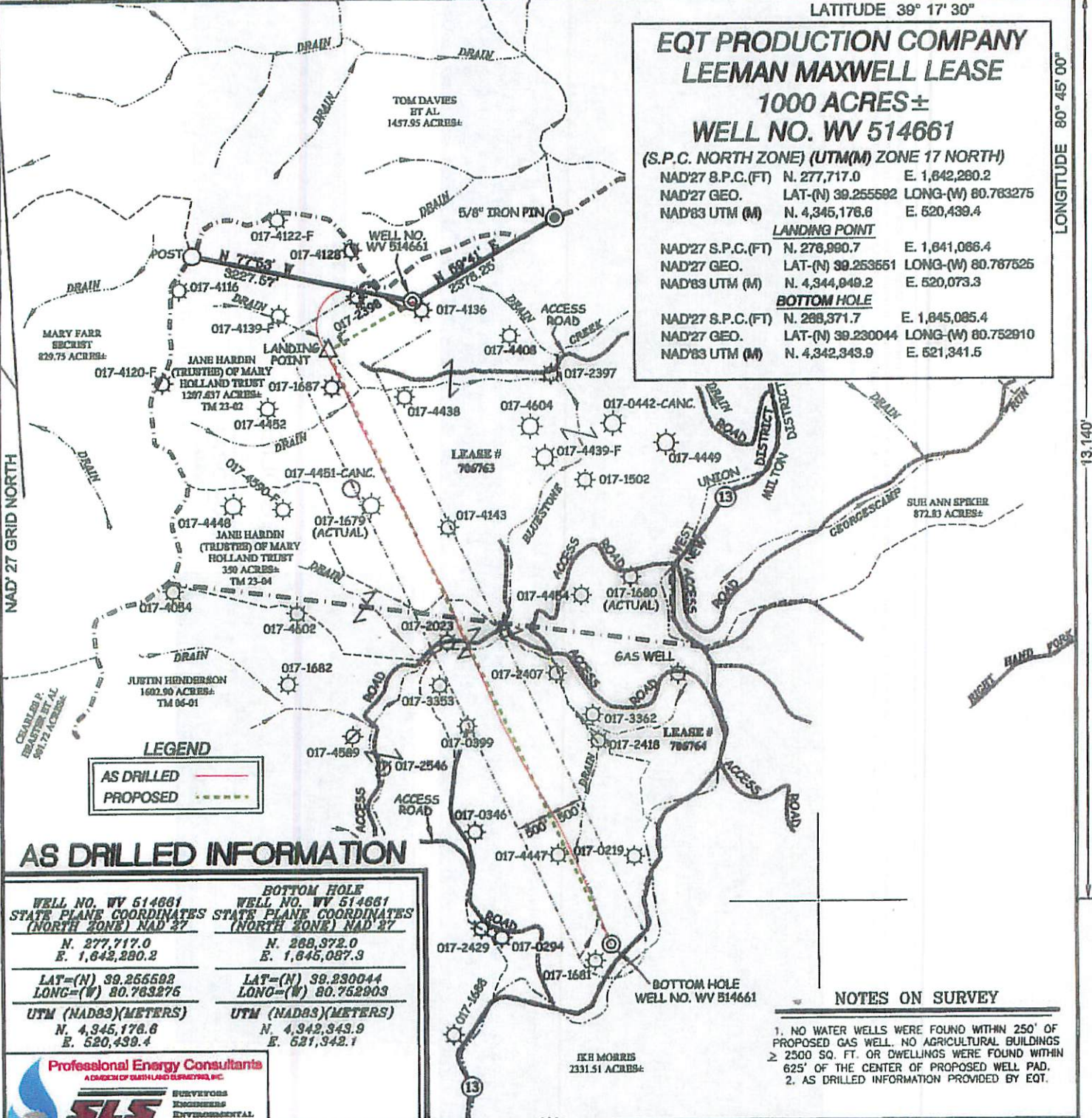
NAD'27 S.P.C.(FT) N. 277,717.0 E. 1,642,280.2  
NAD'27 GEO. LAT-(N) 39.255592 LONG-(W) 80.763275  
NAD'83 UTM (M) N. 4,345,176.6 E. 520,439.4

**LANDING POINT**

NAD'27 S.P.C.(FT) N. 276,980.7 E. 1,641,066.4  
NAD'27 GEO. LAT-(N) 39.253551 LONG-(W) 80.767525  
NAD'83 UTM (M) N. 4,344,049.2 E. 520,073.3

**BOTTOM HOLE**

NAD'27 S.P.C.(FT) N. 288,971.7 E. 1,645,085.4  
NAD'27 GEO. LAT-(N) 39.230044 LONG-(W) 80.752910  
NAD'83 UTM (M) N. 4,342,343.9 E. 521,341.5



**AS DRILLED INFORMATION**

<b>WELL NO. WV 514661</b> STATE PLANE COORDINATES (NORTH ZONE) NAD 87 N. 277,717.0 E. 1,642,280.2 LAT=(N) 39.255592 LONG=(W) 80.763275 UTM (NAD83)(METERS) N. 4,345,176.6 E. 520,439.4	<b>BOTTOM HOLE</b> <b>WELL NO. WV 514661</b> STATE PLANE COORDINATES (NORTH ZONE) NAD 87 N. 288,972.0 E. 1,645,087.9 LAT=(N) 39.230044 LONG=(W) 80.752903 UTM (NAD83)(METERS) N. 4,342,343.9 E. 521,342.1
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**Professional Energy Consultants**  
A DIVISION OF SOUTHLAND SURVEYING, INC.

SURVEYORS  
ENGINEERS  
ENVIRONMENTAL  
PROJECT MGMT.

(304) 425-8251 WWW.SLSURV.WV.COM

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

P.S. 877  
*Gregory A. Smith*



**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.

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE OCTOBER 1, 20 13  
REVISED 03/05/14 & 11/13/14  
OPERATORS WELL NO. WV 514661  
API WELL NO. 47  
STATE            COUNTY            PERMIT           

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8051ASDRILLED514661  
SCALE 1" = 2,000'  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

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

02/05/2016

WELL            LIQUID            WASTE            IF

**\*\*CELLS WITH BLUE BACKGROUND ARE THE ONLY CELLS TO BE EDITED\*\***

Fracture Start Date/Time:	2/9/15 0:35
Fracture End Date/Time:	3/1/15 16:15
State:	West Virginia
County:	Doddridge
API Number:	47-017-06381-00-00
Operator Number:	E1210363
Well Name:	514661
Federal Well:	No
Longitude:	-80.763275
Latitude:	39.255592
Long/Lat Projection:	NAD83
True Vertical Depth (TVD):	6,753'
Total Clean Fluid Volume* (gals):	17,747,940



Additive	Specific Gravity	Additive Quantity	Mass (lbs)
Water	1.00	17,747,940	148,106,559
Sand (Proppant)	2.65	16,367,758	16,367,758
Hydrochloric Acid (15%)	1.07	30,000	267,875
BRW-600	1.06	14,095	124,630
B-10	1.45	1,839	22,314
HVG-1	1.08	819	7,347
MC MX 437-5	1.33	13,371	148,875
CS-500-SI	1.15	4,239	40,504
CI-150	0.99	61	584
FP-100L	1.77	115	1,699
APH-1	1.58	90	90
NS-100	0.99	56	463

Total Slurry Mass (Lbs)

165,000,469

**Ingredients Section:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass) <sup>(1)(2)</sup>	Mass per Component (LBS)	Maximum Ingredient Concentration in HF Fluid (% by mass) <sup>(1)(2)</sup>	Comments
Water	PTS International	Carrier/Flow Fluid	Water	7732-18-5	100.00%	148,106,559	89.71345%	
Sand (Proppant)	PTS International	Proppant	Crystalline Silica	14808-60-7	100.00%	16,367,758	9.91454%	
Hydrochloric Acid (15%)	PTS International	Acidizing	Hydrochloric Acid	7647-01-6	15.00%	40,181	0.82434%	
BRW-600	PTS International	Foaming reducer	Hydroxyethyl light diacrylate	64742-87-8	30.00%	17,404	0.82266%	
			Ammonium acetate	631-61-8	6.00%	7,481	0.36453%	
B-10	PTS International	High pH buffer	Potassium carbonate	584-08-7	48.00%	10,711	0.86649%	
			Potassium hydroxide	1510-58-3	20.00%	4,363	0.38270%	
HVG-1	PTS International	Gelling agent	Kaolin pipe	9000-30-0	50.00%	5,674	0.50223%	
			Potassium silicate	64742-87-8	55.00%	4,941	0.50245%	
			Clay	14808-60-7	2.00%	147	0.00069%	
			Surfactant	68439-51-0	2.00%	147	0.00069%	
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00%	89,207	0.85484%	
CS-500-SI	PTS International	Scale inhibitor	Ethylene glycol	107-21-1	10.00%	4,859	0.36245%	
CI-150	PTS International	Acid Corrosion Inhibitor	Isocyanate	67-63-0	10.00%	22,151	0.36726%	
			Dibutyltinmaleate	68-12-2	10.00%	4,858	0.36245%	
			Organic amine resin salt	Proprietary	20.00%	151	0.06099%	
			Quaternary ammonium compound	Proprietary	10.00%	50	0.06003%	
			Aromatic aldehyde	Proprietary	10.00%	50	0.36003%	
			Ethylene glycol	107-21-1	20.00%	151	0.36099%	
FP-100L	PTS International	Iron control	Chloric acid	77-52-9	55.00%	277	0.38017%	
APH-1	PTS International	Breaker	Ammonium persulfate	7723-54-0	25.00%	475	0.38029%	
NS-100	PTS International	Non-emoulfier	2-Butoxyethane	111-76-2	10.00%	170	0.38018%	
			2-Propanol	67-63-0	10.00%	9	0.00001%	
			Dodecylbenzenesulfonic acid	27176-87-0	5.00%	23	0.00001%	

<sup>(1)</sup>Total Water Volume sources may include fresh water, produced water, and/or recycled water

<sup>(2)</sup> Information is based on the maximum potential for concentration and thus the total may be over 100%

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.