

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514381

API: 47 - 103 - 02969

Submission: Initial Amended

Notes: Stimulation Notes:
Re-perforated stages: 1(1.1), 4(4.1), 7
(7.1), 11 (11.1)

Combined Stages: [4,4.1,5]

Correction to Production Cement Top
(MD)

Correction to Production Casing Set
Depth (MD)

RECEIVED
Office of Oil and Gas

FEB 02 2016

WV Department of
Environmental Protection

AXWS
03/22/16

03/25/2016

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

API 47-103-02969 County Wetzel District Grant
Quad Pine Grove Pad Name PNG129 Field/Pool Name _____
Farm name Lacock Well Number 514381
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 4,378,118 Easting 530,866
Landing Point of Curve Northing 4,378,023 Easting 530,439
Bottom Hole Northing 4,378,713 Easting 530,039

Elevation (ft) 1330 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

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

Mud Type(s) and Additive(s)

Water base Mud 14.0 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome, lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 11/25/2013 Date drilling commenced 11/26/2013 Date drilling ceased 3/14/2014
Date completion activities began 9/9/2014 Date completion activities ceased 9/15/2014
Verbal plugging (Y/N) n/a 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 734' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 2016', 2365' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 683', 965', 1035', 1049', 1077' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by: _____

API 47-103 - 02969

Farm name Lacock

Well number 514381

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	28"	26"	40'	New	82.6#/ft	n/a	Y
Surface	17-1/2"	13-3/8"	935'	New	54.5#/ft	155', 440'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	3405'	New	40#/ft	112', 323'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	10495'	New	20#/ft	N/A	N
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	49	15.6	1.18	57.82	0	8
Surface	Class A	845	15.6	1.19	1005.55	0	8
Coal							
Intermediate 1	Class A	1265	15.6	1.18	1492.7	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	710/350	15.2/15.6	1.07/1.86	1410.7	4102	72
Tubing							

Drillers TD (ft) 10,504'

Loggers TD (ft) N/A

Deepest formation penetrated Marcellus

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5436'

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 316', 603', 932'

Intermediate-bow spring centralizers set at 3358', 2893', 2387', 1839', 1334', 829'

Production-composite centralizer ran on every joint from 1d up to 4393'

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 47-103-02969 Farm name Lacock Well number 514381

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>7301</u>	<u>TVD</u>	<u>8049</u> <u>MD</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1577 psi Bottom Hole NA psi DURATION OF TEST 90 hrs

OPEN FLOW Gas 6874 mcfpd Oil 0 bpd NGL 14.02 bpd Water 624 bpd GAS MEASURED BY Estimated Orifice Pilot

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

Please insert additional pages as applicable.

Drilling Contractor Savanna Drilling
Address 2204 Timberloch Place Suite 230 City Woodlands State TX Zip 77380

Logging Company Hoss Co. Services LLC
Address 614 Trotters Lane City Charleston State WV Zip 25312

Cementing Company Halliburton Energy Services
Address 121 Champion Way City Canonsburg State PA Zip 15317

Stimulating Company FTS International Services, LLC
Address 301 East 18th St City Cisco State TX Zip 76437

Please insert additional pages as applicable.

Completed by Brad Maddox Telephone 412-395-7053
Signature [Signature] Title Director of Drilling Date 01/20/2016

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

514381 Final Formations API: 47-103-02969

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
SAND / SHALE	0	0	683	683
FRESH WATER ZONE	1	1	734	734
COAL	683	683	685	685
SAND / SHALE	685	685	965	965
COAL	965	965	966	966
SAND / SHALE	966	966	1,035.00	1,035.00
COAL	1,035.00	1,035.00	1,042.00	1,042.00
SAND / SHALE	1,042.00	1,042.00	1,049.00	1,049.00
COAL	1,049.00	1,049.00	1,051.00	1,051.00
SAND / SHALE	1,051.00	1,051.00	1,077.00	1,077.00
COAL	1,077.00	1,077.00	1,083.00	1,083.00
SAND / SHALE	1,083.00	1,083.00	2,183.00	2,183.00
MAXTON	2,183.00	2,183.00	2,419.00	2,419.00
BIG LIME	2,419.00	2,419.00	2,658.00	2,658.00
WEIR	2,658.00	2,658.00	2,856.00	2,856.00
GANTZ	2,856.00	2,856.00	2,972.00	2,972.00
50F	2,972.00	2,972.00	3,045.00	3,045.00
30F	3,045.00	3,045.00	3,092.00	3,092.00
GORDON	3,092.00	3,092.00	3,212.00	3,212.00
4TH	3,212.00	3,212.00	3,347.00	3,347.00
BAYARD	3,347.00	3,347.00	3,763.00	3,763.00
WARREN	3,763.00	3,763.00	3,889.00	3,889.00
SPEECHLEY	3,889.00	3,889.00	4,763.00	4,763.00
RILEY	4,763.00	4,763.00	5,376.00	5,375.90
BENSON	5,376.00	5,375.90	5,758.00	5,743.70
ALEXANDER	5,758.00	5,743.70	7,497.00	7,051.00
MIDDLESEX	7,497.00	7,051.00	7,556.00	7,090.40
GENESSEE	7,556.00	7,090.40	7,680.00	7,166.10
GENESEO	7,680.00	7,166.10	7,726.00	7,190.60
TULLY	7,726.00	7,190.60	7,769.00	7,211.50
HAMILTON	7,769.00	7,211.50	7,994.00	7,289.60
MARCELLUS	7,994.00	7,289.60	10504.00	7292.10



EQT Production - Marcellus

Wetzel County, WV

Wetzel County 514381

Well #514381

API: 47-103-02969

Main Wellbore

Design: As Drilled Surveys

Standard Survey Report

13 March, 2014



Phoenix Technology Services
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514381
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346 0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346 0usft
Site:	Wetzel County 514381	North Reference:	Grid
Well:	Well #514381	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	As Drilled Surveys		

Project Wetzel County, WV		
Map System:	US State Plane 1927 (Exact solution)	System Datum: Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)	
Map Zone:	West Virginia North 4701	Using geodetic scale factor

Site Wetzel County 514381		
Site Position:	Northing: 385,243.00 usft	Latitude: 39.55
From: Map	Easting: 1,678,298.00 usft	Longitude: -80.64
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.73 °

Well Well #514381			
Well Position	+N-S 0.0 usft	Northing: 385,243.00 usft	Latitude: 39° 33' 7.591 N
	+E-W 0.0 usft	Easting: 1,678,298.00 usft	Longitude: 80° 38' 27.298 W
Position Uncertainty	0.0 usft	Wellhead Elevation: usft	Ground Level: 1,330.0 usft

Wellbore Main Wellbore					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	2/26/2014	-8.62	67.03	52,447

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	306.78	

Survey Program		Date 3/13/2014
From (')	To (usft)	Survey (Wellbore)
0.00	5,324.0	514381 Gyro (Main Wellbore)
0.00	10,504.0	514381 PHX MWD (Main Wellbore)
		Tool Name
		GYD_DP_MS
		MWD
		Description
		Gyrodata gyro-compassing and drop
		MWD - Standard

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	-1,346.0	0.0	0.0	0.0	0.00	0.00	0.00	
103.0	0.18	150.92	103.0	-1,243.0	-0.1	0.1	-0.1	0.17	0.17	0.00	
203.0	0.14	149.44	203.0	-1,143.0	-0.4	0.2	-0.4	0.04	-0.04	-1.48	
303.0	0.12	154.15	303.0	-1,043.0	-0.6	0.3	-0.6	0.02	-0.02	4.71	
403.0	0.06	179.69	403.0	-943.0	-0.7	0.4	-0.7	0.07	-0.06	25.54	
503.0	0.10	83.65	503.0	-843.0	-0.8	0.5	-0.8	0.12	0.04	-96.04	
603.0	0.09	60.27	603.0	-743.0	-0.7	0.6	-0.9	0.04	-0.01	-23.38	
703.0	0.07	29.30	703.0	-643.0	-0.6	0.7	-0.9	0.05	-0.02	-30.97	



Phoenix Technology Services
Survey Report



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Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346.0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514381	North Reference:	Gnd
Well:	Well #514381	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)	
803.0	0.09	12.04	803.0	-543.0	-0.5	0.8	-0.9	0.03	0.02	-17.26	
903.0	0.07	342.30	903.0	-443.0	-0.4	0.8	-0.8	0.05	-0.02	-29.74	
1,003.0	0.03	92.21	1,003.0	-343.0	-0.3	0.8	-0.8	0.09	-0.04	109.91	
1,103.0	0.04	266.34	1,103.0	-243.0	-0.3	0.8	-0.8	0.07	0.01	174.13	
1,203.0	0.07	163.51	1,203.0	-143.0	-0.4	0.7	-0.8	0.09	0.03	-102.83	
1,303.0	0.10	185.14	1,303.0	-43.0	-0.5	0.7	-0.9	0.05	0.03	31.63	
1,403.0	0.11	170.31	1,403.0	57.0	-0.7	0.7	-1.0	0.05	0.01	-24.83	
1,503.0	0.18	173.91	1,503.0	157.0	-0.9	0.8	-1.2	0.07	0.07	3.60	
1,603.0	0.27	179.43	1,603.0	257.0	-1.3	0.8	-1.4	0.09	0.09	5.52	
1,703.0	0.31	174.77	1,703.0	357.0	-1.8	0.8	-1.7	0.05	0.04	-4.66	
1,803.0	0.32	176.60	1,803.0	457.0	-2.4	0.8	-2.1	0.01	0.01	1.83	
1,903.0	0.49	152.96	1,903.0	557.0	-3.1	1.1	-2.7	0.23	0.17	-23.64	
2,003.0	0.59	152.20	2,003.0	657.0	-3.9	1.5	-3.5	0.10	0.10	-0.76	
2,103.0	0.61	148.37	2,103.0	757.0	-4.8	2.0	-4.5	0.04	0.02	-3.83	
2,203.0	0.68	146.54	2,203.0	857.0	-5.7	2.6	-5.5	0.07	0.07	-1.83	
2,303.0	0.71	145.94	2,303.0	957.0	-6.8	3.3	-6.7	0.03	0.03	-0.60	
2,403.0	0.76	147.70	2,403.0	1,057.0	-7.8	4.0	-7.9	0.05	0.05	1.76	
2,503.0	0.77	149.98	2,503.0	1,157.0	-9.0	4.7	-9.1	0.03	0.01	2.28	
2,603.0	0.72	151.45	2,602.9	1,256.9	-10.1	5.3	-10.3	0.05	-0.05	1.47	
2,703.0	0.52	155.05	2,702.9	1,356.9	-11.1	5.8	-11.3	0.20	-0.20	3.60	
2,803.0	0.36	158.68	2,802.9	1,456.9	-11.8	6.1	-11.9	0.16	-0.16	3.63	
2,903.0	0.34	156.12	2,902.9	1,556.9	-12.3	6.3	-12.5	0.03	-0.02	-2.56	
3,003.0	0.31	160.36	3,002.9	1,656.9	-12.9	6.6	-13.0	0.04	-0.03	4.24	
3,103.0	0.28	171.10	3,102.9	1,756.9	-13.4	6.7	-13.4	0.06	-0.03	10.74	
3,203.0	0.24	184.60	3,202.9	1,856.9	-13.8	6.7	-13.6	0.07	-0.04	13.50	
3,303.0	0.16	177.18	3,302.9	1,956.9	-14.2	6.7	-13.8	0.08	-0.08	-7.42	
3,403.0	0.18	168.61	3,402.9	2,056.9	-14.4	6.7	-14.0	0.03	0.02	-8.57	
3,503.0	0.19	160.47	3,502.9	2,156.9	-14.8	6.8	-14.3	0.03	0.01	-8.14	
3,603.0	0.17	156.77	3,602.9	2,256.9	-15.1	6.9	-14.6	0.02	-0.02	-3.70	
3,703.0	0.20	162.49	3,702.9	2,356.9	-15.4	7.0	-14.8	0.04	0.03	5.72	
3,803.0	0.16	205.15	3,802.9	2,456.9	-15.6	7.0	-15.0	0.14	-0.04	42.66	
3,903.0	0.13	258.33	3,902.9	2,556.9	-15.8	6.9	-15.0	0.13	-0.03	53.18	
4,003.0	0.11	259.75	4,002.9	2,656.9	-15.8	6.7	-14.8	0.02	-0.02	1.42	
4,103.0	0.10	241.72	4,102.9	2,756.9	-15.9	6.5	-14.7	0.03	-0.01	-18.03	
4,203.0	0.22	239.45	4,202.9	2,856.9	-16.0	6.3	-14.6	0.12	0.12	-2.27	
4,303.0	0.12	241.31	4,302.9	2,956.9	-16.2	6.0	-14.5	0.10	-0.10	1.86	
4,403.0	0.11	60.15	4,402.9	3,056.9	-16.2	6.0	-14.5	0.23	-0.01	178.84	
4,503.0	0.34	81.26	4,502.9	3,156.9	-16.1	6.4	-14.7	0.24	0.23	21.11	
4,603.0	0.37	72.84	4,602.9	3,256.9	-16.0	7.0	-15.1	0.06	0.03	-8.42	
4,703.0	0.47	69.97	4,702.9	3,356.9	-15.7	7.7	-15.5	0.10	0.10	-2.87	
4,803.0	0.50	62.36	4,802.9	3,456.9	-15.4	8.4	-16.0	0.07	0.03	-7.61	
4,903.0	0.55	56.77	4,902.9	3,556.9	-14.9	9.2	-16.3	0.07	0.05	-5.59	



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Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514381	North Reference:	Gnd
Well:	Well #514381	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)
5,003.0	0.62	61.29	5,002.9	3,656.9	-14.4	10.1	-16.7	0.08	0.07	4.52
5,103.0	0.67	59.67	5,102.9	3,756.9	-13.8	11.1	-17.1	0.05	0.05	-1.62
5,203.0	0.64	68.47	5,202.9	3,856.9	-13.3	12.1	-17.7	0.10	-0.03	8.80
5,303.0	0.69	64.90	5,302.9	3,956.9	-12.9	13.2	-18.2	0.06	0.05	-3.57
Gyro Tie in MD=5324'										
5,324.0	0.70	76.82	5,323.9	3,977.9	-12.8	13.4	-18.4	0.69	0.05	56.76
5,340.0	0.50	53.60	5,339.9	3,993.9	-12.7	13.6	-18.5	1.94	-1.25	-145.13
5,371.0	0.50	89.90	5,370.9	4,024.9	-12.6	13.8	-18.6	1.00	0.00	117.10
KOP=6403' MD/5403' TVD										
5,403.0	0.60	56.30	5,402.9	4,056.9	-12.5	14.1	-18.8	1.04	0.31	-105.00
5,435.0	2.00	237.00	5,434.9	4,088.9	-12.8	13.7	-18.7	8.12	4.38	-560.31
5,467.0	6.10	238.30	5,466.8	4,120.8	-14.0	11.8	-17.8	12.81	12.81	4.06
5,498.0	9.80	240.10	5,497.5	4,151.5	-16.1	8.1	-16.2	11.96	11.94	5.81
5,530.0	12.60	243.20	5,528.9	4,182.9	-19.1	2.7	-13.6	8.95	8.75	9.69
5,562.0	13.90	249.50	5,560.0	4,214.0	-22.0	-4.1	-9.9	6.07	4.06	19.69
5,593.0	15.50	250.60	5,590.0	4,244.0	-24.7	-11.4	-5.6	5.24	5.16	3.55
5,625.0	17.40	250.10	5,620.7	4,274.7	-27.7	-20.0	-0.6	5.95	5.94	-1.56
5,657.0	19.20	249.00	5,651.1	4,305.1	-31.2	-29.4	4.8	5.73	5.63	-3.44
5,688.0	21.50	246.10	5,680.1	4,334.1	-35.4	-39.3	10.3	8.10	7.42	-9.35
5,720.0	24.20	246.60	5,709.6	4,363.6	-40.3	-50.7	16.5	8.46	8.44	1.56
5,752.0	27.90	247.10	5,738.4	4,392.4	-45.9	-63.6	23.5	11.58	11.56	1.56
5,783.0	31.10	247.70	5,765.3	4,419.3	-51.7	-77.7	31.3	10.37	10.32	1.94
5,815.0	35.10	246.90	5,792.1	4,446.1	-56.5	-93.9	40.2	12.57	12.50	-2.50
5,847.0	39.00	248.00	5,817.7	4,471.7	-65.9	-111.7	50.0	12.36	12.19	3.44
5,910.0	42.80	248.10	5,865.3	4,519.3	-81.3	-149.9	71.4	6.03	6.03	0.16
5,973.0	41.00	245.50	5,912.2	4,566.2	-97.8	-188.6	92.5	3.97	-2.86	-4.13
6,037.0	42.10	246.50	5,960.1	4,614.1	-115.1	-227.4	113.2	2.01	1.72	1.56
6,100.0	43.30	249.10	6,006.4	4,660.4	-131.2	-266.9	135.2	3.39	1.90	4.13
6,163.0	42.20	247.20	6,052.6	4,706.6	-147.1	-306.6	157.5	2.69	-1.75	-3.02
6,227.0	40.70	246.10	6,100.6	4,754.6	-163.9	-345.5	178.6	2.61	-2.34	-1.72
6,290.0	40.40	247.40	6,148.5	4,802.5	-180.1	-383.1	199.0	1.42	-0.48	2.06
6,353.0	40.70	250.90	6,196.4	4,850.4	-194.6	-421.4	221.0	3.64	0.48	5.56
6,416.0	39.30	250.10	6,244.6	4,898.6	-208.2	-459.6	243.4	2.37	-2.22	-1.27
6,479.0	40.30	249.60	6,293.0	4,947.0	-222.1	-497.4	265.4	1.67	1.59	-0.79
6,543.0	41.90	251.30	6,341.3	4,995.3	-236.1	-537.1	288.8	3.05	2.50	2.66
6,606.0	40.30	249.40	6,388.7	5,042.7	-250.0	-576.1	311.7	3.22	-2.54	-3.02
6,669.0	41.70	248.30	6,436.3	5,090.3	-265.0	-614.6	333.6	2.50	2.22	-1.75
6,732.0	42.10	247.30	6,483.2	5,137.2	-280.9	-653.6	355.3	1.24	0.63	-1.59
6,795.0	40.90	246.00	6,530.4	5,184.4	-297.4	-691.9	376.1	2.34	-1.90	-2.06
6,858.0	40.10	245.70	6,578.3	5,232.3	-314.1	-729.2	396.0	1.31	-1.27	-0.48
6,922.0	38.80	244.40	6,627.7	5,281.7	-331.3	-766.1	415.2	2.41	-2.03	-2.03
6,985.0	39.30	245.90	6,676.6	5,330.6	-348.0	-802.1	434.1	1.70	0.79	2.38
7,049.0	41.90	246.80	6,725.2	5,379.2	-364.7	-840.3	454.7	4.16	4.06	1.41



Phoenix Technology Services
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514381
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346 0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346 0usft
Site:	Wetzel County 514381	North Reference:	Gnd
Well:	Well #514381	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	As Drilled Surveys		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,112.0	41.20	246.00	6,772.3	5,426.3	-381.4	-878.6	475.3	1.39	-1.11	-1.27
7,176.0	40.20	245.20	6,820.9	5,474.9	-398.6	-916.6	495.4	1.76	-1.56	-1.25
7,239.0	40.30	245.50	6,868.9	5,522.9	-415.6	-953.6	514.9	0.35	0.16	0.48
7,271.0	43.30	250.40	6,892.8	5,546.8	-423.6	-973.3	526.0	13.85	9.38	15.31
7,302.0	45.50	256.40	6,915.0	5,569.0	-429.7	-994.1	538.9	15.28	7.10	19.35
7,334.0	46.00	261.40	6,937.3	5,591.3	-434.1	-1,016.6	554.3	11.30	1.56	15.63
7,366.0	46.30	265.20	6,959.5	5,613.5	-436.8	-1,039.5	571.0	8.61	0.94	11.88
7,398.0	45.50	268.50	6,981.7	5,635.7	-438.1	-1,062.4	588.6	7.82	-2.50	10.31
7,429.0	45.20	272.60	7,003.5	5,657.5	-437.9	-1,084.5	606.4	9.46	-0.97	13.23
7,461.0	45.40	277.40	7,026.0	5,680.0	-435.9	-1,107.1	625.7	10.68	0.63	15.00
7,493.0	46.70	280.80	7,048.3	5,702.3	-432.3	-1,129.9	646.1	8.66	4.06	10.63
7,525.0	48.10	283.50	7,069.9	5,723.9	-427.3	-1,152.9	667.5	7.60	4.38	8.44
7,556.0	49.10	286.50	7,090.4	5,744.4	-421.3	-1,175.3	689.1	7.94	3.23	9.68
7,588.0	50.80	289.40	7,111.0	5,765.0	-413.7	-1,198.6	712.3	8.74	5.31	9.06
7,619.0	52.40	292.00	7,130.3	5,784.3	-405.1	-1,221.3	735.6	8.36	5.16	8.39
7,651.0	53.80	293.60	7,149.5	5,803.5	-395.2	-1,244.9	760.5	5.93	4.38	5.00
7,682.0	56.60	296.00	7,167.2	5,821.2	-384.5	-1,268.0	785.4	11.04	9.03	7.74
7,714.0	58.50	298.90	7,184.4	5,838.4	-372.1	-1,292.0	812.0	9.68	5.94	9.06
7,746.0	60.70	302.00	7,200.5	5,854.5	-358.1	-1,315.8	839.4	10.82	6.88	9.69
7,777.0	62.80	304.60	7,215.2	5,869.2	-343.1	-1,338.6	866.7	10.02	6.77	8.39
7,809.0	65.10	307.70	7,229.3	5,883.3	-326.1	-1,361.8	895.4	11.29	7.19	9.69
7,840.0	66.90	310.10	7,241.9	5,895.9	-308.3	-1,383.8	923.7	9.15	5.81	7.74
7,872.0	69.10	311.70	7,253.9	5,907.9	-288.9	-1,406.2	953.3	8.29	6.88	5.00
7,904.0	71.30	313.50	7,264.7	5,918.7	-268.5	-1,428.4	983.3	8.68	6.88	5.63
7,935.0	73.20	316.20	7,274.2	5,928.2	-247.7	-1,449.3	1,012.5	10.31	6.13	8.71
7,967.0	75.00	318.60	7,282.9	5,936.9	-225.1	-1,470.2	1,042.7	9.15	5.63	7.50
7,999.0	76.70	321.20	7,290.8	5,944.8	-201.3	-1,490.1	1,073.0	9.50	5.31	8.13
8,030.0	78.70	323.90	7,297.4	5,951.4	-177.3	-1,508.5	1,102.1	10.68	6.45	8.71
Top of Marcellus@7301' TVD										
8,049.9	80.19	324.77	7,301.0	5,955.0	-161.4	-1,519.9	1,120.7	8.65	7.50	4.39
8,062.0	81.10	325.30	7,303.0	5,957.0	-151.6	-1,526.8	1,132.1	8.65	7.51	4.35
8,093.0	84.00	327.60	7,307.0	5,961.0	-126.0	-1,543.8	1,161.0	11.90	9.35	7.42
8,125.0	85.90	328.10	7,309.8	5,963.8	-99.0	-1,560.7	1,190.8	6.14	5.94	1.56
LP=8189' MD/ 7312' TVD										
8,189.0	90.00	329.80	7,312.1	5,966.1	-44.2	-1,593.7	1,250.0	6.93	6.41	2.66
Deepest Pt of Well=8250' MD/ 7312' TVD										
8,250.4	89.90	329.41	7,312.1	5,966.1	8.7	-1,624.8	1,306.6	0.65	-0.16	-0.63
8,252.0	89.90	329.40	7,312.2	5,966.2	10.1	-1,625.6	1,308.1	0.65	-0.16	-0.63
8,316.0	90.40	330.40	7,312.0	5,966.0	65.5	-1,657.7	1,366.9	1.75	0.78	1.56
8,379.0	90.70	332.50	7,311.4	5,965.4	120.8	-1,687.8	1,424.2	3.37	0.48	3.33
8,442.0	90.90	331.90	7,310.5	5,964.5	176.5	-1,717.2	1,481.1	1.00	0.32	-0.95
8,505.0	90.20	330.60	7,309.9	5,963.9	231.8	-1,747.5	1,538.4	2.34	-1.11	-2.06
8,569.0	90.40	331.60	7,309.6	5,963.6	287.8	-1,778.4	1,596.7	1.59	0.31	1.56



Phoenix Technology Services
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514381
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346.0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514381	North Reference:	Gnd
Well:	Well #514381	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)
8,632.0	90.60	333.50	7,309.0	5,963.0	343.7	-1,807.4	1,653.4	3.03	0.32	3.02
8,695.0	90.90	333.60	7,308.2	5,962.2	400.1	-1,835.5	1,709.7	0.50	0.48	0.16
8,758.0	90.90	333.10	7,307.2	5,961.2	456.4	-1,863.8	1,766.0	0.79	0.00	-0.79
8,821.0	89.30	332.00	7,307.1	5,961.1	512.3	-1,892.8	1,822.8	3.08	-2.54	-1.75
8,885.0	89.30	331.90	7,307.9	5,961.9	568.8	-1,922.9	1,880.7	0.16	0.00	-0.16
8,948.0	89.20	331.40	7,308.7	5,962.7	624.2	-1,952.8	1,937.8	0.81	-0.16	-0.79
9,011.0	89.40	331.60	7,309.5	5,963.5	679.6	-1,982.9	1,995.0	0.45	0.32	0.32
9,074.0	89.50	332.60	7,310.1	5,964.1	735.3	-2,012.3	2,052.0	1.60	0.16	1.59
9,137.0	90.80	332.90	7,309.9	5,963.9	791.3	-2,041.2	2,108.6	2.12	2.06	0.48
9,201.0	91.20	332.30	7,308.8	5,962.8	848.1	-2,070.6	2,166.2	1.13	0.63	-0.94
9,264.0	91.50	332.70	7,307.3	5,961.3	903.9	-2,099.7	2,223.0	0.79	0.48	0.63
9,327.0	90.70	333.10	7,306.1	5,960.1	960.0	-2,128.4	2,279.5	1.42	-1.27	0.63
9,391.0	89.90	333.20	7,305.8	5,959.8	1,017.1	-2,157.3	2,336.9	1.26	-1.25	0.16
9,454.0	90.20	333.20	7,305.7	5,959.7	1,073.3	-2,185.7	2,393.3	0.48	0.48	0.00
9,517.0	90.20	333.60	7,305.5	5,959.5	1,129.7	-2,213.9	2,449.6	0.63	0.00	0.63
9,580.0	90.10	333.40	7,305.3	5,959.3	1,186.1	-2,242.0	2,505.9	0.35	-0.16	-0.32
9,644.0	90.20	333.80	7,305.1	5,959.1	1,243.4	-2,270.5	2,563.0	0.64	0.16	0.63
9,707.0	90.70	334.30	7,304.7	5,958.7	1,300.0	-2,298.1	2,619.0	1.12	0.79	0.79
9,770.0	90.40	331.70	7,304.1	5,958.1	1,356.2	-2,326.7	2,675.5	4.15	-0.48	-4.13
9,834.0	89.20	330.00	7,304.3	5,958.3	1,412.0	-2,357.8	2,733.9	3.25	-1.88	-2.66
9,897.0	89.10	329.70	7,305.2	5,959.2	1,466.5	-2,389.5	2,791.9	0.50	-0.16	-0.48
9,960.0	89.30	329.50	7,306.1	5,960.1	1,520.8	-2,421.4	2,850.0	0.45	0.32	-0.32
10,023.0	89.20	330.30	7,306.9	5,960.9	1,575.3	-2,452.9	2,907.9	1.28	-0.16	1.27
10,087.0	89.80	331.60	7,307.6	5,961.6	1,631.3	-2,484.0	2,966.3	2.13	0.63	2.03
10,150.0	90.40	332.40	7,307.6	5,961.6	1,686.9	-2,513.6	3,023.3	1.80	1.27	1.27
10,214.0	92.20	332.40	7,306.1	5,960.1	1,743.6	-2,543.2	3,081.0	2.81	2.81	0.00
10,277.0	92.60	332.00	7,303.5	5,957.5	1,799.3	-2,572.6	3,137.8	0.90	0.63	-0.63
10,340.0	92.70	331.20	7,300.6	5,954.6	1,854.7	-2,602.5	3,194.9	1.28	0.16	-1.27
10,404.0	92.80	330.80	7,297.5	5,951.5	1,910.6	-2,633.5	3,253.2	0.64	0.16	-0.63
Final Survey=10446' MD/7295' TVD										
10,446.0	93.20	330.30	7,295.3	5,949.3	1,947.1	-2,654.1	3,291.6	1.52	0.95	-1.19
Projection to TD=10504' MD/7292' TVD										
10,504.0	93.20	330.30	7,292.1	5,946.1	1,997.4	-2,682.8	3,344.7	0.00	0.00	0.00

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
8,049.9	7,301.0	Top of Marcellus@7301' TVD		0.00	



Phoenix Technology Services
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514381
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346 0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346 0usft
Site:	Wetzel County 514381	North Reference:	Grid
Well:	Well #514381	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	As Drilled Surveys		

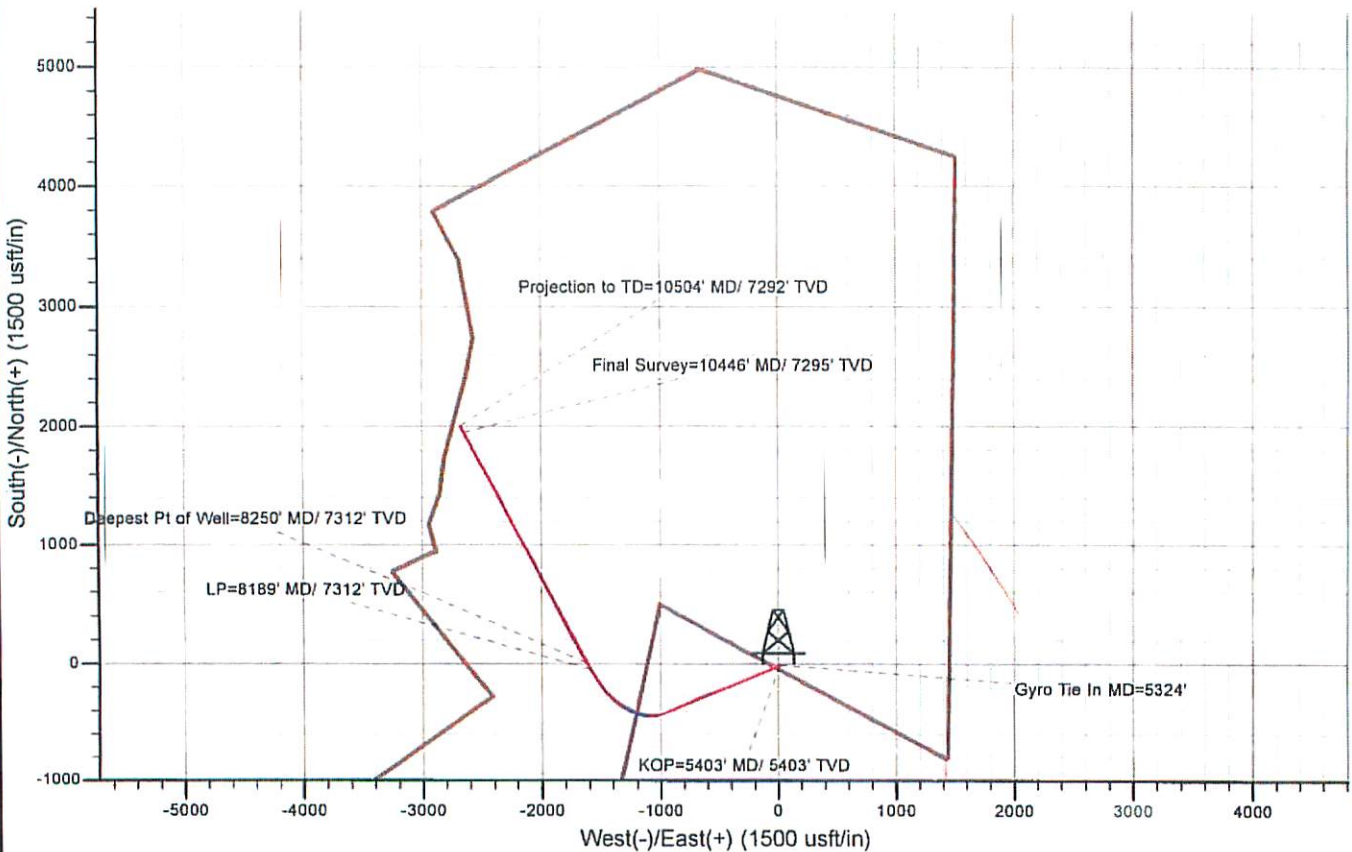
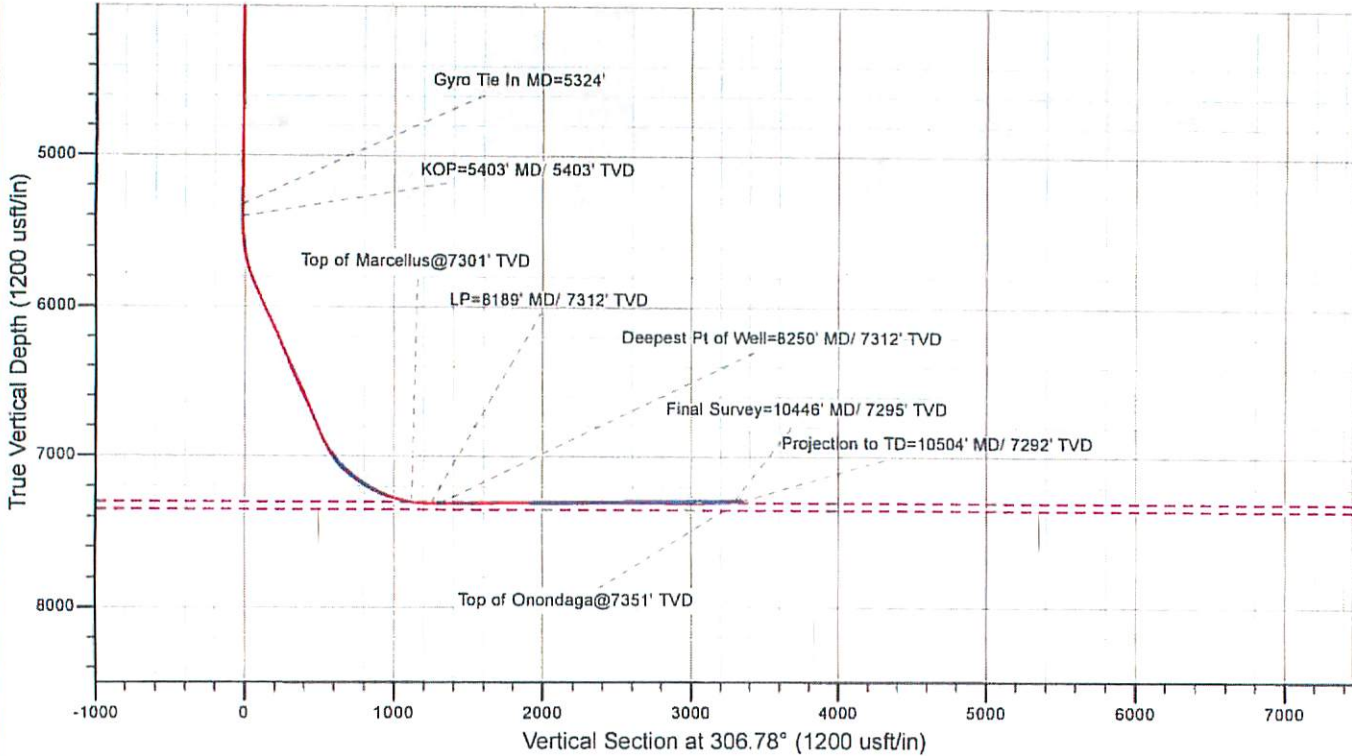
Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,324.0	5,323.9	-12.8	13.4	Gyro Tie In MD=5324'
5,403.0	5,402.9	-12.5	14.1	KOP=5403' MD/ 5403' TVD
8,189.0	7,312.1	-44.2	-1,593.7	LP=8189' MD/ 7312' TVD
8,250.4	7,312.1	8.7	-1,624.8	Deepest Pt of Well=8250' MD/ 7312' TVD
10,446.0	7,295.3	1,947.1	-2,654.1	Final Survey=10446' MD/ 7295' TVD
10,504.0	7,292.1	1,997.4	-2,682.8	Projection to TD=10504' MD/ 7292' TVD

Checked By: _____ Approved By: _____ Date: _____



KB Elevation= 1346 FT
 Ground Elevation= 1330 FT
 All Depths are Measured from KB Elevation



514381 - 47-103-02969-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	9/10/2014	10,467.00	10,470.00	10	MARCELLUS
1	9/10/2014	10,345.00	10,409.00	28	MARCELLUS
1.1 (Re-Perf)	9/10/2014	10,368.00	10,389.00	28	MARCELLUS
2	9/10/2014	10,165.00	10,289.00	42	MARCELLUS
3	9/10/2014	9,989.00	10,109.00	42	MARCELLUS
4	9/11/2014	9,802.00	9,929.00	42	MARCELLUS
4.1 (Re-Perf)	9/12/2014	9,783.00	9,794.00	32	MARCELLUS
5	9/12/2014	9,625.00	9,745.00	42	MARCELLUS
6	9/12/2014	9,445.00	9,569.00	42	MARCELLUS
7	9/13/2014	9,265.00	9,389.00	42	MARCELLUS
7.1 (Re-Perf)	9/13/2014	9,290.00	9,355.00	28	MARCELLUS
8	9/13/2014	9,085.00	9,234.00	42	MARCELLUS
9	9/13/2014	8,905.00	9,029.00	42	MARCELLUS
10	9/14/2014	8,725.00	8,851.00	42	MARCELLUS
11	9/14/2014	8,665.00	8,549.00	42	MARCELLUS
11.1 (Re-Perf)	9/14/2014	8,512.00	8,669.00	28	MARCELLUS
12	9/14/2014	8,332.00	8,458.00	42	MARCELLUS
13	9/15/2014	8,152.00	8,276.00	42	MARCELLUS
14	9/15/2014	7,972.00	8,096.00	42	MARCELLUS

514381 - 47-103-02969-0000 - 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	9/10/2014	15.00	6,600.00	8,850.00	4,320	0	1,049	- 0
1	9/10/2014	93.00	8,389.00	9,129.00	4,792	226,342	9,804	0
1.1 (Re-Perf)								
2	9/10/2014	96.90	8,125.00	8,334.00	4,639	225,841	6,118	0
3	9/11/2014	99.30	7,753.00	8,180.00	4,832	226,322	6,586	0
4	9/12/2014	101.40	7,676.00	8,217.00	4,685	448,692	16,382	0
4.1 (Re-Perf)								
5								
6	9/13/2014	94.50	8,114.00	9,140.00	4,815	211,931	5,898	0
7	9/13/2014	97.50	8,659.00	9,041.00	4,395	222,401	8,103	0
7.1 (Re-Perf)								
8	9/13/2014	94.40	8,121.00	8,978.00	4,705	224,948	6,576	0
9	9/14/2014	92.30	7,978.00	8,590.00	4,235	222,080	5,689	0
10	9/14/2014	96.40	8,088.00	8,540.00	4,405	223,280	5,568	0
11	9/14/2014	95.90	8,447.00	9,297.00	4,326	225,564	12,732	0
11.1 (Re-Perf)								
12	9/14/2014	91.30	8,103.00	9,251.00	4,790	222,541	8,281	0
13	9/15/2014	101.20	7,559.00	8,077.00	4,558	224,123	6,035	0
14	9/15/2014	101.70	7,420.00	8,433.00	3,785	222,505	5,893	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/9/2014
Job End Date:	9/15/2014
State:	West Virginia
County:	Wetzel
API Number:	47-103-02969-00-00
Operator Name:	EQT Production
Well Name and Number:	PNG129 - 514381
Longitude:	-80.64073600
Latitude:	39.55218900
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,312
Total Base Water Volume (gal):	4,447,716
Total Base Non Water Volume:	168,621



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	FTSI	Carrier	Water	7732-18-5	100.00000	91.63102	
Sand	FTSI	Proppant	Crystalline Silica	14808-60-7	100.00000	7.73265	
Hydrochloric Acid 15%	FTSI	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.07526	
FRW-600	FTSI	Friction Reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02515	
			Ammonium acetate	531-61-8	6.00000	0.00503	
HVG-1	FTSI	Gel	Petroleum Distillate	64742-47-8	55.00000	0.00467	
			Guar Gum	9000-30-0	50.00000	0.00425	
			Clay	14808-60-7	2.00000	0.00017	
			Surfactant	68439-51-0	2.00000	0.00017	
B-10	FTSI	Buffer Agent	Potassium carbonate	584-08-7	48.00000	0.00611	
			Potassium hydroxide	1310-58-3	20.00000	0.00254	
CS-500-SI	FTSI	Scale Inhibitor	Ethylene Glycol	107-21-1	10.00000	0.00258	

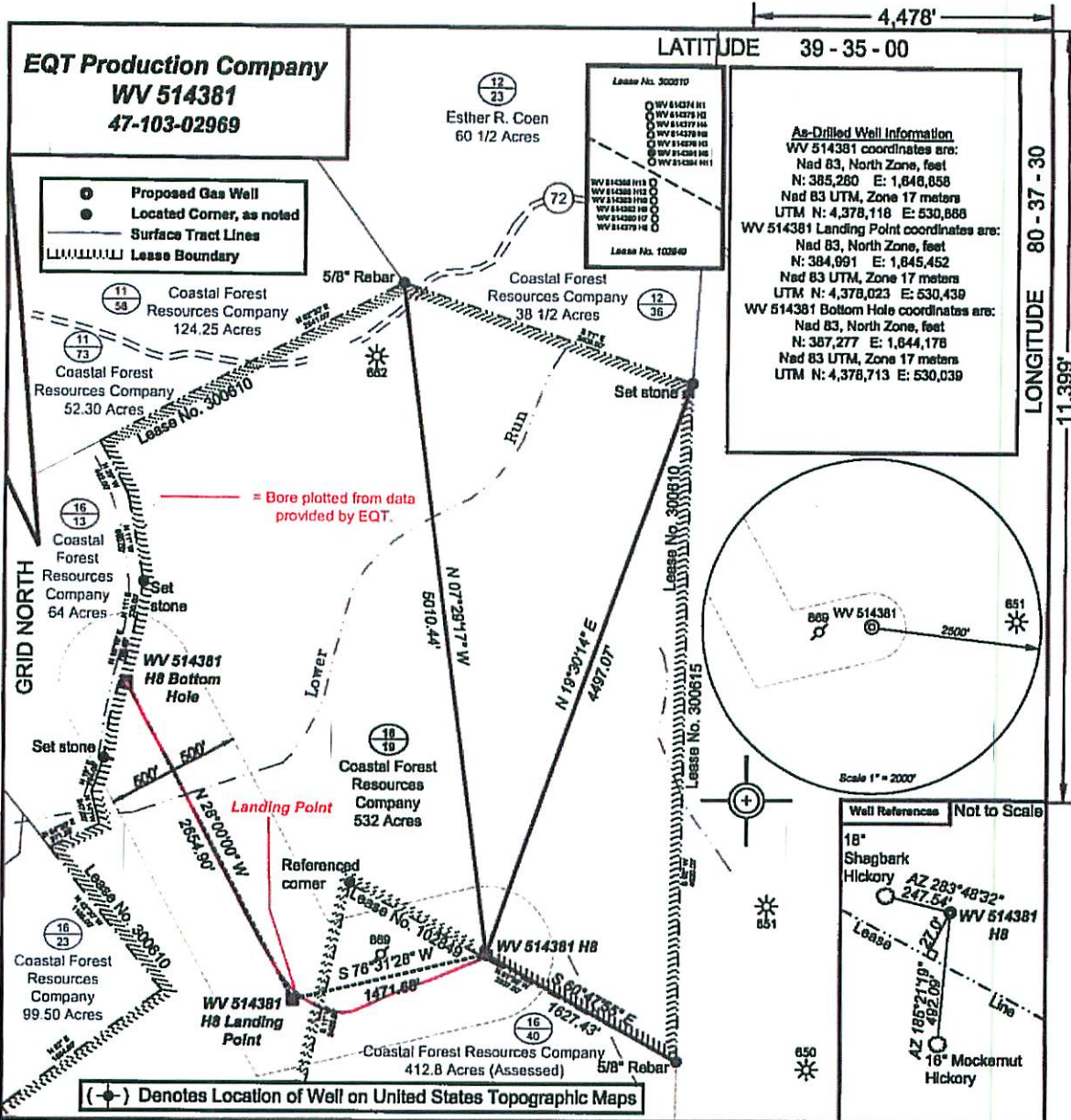
CI-150	FTSI	Corrosion Inhibitor				
			Ethylene Glycol	107-21-1	30.00000	0.00026
			Isopropanol	67-63-0	30.00000	0.00026
			Organic amine resin salt	Proprietary	30.00000	0.00026
			Dimethylformamide	68-12-2	10.00000	0.00009
			Aromatic aldehyde	Proprietary	10.00000	0.00009
			Quaternary ammonium compound	Proprietary	10.00000	0.00009
FE-100L	FTSI	Iron Control				
			Citric Acid	77-92-9	55.00000	0.00091
ClO2	Neptune	Biocide				
			Chlorine Dioxide	10049-04-4	100.00000	0.00058
NE-100	FTSI	Non-Emulsifier				
			2-Butoxyethanol	111-76-2	10.00000	0.00005
			2-Propanol	67-63-0	10.00000	0.00005
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00003
APB-1	FTSI	Gel Breaker				
			Ammonium Persulfate	7727-54-0	95.00000	0.00012
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

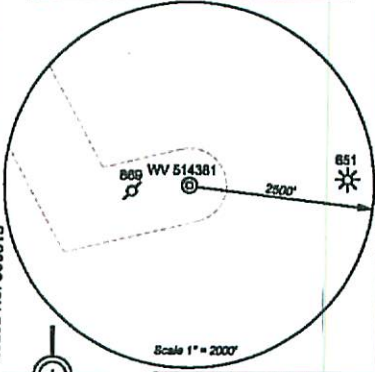
** Information is based on the maximum potential for concentration and thus the total may be over 100%

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)



As-Drilled Well Information
 WV 514381 coordinates are:
 Nad 83, North Zone, feet
 N: 385,280 E: 1,848,858
 Nad 83 UTM, Zone 17 meters
 UTM N: 4,378,118 E: 530,868
 WV 514381 Landing Point coordinates are:
 Nad 83, North Zone, feet
 N: 384,891 E: 1,845,452
 Nad 83 UTM, Zone 17 meters
 UTM N: 4,378,023 E: 530,439
 WV 514381 Bottom Hole coordinates are:
 Nad 83, North Zone, feet
 N: 387,277 E: 1,844,178
 Nad 83 UTM, Zone 17 meters
 UTM N: 4,378,713 E: 530,039



(-+) Denotes Location of Well on United States Topographic Maps



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 Department of Environmental Protection.

Ben R. Singleton
 P.S. 2092



FILE NO: 204-34-G-12 EQT PNG 129
 DRAWING NO: 204-12 PNG 129 H8
 SCALE: 1" = 1000'
 MINIMUM DEGREE OF ACCURACY: 1:2500
 PROVEN SOURCE OF ELEVATION: NGS CORS Station

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

DATE: July 10, 2014
 OPERATOR'S WELL NO. WV 514381
 API WELL NO. 47-103-02969
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 LOCATION: ELEVATION: 1328' WATERSHED Upper Run of South Fork of Fishing Creek QUADRANGLE: Pine Grove
 DISTRICT: Grant COUNTY: Wetzel
 SURFACE OWNER: Coastal Forest Resources Company F.I.A. Coastal Lumber Company ACREAGE: 532
 ROYALTY OWNER: Waco Oil & Gas Co., Inc. LEASE NO: 300610 ACREAGE: 532
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY)
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus ESTIMATED DEPTH: Tvd. 1,780' MD 11,800'

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray
 ADDRESS: 115 Professional Place P.O. Box 280 ADDRESS: 115 Professional Place P.O. Box 280
 Bridgeport, WV 26330 Bridgeport, WV 26330

03/25/2016