

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514378

API: 47 - 103 - 02875

Submission:  Initial  Amended

Notes: Amended Report w FB Data

Correction to Production Cement Top  
(MD)

Stimulation Notes:  
Reperforated Stage 3 (3.1) and 10  
(10.1)  
Combined stages 3, 3.1, and 4;  
Combined stages 10, 10.1, and 11

RECEIVED  
Office of Oil and Gas

FEB 02 2016

WV Department of  
Environmental Protection

AXWS 03/21/16

03/25/2016

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

API 47-103-02875 County Wetzel District Grant  
Quad Pine Grove Pad Name PNG129 Field/Pool Name \_\_\_\_\_  
Farm name Coastal Lumber Company Well Number 514378  
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 4,378,128 Easting 530,866  
Landing Point of Curve Northing 4,378,281 Easting 530,541  
Bottom Hole Northing 4,379,258 Easting 530,001

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 05/29/2013 Date drilling commenced 08/27/2013 Date drilling ceased 3/19/2014  
Date completion activities began 8/11/2014 Date completion activities ceased 8/18/2014  
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 686', 968', 1038', 1052', 1080' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:

03/25/2016

API 47-103 - 02875 Farm name Coastal Lumber Company Well number 514378

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"	950'	New	54.5#/ft	112', 430'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	3384'	New	40#/ft	1898', 1012'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	11563'	New	20#/ft	N/A	N
Tubing							
Packer type and depth set							

Comment Details N/A

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	845	15.6	1.19	1005.55	0	8
Coal							
Intermediate 1	Class A	1520	15.6	1.18	1793.6	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	690/505	15.2/15.6	1.07/1.86	1677.6	4,388'	72
Tubing							

Drillers TD (ft) 11,570' Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5808'

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 828', 310'
Intermediate-bow spring centralizers set at 3058', 2551', 2045', 1538', 1031', 525', 20'
Production-composite centralizer ran on every joint from 1d up to 5300'

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 \_\_\_\_\_





## 514378 Final Formations API #47-10302875

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
SAND / SHALE	0	0	686	686
FRESH WATER ZONE	1	1	734	734
COAL	686	686	688	688
SAND / SHALE	688	688	968	968
COAL	968	968	969	969
SAND / SHALE	969	969	1,038.00	1,038.00
COAL	1,038.00	1,038.00	1,045.00	1,045.00
SAND / SHALE	1,045.00	1,045.00	1,052.00	1,052.00
COAL	1,052.00	1,052.00	1,054.00	1,054.00
SAND / SHALE	1,054.00	1,054.00	1,080.00	1,080.00
COAL	1,080.00	1,080.00	1,086.00	1,086.00
SAND / SHALE	1,086.00	1,086.00	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	5,376.00
BENSON	5,374.00	5,374.00	5,758.00	5,758.00
ALEXANDER	5,742.00	5,742.00	7,300.00	7,300.00
MIDDLESEX	7,300.00	7,300.00	7,361.00	7,361.00
GENESSEE	7,361.00	7,361.00	7,509.00	7,509.00
GENESEO	7,509.00	7,509.00	7,571.00	7,190.00
TULLY	7,571.00	7,190.00	7,619.00	7,211.70
HAMILTON	7,619.00	7,211.70	7,852.00	7,287.70
MARCELLUS	7,852.00	7,287.70	11,570.00	7,300.00

03/25/2016



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## **EQT Production - Marcellus**

**Wetzel County, WV**

**Wetzel County 514378**

**Well #514378**

API #47-10302875

**Main Wellbore**

**Design: As Drilled Surveys**

## **Standard Survey Report**

19 March, 2014



Where energy meets innovation.

03/25/2016



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514378
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346 0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346 0usft
Site:	Wetzel County 514378	North Reference:	Gnd
Well:	Well #514378	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	As Drilled Surveys		

<b>Project</b> Wetzel County, WV			
<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

<b>Site</b> Wetzel County 514378			
<b>Site Position:</b>		<b>Northing:</b>	385,273.00 usft
<b>From:</b>	Map	<b>Easting:</b>	1,678,296.00 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.55
		<b>Longitude:</b>	-80.64
		<b>Grid Convergence:</b>	-0.73 "

<b>Well</b> Well #514378			
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b> 385,273.00 usft
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b> 1,678,296.00 usft
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	39° 33' 7.888 N
		<b>Longitude:</b>	80° 38' 27.329 W
		<b>Ground Level:</b>	1,330.0 usft

<b>Wellbore</b> Main Wellbore					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2010_14	3/11/2014	(°)	(°)	(nT)
			-8.62	67.02	52,443

<b>Design</b> As Drilled Surveys					
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	323.54	

<b>Survey Program</b> Date 3/19/2014					
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
()	(usft)				
0.00	5,791.0	514378 GyroData Gyros (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
0.00	7,515.0	514378 MWD (Main Wellbore)	MWD	MWD - Standard	
0.00	11,570.0	514378 Bottom Curve MWD (Main Wellbor	MWD	MWD - Standard	

<b>Survey</b>											
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	0.05	66.95	103.0	-1,243.0	0.0	0.0	0.0	0.05	0.05	0.00	
203.0	0.09	133.17	203.0	-1,143.0	0.0	0.1	-0.1	0.08	0.04	66.22	
303.0	0.13	165.48	303.0	-1,043.0	-0.2	0.2	-0.3	0.07	0.04	32.31	
403.0	0.11	205.14	403.0	-943.0	-0.4	0.2	-0.4	0.08	-0.02	39.66	
503.0	0.08	277.54	503.0	-843.0	-0.5	0.1	-0.4	0.11	-0.03	72.40	
603.0	0.10	44.67	603.0	-743.0	-0.4	0.1	-0.4	0.16	0.02	127.13	



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Project:	Wetzel County, WV	MD Reference:	KB @ 1346 Ousft
Site:	Wetzel County 514378	North Reference:	Grid
Well:	Well #514378	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)
703.0	0.11	168.54	703.0	-643.0	-0.4	0.2	-0.4	0.19	0.01	123.87
803.0	0.15	262.49	803.0	-543.0	-0.5	0.1	-0.5	0.19	0.04	93.95
903.0	0.10	302.39	903.0	-443.0	-0.5	-0.1	-0.3	0.10	-0.05	39.90
1,003.0	0.13	306.70	1,003.0	-343.0	-0.4	-0.3	-0.1	0.03	0.03	4.31
1,103.0	0.18	333.51	1,103.0	-243.0	-0.2	-0.5	0.1	0.09	0.05	26.81
1,203.0	0.21	298.81	1,203.0	-143.0	0.1	-0.7	0.5	0.12	0.03	-34.70
1,303.0	0.25	351.38	1,303.0	-43.0	0.4	-0.9	0.8	0.21	0.04	52.57
1,403.0	0.21	175.40	1,403.0	57.0	0.4	-0.9	0.9	0.46	-0.04	-175.98
1,503.0	0.33	157.86	1,503.0	157.0	-0.1	-0.8	0.4	0.14	0.12	-17.54
1,603.0	0.43	165.22	1,603.0	257.0	-0.7	-0.6	-0.2	0.11	0.10	7.36
1,703.0	0.51	147.79	1,703.0	357.0	-1.4	-0.2	-1.0	0.16	0.08	-17.43
1,803.0	0.50	153.68	1,803.0	457.0	-2.2	0.2	-1.9	0.05	-0.01	5.89
1,903.0	0.70	122.59	1,903.0	557.0	-2.9	0.9	-2.9	0.37	0.20	-31.09
2,003.0	0.96	128.35	2,003.0	657.0	-3.8	2.1	-4.3	0.27	0.26	5.76
2,103.0	0.97	117.79	2,103.0	757.0	-4.7	3.5	-5.8	0.18	0.01	-10.56
2,203.0	1.03	117.70	2,202.9	856.9	-5.5	5.0	-7.4	0.06	0.06	-0.09
2,303.0	1.08	117.29	2,302.9	956.9	-6.3	6.6	-9.1	0.05	0.05	-0.41
2,403.0	1.16	120.51	2,402.9	1,056.9	-7.3	8.4	-10.8	0.10	0.08	3.22
2,503.0	1.14	117.61	2,502.9	1,156.9	-8.3	10.1	-12.7	0.06	-0.02	-2.90
2,603.0	1.23	119.42	2,602.9	1,256.9	-9.3	11.9	-14.5	0.10	0.09	1.81
2,703.0	1.06	122.62	2,702.8	1,356.8	-10.3	13.6	-16.4	0.18	-0.17	3.20
2,803.0	0.96	123.56	2,802.8	1,456.8	-11.2	15.1	-18.0	0.10	-0.10	0.94
2,903.0	0.74	128.49	2,902.8	1,556.8	-12.1	16.3	-19.4	0.23	-0.22	4.93
3,003.0	0.75	126.68	3,002.8	1,656.8	-12.9	17.4	-20.7	0.03	0.01	-1.81
3,103.0	0.88	127.40	3,102.8	1,756.8	-13.8	18.5	-22.0	0.13	0.13	0.72
3,203.0	0.92	129.13	3,202.8	1,856.8	-14.7	19.7	-23.6	0.05	0.04	1.73
3,303.0	0.89	126.15	3,302.8	1,956.8	-15.7	21.0	-25.1	0.06	-0.03	-2.98
3,403.0	0.94	134.43	3,402.8	2,056.8	-16.7	22.2	-26.6	0.14	0.05	8.28
3,503.0	0.69	125.85	3,502.8	2,156.8	-17.7	23.3	-28.0	0.28	-0.25	-8.58
3,603.0	0.37	144.44	3,602.7	2,256.7	-18.3	23.9	-28.9	0.36	-0.32	18.59
3,703.0	0.29	142.93	3,702.7	2,356.7	-18.7	24.3	-29.5	0.08	-0.08	-1.51
3,803.0	0.20	165.28	3,802.7	2,456.7	-19.1	24.5	-29.9	0.13	-0.09	22.35
3,903.0	0.17	189.96	3,902.7	2,556.7	-19.4	24.5	-30.2	0.08	-0.03	24.68
4,003.0	0.08	310.22	4,002.7	2,656.7	-19.5	24.4	-30.2	0.22	-0.09	120.26
4,103.0	0.19	292.98	4,102.7	2,756.7	-19.4	24.2	-30.0	0.12	0.11	-17.24
4,203.0	0.20	315.80	4,202.7	2,856.7	-19.2	23.9	-29.7	0.08	0.01	22.82
4,303.0	0.29	317.73	4,302.7	2,956.7	-18.9	23.6	-29.3	0.09	0.09	1.93
4,403.0	0.13	15.45	4,402.7	3,056.7	-18.6	23.5	-28.9	0.25	-0.16	57.72
4,503.0	0.57	93.56	4,502.7	3,156.7	-18.5	24.0	-29.2	0.56	0.44	78.11
4,603.0	0.64	64.88	4,602.7	3,256.7	-18.3	25.0	-29.6	0.31	0.07	-28.68
4,703.0	0.74	66.61	4,702.7	3,356.7	-17.8	26.1	-29.9	0.10	0.10	1.73
4,803.0	0.87	67.85	4,802.7	3,456.7	-17.3	27.4	-30.2	0.13	0.13	1.24
4,903.0	0.81	59.13	4,802.7	3,556.7	-16.6	28.7	-30.5	0.14	-0.06	-8.72



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Well:	Well# #514378	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	0.72	67.74	5,002.7	3,656.7	-16.0	29.9	-30.7	0.15 -0.09		8.61
5,103.0	0.76	64.16	5,102.7	3,756.7	-15.5	31.1	-31.0	0.06 0.04		-3.58
5,203.0	0.80	63.13	5,202.7	3,856.7	-14.9	32.3	-31.2	0.04 0.04		-1.03
5,303.0	0.67	71.18	5,302.7	3,956.7	-14.4	33.5	-31.5	0.17 -0.13		8.05
5,403.0	0.65	78.63	5,402.7	4,056.7	-14.1	34.6	-31.9	0.09 -0.02		7.45
5,503.0	0.69	85.42	5,502.7	4,156.7	-13.9	35.8	-32.5	0.09 0.04		6.79
5,603.0	0.45	76.19	5,602.7	4,256.7	-13.8	36.7	-32.9	0.26 -0.24		-9.23
5,703.0	0.56	79.51	5,702.6	4,356.6	-13.6	37.6	-33.3	0.11 0.11		3.32
<b>Gyro Tie In MD=5788'</b>										
5,791.0	0.55	92.88	5,790.6	4,444.6	-13.6	38.4	-33.8	0.15 -0.01		15.19
5,838.0	0.40	65.20	5,837.6	4,491.6	-13.5	38.8	-33.9	0.57 -0.32		-58.89
5,881.0	0.40	66.10	5,880.6	4,534.6	-13.4	39.1	-34.0	0.01 0.00		2.09
5,924.0	0.40	348.00	5,923.6	4,577.6	-13.2	39.2	-33.9	1.17 0.00		-181.63
5,967.0	5.70	270.10	5,966.6	4,620.6	-13.0	37.0	-32.5	13.09 12.33		-181.16
6,010.0	11.00	271.80	6,009.1	4,663.1	-12.9	30.8	-28.7	12.34 12.33		3.95
6,053.0	14.20	273.20	6,051.1	4,705.1	-12.5	21.4	-22.8	7.48 7.44		3.26
6,096.0	17.60	275.60	6,092.4	4,746.4	-11.5	9.7	-15.0	8.05 7.91		5.58
6,139.0	21.40	279.20	6,132.9	4,786.9	-9.6	-4.5	-5.1	9.26 8.84		8.37
6,182.0	25.00	280.80	6,172.5	4,826.5	-6.7	-21.2	7.2	8.50 8.37		3.72
6,225.0	27.90	281.60	6,210.9	4,864.9	-3.0	-40.0	21.4	6.79 6.74		1.86
6,268.0	30.20	281.70	6,248.5	4,902.5	1.3	-60.4	36.9	5.35 5.35		0.23
6,311.0	33.10	279.80	6,285.1	4,939.1	5.4	-82.6	53.5	7.13 6.74		-4.42
6,354.0	36.50	279.80	6,320.4	4,974.4	9.6	-106.8	71.2	7.91 7.91		0.00
6,397.0	37.00	281.90	6,354.9	5,008.9	14.5	-132.1	90.1	3.14 1.16		4.88
6,440.0	40.70	282.30	6,388.4	5,042.4	20.1	-158.4	110.3	8.62 8.60		0.93
6,483.0	40.90	282.30	6,420.9	5,074.9	26.1	-185.9	131.5	0.47 0.47		0.00
6,526.0	40.70	281.90	6,453.5	5,107.5	32.0	-213.3	152.5	0.77 -0.47		-0.93
6,568.0	40.30	281.50	6,485.4	5,139.4	37.5	-240.1	172.8	1.14 -0.95		-0.95
6,612.0	39.70	280.20	6,519.1	5,173.1	42.9	-267.8	193.6	2.34 -1.36		-2.95
6,655.0	39.30	279.40	6,552.3	5,206.3	47.5	-294.8	213.4	1.51 -0.93		-1.86
6,697.0	38.90	279.10	6,584.9	5,238.9	51.8	-320.9	232.4	1.05 -0.95		-0.71
6,740.0	39.10	283.60	6,618.3	5,272.3	57.1	-347.4	252.4	6.60 0.47		10.47
6,783.0	38.80	283.20	6,651.8	5,305.8	63.4	-373.7	273.1	0.91 -0.70		-0.93
6,826.0	38.80	282.20	6,685.3	5,339.3	69.3	-400.0	293.4	1.46 0.00		-2.33
6,869.0	40.60	282.00	6,718.4	5,372.4	75.0	-426.9	314.0	4.20 4.19		-0.47
6,913.0	40.20	281.50	6,751.9	5,405.9	80.8	-454.8	335.3	1.17 -0.91		-1.14
6,956.0	40.00	280.60	6,784.8	5,438.8	86.2	-482.0	355.7	1.43 -0.47		-2.09
6,999.0	39.70	280.30	6,817.8	5,471.8	91.2	-509.1	375.8	0.83 -0.70		-0.70
7,042.0	39.60	280.70	6,850.9	5,504.9	96.2	-536.1	395.9	0.64 -0.23		0.93
7,085.0	39.50	280.00	6,884.0	5,538.0	101.1	-563.0	415.9	1.06 -0.23		-1.63
7,128.0	41.30	280.20	6,916.8	5,570.8	106.0	-590.4	436.1	4.20 4.19		0.47
7,171.0	42.90	284.40	6,948.7	5,602.7	112.1	-618.6	457.8	7.53 3.72		9.77



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514378
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346.0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514378	North Reference:	Grid
Well:	Well #514378	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)
7,214.0	45.00	286.60	6,979.6	5,633.6	120.7	-647.2	481.6	8.62	4.88	10.23
7,257.0	47.10	292.40	7,009.5	5,663.5	131.6	-676.1	507.6	7.76	4.88	8.37
7,300.0	48.80	294.90	7,038.3	5,692.3	144.4	-705.4	535.3	5.85	3.95	5.81
7,343.0	50.90	297.10	7,066.0	5,720.0	158.8	-734.9	564.4	6.26	4.88	5.12
7,386.0	53.90	300.30	7,092.3	5,746.3	175.2	-764.7	595.3	9.13	6.98	7.44
7,429.0	56.40	302.80	7,116.8	5,770.8	193.6	-794.8	628.1	7.52	5.81	5.81
<b>Final Survey MD=7469'</b>										
7,472.0	58.20	305.10	7,140.1	5,794.1	213.8	-824.8	662.1	6.15	4.19	5.35
<b>Projection to TD MD=7512' - Plan Tie In=7515' MD</b>										
7,515.0	59.50	307.80	7,162.3	5,816.3	235.7	-854.4	697.3	6.17	3.02	6.28
7,556.0	60.70	309.80	7,182.8	5,836.8	258.0	-882.1	731.7	5.14	2.93	4.88
7,588.0	63.00	312.40	7,197.8	5,851.8	276.5	-903.4	759.2	10.15	7.19	8.13
7,620.0	63.90	312.60	7,212.2	5,866.2	295.9	-924.5	787.3	2.87	2.81	0.63
7,651.0	65.80	313.80	7,225.3	5,879.3	315.1	-944.9	814.9	7.06	6.13	3.87
7,683.0	67.30	314.50	7,238.1	5,892.1	335.5	-966.0	843.9	5.10	4.69	2.19
7,715.0	69.30	316.20	7,249.9	5,903.9	356.7	-986.9	873.3	7.96	6.25	5.31
7,746.0	71.80	319.30	7,260.2	5,914.2	378.3	-1,006.5	902.4	12.41	8.06	10.00
7,778.0	73.80	321.70	7,269.7	5,923.7	401.9	-1,025.9	932.9	9.51	6.25	7.50
7,810.0	75.30	323.80	7,278.2	5,932.2	426.5	-1,044.6	963.8	7.87	4.69	6.56
7,841.0	77.70	325.00	7,285.4	5,939.4	451.0	-1,062.2	993.9	8.61	7.74	3.87
7,873.0	78.50	325.70	7,292.0	5,946.0	476.7	-1,080.0	1,025.2	3.29	2.50	2.19
7,905.0	80.40	326.90	7,297.9	5,951.9	502.9	-1,097.4	1,056.6	6.99	5.94	3.75
7,936.0	81.80	328.40	7,302.7	5,956.7	528.8	-1,113.8	1,087.2	6.58	4.52	4.84
7,968.0	83.90	330.40	7,306.7	5,960.7	556.1	-1,130.0	1,118.7	9.03	6.56	6.25
8,000.0	86.40	330.70	7,309.4	5,963.4	583.9	-1,145.6	1,150.4	7.87	7.81	0.94
8,063.0	89.40	330.90	7,311.7	5,965.7	638.8	-1,176.3	1,212.8	4.77	4.76	0.32
8,126.0	90.40	330.70	7,311.8	5,965.8	693.8	-1,207.1	1,275.3	1.62	1.59	-0.32
8,189.0	91.10	330.70	7,311.0	5,965.0	748.7	-1,237.9	1,337.8	1.11	1.11	0.00
8,252.0	91.30	332.30	7,309.7	5,963.7	804.1	-1,268.0	1,400.2	2.56	0.32	2.54
8,315.0	91.30	332.80	7,308.2	5,962.2	860.0	-1,297.0	1,462.4	0.79	0.00	0.79
8,379.0	90.00	332.40	7,307.5	5,961.5	916.8	-1,326.4	1,525.6	2.13	-2.03	-0.63
8,442.0	89.40	332.30	7,307.8	5,961.8	972.6	-1,355.7	1,587.9	0.97	-0.95	-0.16
8,505.0	89.90	332.20	7,308.2	5,962.2	1,028.4	-1,385.0	1,650.1	0.81	0.79	-0.16
8,569.0	90.40	331.60	7,308.1	5,962.1	1,084.8	-1,415.2	1,713.5	1.22	0.78	-0.94
8,632.0	91.10	331.10	7,307.2	5,961.2	1,140.1	-1,445.4	1,775.9	1.37	1.11	-0.79
8,695.0	91.10	332.00	7,306.0	5,960.0	1,195.5	-1,475.4	1,838.2	1.43	0.00	1.43
8,759.0	91.10	334.10	7,304.8	5,958.8	1,252.5	-1,504.4	1,901.3	3.28	0.00	3.28
8,822.0	90.70	333.20	7,303.8	5,957.8	1,309.0	-1,532.3	1,963.4	1.56	-0.63	-1.43
8,886.0	88.20	333.00	7,304.4	5,958.4	1,366.0	-1,561.3	2,026.5	3.92	-3.91	-0.31
8,949.0	88.30	332.50	7,306.3	5,960.3	1,422.0	-1,590.1	2,088.6	0.81	0.16	-0.79
9,012.0	88.80	332.40	7,307.9	5,961.9	1,477.8	-1,619.2	2,150.8	0.81	0.79	-0.16
9,076.0	89.00	331.90	7,309.2	5,963.2	1,534.4	-1,649.1	2,214.1	0.84	0.31	-0.78
9,140.0	89.70	331.90	7,309.9	5,963.9	1,590.9	-1,679.3	2,277.4	1.09	1.09	0.00





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# Phoenix Technology Services

## Survey Report



Where energy meets Innovation.

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514378
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346.0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514378	North Reference:	Grid
Well:	Well #514378	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)
9,203.0	90.80	333.20	7,309.6	5,963.6	1,646.8	-1,708.3	2,339.6	2.70	1.75	2.06
9,266.0	91.00	332.70	7,308.6	5,962.6	1,702.9	-1,737.0	2,401.8	0.85	0.32	-0.79
9,329.0	91.40	331.70	7,307.3	5,961.3	1,758.6	-1,766.3	2,464.1	1.71	0.63	-1.59
9,392.0	92.40	332.20	7,305.2	5,959.2	1,814.2	-1,795.9	2,526.3	1.77	1.59	0.79
9,455.0	92.70	334.90	7,302.4	5,956.4	1,870.5	-1,824.0	2,588.3	4.31	0.48	4.29
9,518.0	91.70	334.90	7,300.0	5,954.0	1,927.5	-1,850.7	2,650.0	1.59	-1.59	0.00
9,582.0	90.80	333.80	7,298.6	5,952.6	1,985.2	-1,878.4	2,712.9	2.22	-1.41	-1.72
9,645.0	90.50	337.30	7,297.9	5,951.9	2,042.5	-1,904.5	2,774.5	5.58	-0.48	5.56
9,708.0	90.80	335.70	7,297.2	5,951.2	2,100.3	-1,929.6	2,835.9	2.58	0.48	-2.54
9,771.0	91.10	335.10	7,296.1	5,950.1	2,157.6	-1,955.8	2,897.5	1.06	0.48	-0.95
9,835.0	90.00	335.10	7,295.5	5,949.5	2,215.6	-1,982.7	2,960.2	1.72	-1.72	0.00
9,898.0	88.30	335.50	7,296.4	5,950.4	2,272.8	-2,009.1	3,021.9	2.77	-2.70	0.63
9,961.0	88.20	335.90	7,298.4	5,952.4	2,330.2	-2,035.0	3,083.4	0.65	-0.16	0.63
10,024.0	88.50	333.10	7,300.2	5,954.2	2,387.1	-2,062.1	3,145.3	4.47	0.48	-4.44
10,087.0	88.80	332.40	7,301.7	5,955.7	2,443.1	-2,090.9	3,207.4	1.21	0.48	-1.11
10,150.0	89.10	332.30	7,302.8	5,956.8	2,498.9	-2,120.1	3,269.7	0.50	0.48	-0.16
10,214.0	89.60	332.20	7,303.5	5,957.5	2,555.5	-2,149.9	3,332.9	0.80	0.78	-0.16
10,277.0	89.50	332.70	7,304.0	5,958.0	2,611.3	-2,179.1	3,395.2	0.81	-0.16	0.79
10,340.0	89.80	332.30	7,304.4	5,958.4	2,667.2	-2,208.2	3,457.4	0.79	0.48	-0.63
10,403.0	90.30	333.60	7,304.4	5,958.4	2,723.3	-2,236.8	3,519.6	2.21	0.79	2.06
10,467.0	90.90	335.20	7,303.7	5,957.7	2,781.0	-2,264.5	3,582.4	2.67	0.94	2.50
10,530.0	91.30	335.10	7,302.5	5,956.5	2,838.2	-2,290.9	3,644.1	0.65	0.63	-0.16
10,594.0	90.60	335.00	7,301.4	5,955.4	2,896.2	-2,317.9	3,706.8	1.10	-1.09	-0.16
10,657.0	90.20	333.50	7,301.0	5,955.0	2,953.0	-2,345.3	3,768.7	2.46	-0.63	-2.38
10,720.0	90.70	334.50	7,300.5	5,954.5	3,009.6	-2,372.9	3,830.7	1.77	0.79	1.59
10,783.0	90.20	333.90	7,300.0	5,954.0	3,066.3	-2,400.3	3,892.6	1.24	-0.79	-0.95
10,847.0	89.40	331.20	7,300.2	5,954.2	3,123.1	-2,429.8	3,955.8	4.40	-1.25	-4.22
10,910.0	89.70	330.30	7,300.7	5,954.7	3,178.1	-2,460.6	4,018.3	1.51	0.48	-1.43
10,973.0	90.20	330.20	7,300.8	5,954.8	3,232.8	-2,491.9	4,080.8	0.81	0.79	-0.16
11,037.0	90.90	329.80	7,300.2	5,954.2	3,288.2	-2,523.9	4,144.4	1.26	1.09	-0.63
11,100.0	91.90	330.60	7,298.6	5,952.6	3,342.8	-2,555.2	4,207.0	2.03	1.59	1.27
11,163.0	90.30	331.80	7,297.4	5,951.4	3,398.0	-2,585.5	4,269.4	3.17	-2.54	1.90
11,226.0	91.10	331.20	7,296.6	5,950.6	3,453.4	-2,615.6	4,331.8	1.59	1.27	-0.95
11,289.0	90.90	332.30	7,295.5	5,949.5	3,508.9	-2,645.4	4,394.1	1.77	-0.32	1.75
11,353.0	88.30	332.10	7,296.0	5,950.0	3,565.5	-2,675.2	4,457.4	4.07	-4.06	-0.31
11,416.0	88.70	331.80	7,297.6	5,951.6	3,621.1	-2,704.9	4,519.7	0.79	0.63	-0.48
11,479.0	89.20	332.00	7,298.8	5,952.8	3,676.6	-2,734.5	4,582.0	0.85	0.79	0.32
<b>Last Survey=11515' MD/ 7299' TVD</b>										
11,515.0	89.40	331.40	7,299.2	5,953.2	3,708.3	-2,751.6	4,617.7	1.76	0.56	-1.67
<b>Projection to TD=11570' MD/ 7300' TVD</b>										
11,570.0	89.40	331.40	7,299.8	5,953.8	3,756.6	-2,777.9	4,672.1	0.00	0.00	0.00



Phoenix Technology Services  
Survey Report



Where energy meets innovation.

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Wetzel County 514378
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1346.0usft
Project:	Wetzel County, WV	MD Reference:	KB @ 1346.0usft
Site:	Wetzel County 514378	North Reference:	Gnd
Well:	Well #514378	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)		
5,791.0	5,790.6	-13.6	38.4	Gyro Tie In MD=5788'	
7,472.0	7,140.1	213.8	-824.8	Final Survey MD=7469'	
7,515.0	7,162.3	235.7	-854.4	Projection to TD MD=7512'	
7,515.0	7,162.3	235.7	-854.4	Plan Tie In=7515' MD	
11,515.0	7,299.2	3,708.3	-2,751.6	Last Survey=11515' MD/ 7299' TVD	
11,570.0	7,299.8	3,756.6	-2,777.9	Projection to TD=11570' MD/ 7300' TVD	

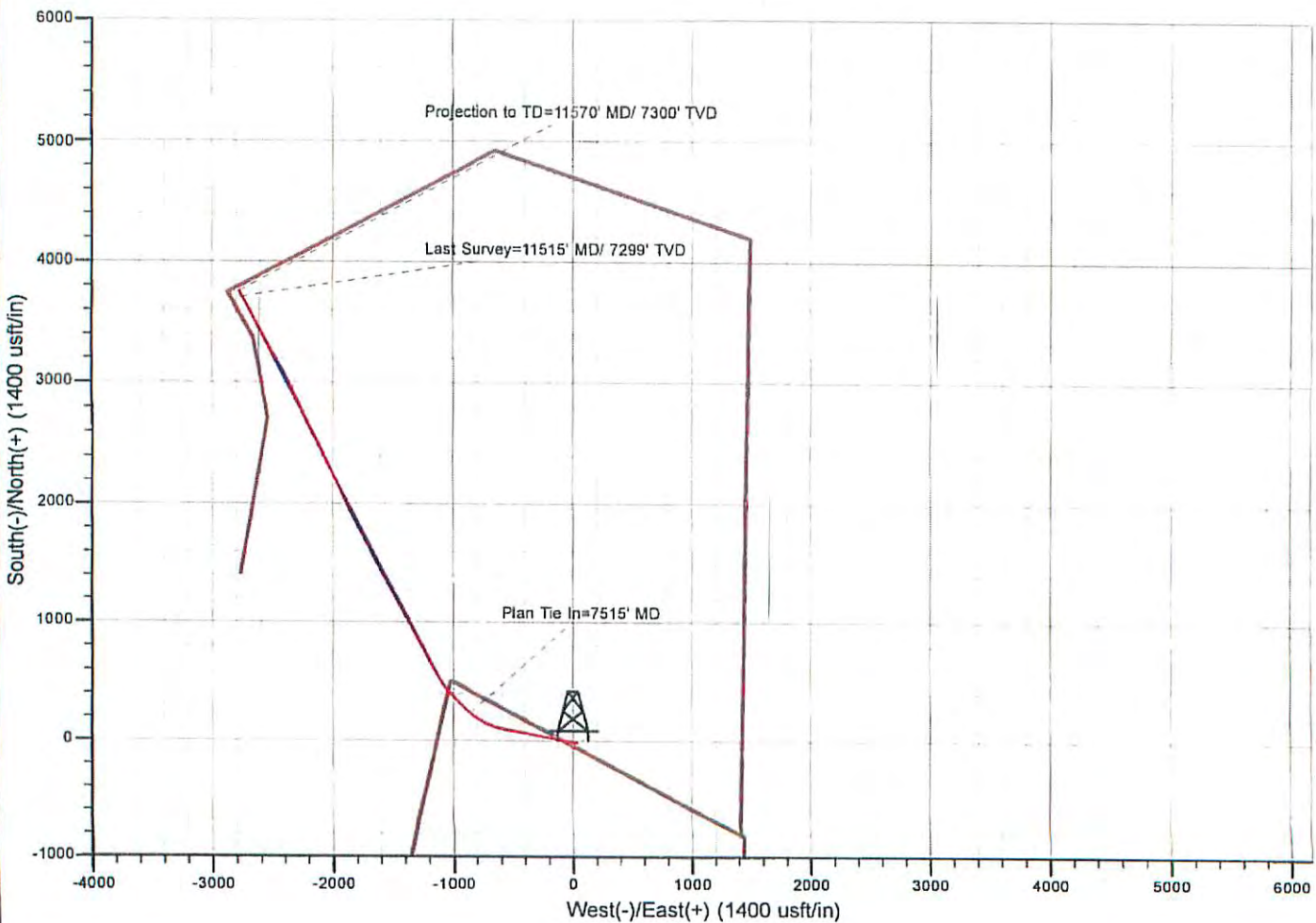
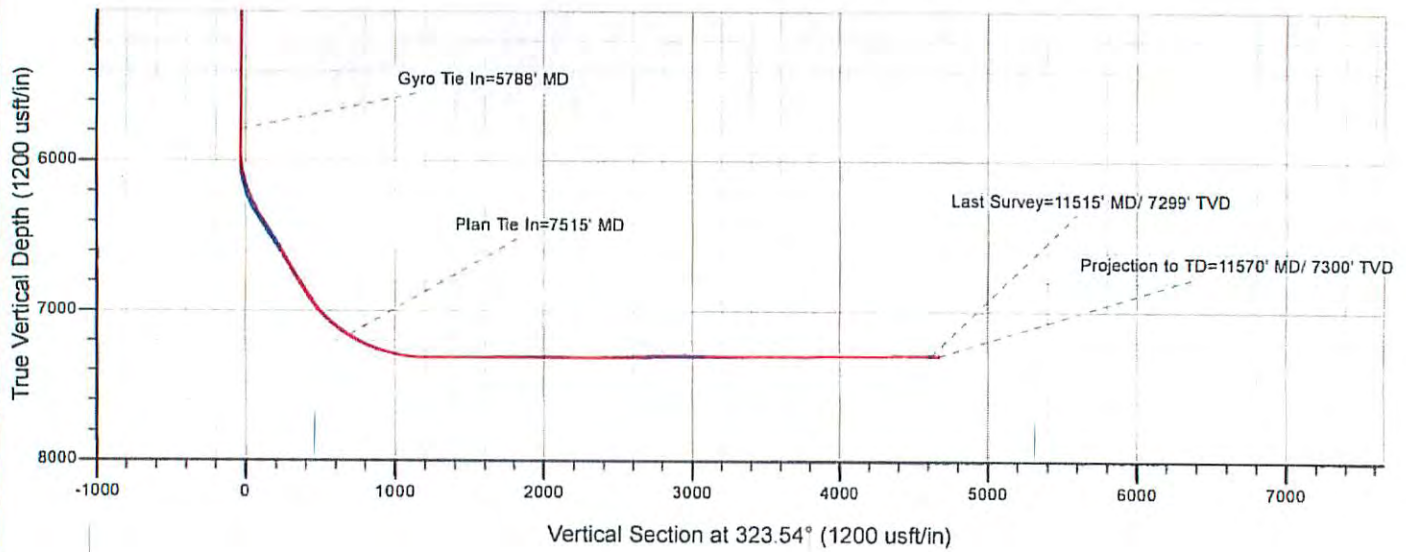
Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_





# EQT Production - Marcellus

Project: Wetzel County, WV  
Site: Wetzel County 514378  
Well: Well #514378  
Wellbore: Main Wellbore  
Design: As Drilled Surveys



**514378 - 47-103-02875-0000 - Perforations**

<b>Stage Number</b>	<b>Perforation Date</b>	<b>Top Perf Depth (ftKB)</b>	<b>Bottom Perf Depth (ftKB)</b>	<b>Number of Shots</b>	<b>Formation</b>
<b>Initiation Sleeve</b>	8/11/2014	11,533.00	11,535.00	10	MARCELLUS
<b>1</b>	8/12/2014	11,352.00	11,489.00	32	MARCELLUS
<b>2</b>	8/12/2014	11,128.00	11,310.00	40	MARCELLUS
<b>3</b>	8/12/2014	10,903.00	11,085.00	40	MARCELLUS
<b>3.1 (Re-Perf)</b>	8/12/2014	10,914.00	10,982.00	32	MARCELLUS
<b>4</b>	8/13/2014	10,678.00	10,860.00	40	MARCELLUS
<b>5</b>	8/14/2014	10,453.00	10,635.00	40	MARCELLUS
<b>6</b>	8/14/2014	10,228.00	10,410.00	40	MARCELLUS
<b>7</b>	8/14/2014	10,003.00	10,185.00	40	MARCELLUS
<b>8</b>	8/15/2014	9,778.00	9,960.00	40	MARCELLUS
<b>9</b>	8/15/2014	9,550.00	9,735.00	40	MARCELLUS
<b>10</b>	8/16/2014	9,328.00	9,510.00	40	MARCELLUS
<b>10.1 (Re-Perf)</b>	8/16/2014	9,307.00	9,396.00	24	MARCELLUS
<b>11</b>	8/16/2014	9,103.00	9,285.00	40	MARCELLUS
<b>12</b>	8/16/2014	8,878.00	9,060.00	40	MARCELLUS
<b>13</b>	8/17/2014	8,653.00	8,835.00	40	MARCELLUS
<b>14</b>	8/17/2014	8,428.00	8,610.00	40	MARCELLUS
<b>15</b>	8/17/2014	8,203.00	8,385.00	40	MARCELLUS
<b>16</b>	8/18/2014	7,978.00	8,160.00	40	MARCELLUS

**514378 - 47-103-02875-0000 - Stimulated Stages**

<b>Stage Number</b>	<b>Stimulation Date</b>	<b>Ave Pump Rate (BPM)</b>	<b>Ave Treatment Pressure (PSI)</b>	<b>Max Breakdown Pressure (PSI)</b>	<b>ISIP (PSI)</b>	<b>Amount of Proppant (lbs)</b>	<b>Amount of Water (bbls)</b>	<b>Amount of Nitrogen/other (units)</b>
<b>Initiation Sleeve</b>	8/11/2014	12.10	7,105.00	9,139.00	4,801	NA	913	0
<b>1</b>	8/11/2014	99.40	8,113.00	9,089.00	4,706	372,968	9,375	0
<b>2</b>	8/12/2014	100.10	8,530.00	9,143.00	4,665	375,983	9,887	0
<b>3</b>	8/13/2014	98.20	8,361.00	8,920.00	4,858	748,359	24,168	0
<b>3.1 (Re-Perf)</b>								
<b>4</b>								
<b>5</b>	8/14/2014	98.10	8,512.00	8,973.00	5,588	374,751	11,346	0
<b>6</b>	8/14/2014	99.50	8,417.00	9,129.00	4,739	373,691	9,323	0
<b>7</b>	8/15/2014	100.70	7,821.00	8,647.00	4,244	376,720	9,150	0
<b>8</b>	8/15/2014	91.20	8,631.00	9,253.00	4,817	375,900	10,154	0
<b>9</b>	8/16/2014	100.50	7,873.00	8,718.00	4,388	374,600	8,653	0
<b>10</b>	8/16/2014	100.70	7,548.00	8,805.00	4,937	745,600	20,566	0
<b>10.1 (Re-Perf)</b>								
<b>11</b>								
<b>12</b>	8/17/2014	101.20	7,965.00	9,007.00	5,623	372,600	8,777	0
<b>13</b>	8/17/2014	100.10	8,145.00	8,884.00	4,449	375,212	9,494	0
<b>14</b>	8/17/2014	100.40	7,487.00	9,051.00	4,665	375,000	8,651	0
<b>15</b>	8/18/2014	100.90	8,527.00	8,962.00	4,738	377,400	8,564	0
<b>16</b>	8/18/2014	100.30	8,441.00	9,132.00	4,925	375,603	10,186	0



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/11/2014
Job End Date:	8/18/2014
State:	West Virginia
County:	Wetzel
API Number:	47-103-02875-00-00
Operator Name:	EQT Production
Well Name and Number:	PNG129 - 514378
Longitude:	-80.64074200
Latitude:	39.55227400
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,312
Total Base Water Volume (gal):	6,758,997
Total Base Non Water Volume:	295,892



## 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	90.04535	
Sand	FTSI	Proppant	Crystalline Silica	14808-60-7	100.00000	9.58691	
Hydrochloric Acid 15%	FTSI	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.03534	
FRW-600	FTSI	Friction Reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02393	
			Ammonium acetate	631-61-8	6.00000	0.00479	
B-10	FTSI	Buffer Agent	Potassium carbonate	584-08-7	48.00000	0.00465	
			Potassium hydroxide	1310-58-3	20.00000	0.00194	
CS-500-SI	FTSI	Scale Inhibitor	Ethylene Glycol	107-21-1	10.00000	0.00374	
HVG-1	FTSI	Gel	Petroleum Distillate	64742-47-8	55.00000	0.00183	
			Guar Gum	9000-30-0	50.00000	0.00166	
			Surfactant	68439-51-0	2.00000	0.00007	
			Clay	14808-60-7	2.00000	0.00007	



CI-150	FTSI	Corrosion Inhibitor				
			Organic amine resin salt	Proprietary	30.00000	0.00012
			Ethylene Glycol	107-21-1	30.00000	0.00012
			Isopropanol	67-63-0	30.00000	0.00012
			Dimethylformamide	68-12-2	10.00000	0.00004
			Aromatic aldehyde	Proprietary	10.00000	0.00004
			Quaternary ammonium compound	Proprietary	10.00000	0.00004
CIO2	Neptune	Biocide				
			Chlorine Dioxide	10049-04-4	100.00000	0.00044
FE-100L	FTSI	Iron Control				
			Citric Acid	77-92-9	55.00000	0.00044
APB-1	FTSI	Gel Breaker				
			Ammonium Persulfate	7727-54-0	95.00000	0.00007
NE-100	FTSI	Non-Emulsifier				
			2-Butoxyethanol	111-76-2	10.00000	0.00003
			2-Propanol	67-63-0	10.00000	0.00003
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001

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.

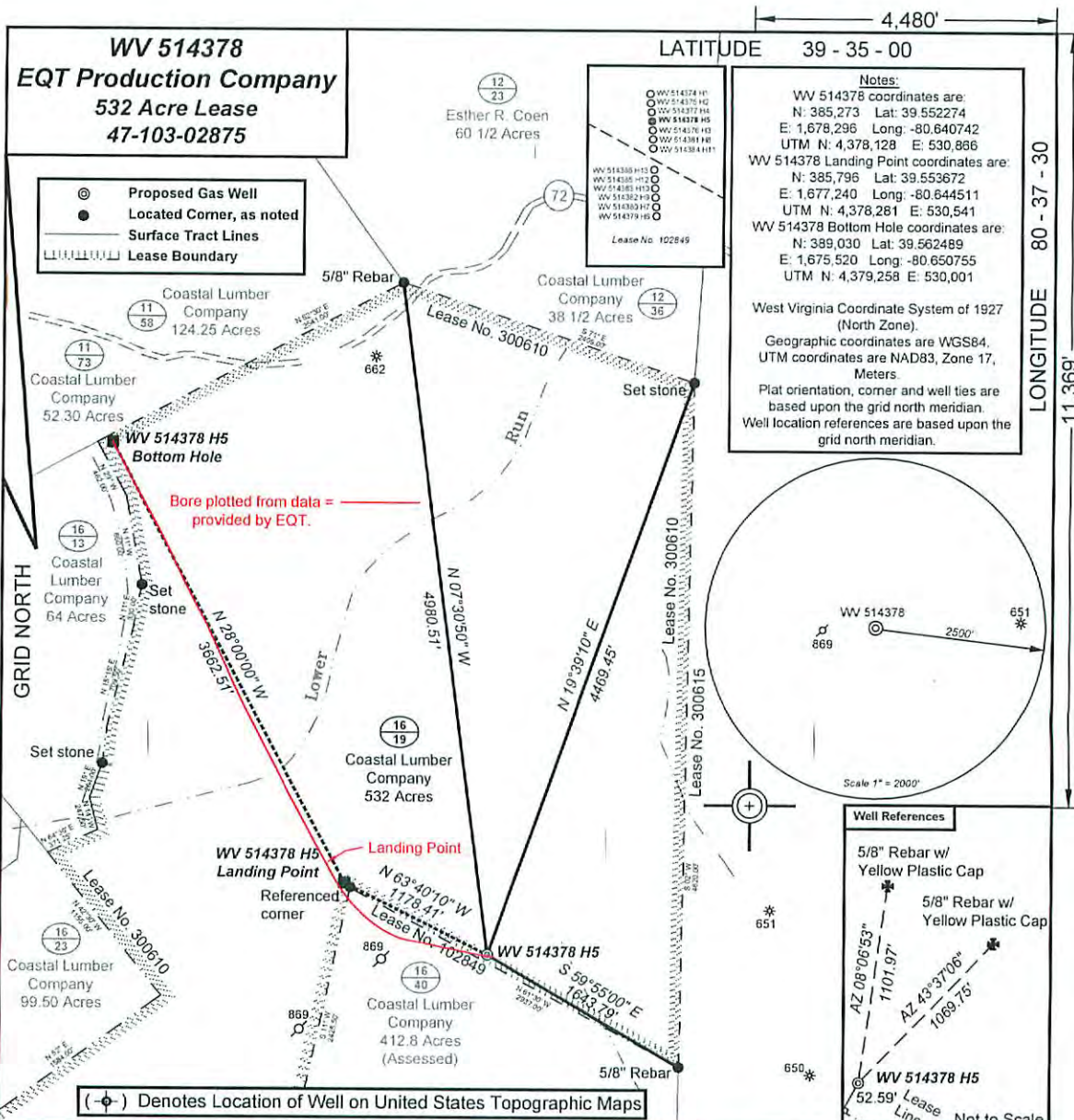
\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* 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.

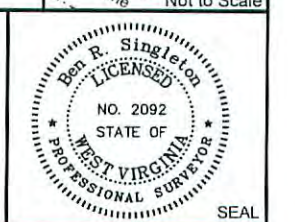
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)





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.

P.S. 2092



FILE NO: 204-34-G-12 EQT PNG 129  
 DRAWING NO: 204-12 PNG 129 H5  
 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: March 25 20 14  
 OPERATOR'S WELL NO. WV 514378  
 API WELL NO  
 47 - 103 - 02875  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
 LOCATION: ELEVATION: Proposed 1329.50' Ground 1391' WATERSHED Upper Run of South Fork of Fishing Creek QUADRANGLE: Pine Grove  
 DISTRICT: Grant COUNTY: Wetzel  
 SURFACE OWNER: 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: MD 13,602 TVD: 7,760'

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray  
 ADDRESS: 1710 Pennsylvania Avenue ADDRESS: 1710 Pennsylvania Avenue  
Charleston, WV 25302 Charleston, WV 25302

03/25/2016