

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 513758

API: 47 - 085 - 10134

Submission:  Initial  Amended

Notes: -Revised Plat  
-Revised "As Drilled" Coordinates

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**APPROVED**

NAME: Michael Laff  
DATE: 12-21-2016

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

API 47-085-10134 County RITCHIE District UNION  
Quad OXFORD 7.5' Pad Name OXF163 Field/Pool Name \_\_\_\_\_  
Farm name HAROLD K. PIERCE Well Number 513758  
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 4,331,885.9 Easting 513,599.6  
Landing Point of Curve Northing 4,331,504.0 Easting 513,009.3  
Bottom Hole Northing 4,329,293.1 Easting 513,782.4

Elevation (ft) 1159 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 12.5 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 9/22/2014 Date drilling commenced 12/03/2014 Date drilling ceased 7/05/2015  
Date completion activities began 9/12/2015 Date completion activities ceased 9/21/2015  
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 176',453',517' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1156' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

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

API 47-085 - 10134 Farm name HAROLD K. PIERCE Well number 513758

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	40'	NEW	A-500 78.7LB/FT	NONE	Y
Surface	17.5"	13.375"	1055'	NEW	J-55 54.5LB/FT	511'	Y
Coal							
Intermediate 1	12.375"	9.625"	3039'	NEW	A-500 40LB/FT	1851'	N
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	15,397'	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set							

Comment Details We grouted with cement to surface on the intermediate casing string with 79 bbls of cement.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	38	15.6	1.18	44.84	0	8
Surface	CLASS A	832	15.6	1.18	981.8	0	8
Coal							
Intermediate 1	CLASS A	1407	15.6	1.18	1660.3	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class H	815/1040	14.2 / 15.2	1.23 / 1.95	3030.45	2,565'	72
Tubing							

Drillers TD (ft) 15,400' MD Loggers TD (ft) N/A

Deepest formation penetrated Geneseo Plug back to (ft) 2480'

Plug back procedure Tripped in hole open ended to 5225'. Tripped out of hole to 4443' and pumped 45 bbls Class A cement (201 sacks) and then tripped out to 3813' and pumped 45 bbls Class A cement (201 sacks) and then tripped out to 3088' and pumped 38 bbls Class A cement (181 sacks). Top of cement at 3423'.

Kick off depth (ft) 3,690' MD

Check all wireline logs run  caliper  density  deviated/directional  induction  neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No  Conventional  Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

CONDUCTOR- NONE  
SURFACE- JOINTS: 1,11, 21  
INTERMEDIATE- RAN AT LEAST EVERY 500' FEET  
PRODUCTION- 280 Composite Centralizers. One on every joint from TD to 3,500 MD

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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- 085 - 10134 Farm name HAROLD K. PIERCE Well number 513758

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					<b>Please See Attached</b>

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)
						<b>Please</b>	<b>See</b>	<b>Attached</b>

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API 47- 085 - 10134 Farm name HAROLD K. PIERCE Well number 513758

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>GENESEO</u>	<u>6,460</u>	<u>TVD</u>	<u>7,535</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 1,664 psi Bottom Hole N/A psi DURATION OF TEST 118.00 hrs

OPEN FLOW Gas 11,326 mcfpd Oil N/A bpd NGL 515 bpd Water 851 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

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

Please insert additional pages as applicable.

Drilling Contractor KEANE & SONS DRILLING (RIG 2143)  
Address 14235 OLD ROUTE 6 City MANSFIELD State PA Zip 16933

Logging Company Phoenix Technology Services  
Address 1805 Brittmoore Road City HOUSTON State TX Zip 77043

Cementing Company ALLIED CEMENTING SERVICES  
Address 333 Technology Drive, Suite 290 City Canonsburg State PA Zip 15317

Stimulating Company Keane  
Address 2121 Sage Road City Houston State TX Zip 77056

Please insert additional pages as applicable.

Completed by Jim Helmick Telephone 412-395-5518  
Signature  Title VP Completions Date 8/23/2016

API 47- 085 - 10134 Farm name HAROLD K. PIERCE Well number 513758

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

Logging Company GYRODATA  
Address 601 MAYER ST City BRIDGEVILLE State PA Zip 15017

Logging Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company C&J Energy Services  
Address 1650 Hackers Creek Rd City Jane Lew State WV Zip 26378

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API 47-085-10134

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	0	0	520	520
SAND/SHALE	520	520	1,774	1,774
MAXTON	1,774	1,774	1,955	1,955
BIG LIME	1,955	1,955	2,244	2,244
WEIR	2,244	2,244	2,472	2,472
GANTZ	2,472	2,472	2,567	2,567
50F	2,567	2,567	2,653	2,653
30F	2,653	2,653	2,715	2,715
GORDON	2,715	2,715	2,803	2,803
4TH	2,803	2,803	2,959	2,959
BAYARD	2,959	2,959	3,299	3,299
WARREN	3,299	3,299	3,352	3,352
SPEECHLEY	3,352	3,352	3,846	3,845
BALLTOWN A	3,846	3,845	4,430	4,326
RILEY	4,430	4,326	4,767	4,575
BENSON	4,767	4,575	5,100	4,819
ALEXANDER	5,100	4,819	6,984	6,213
SONYEA	6,984	6,213	7,216	6,353
MIDDLESEX	7,216	6,353	7,306	6,393
GENESSEE	7,306	6,393	7,535	6,460
GENESE0	7,535	6,460	15,400	6,474

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API 47-085-10134

**PHOENIX**  
TECHNOLOGY SERVICES



## **EQT Production - Geneseo Shale**

**Ritchie County, WV**

**Ritchie County 513758**

**Well #513758**

**Main Wellbore**

**Design: 513758 As Drilled Surveys**

## **Standard Survey Report**

**09 July, 2015**

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**EQT**

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# Phoenix Technology Services Survey Report



Database:	EQM Main - Survey Results	Local Co-ordinate Reference:	PHX Well 513758
Company:	Q1 Technology - Dallas, Texas	TVD Reference:	MSL (Mean Sea Level)
Project:	PHX MWD - PHX	MD Reference:	PHX Well 513758
Site:	PHX - 513758	North Reference:	PHX
Well:	PHX MWD	Survey Calculation Method:	Minimum Curvature
Wellbore:	PHX Wellbore		
Design:	PHX MWD Survey		

<b>Project:</b> PHX MWD Survey			
<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		

<b>Site:</b> PHX Well 513758			
<b>Site Position:</b>		<b>Northing:</b>	234,477.30 usft
<b>From:</b>	Map	<b>Easting:</b>	1,619,107.10 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.14
		<b>Longitude:</b>	-80.84
		<b>Grid Convergence:</b>	-0.86 °

<b>Well:</b> PHX MWD			
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b> 234,477.30 usft
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b> 1,619,107.10 usft
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b> usft
			<b>Latitude:</b> 39° 8' 9.463 N
			<b>Longitude:</b> 80° 50' 34.138 W
			<b>Ground Level:</b> 1,159.0 usft

<b>Wellbore:</b> PHX Wellbore			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	6/15/2015	-7.72	66.57	52,062

<b>Design:</b> PHX MWD Survey			
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<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>
	0.0	0.0	0.0
			<b>Direction (°)</b>
			177.17

<b>Survey Program</b>		<b>Date:</b> 7/9/2015
From (')	To (usft)	Survey (Wellbore)
0.00	3,503.0	513758 Gyrodata (merged 5/30/15) (Main)
0.00	15,400.0	513758 PHX MWD (Main Wellbore)
Tool Name	Description	
GYD_DP_MS	Gyrodata gyro-compassing and drop	
PHX+MWD+HDGM	PHX+OWSG MWD + HDGM	

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	-1,175.0	0.0	0.0	0.0	0.00	0.00	0.00
103.0	0.43	107.72	103.0	-1,072.0	-0.1	0.4	0.1	0.42	0.42	0.00
128.0	0.43	112.00	128.0	-1,047.0	-0.2	0.5	0.2	0.13	0.00	0.12
153.0	0.39	111.48	153.0	-1,022.0	-0.2	0.7	0.3	0.16	-0.16	-2.08
178.0	0.42	111.44	178.0	-997.0	-0.3	0.9	0.4	0.12	0.12	-0.16
203.0	0.42	115.09	203.0	-972.0	-0.4	1.0	0.4	0.11	0.00	14.60
228.0	0.41	117.17	228.0	-947.0	-0.5	1.2	0.5	0.07	-0.04	8.32
253.0	0.42	116.13	253.0	-922.0	-0.5	1.4	0.6	0.05	0.04	-4.16

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Database:	EQT Production - December 2014	Local Co-ordinate Reference:	North Reference:
Company:	Phoenix Technology Services	TVD Reference:	Survey Calculation Method:
Project:	Phoenix Technology Services	MD Reference:	
Site:	Phoenix Technology Services	North Reference:	
Well:	Phoenix Technology Services	Survey Calculation Method:	
Wellbore:	Phoenix Technology Services		
Design:	Phoenix Technology Services		

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)
278.0	0.36	123.65	278.0	-897.0	-0.6	1.5	0.7	0.31	-0.24	30.08
303.0	0.29	124.20	303.0	-872.0	-0.7	1.6	0.8	0.28	-0.28	2.20
328.0	0.24	142.00	328.0	-847.0	-0.8	1.7	0.9	0.38	-0.20	71.20
353.0	0.22	154.27	353.0	-822.0	-0.9	1.8	1.0	0.21	-0.08	49.08
378.0	0.24	163.84	378.0	-797.0	-1.0	1.8	1.1	0.17	0.08	38.28
403.0	0.27	165.07	403.0	-772.0	-1.1	1.8	1.2	0.12	0.12	4.92
428.0	0.20	169.31	428.0	-747.0	-1.2	1.9	1.3	0.29	-0.28	16.96
453.0	0.22	174.22	453.0	-722.0	-1.3	1.9	1.4	0.11	0.08	19.64
478.0	0.21	169.13	478.0	-697.0	-1.4	1.9	1.4	0.09	-0.04	-20.36
503.0	0.20	174.93	503.0	-672.0	-1.4	1.9	1.5	0.09	-0.04	23.20
528.0	0.16	176.27	528.0	-647.0	-1.5	1.9	1.6	0.16	-0.16	5.36
553.0	0.16	180.64	553.0	-622.0	-1.6	1.9	1.7	0.05	0.00	17.48
578.0	0.14	190.97	578.0	-597.0	-1.7	1.9	1.7	0.13	-0.08	41.32
603.0	0.14	181.37	603.0	-572.0	-1.7	1.9	1.8	0.09	0.00	-38.40
628.0	0.14	176.26	628.0	-547.0	-1.8	1.9	1.9	0.05	0.00	-20.44
653.0	0.10	158.22	653.0	-522.0	-1.8	1.9	1.9	0.22	-0.16	-72.16
678.0	0.09	84.28	678.0	-497.0	-1.8	1.9	1.9	0.46	-0.04	-295.76
703.0	0.09	54.38	703.0	-472.0	-1.8	2.0	1.9	0.19	0.00	-119.80
728.0	0.14	56.68	728.0	-447.0	-1.8	2.0	1.9	0.20	0.20	9.20
753.0	0.15	48.13	753.0	-422.0	-1.8	2.1	1.9	0.10	0.04	-34.20
778.0	0.15	50.30	778.0	-397.0	-1.7	2.1	1.8	0.02	0.00	8.68
803.0	0.16	58.67	803.0	-372.0	-1.7	2.2	1.8	0.10	0.04	33.48
828.0	0.17	53.27	828.0	-347.0	-1.6	2.2	1.8	0.07	0.04	-21.60
853.0	0.17	57.75	853.0	-322.0	-1.6	2.3	1.7	0.05	0.00	17.92
878.0	0.18	59.53	878.0	-297.0	-1.6	2.3	1.7	0.05	0.04	7.12
903.0	0.20	60.77	903.0	-272.0	-1.5	2.4	1.6	0.08	0.08	4.96
928.0	0.16	70.16	928.0	-247.0	-1.5	2.5	1.6	0.20	-0.16	37.56
953.0	0.17	68.43	953.0	-222.0	-1.5	2.6	1.6	0.04	0.04	-6.92
978.0	0.19	69.88	978.0	-197.0	-1.4	2.6	1.6	0.08	0.08	5.80
1,003.0	0.22	58.57	1,003.0	-172.0	-1.4	2.7	1.5	0.20	0.12	-45.24
1,028.0	0.20	49.10	1,028.0	-147.0	-1.3	2.8	1.5	0.16	-0.08	-37.88
1,053.0	0.29	26.66	1,053.0	-122.0	-1.3	2.8	1.4	0.52	0.36	-89.76
1,078.0	0.30	19.31	1,078.0	-97.0	-1.1	2.9	1.3	0.16	0.04	-29.40
1,103.0	0.34	19.39	1,103.0	-72.0	-1.0	2.9	1.2	0.16	0.16	0.32
1,128.0	0.36	20.48	1,128.0	-47.0	-0.9	3.0	1.0	0.08	0.08	4.36
1,153.0	0.36	14.76	1,153.0	-22.0	-0.7	3.0	0.9	0.14	0.00	-22.88
1,178.0	0.33	16.47	1,178.0	3.0	-0.6	3.1	0.7	0.13	-0.12	6.84
1,203.0	0.34	16.35	1,203.0	28.0	-0.4	3.1	0.6	0.04	0.04	-0.48
1,228.0	0.37	16.03	1,228.0	53.0	-0.3	3.2	0.4	0.12	0.12	-1.28
1,253.0	0.35	15.44	1,253.0	78.0	-0.1	3.2	0.3	0.08	-0.08	-2.36
1,278.0	0.37	12.94	1,278.0	103.0	0.0	3.3	0.1	0.10	0.08	-10.00
1,303.0	0.36	16.47	1,303.0	128.0	0.2	3.3	0.0	0.10	-0.04	14.12

Database:	COMPASS 5000.1 Build 73	Local Co-ordinate Reference:	North American Datum 83
Company:	Equinor Production Services (USA)	TVD Reference:	True Vertical Depth
Project:	Comanche Shale - Well	MD Reference:	Measured Depth
Site:	Surface Quality 110774	North Reference:	True North
Well:	110774	Survey Calculation Method:	Minimum Curvature
Wellbore:	110774		
Design:	110774 - 2D/3D 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)
1,328.0	0.40	13.40	1,328.0	153.0	0.3	3.3	-0.2	0.18	0.16	-12.28
1,353.0	0.42	10.45	1,353.0	178.0	0.5	3.4	-0.3	0.12	0.08	-11.80
1,378.0	0.42	10.51	1,378.0	203.0	0.7	3.4	-0.5	0.00	0.00	0.24
1,403.0	0.43	13.68	1,403.0	228.0	0.9	3.4	-0.7	0.10	0.04	12.68
1,428.0	0.46	18.65	1,428.0	253.0	1.1	3.5	-0.9	0.20	0.12	19.88
1,453.0	0.47	20.59	1,453.0	278.0	1.3	3.6	-1.1	0.07	0.04	7.76
1,478.0	0.46	23.83	1,478.0	303.0	1.4	3.6	-1.3	0.11	-0.04	12.96
1,503.0	0.46	29.19	1,503.0	328.0	1.6	3.7	-1.4	0.17	0.00	21.44
1,528.0	0.49	42.82	1,528.0	353.0	1.8	3.9	-1.6	0.47	0.12	54.52
1,553.0	0.52	45.47	1,553.0	378.0	1.9	4.0	-1.7	0.15	0.12	10.60
1,578.0	0.56	52.87	1,578.0	403.0	2.1	4.2	-1.9	0.32	0.16	29.60
1,603.0	0.62	57.14	1,603.0	428.0	2.2	4.4	-2.0	0.30	0.24	17.08
1,628.0	0.67	63.12	1,628.0	453.0	2.4	4.6	-2.2	0.34	0.20	23.92
1,653.0	0.72	70.03	1,653.0	478.0	2.5	4.9	-2.3	0.39	0.20	27.64
1,678.0	0.85	84.43	1,678.0	503.0	2.6	5.2	-2.3	0.94	0.52	57.60
1,703.0	0.93	91.51	1,703.0	528.0	2.6	5.6	-2.3	0.54	0.32	28.32
1,728.0	0.97	89.33	1,728.0	553.0	2.6	6.1	-2.3	0.22	0.16	-8.72
1,753.0	0.99	92.67	1,753.0	578.0	2.6	6.5	-2.3	0.24	0.08	13.36
1,778.0	1.01	94.22	1,778.0	603.0	2.6	6.9	-2.2	0.13	0.08	6.20
1,803.0	1.04	95.07	1,803.0	628.0	2.5	7.4	-2.1	0.13	0.12	3.40
1,828.0	1.05	96.03	1,827.9	652.9	2.5	7.8	-2.1	0.08	0.04	3.84
1,853.0	1.06	94.58	1,852.9	677.9	2.4	8.3	-2.0	0.11	0.04	-5.80
1,878.0	1.06	93.67	1,877.9	702.9	2.4	8.7	-2.0	0.07	0.00	-3.84
1,903.0	1.10	96.03	1,902.9	727.9	2.4	9.2	-1.9	0.24	0.18	9.44
1,928.0	1.08	96.65	1,927.9	752.9	2.3	9.7	-1.8	0.09	-0.08	2.48
1,953.0	1.08	95.49	1,952.9	777.9	2.3	10.1	-1.7	0.09	0.00	-4.64
1,978.0	1.09	97.23	1,977.9	802.9	2.2	10.6	-1.7	0.14	0.04	6.96
2,003.0	1.01	99.82	2,002.9	827.9	2.1	11.1	-1.6	0.37	-0.32	10.36
2,028.0	1.10	97.67	2,027.9	852.9	2.1	11.5	-1.5	0.39	0.36	-8.60
2,053.0	1.00	101.74	2,052.9	877.9	2.0	12.0	-1.4	0.50	-0.40	16.28
2,078.0	0.95	105.73	2,077.9	902.9	1.9	12.4	-1.3	0.34	-0.20	15.96
2,103.0	1.01	105.58	2,102.9	927.9	1.8	12.8	-1.1	0.24	0.24	0.60
2,128.0	0.93	107.46	2,127.9	952.9	1.7	13.2	-1.0	0.34	-0.32	7.52
2,153.0	1.00	103.69	2,152.9	977.9	1.5	13.6	-0.9	0.88	0.28	-15.08
2,178.0	1.00	105.99	2,177.9	1,002.9	1.4	14.0	-0.7	0.16	0.00	9.20
2,203.0	0.96	105.86	2,202.9	1,027.9	1.3	14.4	-0.6	0.16	-0.16	-0.52
2,228.0	1.03	109.11	2,227.9	1,052.9	1.2	14.9	-0.4	0.36	0.28	13.00
2,253.0	1.01	107.04	2,252.9	1,077.9	1.0	15.3	-0.3	0.17	-0.08	8.28
2,278.0	1.01	108.44	2,277.9	1,102.9	0.9	15.7	-0.1	0.10	0.00	5.60
2,303.0	1.02	107.79	2,302.9	1,127.9	0.8	16.1	0.0	0.06	0.04	-2.60
2,328.0	1.00	110.68	2,327.9	1,152.9	0.6	16.5	0.2	0.22	-0.08	11.56
2,353.0	0.97	110.14	2,352.9	1,177.9	0.5	16.9	0.4	0.13	-0.12	-2.16
2,378.0	0.96	113.71	2,377.9	1,202.9	0.3	17.3	0.5	0.24	-0.04	14.28

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Phoenix Technology Services  
Survey Report



Where energy meets innovation

Database:	EQT Phoenix Survey Data	Local Co-ordinate Reference:	North American Datum 83
Company:	EQT Production Services LLC	TVD Reference:	North American Datum 83
Project:	Phoenix, WV	MD Reference:	North American Datum 83
Site:	Robert Valley #11104	North Reference:	North American Datum 83
Well:	11104-11104	Survey Calculation Method:	Minimum Curvature
Wellbore:	11104-11104		
Design:	11104-11104		

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)
2,403.0	0.95	113.83	2,402.9	1,227.9	0.1	17.7	0.7	0.04	-0.04	0.48
2,428.0	0.93	113.14	2,427.9	1,252.9	0.0	18.1	0.9	0.09	-0.08	-2.76
2,453.0	0.86	117.81	2,452.9	1,277.9	-0.2	18.4	1.1	0.40	-0.28	18.68
2,478.0	0.90	117.69	2,477.8	1,302.8	-0.4	18.8	1.3	0.16	0.16	-0.48
2,503.0	0.88	114.59	2,502.8	1,327.8	-0.5	19.1	1.5	0.21	-0.08	-12.40
2,528.0	0.87	116.27	2,527.8	1,352.8	-0.7	19.5	1.7	0.11	-0.04	6.72
2,553.0	0.84	119.38	2,552.8	1,377.8	-0.9	19.8	1.8	0.22	-0.12	12.44
2,578.0	0.86	118.42	2,577.8	1,402.8	-1.0	20.1	2.0	0.10	0.08	-3.84
2,603.0	0.81	121.00	2,602.8	1,427.8	-1.2	20.4	2.2	0.25	-0.20	10.32
2,628.0	0.85	122.00	2,627.8	1,452.8	-1.4	20.8	2.4	0.17	0.16	4.00
2,653.0	0.84	121.37	2,652.8	1,477.8	-1.6	21.1	2.7	0.05	-0.04	-2.52
2,678.0	0.87	122.72	2,677.8	1,502.8	-1.8	21.4	2.9	0.14	0.12	5.40
2,703.0	0.86	125.53	2,702.8	1,527.8	-2.0	21.7	3.1	0.17	-0.04	11.24
2,728.0	0.87	124.22	2,727.8	1,552.8	-2.2	22.0	3.3	0.09	0.04	-5.24
2,753.0	0.86	123.36	2,752.8	1,577.8	-2.4	22.3	3.5	0.07	-0.04	-3.44
2,778.0	0.84	127.34	2,777.8	1,602.8	-2.7	22.6	3.8	0.25	-0.08	15.92
2,803.0	0.86	125.12	2,802.8	1,627.8	-2.9	22.9	4.0	0.15	0.08	-8.88
2,828.0	0.83	128.88	2,827.8	1,652.8	-3.1	23.2	4.2	0.25	-0.12	15.04
2,853.0	0.90	126.88	2,852.8	1,677.8	-3.3	23.5	4.5	0.30	0.28	-8.00
2,878.0	0.80	133.81	2,877.8	1,702.8	-3.6	23.8	4.7	0.56	-0.40	26.92
2,903.0	0.80	132.55	2,902.8	1,727.8	-3.8	24.0	5.0	0.06	0.00	-4.24
2,928.0	0.76	134.11	2,927.8	1,752.8	-4.0	24.3	5.2	0.18	-0.16	6.24
2,953.0	0.54	128.72	2,952.8	1,777.8	-4.2	24.5	5.4	0.91	-0.88	-21.56
2,978.0	0.51	128.34	2,977.8	1,802.8	-4.4	24.7	5.6	0.15	-0.12	-9.52
3,003.0	0.45	111.08	3,002.8	1,827.8	-4.5	24.9	5.7	0.56	-0.24	-61.04
3,028.0	0.35	39.96	3,027.8	1,852.8	-4.5	25.0	5.7	1.89	-0.40	-284.48
3,053.0	0.62	345.94	3,052.8	1,877.8	-4.3	25.0	5.5	2.01	1.08	-216.08
3,078.0	0.30	252.23	3,077.8	1,902.8	-4.2	24.9	5.4	2.82	-1.28	-374.84
3,103.0	0.77	182.12	3,102.8	1,927.8	-4.3	24.9	5.6	2.90	1.88	-280.44
3,128.0	0.44	158.24	3,127.8	1,952.8	-4.6	24.9	5.8	1.63	-1.32	-95.52
3,153.0	0.44	155.85	3,152.8	1,977.8	-4.8	25.0	6.0	0.08	0.00	-10.36
3,178.0	0.37	152.34	3,177.8	2,002.8	-4.9	25.0	6.2	0.30	-0.28	-13.24
3,203.0	0.32	143.05	3,202.8	2,027.8	-5.1	25.1	6.3	0.30	-0.20	-37.16
3,228.0	0.34	140.77	3,227.8	2,052.8	-5.2	25.2	6.4	0.10	0.08	-9.12
3,253.0	0.34	128.31	3,252.8	2,077.8	-5.3	25.3	6.5	0.30	0.00	-49.84
3,278.0	0.35	132.57	3,277.8	2,102.8	-5.4	25.4	6.6	0.11	0.04	17.04
3,303.0	0.33	136.21	3,302.8	2,127.8	-5.5	25.5	6.7	0.12	-0.08	14.56
3,328.0	0.32	132.88	3,327.8	2,152.8	-5.6	25.6	6.8	0.09	-0.04	-13.32
3,353.0	0.32	130.76	3,352.8	2,177.8	-5.7	25.7	6.9	0.05	0.00	-8.48
3,378.0	0.29	131.87	3,377.8	2,202.8	-5.8	25.8	7.0	0.12	-0.12	4.44
3,403.0	0.32	134.19	3,402.8	2,227.8	-5.8	25.9	7.1	0.13	0.12	9.28
3,428.0	0.26	137.79	3,427.8	2,252.8	-5.9	26.0	7.2	0.25	-0.24	14.40



# Phoenix Technology Services

## Survey Report



Energy Services International

Database:	SR 10011 - Survey Job	Local Co-ordinate Reference:	SR 10011 - Survey Job
Company:	EQT Production Services, Dallas	TVD Reference:	SR 10011 - Survey Job
Project:	Wells - Survey - W	MD Reference:	SR 10011 - Survey Job
Site:	Wells Survey 11/15/15	North Reference:	SR 10011 - Survey Job
Well:	KA11010101	Survey Calculation Method:	Minimum Curvature
Wellbore:	MA11 Wellbore		
Design:	SR 10011 - Survey Job		

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)
3,453.0	0.26	141.13	3,452.8	2,277.8	-6.0	26.1	7.3	0.06	0.00	13.36
3,478.0	0.25	127.51	3,477.8	2,302.8	-6.1	26.2	7.4	0.25	-0.04	-54.48
3,503.0	0.27	137.42	3,502.8	2,327.8	-6.2	26.3	7.5	0.20	0.08	39.64
3,631.0	0.10	174.80	3,630.8	2,455.8	-6.5	26.5	7.8	0.16	-0.13	29.20
3,680.0	0.40	246.50	3,679.8	2,504.8	-6.6	26.3	7.9	0.78	0.61	146.33
3,711.0	2.00	255.10	3,710.8	2,535.8	-6.8	25.7	8.1	5.18	5.16	27.74
3,742.0	4.20	260.20	3,741.7	2,566.7	-7.1	24.1	8.3	7.15	7.10	16.45
3,774.0	6.50	263.90	3,773.6	2,598.6	-7.5	21.1	8.6	7.26	7.19	11.56
3,805.0	8.80	264.00	3,804.3	2,629.3	-8.0	17.0	8.8	7.42	7.42	0.32
3,837.0	11.50	261.80	3,835.8	2,660.8	-8.7	11.4	9.2	8.52	8.44	-6.88
3,868.0	14.40	259.20	3,866.0	2,691.0	-9.8	4.6	10.1	9.54	9.35	-8.39
3,900.0	17.10	257.20	3,896.8	2,721.8	-11.6	-3.9	11.4	8.61	8.44	-6.25
3,931.0	19.50	255.50	3,926.2	2,751.2	-13.9	-13.4	13.3	7.93	7.74	-5.48
3,963.0	22.00	254.70	3,956.2	2,781.2	-16.9	-24.3	15.6	7.86	7.81	-2.50
3,994.0	24.60	253.60	3,984.6	2,809.6	-20.2	-36.1	18.4	8.50	8.39	-3.55
4,026.0	27.30	253.20	4,013.4	2,838.4	-24.2	-49.6	21.7	8.46	8.44	-1.25
4,057.0	29.80	254.00	4,040.6	2,865.6	-28.4	-63.8	25.2	8.16	8.06	2.58
4,089.0	32.80	255.40	4,068.0	2,893.0	-32.8	-79.8	28.8	9.65	9.38	4.38
4,120.0	35.40	256.00	4,093.6	2,918.6	-37.1	-96.6	32.2	8.46	8.39	1.94
4,152.0	37.90	256.50	4,119.3	2,944.3	-41.6	-115.2	35.8	7.87	7.81	1.56
4,183.0	40.20	256.10	4,143.4	2,968.4	-46.2	-134.2	39.5	7.46	7.42	-1.29
4,246.0	44.20	255.50	4,190.0	3,015.0	-56.6	-175.2	47.9	6.38	6.35	-0.95
4,308.0	43.00	254.60	4,234.9	3,059.9	-67.6	-216.5	56.8	2.18	-1.94	-1.45
4,371.0	41.10	253.00	4,281.7	3,106.7	-79.4	-257.0	66.6	3.46	-3.02	-2.54
4,434.0	40.90	252.90	4,329.3	3,154.3	-91.5	-296.5	76.7	0.33	-0.32	-0.16
4,498.0	41.50	256.30	4,377.4	3,202.4	-102.7	-337.2	85.9	3.62	0.94	5.31
4,561.0	41.80	257.30	4,424.5	3,249.5	-112.3	-377.9	93.4	1.16	0.48	1.59
4,624.0	43.80	257.30	4,470.7	3,295.7	-121.7	-419.7	100.8	3.17	3.17	0.00
4,687.0	43.50	257.10	4,516.3	3,341.3	-131.3	-462.1	108.3	0.52	-0.48	-0.32
4,750.0	43.30	256.20	4,562.1	3,387.1	-141.3	-504.2	116.2	1.03	-0.32	-1.43
4,813.0	43.20	256.50	4,608.0	3,433.0	-151.5	-546.1	124.3	0.36	-0.16	0.48
4,876.0	43.30	255.20	4,653.9	3,478.9	-162.0	-588.0	132.8	1.42	0.16	-2.06
4,939.0	42.50	254.90	4,700.0	3,525.0	-173.1	-629.4	141.8	1.31	-1.27	-0.48
5,001.0	41.80	254.50	4,746.0	3,571.0	-184.1	-669.6	150.7	1.21	-1.13	-0.65
5,064.0	43.20	255.40	4,792.4	3,617.4	-195.1	-710.7	159.7	2.42	2.22	1.43
5,127.0	42.50	255.60	4,838.6	3,663.6	-205.8	-752.1	168.4	1.13	-1.11	0.32
5,190.0	42.60	255.10	4,885.0	3,710.0	-216.6	-793.4	177.1	0.56	0.16	-0.79
5,253.0	41.50	255.40	4,931.8	3,756.8	-227.4	-834.2	185.8	1.77	-1.75	0.48
5,317.0	41.10	255.10	4,979.9	3,804.9	-238.1	-875.0	194.6	0.70	-0.63	-0.47
5,379.0	42.50	257.00	5,026.1	3,851.1	-248.1	-915.1	202.5	3.04	2.26	3.06
5,442.0	42.30	257.20	5,072.6	3,897.6	-257.6	-956.5	209.9	0.38	-0.32	0.32
5,505.0	42.80	255.90	5,119.0	3,944.0	-267.5	-998.0	217.8	1.61	0.79	-2.06

Database:	EQT Survey Data	Local Co-ordinate Reference:	North American Datum 83
Company:	EQT Production Services	TVD Reference:	Mean Sea Level
Project:	Northway Well	MD Reference:	North American Datum 83
Site:	Northway 11111	North Reference:	North American Datum 83
Well:	11111	Survey Calculation Method:	Minimum Curvature
Wellbore:	11111		
Design:	11111		

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)
5,568.0	43.10	255.40	5,165.2	3,990.2	-278.1	-1,039.5	226.4	0.72	0.48	-0.79
5,632.0	41.40	254.80	5,212.5	4,037.5	-289.2	-1,081.1	235.3	2.73	-2.66	-0.94
5,695.0	41.50	256.00	5,259.7	4,084.7	-299.7	-1,121.5	243.8	1.27	0.16	1.90
5,758.0	42.80	257.20	5,306.5	4,131.5	-309.5	-1,162.6	251.6	2.43	2.06	1.90
5,821.0	41.50	257.00	5,353.2	4,178.2	-318.9	-1,203.8	259.0	2.07	-2.06	-0.32
5,884.0	38.90	255.90	5,401.3	4,226.3	-328.4	-1,243.3	266.5	4.28	-4.13	-1.75
5,946.0	38.60	255.70	5,449.6	4,274.6	-337.9	-1,281.0	274.2	0.52	-0.48	-0.32
6,009.0	40.20	256.20	5,498.3	4,323.3	-347.6	-1,319.8	282.0	2.59	2.54	0.79
6,072.0	42.10	257.40	5,545.7	4,370.7	-357.1	-1,360.1	289.4	3.27	3.02	1.90
6,136.0	44.40	257.40	5,592.4	4,417.4	-366.7	-1,402.9	296.8	3.59	3.59	0.00
6,198.0	45.00	257.90	5,636.4	4,461.4	-376.0	-1,445.5	304.0	1.12	0.97	0.81
6,262.0	44.00	258.60	5,682.1	4,507.1	-385.1	-1,489.4	311.0	1.74	-1.56	1.09
6,325.0	43.20	255.30	5,727.7	4,552.7	-394.9	-1,531.7	318.7	3.83	-1.27	-5.24
6,388.0	41.90	253.60	5,774.1	4,599.1	-406.3	-1,572.8	328.1	2.75	-2.06	-2.70
6,451.0	42.30	254.70	5,820.9	4,645.9	-417.9	-1,613.4	337.6	1.33	0.63	1.75
6,514.0	43.80	255.80	5,866.9	4,691.9	-428.8	-1,655.0	346.4	2.66	2.38	1.75
6,577.0	43.30	255.70	5,912.6	4,737.6	-439.5	-1,697.1	355.0	0.80	-0.79	-0.16
6,640.0	41.80	253.60	5,959.0	4,784.0	-450.8	-1,738.2	364.3	3.28	-2.38	-3.33
6,672.0	40.90	250.70	5,983.0	4,808.0	-457.2	-1,758.3	369.7	6.61	-2.81	-9.06
6,703.0	40.70	247.00	6,006.5	4,831.5	-464.5	-1,777.2	376.1	7.82	-0.65	-11.94
6,735.0	41.10	242.40	6,030.7	4,855.7	-473.5	-1,796.1	384.1	9.49	1.25	-14.38
6,766.0	41.70	238.50	6,053.9	4,878.9	-483.6	-1,813.9	393.3	8.54	1.94	-12.58
6,798.0	42.50	234.00	6,077.7	4,902.7	-495.5	-1,831.7	404.3	9.75	2.50	-14.06
6,829.0	42.90	229.80	6,100.5	4,925.5	-508.5	-1,848.3	416.5	9.28	1.29	-13.55
6,861.0	43.00	225.60	6,123.9	4,948.9	-523.2	-1,864.4	430.3	8.95	0.31	-13.13
6,892.0	43.40	221.90	6,148.5	4,971.5	-538.5	-1,879.1	444.9	8.27	1.29	-11.94
6,924.0	43.50	218.10	6,169.7	4,994.7	-555.3	-1,893.2	461.0	8.17	0.31	-11.88
6,955.0	44.00	214.60	6,192.1	5,017.1	-572.6	-1,905.9	477.6	7.97	1.61	-11.29
6,987.0	44.90	211.00	6,215.0	5,040.0	-591.4	-1,918.0	495.9	8.36	2.81	-11.25
7,018.0	46.80	207.90	6,236.6	5,061.6	-610.8	-1,929.0	514.7	9.44	6.13	-10.00
7,049.0	49.10	206.30	6,257.3	5,082.3	-631.3	-1,939.4	534.6	8.35	7.42	-5.16
7,081.0	51.10	205.60	6,277.8	5,102.8	-653.4	-1,950.2	556.1	6.47	6.25	-2.19
7,112.0	53.50	204.10	6,296.8	5,121.8	-675.6	-1,960.5	577.8	8.64	7.74	-4.84
7,143.0	56.40	202.00	6,314.6	5,139.6	-699.0	-1,970.4	600.7	10.87	9.35	-6.77
7,175.0	58.70	200.00	6,331.8	5,156.8	-724.2	-1,980.1	625.4	8.91	7.19	-6.25
7,207.0	60.20	197.20	6,348.0	5,173.0	-750.3	-1,988.9	651.0	8.87	4.69	-8.75
7,238.0	61.90	194.10	6,363.0	5,188.0	-776.4	-1,996.2	676.7	10.33	5.48	-10.00
7,269.0	63.50	191.00	6,377.3	5,202.3	-803.3	-2,002.1	703.3	10.28	5.16	-10.00
7,301.0	65.00	188.30	6,391.2	5,216.2	-831.7	-2,007.0	731.4	8.93	4.69	-8.44
7,332.0	66.80	186.00	6,403.8	5,228.8	-859.8	-2,010.5	759.3	8.92	5.81	-7.42
7,364.0	69.10	183.60	6,415.8	5,240.8	-889.3	-2,013.0	788.7	10.00	7.19	-7.50
7,395.0	72.00	181.30	6,426.2	5,251.2	-916.5	-2,014.2	817.8	11.68	9.35	-7.42
7,426.0	74.20	178.50	6,435.2	5,260.2	-948.2	-2,014.2	847.4	11.18	7.10	-9.63



Database:	COMPASS 5000.1	Local Co-ordinate Reference:	North American Datum 1983
Company:	Phoenix Technology Services	TVD Reference:	North American Datum 1983
Project:	Wellsite Survey - W-1	MD Reference:	North American Datum 1983
Site:	W-1 Well - 211314	North Reference:	North American Datum 1983
Well:	W-1 Well	Survey Calculation Method:	Minimum Curvature
Wellbore:	W-1 Well		
Design:	W-1 Well		

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)
7,457.0	75.70	176.00	6,443.2	5,268.2	-978.1	-2,012.7	877.4	9.17	4.84	-8.06
7,489.0	77.30	173.40	6,450.7	5,275.7	-1,009.1	-2,009.8	908.4	9.35	5.00	-8.13
7,520.0	78.90	170.60	6,457.1	5,282.1	-1,039.1	-2,005.6	938.6	10.23	5.16	-9.03
7,551.0	81.00	168.40	6,462.5	5,287.5	-1,069.1	-2,000.0	968.9	9.73	6.77	-7.10
7,583.0	83.20	167.20	6,466.9	5,291.9	-1,100.1	-1,993.4	1,000.2	7.81	6.88	-3.75
7,614.0	85.40	165.30	6,470.0	5,295.0	-1,130.1	-1,986.0	1,030.5	9.36	7.10	-6.13
7,622.5	85.85	164.74	6,470.6	5,295.6	-1,138.3	-1,983.8	1,038.8	8.43	5.31	-6.57
7,646.0	87.10	163.20	6,472.1	5,297.1	-1,160.8	-1,977.4	1,061.6	8.43	5.31	-6.56
7,709.0	90.70	161.50	6,473.3	5,298.3	-1,220.8	-1,958.3	1,122.5	6.32	5.71	-2.70
7,772.0	90.30	159.60	6,472.7	5,297.7	-1,280.2	-1,937.3	1,182.8	3.08	-0.63	-3.02
7,835.0	90.00	159.20	6,472.6	5,297.6	-1,339.2	-1,915.1	1,242.8	0.79	-0.48	-0.63
7,898.0	90.90	160.30	6,472.1	5,297.1	-1,398.3	-1,893.3	1,302.9	2.26	1.43	1.75
7,960.0	91.20	161.00	6,470.9	5,295.9	-1,456.8	-1,872.8	1,362.4	1.23	0.48	1.13
8,023.0	91.60	162.50	6,469.4	5,294.4	-1,516.6	-1,853.0	1,423.1	2.46	0.63	2.38
8,087.0	91.40	161.60	6,467.7	5,292.7	-1,577.4	-1,833.3	1,484.8	1.44	-0.31	-1.41
8,150.0	92.00	161.80	6,465.9	5,290.9	-1,637.2	-1,813.6	1,545.5	1.00	0.95	0.32
8,173.0	91.78	161.73	6,465.1	5,290.1	-1,659.0	-1,806.4	1,567.6	1.00	-0.95	-0.32
8,213.0	91.40	161.60	6,464.0	5,289.0	-1,697.0	-1,793.8	1,606.2	1.00	-0.95	-0.32
8,276.0	88.20	161.80	6,464.2	5,289.2	-1,756.8	-1,774.0	1,666.9	5.09	-5.08	0.32
8,339.0	88.70	161.50	6,465.9	5,290.9	-1,816.6	-1,754.2	1,727.6	0.93	0.79	-0.48
8,402.0	89.00	162.20	6,467.2	5,292.2	-1,876.4	-1,734.6	1,788.4	1.21	0.48	1.11
8,465.0	89.10	161.20	6,468.2	5,293.2	-1,936.2	-1,714.8	1,849.1	1.60	0.16	-1.59
8,528.0	89.00	160.70	6,469.3	5,294.3	-1,995.8	-1,694.2	1,909.6	0.81	-0.16	-0.79
8,591.0	89.40	160.70	6,470.1	5,295.1	-2,055.2	-1,673.4	1,970.0	0.63	0.63	0.00
8,654.0	88.40	161.40	6,471.4	5,296.4	-2,114.8	-1,652.9	2,030.5	1.94	-1.59	1.11
8,717.0	89.10	162.00	6,472.7	5,297.7	-2,174.6	-1,633.2	2,091.2	1.46	1.11	0.95
8,780.0	89.30	162.20	6,473.6	5,298.6	-2,234.6	-1,613.8	2,152.0	0.45	0.32	0.32
8,843.0	89.40	161.70	6,474.3	5,299.3	-2,294.4	-1,594.3	2,212.8	0.81	0.16	-0.79
8,906.0	89.30	160.90	6,475.0	5,300.0	-2,354.1	-1,574.1	2,273.4	1.28	-0.16	-1.27
8,970.0	90.50	161.50	6,475.1	5,300.1	-2,414.7	-1,553.5	2,334.9	2.10	1.88	0.94
9,032.0	91.30	163.60	6,474.2	5,299.2	-2,473.8	-1,534.9	2,394.9	3.62	1.29	3.39
9,095.0	91.20	162.90	6,472.8	5,297.8	-2,534.2	-1,516.7	2,456.0	1.12	-0.16	-1.11
9,158.0	91.60	163.00	6,471.3	5,296.3	-2,594.4	-1,498.3	2,517.1	0.65	0.63	0.16
9,221.0	91.40	161.60	6,469.6	5,294.6	-2,654.4	-1,479.1	2,578.0	2.24	-0.32	-2.22
9,284.0	91.80	162.60	6,467.9	5,292.9	-2,714.3	-1,459.8	2,638.8	1.71	0.63	1.59
9,347.0	91.40	163.60	6,466.1	5,291.1	-2,774.5	-1,441.4	2,699.9	1.71	-0.63	1.59
9,410.0	90.60	162.50	6,465.0	5,290.0	-2,834.8	-1,423.1	2,760.9	2.16	-1.27	-1.75
9,472.0	90.80	161.80	6,464.2	5,289.2	-2,893.8	-1,404.1	2,820.8	1.17	0.32	-1.13
9,535.0	91.30	161.50	6,463.1	5,288.1	-2,953.6	-1,384.3	2,881.5	0.93	0.79	-0.48
9,598.0	91.60	160.90	6,461.5	5,286.5	-3,013.2	-1,364.0	2,942.1	1.06	0.48	-0.95

Database:	10264001 - Single Well Log	Local Co-ordinate Reference:	WGS 1984 NAD83
Company:	EQT Production - Gaswell Area	TVD Reference:	10016.0 - 1115.000
Project:	Gaswell Survey - NY	MD Reference:	10016.0 - 1115.000
Site:	Madison County 111714	North Reference:	10016.0 - 1115.000
Well:	10264001	Survey Calculation Method:	Minimum Curvature
Wellbore:	10264001		
Design:	10264001 - 111714		

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)
9,660.0	90.10	161.10	6,460.6	5,285.6	-3,071.8	-1,343.8	3,001.6	2.44	-2.42	0.32
9,723.0	89.00	160.90	6,461.1	5,286.1	-3,131.4	-1,323.3	3,062.1	1.77	-1.75	-0.32
9,786.0	89.90	161.80	6,461.7	5,286.7	-3,191.1	-1,303.1	3,122.7	2.02	1.43	1.43
9,849.0	90.40	161.50	6,461.5	5,286.5	-3,250.9	-1,283.3	3,183.4	0.93	0.79	-0.48
9,912.0	90.40	160.90	6,461.1	5,286.1	-3,310.5	-1,263.0	3,244.0	0.95	0.00	-0.95
9,975.0	90.80	163.50	6,460.4	5,285.4	-3,370.5	-1,243.7	3,304.9	4.18	0.63	4.13
10,038.0	90.90	163.40	6,459.5	5,284.5	-3,430.9	-1,225.8	3,366.0	0.22	0.16	-0.16
10,101.0	91.00	163.10	6,458.4	5,283.4	-3,491.2	-1,207.6	3,427.2	0.50	0.16	-0.48
10,163.0	90.80	162.40	6,457.5	5,282.5	-3,550.4	-1,189.2	3,487.2	1.17	-0.32	-1.13
10,226.0	89.20	162.60	6,457.5	5,282.5	-3,610.5	-1,170.3	3,548.2	2.56	-2.54	0.32
10,289.0	88.90	161.70	6,458.5	5,283.5	-3,670.4	-1,151.0	3,609.0	1.51	-0.48	-1.43
10,352.0	88.80	161.40	6,459.8	5,284.8	-3,730.2	-1,131.1	3,669.7	0.50	-0.16	-0.48
10,415.0	88.80	160.70	6,461.1	5,286.1	-3,789.8	-1,110.6	3,730.2	1.11	0.00	-1.11
10,477.0	89.00	161.20	6,462.3	5,287.3	-3,848.3	-1,090.4	3,789.7	0.87	0.32	0.81
10,540.0	88.00	162.70	6,463.9	5,288.9	-3,908.2	-1,070.9	3,850.5	2.86	-1.59	2.38
10,603.0	87.90	162.20	6,466.2	5,291.2	-3,968.3	-1,051.9	3,911.4	0.81	-0.16	-0.79
10,666.0	87.90	161.80	6,468.5	5,293.5	-4,028.1	-1,032.4	3,972.1	0.63	0.00	-0.63
10,729.0	88.10	161.70	6,470.7	5,295.7	-4,087.9	-1,012.7	4,032.8	0.35	0.32	-0.16
10,793.0	88.30	162.50	6,472.7	5,297.7	-4,148.8	-993.0	4,094.6	1.29	0.31	1.25
10,855.0	88.70	162.40	6,474.3	5,299.3	-4,207.9	-974.4	4,154.6	0.67	0.65	-0.16
10,918.0	91.30	162.60	6,474.3	5,299.3	-4,268.0	-955.4	4,215.5	4.14	4.13	0.32
10,981.0	91.60	161.70	6,472.7	5,297.7	-4,327.9	-936.1	4,276.3	1.51	0.48	-1.43
11,045.0	91.60	161.10	6,470.9	5,295.9	-4,388.5	-915.7	4,337.9	0.94	0.00	-0.94
11,108.0	91.30	160.30	6,469.3	5,294.3	-4,448.0	-894.9	4,398.3	1.36	-0.48	-1.27
11,171.0	91.20	160.20	6,468.0	5,293.0	-4,507.3	-873.6	4,458.5	0.22	-0.16	-0.16
11,234.0	91.50	161.50	6,466.5	5,291.5	-4,566.8	-852.9	4,519.0	2.12	0.48	2.06
11,297.0	92.00	162.20	6,464.6	5,289.6	-4,626.6	-833.3	4,579.7	1.37	0.79	1.11
11,360.0	92.70	164.10	6,462.0	5,287.0	-4,686.8	-815.1	4,640.8	3.21	1.11	3.02
11,423.0	92.10	163.10	6,459.3	5,284.3	-4,747.2	-797.3	4,702.0	1.85	-0.95	-1.59
11,486.0	92.00	162.30	6,457.1	5,282.1	-4,807.3	-778.6	4,762.9	1.28	-0.16	-1.27
11,549.0	91.90	161.80	6,454.9	5,279.9	-4,867.2	-759.2	4,823.7	0.81	-0.16	-0.79
11,612.0	91.30	160.60	6,453.2	5,278.2	-4,926.8	-738.9	4,884.3	2.13	-0.95	-1.90
11,674.0	91.50	160.90	6,451.7	5,276.7	-4,985.4	-718.5	4,943.7	0.58	0.32	0.48
11,737.0	91.20	163.00	6,450.2	5,275.2	-5,045.2	-698.9	5,004.5	3.37	-0.48	3.33
11,800.0	90.60	161.60	6,449.2	5,274.2	-5,105.3	-679.8	5,065.4	2.42	-0.95	-2.22
11,863.0	90.20	160.30	6,448.7	5,273.7	-5,164.8	-659.2	5,125.9	2.16	-0.63	-2.06
11,926.0	90.30	163.20	6,448.5	5,273.5	-5,224.6	-639.5	5,186.6	4.61	0.16	4.60
11,989.0	90.40	163.30	6,448.1	5,273.1	-5,284.9	-621.3	5,247.8	0.22	0.16	0.16
12,052.0	90.20	165.20	6,447.8	5,272.8	-5,345.6	-604.2	5,309.2	3.03	-0.32	3.02
12,115.0	89.80	164.40	6,447.8	5,272.8	-5,406.4	-587.7	5,370.7	1.42	-0.63	-1.27
12,178.0	89.50	163.50	6,448.1	5,273.1	-5,466.9	-570.3	5,432.0	1.51	-0.48	-1.43





# Phoenix Technology Services

## Survey Report



Where energy meets innovation

Database:	COMPASS 5000.1 Build 73	Local Co-ordinate Reference:	WGS 1984 UTM Zone 18Q
Company:	EQT Production Services (USA)	TVD Reference:	WGS 1984 UTM Zone 18Q
Project:	Wells County, WY	MD Reference:	WGS 1984 UTM Zone 18Q
Site:	Wells County, WY	North Reference:	WGS 1984 UTM Zone 18Q
Well:	WY-11704	Survey Calculation Method:	Minimum Curvature
Wellbore:	WY-11704		
Design:	WY-11704		

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)
12,241.0	89.60	162.60	6,448.6	5,273.6	-5,527.2	-551.9	5,493.1	1.44	0.16	-1.43
12,304.0	90.20	163.60	6,448.7	5,273.7	-5,587.5	-533.6	5,554.2	1.85	0.95	1.59
12,367.0	90.80	164.10	6,448.2	5,273.2	-5,648.0	-516.1	5,615.5	1.24	0.95	0.79
12,430.0	90.10	162.80	6,447.7	5,272.7	-5,708.4	-498.2	5,676.7	2.34	-1.11	-2.06
12,493.0	88.70	162.20	6,448.4	5,273.4	-5,768.4	-479.2	5,737.7	2.42	-2.22	-0.95
12,556.0	88.40	161.30	6,450.0	5,275.0	-5,828.2	-459.5	5,798.4	1.51	-0.48	-1.43
12,619.0	89.10	160.80	6,451.3	5,276.3	-5,887.8	-439.0	5,858.9	1.37	1.11	-0.79
12,682.0	90.30	162.70	6,451.7	5,276.7	-5,947.6	-419.3	5,919.6	3.57	1.90	3.02
12,745.0	90.20	164.80	6,451.4	5,276.4	-6,008.1	-401.7	5,980.9	3.34	-0.16	3.33
12,808.0	90.10	164.80	6,451.2	5,276.2	-6,068.9	-385.2	6,042.4	0.16	-0.16	0.00
12,871.0	89.90	164.50	6,451.2	5,276.2	-6,129.7	-368.5	6,103.9	0.57	-0.32	-0.48
12,934.0	89.80	164.50	6,451.4	5,276.4	-6,190.4	-351.7	6,165.4	0.16	-0.16	0.00
12,997.0	90.30	165.40	6,451.3	5,276.3	-6,251.2	-335.3	6,227.0	1.63	0.79	1.43
13,060.0	90.50	164.50	6,450.9	5,275.9	-6,312.1	-318.9	6,288.6	1.46	0.32	-1.43
13,123.0	90.10	162.80	6,450.6	5,275.6	-6,372.5	-301.2	6,349.8	2.77	-0.63	-2.70
13,186.0	90.20	162.30	6,450.4	5,275.4	-6,432.6	-282.3	6,410.8	0.81	0.16	-0.79
13,249.0	90.10	160.70	6,450.2	5,275.2	-6,492.3	-262.3	6,471.4	2.54	-0.16	-2.54
13,311.0	90.20	161.90	6,450.1	5,275.1	-6,551.1	-242.4	6,531.1	1.94	0.16	1.94
13,374.0	90.70	161.00	6,449.6	5,274.6	-6,610.8	-222.4	6,591.7	1.63	0.79	-1.43
13,438.0	90.20	158.80	6,449.1	5,274.1	-6,670.9	-200.3	6,652.8	3.83	-0.78	-3.75
13,501.0	89.80	160.00	6,449.1	5,274.1	-6,729.8	-178.0	6,712.7	2.31	-0.63	2.22
13,563.0	90.00	160.80	6,449.2	5,274.2	-6,788.2	-157.1	6,772.1	1.02	0.32	0.97
13,626.0	89.80	160.80	6,449.3	5,274.3	-6,847.6	-136.3	6,832.5	0.45	-0.32	0.32
13,689.0	89.80	161.10	6,449.5	5,274.5	-6,907.2	-115.8	6,893.0	0.48	0.00	0.48
13,752.0	90.00	160.50	6,449.6	5,274.6	-6,966.7	-95.0	6,953.4	1.00	0.32	-0.95
13,815.0	89.80	160.30	6,449.7	5,274.7	-7,026.0	-73.9	7,013.8	0.45	-0.32	-0.32
13,878.0	90.20	160.00	6,449.7	5,274.7	-7,085.3	-52.5	7,074.0	0.79	0.63	-0.48
13,941.0	90.20	160.00	6,449.5	5,274.5	-7,144.5	-31.0	7,134.2	0.00	0.00	0.00
14,004.0	89.80	161.00	6,449.5	5,274.5	-7,203.8	-9.9	7,194.5	1.71	-0.63	1.59
14,067.0	90.20	161.70	6,449.5	5,274.5	-7,263.5	10.2	7,255.2	1.28	0.63	1.11
14,130.0	90.00	162.90	6,449.4	5,274.4	-7,323.6	29.4	7,316.0	1.93	-0.32	1.90
14,193.0	89.40	160.70	6,449.7	5,274.7	-7,383.4	49.0	7,376.8	3.62	-0.95	-3.49
14,256.0	89.10	159.00	6,450.6	5,275.6	-7,442.5	70.7	7,436.9	2.74	-0.48	-2.70
14,319.0	88.70	159.30	6,451.8	5,276.8	-7,501.4	93.2	7,496.8	0.79	-0.63	0.48
14,382.0	88.80	159.80	6,453.1	5,278.1	-7,560.4	115.2	7,556.9	0.81	0.16	0.79
14,445.0	89.30	159.60	6,454.2	5,279.2	-7,619.5	137.0	7,616.9	0.85	0.79	-0.32
14,508.0	89.60	159.30	6,454.8	5,279.8	-7,678.5	159.1	7,677.0	0.67	0.48	-0.48
14,571.0	90.20	160.40	6,454.9	5,279.9	-7,737.6	180.8	7,737.1	1.99	0.95	1.75
14,634.0	89.50	162.50	6,455.1	5,280.1	-7,797.3	200.9	7,797.7	3.51	-1.11	3.33
14,697.0	89.20	161.40	6,455.8	5,280.8	-7,857.2	220.4	7,858.5	1.81	-0.48	-1.75
14,760.0	89.90	162.10	6,456.3	5,281.3	-7,917.1	240.1	7,919.3	1.57	1.11	1.11
14,823.0	89.80	162.00	6,456.4	5,281.4	-7,977.0	259.5	7,980.1	0.22	-0.16	-0.16
14,886.0	89.70	161.80	6,456.7	5,281.7	-8,036.9	279.1	8,040.9	0.35	-0.16	-0.32



Database:	COMPASS 5000 - Energy User Co.	Local Co-ordinate Reference:	PROJ to Bit=15400'
Company:	EQT (Production), Cameron Area	TVD Reference:	MD/6474'
Project:	North-Canyon-01	MD Reference:	PROJ to Bit=15400'
Site:	Wade County 123744	North Reference:	Bit
Well:	Well=611279	Survey Calculation Method:	Minimum Curvature
Wellbore:	MD/6474		
Design:	15343 74 Oilwell Surface		

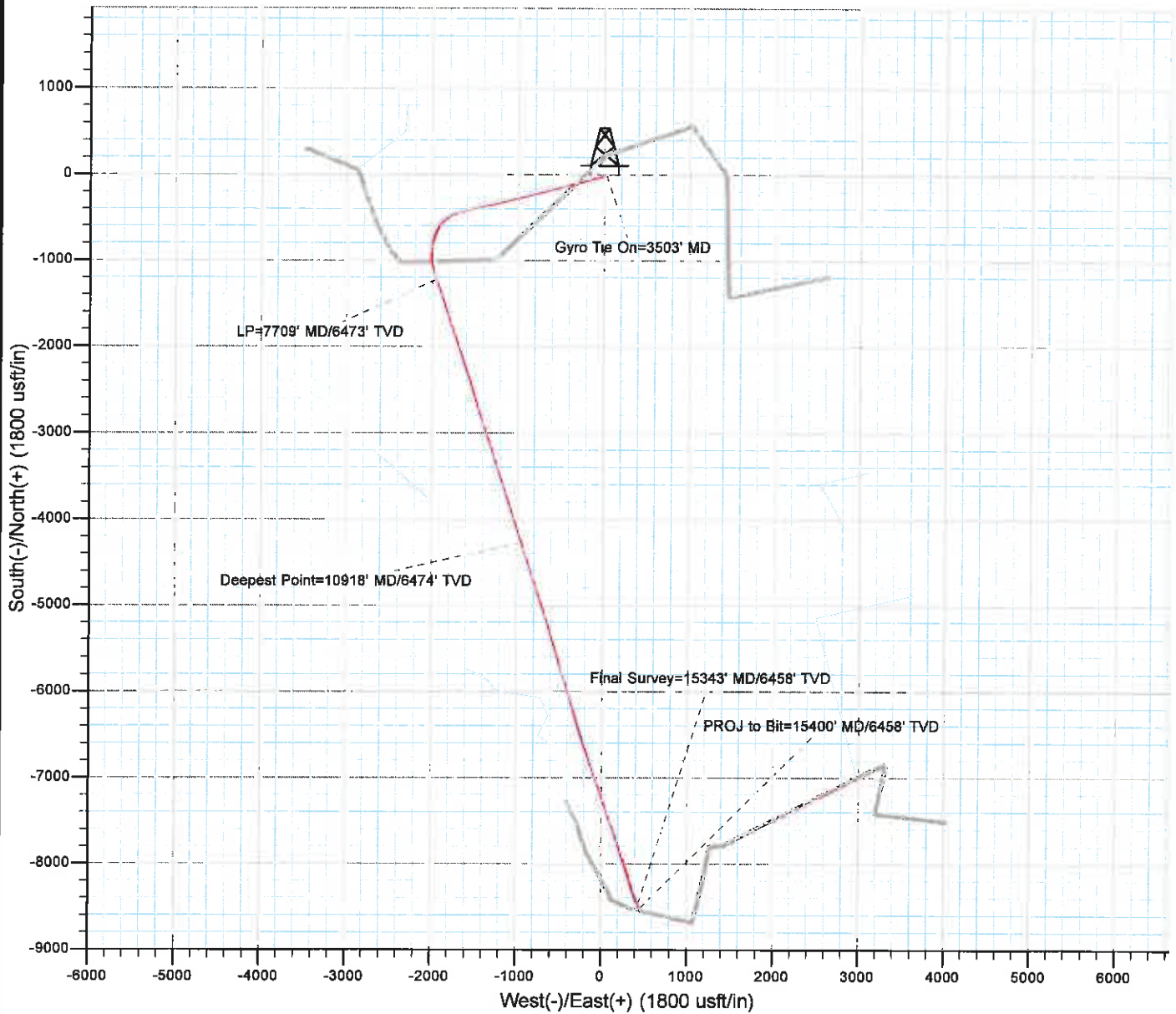
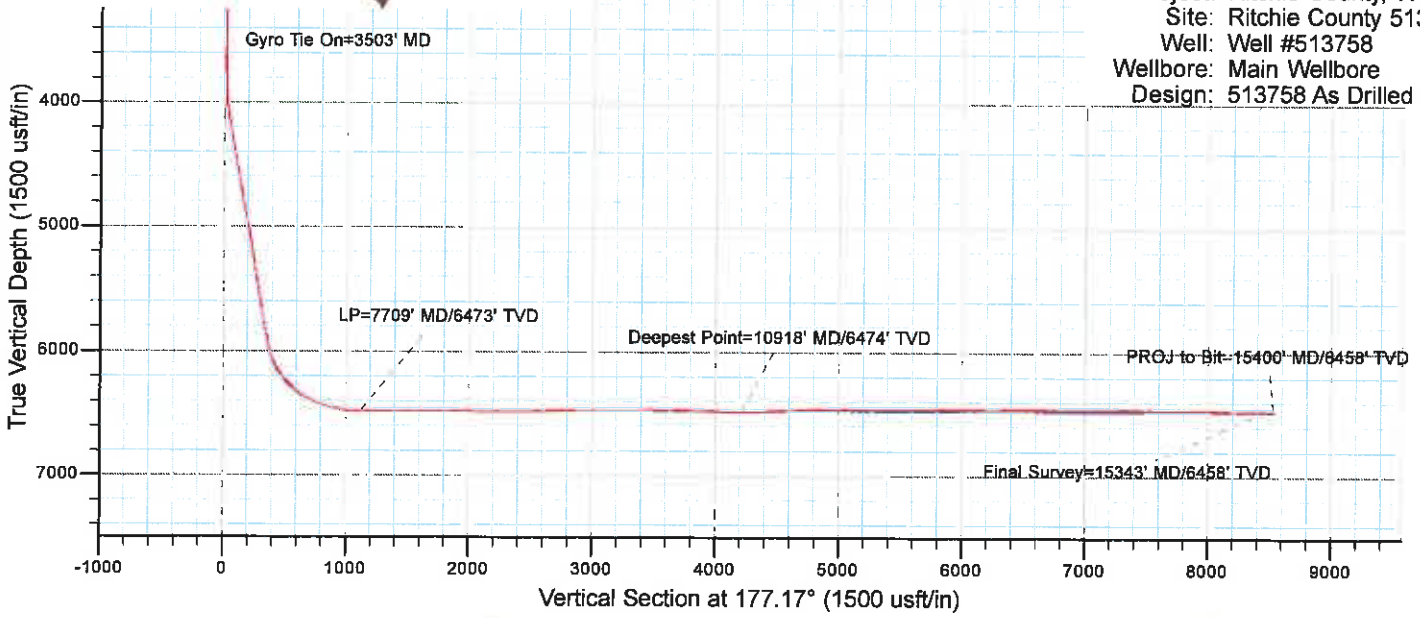
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,948.0	89.90	161.90	6,456.9	5,281.9	-8,095.8	298.4	8,100.7	0.36	0.32	0.16
15,011.0	90.20	161.60	6,456.9	5,281.9	-8,155.6	318.2	8,161.4	0.67	0.48	-0.48
15,074.0	90.20	161.50	6,456.7	5,281.7	-8,215.4	338.1	8,222.1	0.16	0.00	-0.16
15,136.0	89.60	159.30	6,456.8	5,281.8	-8,273.8	358.9	8,281.4	3.68	-0.97	-3.55
15,199.0	89.80	158.60	6,457.1	5,282.1	-8,332.6	381.5	8,341.3	1.16	0.32	-1.11
15,262.0	90.10	158.50	6,457.1	5,282.1	-8,391.2	404.6	8,401.0	0.50	0.48	-0.16
15,324.0	89.60	157.60	6,457.3	5,282.3	-8,448.7	427.7	8,459.5	1.66	-0.81	-1.45
15,343.0	89.40	156.80	6,457.5	5,282.5	-8,466.2	435.1	8,477.4	4.34	-1.05	-4.21
15,393.5	89.40	156.80	6,458.0	5,283.0	-8,512.7	455.0	8,524.8	0.00	0.00	0.00
15,400.0	89.40	156.80	6,458.1	5,283.1	-8,518.6	457.5	8,530.8	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates:		Comment:
		+N/-S (usft)	+E/-W (usft)	
3,503.0	3,502.8	-6.2	26.3	Gyro Tie On=3503' MD
7,709.0	6,473.3	-1,220.8	-1,958.3	LP=7709' MD/6473' TVD
10,918.0	6,474.3	-4,268.0	-955.4	Deepest Point=10918' MD/6474' TVD
15,343.0	6,457.5	-8,466.2	435.1	Final Survey=15343' MD/6458' TVD
15,400.0	6,458.1	-8,518.6	457.5	PROJ to Bit=15400' MD/6458' TVD

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

# EQT Production - Geneseo Shale

Project: Ritchie County, WV  
Site: Ritchie County 513758  
Well: Well #513758  
Wellbore: Main Wellbore  
Design: 513758 As Drilled Surveys



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	9/12/2015
Job End Date	9/21/2015
State	West Virginia
County	Ritchie
API Number	47-085-10134-00-00
Operator Name	EQT Production
Well Name and Number	513758
Longitude	-80 84281600
Latitude	39 13596200
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	6,460
Total Base Water Volume (gal)	13,789,188
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	Keane Group	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.45292	None
Sand (Proppant)	Keane Group	Proppant					
MC MIX 437-5	Multi-Chem	Calcium nitrate solution	Silica Substrate	14808-60-7	100.00000	10.15842	None
Hydrochloric Acid (15%)	Keane Group	Acidizing	Calcium nitrate	10124-37-5	60.00000	0.05720	None
FFR760	Keane Group	Friction Reducer	Hydrochloric Acid	7647-01-0	15.00000	0.03070	None
			Hydrotreated Light Distillate	84742-47-8	30.00000	0.01965	None
			Alkyl Alcohol	Proprietary	10.00000	0.00655	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00328	None
EC6330A	Keane Group	Scale Inhibitor					
			Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00133	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	5.00000	0.00133	None
			Ethylene Glycol	107-21-1	40.00000	0.00020	None
			Dimethylformamide	68-12-2	20.00000	0.00010	None

		Pyridine, alkyl derivatives, quaternized with benzyl chloride	68909-18-2	15.00000	0.00007	None
		Cinnamialdehyde	104-55-2	15.00000	0.00007	None
		1-Decanol	112-30-1	5.00000	0.00002	None
		Nonyl Phenol Ethoxylate, Branched	127087-87-0	5.00000	0.00002	None
		1-Octanol	111-87-5	5.00000	0.00002	None
		2-Butoxyethanol	111-76-2	5.00000	0.00002	None
		Triethyl Phosphate	78-40-0	2.50000	0.00001	None
		Methanol	67-56-1	2.50000	0.00001	None
		Alkyl Pyridine	68391-11-7	1.00000	0.00000	None
Breaker- LEB 10 X	Keane Group	Gel Breaker				
		Ethylene Glycol	107-21-1	30.00000	0.00002	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.						

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

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

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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 AUG 25 2016  
 NY Department of  
 Environmental Protection

513758- 47-085-10134-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	7/23/2015	15,395	15,397	10	GENESEO
1	9/12/2015	15,250	15,342	32	GENESEO
2	9/12/2015	15,100	15,222	40	GENESEO
3	9/12/2015	14,950	15,072	40	GENESEO
4	9/12/2015	14,800	14,920	40	GENESEO
5	9/13/2015	14,650	14,770	40	GENESEO
6	9/13/2015	14,500	14,620	40	GENESEO
7	9/13/2015	14,350	14,472	40	GENESEO
8	9/13/2015	14,200	14,318	40	GENESEO
9	9/13/2015	14,050	14,170	40	GENESEO
10	9/14/2015	13,900	14,020	40	GENESEO
11	9/14/2015	13,750	13,870	40	GENESEO
12	9/14/2015	13,600	13,720	40	GENESEO
13	9/14/2015	13,450	13,570	40	GENESEO
14	9/14/2015	13,300	13,422	40	GENESEO
15	9/14/2015	13,150	13,270	40	GENESEO
16	9/14/2015	13,000	13,120	40	GENESEO
17	9/15/2015	12,850	12,966	40	GENESEO
18	9/15/2015	12,700	12,822	40	GENESEO
19	9/15/2015	12,550	12,672	40	GENESEO
20	9/15/2015	12,400	12,520	40	GENESEO
21	9/15/2015	12,252	12,370	40	GENESEO
22	9/16/2015	12,100	12,222	40	GENESEO
23	9/16/2015	11,950	12,070	40	GENESEO
24	9/16/2015	11,800	11,922	40	GENESEO
25	9/17/2015	11,650	11,772	40	GENESEO
26	9/17/2015	11,500	11,622	40	GENESEO
27	9/17/2015	11,350	11,468	40	GENESEO
28	9/17/2015	11,200	11,322	40	GENESEO
29	9/17/2015	11,050	11,170	40	GENESEO
30	9/17/2015	10,900	11,022	40	GENESEO
31	9/17/2015	10,750	10,872	40	GENESEO
32	9/18/2015	10,600	10,722	40	GENESEO
33	9/18/2015	10,450	10,566	40	GENESEO
34	9/18/2015	10,300	10,422	40	GENESEO
35	9/18/2015	10,150	10,272	40	GENESEO
36	9/18/2015	10,000	10,118	40	GENESEO
37	9/18/2015	9,850	9,972	40	GENESEO
38	9/18/2015	9,700	9,822	40	GENESEO
39	9/19/2015	9,554	9,672	40	GENESEO
40	9/19/2015	9,400	9,522	40	GENESEO
41	9/20/2015	9,250	9,372	40	GENESEO
42	9/20/2015	9,100	9,222	40	GENESEO
43	9/20/2015	8,950	9,068	40	GENESEO
44	9/20/2015	8,800	8,922	40	GENESEO
45	9/20/2015	8,652	8,772	40	GENESEO
46	9/20/2015	8,500	8,622	40	GENESEO
47	9/20/2015	8,350	8,472	40	GENESEO
48	9/20/2015	8,200	8,316	40	GENESEO
49	9/21/2015	8,050	8,172	40	GENESEO
50	9/21/2015	7,900	8,022	40	GENESEO
51	9/21/2015	7,750	7,872	40	GENESEO
52	9/21/2015	7,598	7,722	40	GENESEO

AUG 25 2015

Department of Environmental Protection

513758-47-085-10134-0000 - 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)
1	9/12/2015	15.8	7,488	8,732	4,009	0	676	0
2	9/12/2015	96.4	8,237	8,593	3,016	250,268.00	7,176	0
3	9/12/2015	91.9	8,260	8,731	3,075	250,925.00	7,655	0
4	9/13/2015	98.7	8,398	8,878	3,176	251,160.00	6,903	0
5	9/13/2015	99.2	8,510	8,941	3,394	250,460.00	6,519	0
6	9/13/2015	99.4	8,288	8,841	3,453	251,220.00	6,680	0
7	9/13/2015	100.7	8,087	8,711	3,456	249,018.00	6,637	0
8	9/13/2015	92.6	8,108	9,081	3,241	250,774.00	7,185	0
9	9/13/2015	100.1	7,935	8,658	3,332	253,085.00	6,592	0
10	9/13/2015	100.1	8,166	8,812	3,351	252,380.00	6,408	0
11	9/14/2015	101	7,663	8,564	3,288	249,740.00	6,406	0
12	9/14/2015	101	7,867	8,523	3,315	249,103.00	6,258	0
13	9/14/2015	100.6	7,773	8,394	3,228	250,358.00	6,142	0
14	9/14/2015	99.9	7,850	8,424	3,438	250,487.00	6,325	0
15	9/14/2015	101.7	7,717	8,697	3,562	250,840.00	6,486	0
16	9/14/2015	101.7	7,577	8,401	3,619	251,091.00	6,344	0
17	9/15/2015	101.2	7,543	8,393	3,943	251,180.00	6,422	0
18	9/15/2015	100.8	7,864	8,828	3,588	252,180.00	5,958	0
19	9/15/2015	99.6	7,987	8,691	3,394	251,680.00	6,770	0
20	9/15/2015	100.3	7,845	8,249	3,459	250,934.00	5,893	0
21	9/15/2015	101.4	7,428	8,268	3,698	252,216.00	6,632	0
22	9/15/2015	101	7,688	8,558	3,681	250,770.00	6,367	0
23	9/16/2015	99.1	7,827	8,677	3,404	250,107.00	6,606	0
24	9/16/2015	100.2	7,775	8,720	3,773	251,780.00	6,043	0
25	9/17/2015	101.1	7,655	8,931	4,017	250,803.00	6,294	0
26	9/17/2015	100.2	7,784	8,624	3,866	251,570.00	6,133	0
27	9/17/2015	99.7	7,652	8,377	3,725	259,382.00	6,138	0
28	9/17/2015	101.7	7,640	8,467	3,658	259,471.00	5,981	0
29	9/17/2015	101.1	7,505	8,161	3,328	251,053.00	6,528	0
30	9/17/2015	101.2	7,173	7,773	3,821	252,860.00	6,266	0
31	9/17/2015	101	7,328	8,355	3,621	253,314.00	6,322	0
32	9/18/2015	100.9	7,036	7,609	3,749	251,400.00	6,343	0
33	9/18/2015	101	6,986	8,053	3,557	248,360.00	5,792	0
34	9/18/2015	101.2	7,271	8,242	3,307	248,697.00	5,723	0
35	9/18/2015	101.1	6,932	7,816	3,330	251,147.00	5,665	0
36	9/18/2015	101.1	7,081	7,506	3,287	251,268.00	5,581	0
37	9/18/2015	101	6,866	7,591	3,891	249,949.00	6,230	0
38	9/19/2015	100.9	7,094	8,326	3,561	250,979.00	6,315	0
39	9/19/2015	100.9	6,536	7,629	3,346	252,540.00	6,350	0
40	9/19/2015	102.3	6,750	7,609	3,381	250,650.00	6,170	0
41	9/19/2015	101.9	6,791	7,630	3,365	250,808.00	6,365	0
42	9/19/2015	101.7	6,822	8,605	3,392	250,222.00	6,252	0
43	9/20/2015	101.2	6,859	7,824	3,116	250,700.00	5,803	0
44	9/20/2015	101	6,791	7,922	3,180	250,429.00	6,033	0
45	9/20/2015	100.7	7,134	8,452	3,263	250,455.00	5,677	0
46	9/20/2015	101.1	6,555	7,123	3,135	250,351.00	5,825	0
47	9/20/2015	101.8	6,534	7,833	3,188	251,905.00	6,250	0
48	9/20/2015	101.2	6,547	7,222	3,129	250,250.00	6,277	0
49	9/21/2015	102.1	6,722	8,590	3,253	252,360.00	6,368	0
50	9/21/2015	102.2	6,230	7,424	3,172	252,670.00	6,316	0
51	9/21/2015	101.8	6,381	7,688	3,137	249,620.00	6,305	0
52	9/21/2015	101.5	6,344	7,397	2,987	251,180.00	6,224	0
			7,051	8,251	3,032	251,480.00	5,705	0

Environ Mental Protection



June 8, 2016

Mr. Gene Smith  
West Virginia Department of Environmental Protection  
Office of Oil and Gas  
601 57th Street SE  
Charleston, WV 25304

Re: Modification of 47-085-10134

Dear Mr. Smith,

Please accept the attached updates for the above referenced permit. Upon inspection of our as-drilled plat, we noted the curve geometry crossed into an additional tract, for which EQT had acquired a subsurface agreement. Enclosed is an updated WW-6A1, WW-6B, mylar plat and rec plan reflecting corrections to update the permit file to be consistent with the as-drilled well bore.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark', is written over a light blue horizontal line.

Vicki Roark  
Permitting Supervisor-WV

Enc.

RECEIVED  
Office of Oil and Gas  
AUG 25 2016  
WV Department of  
Environmental Protection



ROYALTY OWNERS		
CRAIG H. WILLIAMS	243.88 AC.±	LEASE NO. 987447
J.P. SMITH ET LIX	130 AC.±	LEASE NO. 107887
DONALD SHEETS ET AL	82.10 AC.±	LEASE NO. 988339

NOTES ON SURVEY

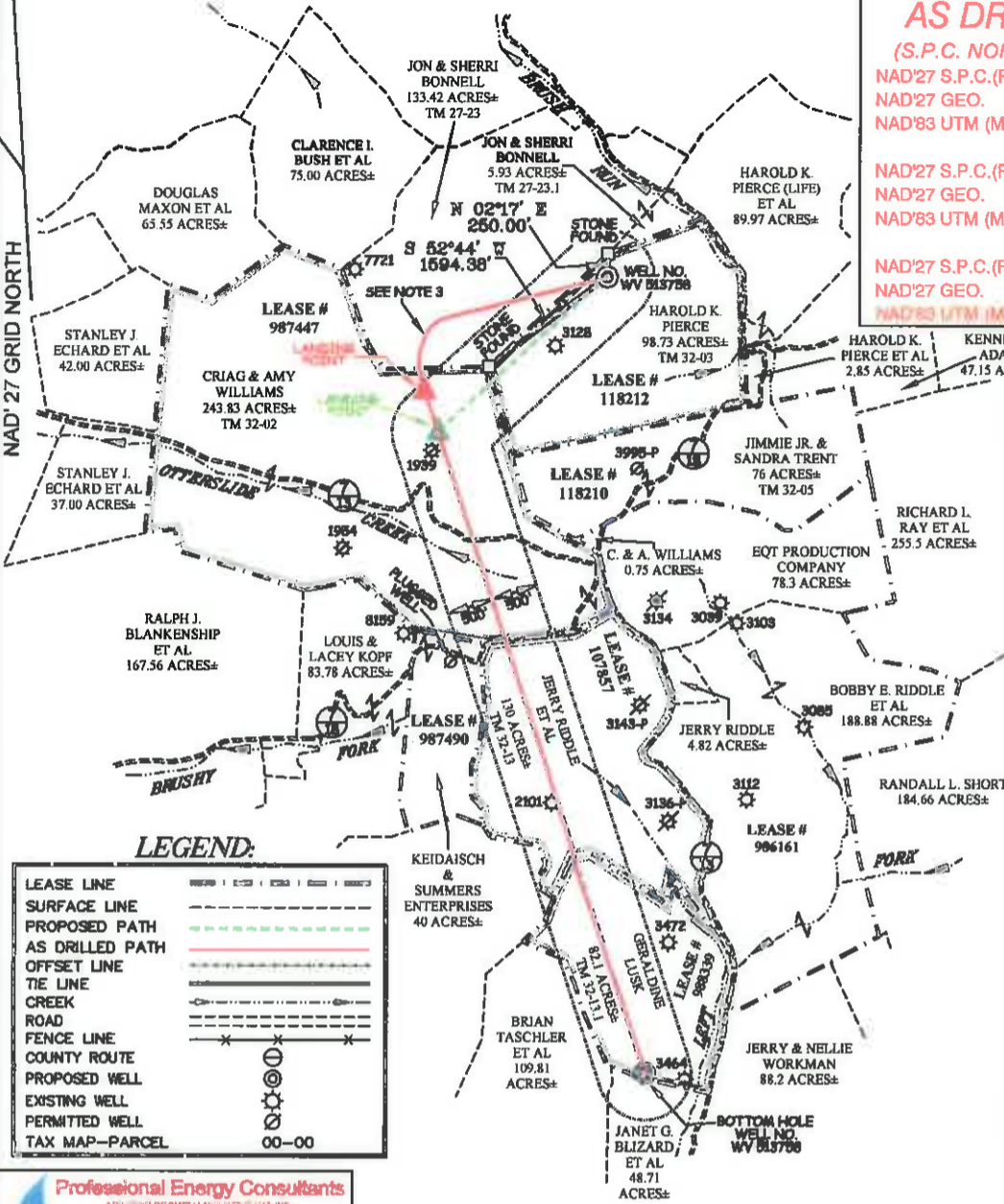
1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. AS DRILLED INFORMATION PROVIDED BY EQT.
3. NONPRODUCTIVE SUBSURFACE RIGHT OF WAY.

LATITUDE 39°10'00"  
**EQT PRODUCTION COMPANY**  
**J.E. PIERCE ET AL LEASE**  
**108 (98.73±) ACRES±**  
**WELL NO. WV 513758**  
**(OXF163 H3)**

AS DRILLED COORDINATES

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

NAD'27 S.P.C.(FT)	N. 234,477.3	E. 1,619,107.1
NAD'27 GEO.	LAT-(N) 39.135982	LONG-(W) 80.842816
NAD'83 UTM (M)	N. 4,331,885.9	E. 513,599.6
<b>LANDING POINT</b>		
NAD'27 S.P.C.(FT)	N. 233,256.5	E. 1,617,148.8
NAD'27 GEO.	LAT-(N) 39.132530	LONG-(W) 80.849654
NAD'83 UTM (M)	N. 4,331,504.0	E. 513,009.3
<b>BOTTOM HOLE</b>		
NAD'27 S.P.C.(FT)	N. 225,958.7	E. 1,619,564.7
NAD'27 GEO.	LAT-(N) 39.112594	LONG-(W) 80.840755
NAD'83 UTM (M)	N. 4,329,293.1	E. 513,782.4



SUBSURFACE AGREEMENT  
 JOHN M. & SHERRI L. BONNELL 133.42 AC.± TM 27-23

LEGEND:

LEASE LINE	
SURFACE LINE	
PROPOSED PATH	
AS DRILLED PATH	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
FENCE LINE	
COUNTY ROUTE	
PROPOSED WELL	
EXISTING WELL	
PERMITTED WELL	
TAX MAP-PARCEL	00-00

Professional Energy Consultants  
 A DIVISION OF SMITH LANGRISH & ASSOCIATES, INC.  
  
 SURVEYORS  
 ENGINEERS  
 ENVIRONMENTAL  
 PROJECT MGMT.  
 (804) 482-8834 WWW.SLSURVEYS.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.  
 2288 *Earl N. Thompson*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE MAY 27, 20 14  
 REVISED 08/22/14, 10/27/14, 10/31/14, 12/02/14, 12/05/14, 04/14/15, 12/03/15, 05/16/16 & 06/06/16  
 OPERATORS WELL NO. WV 513758  
 API WELL NO. 47 - 085 - 10134H  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7698AD513758R2  
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

WELL TYPE: OIL \_\_\_\_\_ GAS  LIQUID INJECTION \_\_\_\_\_ WASTE DISPOSAL \_\_\_\_\_ IF "GAS" PRODUCTION  STORAGE \_\_\_\_\_ DEEP \_\_\_\_\_ SHALLOW

LOCATION:  
 PAD ELEVATION 1,158.4' WATERSHED BRUSH RUN OF MIDDLE FORK  
 DISTRICT UNION COUNTY RITCHIE QUADRANGLE OXFORD 7.5'  
 SURFACE OWNER HAROLD K. PIERCE ACREAGE 98.73±  
 ROYALTY OWNER J.E. PIERCE ET AL ACREAGE 108± (98.73±)  
 PROPOSED WORK:  
 DRILL  CONVERT \_\_\_\_\_ DRILL DEEPER \_\_\_\_\_ REDRILL \_\_\_\_\_ FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION \_\_\_\_\_ PERFORATE NEW FORMATION \_\_\_\_\_ PLUG AND ABANDON \_\_\_\_\_ CLEAN OUT AND REPLUG \_\_\_\_\_ OTHER \_\_\_\_\_  
 PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION GENESEO  
 ESTIMATED DEPTH 6,434'

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