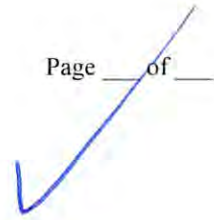


State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work



API 47 - 085 - 10136 County RITCHIE District UNION  
Quad OXFORD 7.5' Pad Name OXF163 Field/Pool Name \_\_\_\_\_  
Farm name HAROLD K. PIERCE Well Number 513760  
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 4,331,879 Easting 513,593  
Landing Point of Curve Northing 4,331,529 Easting 513,257  
Bottom Hole Northing 4,329,394 Easting 513,991

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, ferrocchrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 9/22/2014 Date drilling commenced 12/3/2014 Date drilling ceased 7/15/2015  
Date completion activities began 9/22/2015 Date completion activities ceased 10/16/2015  
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 Office of Oil and Gas  
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

**APPROVED**

NAME: Michael Daff  
DATE: 6/13/16

WV Department of  
Environmental Protection

MAR 22 2016  
Reviewed by:

12/02/2016  
AX RBDM5 12/01/16

API 47- 085 - 10136 Farm name HAROLD K. PIERCE Well number 513760

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"	1057'	NEW	J-55 54.5LB/FT	760'	Y
Coal							
Intermediate 1	12.375"	9.625"	3032'	NEW	A-500 40LB/FT	1812'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	14804'	NEW	P-110 20LB/FT	NONE	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	38	15.6	1.18	44.84	0	8
Surface	CLASS A	803	15.6	1.20	963.6	0	8
Coal							
Intermediate 1	CLASS A	1031	15.6	1.18	1218.5	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class H	730/990	14.2 / 15.2	1.23 / 1.95	2828.4	3,020' MD	72
Tubing							

Drillers TD (ft) 14,819' MD Loggers TD (ft) N/A

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

Plug back procedure N/A

Kick off depth (ft) 4,655' 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- 258 Composite Centralizers. One on every joint from TD to 4,000 MD

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 \_\_\_\_\_

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API 47- 085 - 10136

Farm name HAROLD K. PIERCE

Well number 513760

**PERFORATION RECORD**

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

Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
						Please	See	Attached

Please insert additional pages as applicable.

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API 47- 085 - 10136 Farm name HAROLD K. PIERCE Well number 513760

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
Marcellus	6,528	TVD	7,208 MD
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1,917 psi Bottom Hole N/A psi DURATION OF TEST 97.00 hrs

OPEN FLOW Gas 11,405 mcfpd Oil N/A bpd NGL 498 bpd Water 809 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	
	0		0		

Please insert additional pages as applicable.

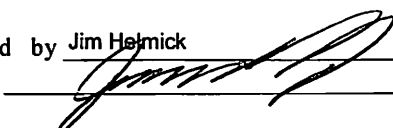
Drilling Contractor KEANE & SONS DRILLING (RIG 2143)  
Address 14235 OLD ROUTE 6 City MANSFIELD State PA Zip 16933

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

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

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 3/17/2016

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry  
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WV Department of Environmental Protection

API 47- 085 - 10136 Farm name HAROLD K. PIERCE Well number 513760

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 47-085-10136

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	0	0	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	3,298
WARREN	3,299	3,298	3,352	3,351
SPEECHLEY	3,352	3,351	3,846	3,845
BALLTOWN A	3,846	3,845	4,430	4,429
RILEY	4,430	4,429	4,767	4,766
BENSON	4,767	4,766	5,100	5,059
ALEXANDER	5,100	5,059	6,639	6,215
SONYEA	6,639	6,215	6,828	6,348
MIDDLESEX	6,828	6,348	6,902	6,395
GENESSEE	6,902	6,395	7,034	6,465
GENESEO	7,034	6,465	7,138	6,507
TULLY	7,138	6,507	7,174	6,518
HAMILTON	7,174	6,518	7,208	6,528
MARCELLUS	7,208	6,528	14,819	6,556

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API 47-085-10136

**PHOENIX**  
TECHNOLOGY SERVICES



## **EQT Production - Marcellus**

Ritchie County, WV  
Ritchie County 513760  
Well #513760

Main Wellbore

Design: 513760 As Drilled Surveys

## **Standard Survey Report**

15 July, 2015



WV Department of  
Environmental Protection 12/02/2016



Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ritchie County 513760
Company:	EQT Production - Marcellus	TVD Reference:	KB@16 @ 1175.0usft
Project:	Ritchie County, WV	MD Reference:	KB@16 @ 1175.0usft
Site:	Ritchie County 513760	North Reference:	Grid
Well:	Well #513760	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513760 As Drilled Surveys		

**Project** Ritchie 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** Ritchie County 513760

Site Position:		Northing:	234,456.00 usft	Latitude:	39.14
From:	Map	Easting:	1,619,086.00 usft	Longitude:	-80.84
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.86 °

**Well** Well #513760

Well Position	+N/-S	0.0 usft	Northing:	234,456.00 usft	Latitude:	39° 8' 9.250 N
	+E/-W	0.0 usft	Easting:	1,619,086.00 usft	Longitude:	80° 50' 34.402 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,159.0 usft

**Wellbore** Main Wellbore

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	6/22/2015	-7.72	66.57	52,059

**Design** 513760 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	171.87

**Survey Program** Date 7/15/2015

From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	4,571.0	513760 Gyrodata Gyros (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0.00	14,819.0	513760 PHX MWD (Main Wellbore)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

**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	-1,175.0	0.0	0.0	0.0	0.00	0.00	0.00
103.0	0.36	110.32	103.0	-1,072.0	-0.1	0.3	0.2	0.35	0.35	0.00
203.0	0.35	105.39	203.0	-972.0	-0.3	0.9	0.4	0.03	0.01	-4.93
303.0	0.36	105.89	303.0	-872.0	-0.5	1.5	0.7	0.01	0.01	0.50
403.0	0.28	122.38	403.0	-772.0	-0.7	2.0	1.0	0.12	0.06	16.49
503.0	0.25	116.78	503.0	-672.0	-0.9	2.4	1.2	0.04	-0.03	-5.60
603.0	0.21	125.34	603.0	-572.0	-1.1	2.7	1.5	0.05	0.04	6.56
703.0	0.17	132.40	703.0	-472.0	-1.3	3.0	1.7	0.05	-0.04	7.06





Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User Ed	Local Co-ordinate Reference:	Site Ritchie County 513780
Company:	EQT Production - Marshall	TVD Reference:	KB@16 @ 1175.Davit
Project:	Ritchie County WV	MD Reference:	KB@15 @ 1175.Davit
Site:	Ritchie County 513780	North Reference:	Gnd
Well:	Well #5 13780	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513780 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)
803.0	0.16	71.36	803.0	-372.0	-1.4	3.2	1.8	0.17	-0.01	-61.04
903.0	0.15	73.67	903.0	-272.0	-1.3	3.5	1.8	0.01	-0.01	2.31
1,003.0	0.17	78.72	1,003.0	-172.0	-1.2	3.8	1.8	0.02	0.02	5.05
1,103.0	0.37	78.32	1,103.0	-72.0	-1.1	4.2	1.7	0.20	0.20	-0.40
1,203.0	0.57	90.50	1,203.0	28.0	-1.1	5.0	1.8	0.22	0.20	12.18
1,303.0	0.71	94.11	1,303.0	128.0	-1.1	6.2	2.0	0.15	0.14	3.61
1,403.0	0.77	96.72	1,403.0	228.0	-1.3	7.4	2.3	0.07	0.06	2.61
1,503.0	0.87	96.65	1,503.0	328.0	-1.4	8.9	2.7	0.10	0.10	-0.07
1,603.0	0.95	99.39	1,602.9	427.9	-1.6	10.4	3.1	0.09	0.08	2.74
1,703.0	1.14	105.08	1,702.9	527.9	-2.0	12.2	3.7	0.22	0.19	5.69
1,803.0	1.48	114.23	1,802.9	627.9	-2.8	14.4	4.8	0.40	0.34	9.15
1,903.0	1.54	114.93	1,902.9	727.9	-3.9	16.8	6.2	0.06	0.06	0.70
2,003.0	1.56	117.19	2,002.8	827.8	-5.1	19.2	7.8	0.06	0.02	2.26
2,103.0	1.61	116.92	2,102.8	927.8	-6.4	21.6	9.4	0.05	0.05	-0.27
2,203.0	1.67	117.97	2,202.8	1,027.8	-7.7	24.2	11.0	0.07	0.06	1.05
2,303.0	1.69	118.20	2,302.7	1,127.7	-9.1	26.8	12.8	0.02	0.02	0.23
2,403.0	1.58	119.47	2,402.7	1,227.7	-10.4	29.3	14.5	0.12	-0.11	1.27
2,503.0	1.52	121.52	2,502.6	1,327.6	-11.8	31.6	16.2	0.08	-0.06	2.05
2,603.0	1.39	119.87	2,602.6	1,427.6	-13.1	33.8	17.8	0.14	-0.13	-1.65
2,703.0	1.33	120.66	2,702.6	1,527.6	-14.3	35.8	19.2	0.06	-0.06	0.79
2,803.0	1.31	119.99	2,802.5	1,627.5	-15.5	37.8	20.7	0.03	-0.02	-0.67
2,903.0	1.29	121.24	2,902.5	1,727.5	-16.6	39.8	22.1	0.03	-0.02	1.25
3,003.0	1.20	125.21	3,002.5	1,827.5	-17.8	41.6	23.5	0.12	-0.09	3.97
3,103.0	1.14	134.60	3,102.5	1,927.5	-19.1	43.2	25.0	0.20	-0.06	9.39
3,203.0	1.03	135.79	3,202.5	2,027.5	-20.5	44.5	26.5	0.11	-0.11	1.19
3,303.0	0.88	137.01	3,302.4	2,127.4	-21.7	45.6	27.9	0.15	-0.15	1.22
3,403.0	0.67	138.82	3,402.4	2,227.4	-22.7	46.6	29.0	0.21	-0.21	1.81
3,503.0	0.52	142.62	3,502.4	2,327.4	-23.5	47.2	29.9	0.16	-0.15	3.80
3,603.0	0.45	145.17	3,602.4	2,427.4	-24.1	47.7	30.6	0.07	-0.07	2.55
3,703.0	0.37	128.43	3,702.4	2,527.4	-24.7	48.2	31.2	0.14	-0.08	-16.74
3,803.0	0.30	129.45	3,802.4	2,627.4	-25.0	48.6	31.7	0.07	-0.07	1.02
3,903.0	0.07	112.36	3,902.4	2,727.4	-25.2	48.9	31.9	0.23	-0.23	-17.09
4,003.0	0.16	341.34	4,002.4	2,827.4	-25.1	48.9	31.8	0.21	0.09	-131.02
4,103.0	0.33	330.94	4,102.4	2,927.4	-24.7	48.7	31.4	0.18	0.17	-10.40
4,203.0	0.70	339.09	4,202.4	3,027.4	-23.9	48.4	30.5	0.38	0.37	8.15
4,303.0	0.70	335.95	4,302.4	3,127.4	-22.8	47.9	29.3	0.04	0.00	-3.14
4,403.0	0.91	333.83	4,402.4	3,227.4	-21.5	47.3	28.0	0.21	0.21	-2.12
4,503.0	1.14	330.26	4,502.4	3,327.4	-19.9	46.5	26.3	0.24	0.23	-3.57
4,571.0	1.41	322.82	4,570.4	3,395.4	-18.7	45.6	24.9	0.49	0.49	-10.94
Gyro Tie On=4571 MD										
4,571.3	1.41	322.82	4,570.7	3,395.7	-18.7	45.6	24.9	0.00	0.00	0.00
4,655.0	1.60	316.80	4,654.3	3,479.3	-17.0	44.2	23.1	0.30	0.23	-7.19
4,686.0	3.20	274.70	4,685.3	3,510.3	-16.6	43.0	22.5	0.15	0.15	-135.81

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Phoenix Technology Services  
Survey Report



Database:	EDM-5000.1 Single User DB	Local Co-ordinate Reference:	Site Ritchie County 513760
Company:	EQT Production - Marcellus	TVD Reference:	K8@15 @ 1175.Dust
Project:	Ritchie County WV	MD Reference:	K8@15 @ 1175.Dust
Site:	Ritchie County 513760	North Reference:	End
Well:	Well #5 (3750)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513760 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)
4,718.0	6.30	262.70	4,717.2	3,542.2	-16.8	40.4	22.3	10.12	9.69	-37.50
4,749.0	9.10	255.70	4,747.9	3,572.9	-17.6	36.3	22.5	9.51	9.03	-22.58
4,781.0	12.00	250.80	4,779.4	3,604.4	-19.3	30.7	23.5	9.48	9.06	-15.31
4,812.0	14.60	250.60	4,809.5	3,634.5	-21.7	24.0	24.8	8.39	8.39	-0.65
4,844.0	17.80	249.20	4,840.3	3,665.3	-24.7	15.6	26.7	10.07	10.00	-4.38
4,875.0	20.60	248.00	4,869.5	3,694.5	-28.5	6.1	29.1	9.12	9.03	-3.87
4,907.0	24.00	245.80	4,899.1	3,724.1	-33.2	-5.0	32.2	10.94	10.63	-6.88
4,938.0	27.10	244.90	4,927.1	3,752.1	-38.8	-17.2	36.0	10.08	10.00	-2.90
4,969.0	30.40	244.10	4,954.3	3,779.3	-45.3	-30.6	40.5	10.72	10.65	-2.58
5,001.0	33.40	243.90	4,981.4	3,806.4	-52.7	-45.8	45.7	9.38	9.38	-0.63
5,032.0	36.70	243.50	5,006.8	3,831.8	-60.6	-61.8	51.2	10.67	10.65	-1.29
5,064.0	40.00	244.10	5,031.9	3,856.9	-69.3	-79.6	57.4	10.38	10.31	1.88
5,127.0	42.80	244.70	5,079.2	3,904.2	-87.3	-117.1	69.9	4.49	4.44	0.95
5,190.0	42.80	244.30	5,125.4	3,950.4	-105.7	-155.8	82.7	0.43	0.00	-0.63
5,253.0	39.10	243.00	5,173.0	3,998.0	-124.0	-192.8	95.6	6.03	-5.87	-2.06
5,316.0	39.70	243.50	5,221.6	4,046.6	-142.0	-228.5	108.3	1.08	0.95	0.79
5,379.0	42.70	245.70	5,269.0	4,094.0	-159.8	-266.0	120.6	5.29	4.76	3.49
5,442.0	43.50	246.50	5,315.0	4,140.0	-177.3	-305.3	132.3	1.54	1.27	1.27
5,505.0	42.20	244.60	5,361.2	4,186.2	-195.0	-344.3	144.4	2.91	-2.06	-3.02
5,568.0	42.20	243.50	5,407.9	4,232.9	-213.5	-382.4	157.3	1.17	0.00	-1.75
5,631.0	43.10	244.30	5,454.2	4,279.2	-232.3	-420.7	170.5	1.67	1.43	1.27
5,694.0	42.40	244.20	5,500.5	4,325.5	-250.8	-459.2	183.4	1.12	-1.11	-0.16
5,757.0	41.10	245.20	5,547.5	4,372.5	-268.8	-497.2	195.8	2.32	-2.06	1.59
5,820.0	40.30	247.10	5,595.3	4,420.3	-285.4	-534.7	206.9	2.34	-1.27	3.02
5,883.0	40.90	247.10	5,643.1	4,468.1	-301.3	-572.5	217.4	0.95	0.95	0.00
5,946.0	40.00	246.40	5,691.0	4,516.0	-317.5	-610.0	228.1	1.60	-1.43	-1.11
6,009.0	40.40	247.00	5,739.2	4,564.2	-333.6	-647.4	238.7	0.88	0.63	0.95
6,072.0	41.60	248.60	5,786.7	4,611.7	-349.2	-685.7	248.8	2.53	1.90	2.54
6,135.0	40.50	247.80	5,834.2	4,659.2	-364.5	-724.1	258.5	1.93	-1.75	-1.27
6,198.0	40.60	246.10	5,882.1	4,707.1	-380.6	-761.8	269.1	1.76	0.16	-2.70
6,261.0	41.20	245.60	5,929.7	4,754.7	-397.4	-799.4	280.5	1.08	0.95	-0.79
6,324.0	40.50	243.80	5,977.4	4,802.4	-415.1	-836.7	292.6	2.17	-1.11	-2.86
6,387.0	40.20	245.20	6,025.4	4,850.4	-432.6	-873.5	304.8	1.52	-0.48	2.22
6,451.0	40.80	244.90	6,074.0	4,899.0	-450.1	-911.1	316.8	0.99	0.94	-0.47
6,514.0	40.70	243.50	6,121.8	4,946.8	-468.0	-948.2	329.3	1.46	-0.16	-2.22
6,545.0	40.80	242.20	6,145.3	4,970.3	-477.3	-966.2	335.9	2.76	0.32	-4.19
6,577.0	41.70	237.70	6,169.3	4,994.3	-487.8	-984.4	343.8	9.69	2.81	-14.06
6,608.0	42.90	232.40	6,192.3	5,017.3	-499.8	-1,001.5	353.2	12.14	3.87	-17.10
6,640.0	44.00	228.30	6,215.5	5,040.5	-513.8	-1,018.4	364.7	9.46	3.44	-12.81
6,671.0	44.80	224.90	6,237.6	5,062.6	-528.7	-1,034.2	377.3	8.10	2.56	-10.97
6,703.0	44.30	221.00	6,260.5	5,085.5	-545.2	-1,049.5	391.3	8.69	-1.56	-12.99
6,734.0	44.70	216.50	6,282.6	5,107.6	-562.1	-1,063.1	406.2	10.25	1.29	-14.52

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Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User DC	Local Co-ordinate Reference:	Site Ritchie County 513760
Company:	EQT Production - Marcellus	TVD Reference:	KB@16 @-1175 Dual
Project:	Ritchie County, WV	MD Reference:	KB@16 @-1175 Dual
Site:	Ritchie County 513760	North Reference:	Grid
Well:	Well #513760	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513760 As Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,766.0	45.60	212.60	6,305.1	5,130.1	-580.8	-1,075.9	422.9	9.09	2.81	-12.19
6,797.0	46.30	208.90	6,326.7	5,151.7	-599.9	-1,087.3	440.2	8.87	2.26	-11.94
6,829.0	48.00	205.70	6,348.5	5,173.5	-620.8	-1,098.1	459.3	9.05	5.31	-10.00
6,860.0	50.20	202.20	6,368.8	5,193.8	-642.2	-1,107.6	479.2	11.10	7.10	-11.29
6,892.0	51.90	199.90	6,388.9	5,213.9	-665.4	-1,116.5	500.9	7.71	5.31	-7.19
6,923.0	54.10	198.00	6,407.5	5,232.5	-688.8	-1,124.5	523.0	8.62	7.10	-6.13
6,955.0	56.40	195.90	6,425.8	5,250.8	-714.0	-1,132.2	546.8	8.98	7.19	-6.56
6,986.0	59.10	193.70	6,442.3	5,267.3	-739.3	-1,138.9	570.9	10.58	8.71	-7.10
7,017.0	61.90	192.60	6,457.6	5,282.6	-765.6	-1,145.0	596.1	9.55	9.03	-3.55
7,049.0	64.50	190.50	6,472.0	5,297.0	-793.6	-1,150.7	622.9	10.02	8.13	-6.56
7,080.0	66.40	188.10	6,484.9	5,309.9	-821.4	-1,155.3	649.9	9.34	6.13	-7.74
7,111.0	68.30	185.90	6,496.8	5,321.8	-849.8	-1,158.8	677.5	8.97	6.13	-7.10
7,143.0	69.90	182.90	6,508.3	5,333.3	-879.6	-1,161.0	706.6	10.08	5.00	-9.38
7,174.0	72.30	180.00	6,518.3	5,343.3	-908.9	-1,161.8	735.6	11.76	7.74	-9.35
7,206.0	73.50	178.10	6,527.7	5,352.7	-939.5	-1,161.3	765.9	6.80	3.75	-5.94
7,238.0	75.50	176.10	6,536.3	5,361.3	-970.3	-1,159.7	796.6	8.68	6.25	-6.25
7,269.0	78.20	173.60	6,543.3	5,368.3	-1,000.3	-1,157.0	826.7	11.73	8.71	-8.06
7,300.0	81.70	171.60	6,548.7	5,373.7	-1,030.6	-1,153.1	857.3	12.95	11.29	-6.45
7,332.0	84.50	169.30	6,552.6	5,377.6	-1,061.9	-1,147.8	889.0	11.29	8.75	-7.19
7,363.0	87.20	166.50	6,554.8	5,379.8	-1,092.1	-1,141.3	919.9	12.53	8.71	-9.03
LP'Deepst Point=7394 MD/6556" TVD										
7,394.0	90.00	164.40	6,555.6	5,380.6	-1,122.1	-1,133.5	950.6	11.29	9.03	-6.77
513760 Plat LP"										
7,405.7	90.57	163.78	6,555.5	5,380.5	-1,133.4	-1,130.3	962.2	7.19	4.85	-5.31
7,458.0	93.10	161.00	6,553.8	5,378.8	-1,183.2	-1,114.5	1,013.8	7.19	4.84	-5.31
7,520.0	93.10	160.70	6,550.5	5,375.5	-1,241.7	-1,094.2	1,074.6	0.48	0.00	-0.48
7,583.0	91.80	160.30	6,547.8	5,372.8	-1,301.0	-1,073.2	1,136.3	2.16	-2.06	-0.63
7,646.0	89.00	161.20	6,547.3	5,372.3	-1,360.5	-1,052.4	1,198.1	4.67	-4.44	1.43
7,709.0	88.00	161.40	6,549.0	5,374.0	-1,420.1	-1,032.2	1,260.0	1.62	-1.59	0.32
7,772.0	88.60	161.10	6,550.9	5,375.9	-1,479.8	-1,012.0	1,321.9	1.06	0.95	-0.48
7,835.0	88.90	160.80	6,552.2	5,377.2	-1,539.3	-991.4	1,383.7	0.67	0.48	-0.48
7,898.0	89.70	161.50	6,553.0	5,378.0	-1,598.9	-971.1	1,445.6	1.69	1.27	1.11
7,961.0	90.60	163.60	6,552.8	5,377.8	-1,659.0	-952.2	1,507.8	3.63	1.43	3.33
8,024.0	90.90	163.30	6,552.0	5,377.0	-1,719.4	-934.2	1,570.1	0.67	0.48	-0.48
8,087.0	91.20	163.50	6,550.9	5,375.9	-1,779.8	-916.2	1,632.4	0.57	0.48	0.32
8,149.0	91.70	162.90	6,549.3	5,374.3	-1,839.1	-898.3	1,693.7	1.26	0.81	-0.97
8,212.0	91.70	161.90	6,547.4	5,372.4	-1,899.1	-879.3	1,755.8	1.59	0.00	-1.59
8,275.0	90.90	160.80	6,546.0	5,371.0	-1,958.8	-859.1	1,817.7	2.16	-1.27	-1.75
8,338.0	89.90	159.50	6,545.6	5,370.6	-2,018.0	-837.8	1,879.4	2.60	-1.59	-2.06
8,401.0	89.20	160.20	6,546.1	5,371.1	-2,077.2	-816.1	1,941.0	1.57	-1.11	1.11
513760 Point to avoid										
8,464.0	91.00	162.50	6,545.9	5,370.9	-2,136.9	-795.9	2,002.9	4.64	2.86	3.65
8,527.0	90.20	162.90	6,545.3	5,370.3	-2,197.0	-777.2	2,065.1	1.42	-1.07	0.63

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Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ritchie County 513760
Company:	EQT Production - Marcellus	TVD Reference:	US 10 1175 (usft)
Project:	Ritchie County, WV	MD Reference:	K 68 08 1175 (usft)
Site:	Ritchie County 513760	North Reference:	Grid
Well:	Well #513760	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513760-Ax Drilled 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)
8,590.0	89.80	162.20	6,545.3	5,370.3	-2,257.1	-758.3	2,127.3	1.28	-0.63	-1.11
8,653.0	91.10	162.70	6,544.8	5,369.8	-2,317.2	-739.3	2,189.4	2.21	2.06	0.79
8,716.0	91.20	162.00	6,543.5	5,368.5	-2,377.2	-720.2	2,251.5	1.12	0.16	-1.11
8,779.0	88.70	160.70	6,543.6	5,368.6	-2,436.9	-700.0	2,313.5	4.47	-3.97	-2.06
8,842.0	91.30	163.00	6,543.6	5,368.6	-2,496.7	-680.4	2,375.5	5.51	4.13	3.65
8,905.0	92.40	162.60	6,541.5	5,366.5	-2,556.9	-661.8	2,437.7	1.86	1.75	-0.63
8,967.0	90.50	162.90	6,540.0	5,365.0	-2,616.1	-643.4	2,498.9	3.10	-3.06	0.48
9,031.0	89.10	163.60	6,540.2	5,365.2	-2,677.4	-625.0	2,562.2	2.45	-2.19	1.09
9,093.0	89.40	163.40	6,541.0	5,366.0	-2,736.8	-607.4	2,623.5	0.58	0.48	-0.32
9,157.0	90.90	164.30	6,540.8	5,365.8	-2,798.3	-589.6	2,686.9	2.73	2.34	1.41
9,220.0	90.10	161.30	6,540.3	5,365.3	-2,858.5	-570.9	2,749.1	4.93	-1.27	-4.76
9,283.0	87.90	159.40	6,541.4	5,366.4	-2,917.8	-549.8	2,810.8	4.61	-3.49	-3.02
9,346.0	88.00	159.80	6,543.6	5,368.6	-2,976.8	-527.8	2,872.3	0.65	0.16	0.63
9,409.0	88.00	159.30	6,545.8	5,370.8	-3,035.8	-505.8	2,933.8	0.79	0.00	-0.79
9,472.0	88.40	159.30	6,547.8	5,372.8	-3,094.7	-483.6	2,995.3	0.63	0.63	0.00
9,534.0	89.30	159.20	6,549.1	5,374.1	-3,152.6	-461.6	3,055.7	1.46	1.45	-0.16
9,597.0	90.70	159.60	6,549.1	5,374.1	-3,211.6	-439.4	3,117.3	2.31	2.22	0.63
9,660.0	93.90	158.60	6,546.5	5,371.5	-3,270.4	-417.0	3,178.6	5.32	5.08	-1.59
9,723.0	94.50	157.80	6,541.9	5,366.9	-3,328.8	-393.7	3,239.7	1.58	0.95	-1.27
9,786.0	93.80	159.50	6,537.4	5,362.4	-3,387.3	-370.8	3,300.9	2.91	-1.11	2.70
9,849.0	92.20	160.80	6,534.1	5,359.1	-3,446.4	-349.4	3,362.5	3.27	-2.54	2.06
9,912.0	91.30	163.20	6,532.1	5,357.1	-3,506.3	-330.0	3,424.5	4.07	-1.43	3.81
9,975.0	90.50	163.60	6,531.2	5,356.2	-3,566.7	-312.0	3,486.8	1.42	-1.27	0.63
10,038.0	87.90	163.10	6,532.0	5,357.0	-3,627.0	-293.9	3,549.1	4.20	-4.13	-0.79
10,101.0	88.80	163.70	6,533.8	5,358.8	-3,687.4	-275.9	3,611.4	1.72	1.43	0.95
10,164.0	91.30	163.40	6,533.8	5,358.8	-3,747.8	-258.1	3,673.7	4.00	3.97	-0.48
10,227.0	91.10	163.00	6,532.5	5,357.5	-3,808.1	-239.9	3,736.0	0.71	-0.32	-0.63
10,290.0	90.30	164.30	6,531.7	5,356.7	-3,868.6	-222.2	3,798.3	2.42	-1.27	2.06
10,353.0	90.80	164.00	6,531.1	5,356.1	-3,929.2	-204.9	3,860.7	0.93	0.79	-0.48
10,416.0	90.40	164.40	6,530.4	5,355.4	-3,989.8	-187.8	3,923.2	0.90	-0.63	0.63
10,479.0	89.70	165.10	6,530.4	5,355.4	-4,050.6	-171.2	3,985.7	1.57	-1.11	1.11
10,542.0	90.20	165.90	6,530.4	5,355.4	-4,111.5	-155.4	4,048.3	1.50	0.79	1.27
10,605.0	90.40	164.80	6,530.1	5,355.1	-4,172.5	-139.5	4,110.9	1.77	0.32	-1.75
10,668.0	90.90	164.30	6,529.4	5,354.4	-4,233.2	-122.7	4,173.4	1.12	0.79	-0.79
10,731.0	91.70	164.20	6,528.0	5,353.0	-4,293.8	-105.6	4,235.8	1.28	1.27	-0.16
10,795.0	91.00	163.50	6,526.5	5,351.5	-4,355.3	-87.8	4,299.1	1.55	-1.09	-1.09
10,858.0	89.80	163.30	6,526.0	5,351.0	-4,415.7	-69.8	4,361.5	1.93	-1.90	-0.32
10,920.0	90.50	164.40	6,525.9	5,350.9	-4,475.2	-52.6	4,422.8	2.10	1.13	1.77
10,983.0	90.50	165.00	6,525.3	5,350.3	-4,536.0	-36.0	4,485.4	0.95	0.00	0.95
11,046.0	88.70	162.10	6,525.7	5,350.7	-4,596.4	-18.1	4,547.7	3.18	-2.86	-1.66
11,109.0	88.60	160.10	6,527.2	5,352.2	-4,656.0	2.3	4,609.5	3.18	-0.16	-0.16
11,172.0	88.90	160.00	6,528.6	5,353.6	-4,715.2	23.8	4,671.2	0.50	0.48	-0.16
11,235.0	89.40	159.70	6,529.5	5,354.5	-4,774.3	45.5	4,732.8	0.93	0.48	-0.48

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WV Department of Environmental Protection  
COMPASS 5000.1 Build 73  
12/02/2016



# Phoenix Technology Services

## Survey Report



<b>Database:</b>	EDM 5000.1 Single User.Bb	<b>Local Co-ordinate Reference:</b>	Site: Ritchie County 51378d
<b>Company:</b>	EQT Production - Marcellus	<b>TVD Reference:</b>	K&G 10 @ 1175.0usft
<b>Project:</b>	Ritchie County, WV	<b>MD Reference:</b>	K&G 10 @ 1175.0usft
<b>Site:</b>	Ritchie County 51378d	<b>North Reference:</b>	Geo:
<b>Well:</b>	Well #5 (378d)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	51378d As Drilled Surveys		

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,298.0	90.50	160.30	6,529.6	5,354.6	-4,833.5	67.0	4,794.5	1.99	1.75	0.95
11,361.0	91.80	161.30	6,528.3	5,353.3	-4,893.0	87.7	4,856.3	2.60	2.06	1.59
11,423.0	92.70	160.70	6,525.9	5,350.9	-4,951.6	107.9	4,917.1	1.74	1.45	-0.97
11,486.0	90.40	160.20	6,524.2	5,349.2	-5,010.9	129.0	4,978.8	3.74	-3.65	-0.79
11,549.0	90.70	160.60	6,523.6	5,348.6	-5,070.3	150.1	5,040.6	0.79	0.48	0.63
11,612.0	89.90	161.50	6,523.3	5,348.3	-5,129.8	170.5	5,102.4	1.91	-1.27	1.43
11,675.0	90.40	162.20	6,523.1	5,348.1	-5,189.7	190.2	5,164.5	1.37	0.79	1.11
11,738.0	91.00	162.80	6,522.3	5,347.3	-5,249.8	209.1	5,226.6	1.35	0.95	0.95
11,801.0	91.10	161.90	6,521.2	5,346.2	-5,309.8	228.2	5,288.8	1.44	0.16	-1.43
11,864.0	90.10	159.70	6,520.5	5,345.5	-5,369.3	248.9	5,350.6	3.84	-1.59	-3.49
11,927.0	88.00	159.90	6,521.6	5,346.6	-5,428.4	270.7	5,412.2	3.35	-3.33	0.32
11,990.0	88.40	160.00	6,523.5	5,348.5	-5,487.6	292.3	5,473.8	0.65	0.63	0.16
12,052.0	89.10	160.20	6,524.9	5,349.9	-5,545.8	313.4	5,534.5	1.17	1.13	0.32
12,115.0	90.30	159.10	6,525.2	5,350.2	-5,604.9	335.3	5,596.0	2.58	1.90	-1.75
12,178.0	91.30	159.40	6,524.3	5,349.3	-5,663.8	357.6	5,657.5	1.66	1.59	0.48
12,242.0	92.40	161.00	6,522.3	5,347.3	-5,724.0	379.3	5,720.1	3.03	1.72	2.50
12,304.0	92.00	160.40	6,519.9	5,344.9	-5,782.5	399.7	5,780.9	1.16	-0.65	-0.97
12,367.0	91.40	160.70	6,518.0	5,343.0	-5,841.9	420.7	5,842.7	1.06	-0.95	0.48
12,430.0	91.60	160.80	6,516.4	5,341.4	-5,901.3	441.5	5,904.5	0.35	0.32	0.16
12,492.0	90.10	162.00	6,515.5	5,340.5	-5,960.1	461.2	5,965.4	3.10	-2.42	1.94
12,555.0	89.90	162.20	6,515.5	5,340.5	-6,020.0	480.6	6,027.5	0.45	-0.32	0.32
12,618.0	89.00	162.80	6,516.1	5,341.1	-6,080.1	499.5	6,089.7	1.72	-1.43	0.95
12,681.0	89.10	163.10	6,517.1	5,342.1	-6,140.3	518.0	6,151.9	0.50	0.16	0.48
12,744.0	89.80	162.90	6,517.7	5,342.7	-6,200.6	536.4	6,214.1	1.16	1.11	-0.32
12,807.0	90.40	163.10	6,517.6	5,342.6	-6,260.8	554.9	6,276.4	1.00	0.95	0.32
12,870.0	89.70	164.90	6,517.5	5,342.5	-6,321.4	572.2	6,338.8	3.07	-1.11	2.86
12,933.0	90.10	164.90	6,517.6	5,342.6	-6,382.2	588.6	6,401.3	0.63	0.63	0.00
12,996.0	90.00	165.50	6,517.6	5,342.6	-6,443.1	604.7	6,463.9	0.97	-0.16	0.95
13,059.0	87.90	164.70	6,518.7	5,343.7	-6,504.0	620.9	6,526.4	3.57	-3.33	-1.27
13,122.0	89.80	167.20	6,520.0	5,345.0	-6,565.1	636.2	6,589.1	4.98	3.02	3.97
13,185.0	91.10	169.40	6,519.5	5,344.5	-6,626.7	649.0	6,651.9	4.06	2.06	3.49
13,248.0	89.90	165.70	6,519.0	5,344.0	-6,688.2	662.6	6,714.7	6.17	-1.90	-5.87
13,311.0	88.50	163.00	6,519.8	5,344.8	-6,748.9	679.5	6,777.2	4.83	-2.22	-4.29
13,374.0	89.90	163.80	6,520.7	5,345.7	-6,809.3	697.5	6,839.5	2.56	2.22	1.27
13,438.0	90.30	164.20	6,520.6	5,345.6	-6,870.8	715.2	6,902.9	0.88	0.63	0.63
13,501.0	89.60	163.10	6,520.7	5,345.7	-6,931.2	732.9	6,965.2	2.07	-1.11	-1.75
13,564.0	89.90	162.20	6,520.9	5,345.9	-6,991.4	751.7	7,027.4	1.51	0.48	-1.43
13,626.0	90.40	159.90	6,520.8	5,345.8	-7,050.0	771.8	7,088.3	3.80	3.80	3.80
13,690.0	88.50	156.80	6,521.4	5,346.4	-7,109.5	795.4	7,150.5	5.68	-2.97	-4.84
13,754.0	89.40	156.90	6,522.6	5,347.6	-7,168.3	820.6	7,212.3	1.41	0.16	0.16
13,817.0	89.10	155.50	6,523.4	5,348.4	-7,225.9	846.0	7,273.0	2.27	-0.48	-2.22
13,880.0	90.60	157.10	6,523.6	5,348.6	-7,283.6	871.3	7,333.7	3.48	2.38	2.54

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Phoenix Technology Services  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ritchie County 513760
Company:	EQT Production - Marcellus	TVD Reference:	KB@16 @ 1175.0usft
Project:	Ritchie County, WV	MD Reference:	KB@16 @ 1175.0usft
Site:	Ritchie County 513760	North Reference:	Grid
Well:	Well #513760	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	513760 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)
13,943.0	91.30	158.70	6,522.5	5,347.5	-7,342.0	895.0	7,394.8	2.77	1.11	2.54
14,006.0	90.80	160.00	6,521.4	5,346.4	-7,400.9	917.3	7,456.3	2.21	-0.79	2.06
14,069.0	89.10	160.60	6,521.4	5,346.4	-7,460.2	938.5	7,518.0	2.86	-2.70	0.95
14,132.0	89.20	161.10	6,522.4	5,347.4	-7,519.8	959.2	7,579.8	0.81	0.16	0.79
14,194.0	89.30	163.00	6,523.2	5,348.2	-7,578.7	978.3	7,640.9	3.07	0.16	3.06
14,257.0	89.60	163.00	6,523.8	5,348.8	-7,639.0	996.7	7,703.2	0.48	0.48	0.00
14,320.0	90.20	163.40	6,523.9	5,348.9	-7,699.3	1,014.9	7,765.4	1.14	0.95	0.63
14,383.0	90.50	163.30	6,523.5	5,348.5	-7,759.6	1,032.9	7,827.7	0.50	0.48	-0.16
14,446.0	90.80	163.20	6,522.8	5,347.8	-7,820.0	1,051.1	7,890.0	0.50	0.48	-0.16
14,509.0	90.90	163.30	6,521.8	5,346.8	-7,880.3	1,069.2	7,952.3	0.22	0.16	0.16
14,572.0	88.90	163.80	6,522.0	5,347.0	-7,940.7	1,087.1	8,014.6	3.27	-3.17	0.79
14,635.0	89.40	163.70	6,522.9	5,347.9	-8,001.2	1,104.7	8,077.0	0.81	0.79	-0.16
14,698.0	88.40	164.30	6,524.1	5,349.1	-8,061.7	1,122.1	8,139.4	1.85	-1.59	0.95
Final Survey=14761' MD/6526' TVD										
14,761.0	87.90	164.40	6,526.1	5,351.1	-8,122.4	1,139.1	8,201.8	0.81	-0.79	0.16
PROJ to Bit=14819' MD/6528' TVD - 513760 Plat TD 4'										
14,819.0	87.90	164.40	6,528.3	5,353.3	-8,178.2	1,154.6	8,259.3	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,571.3	4,570.7	-18.7	45.6	Gyro Tie On=4571' MD
7,394.0	6,555.6	-1,122.1	-1,133.5	LP/Deepest Point=7394' MD/6556' TVD
14,761.0	6,526.1	-8,122.4	1,139.1	Final Survey=14761' MD/6526' TVD
14,819.0	6,528.3	-8,178.2	1,154.6	PROJ to Bit=14819' MD/6528' TVD

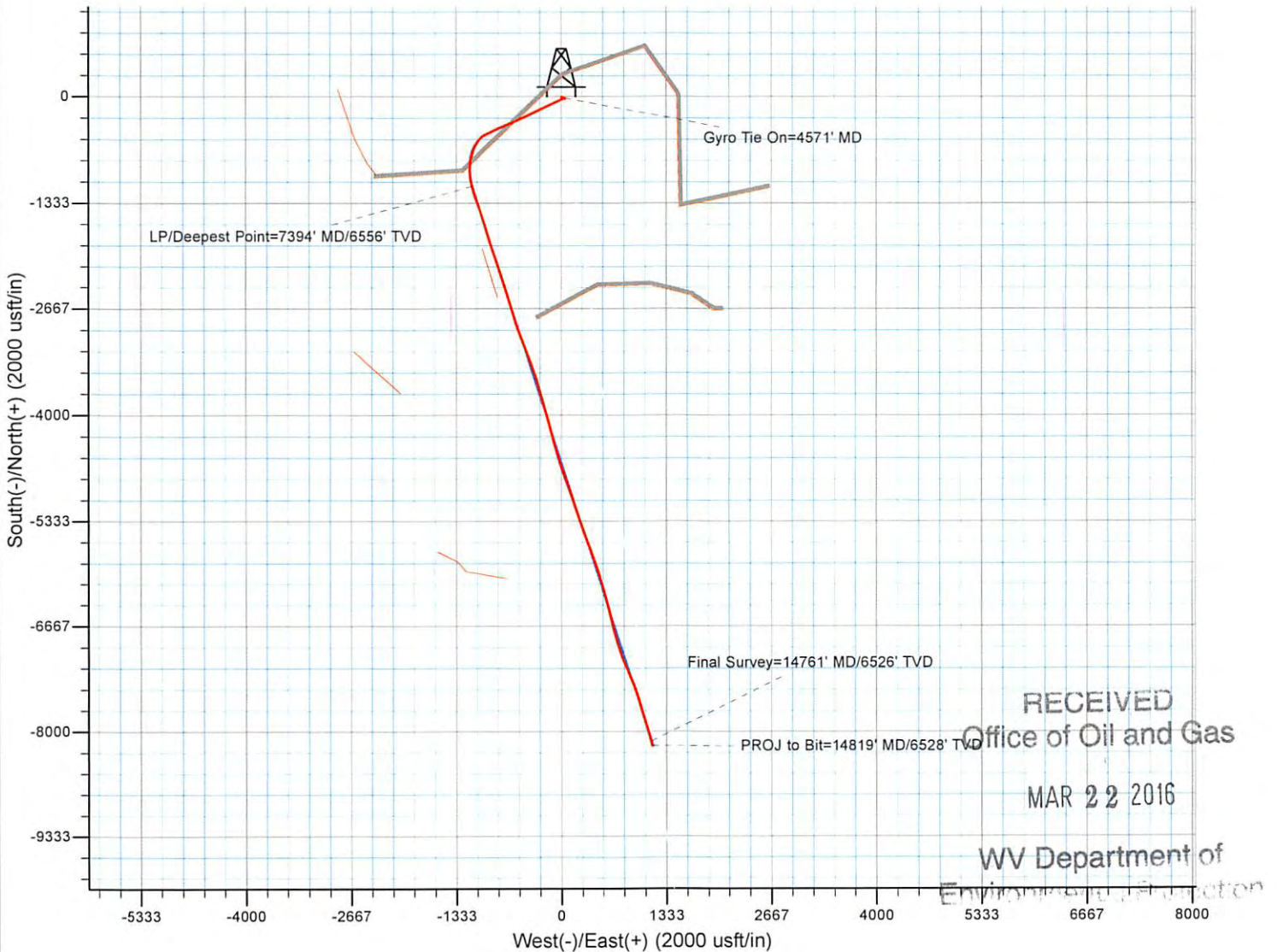
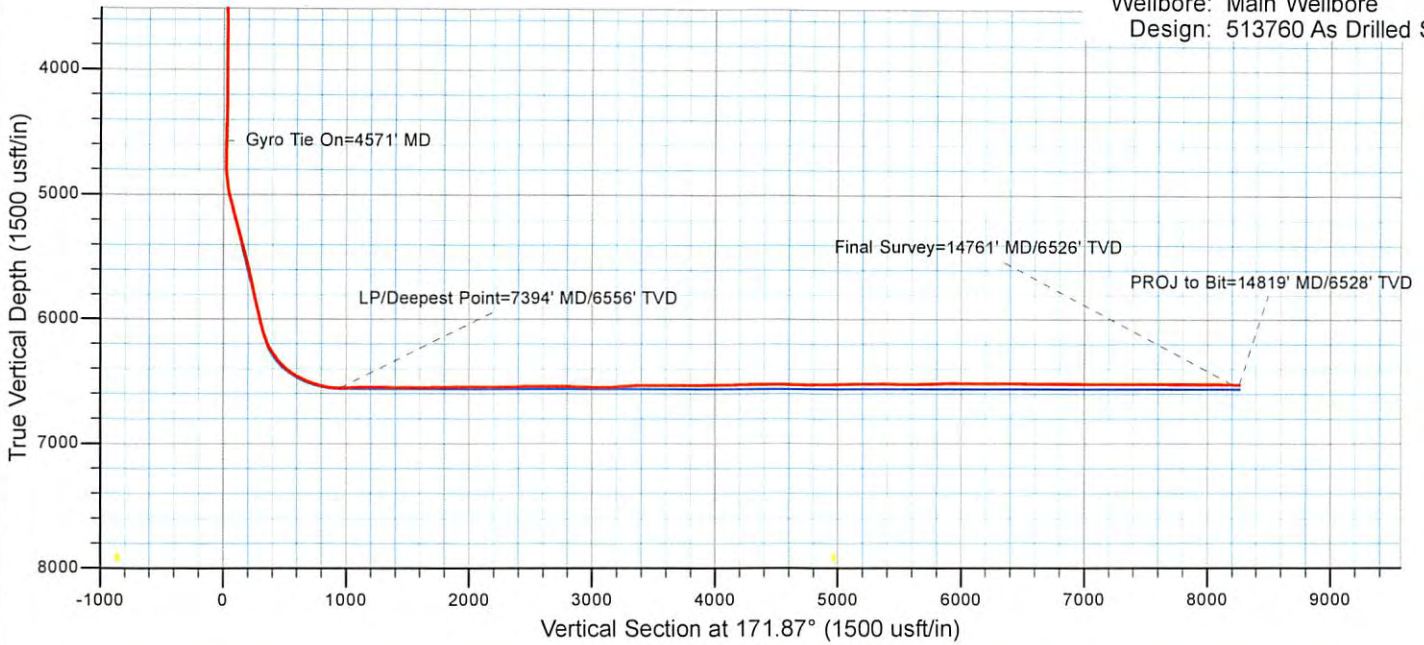
Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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# EQT Production - Marcellus

Project: Ritchie County, WV  
 Site: Ritchie County 513760  
 Well: Well #513760  
 Wellbore: Main Wellbore  
 Design: 513760 As Drilled Surveys



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## 513760 - 47-085-10136-0000- Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	8/25/2015	14,802.00	14,804.00	10	MARCELLUS
1	9/22/2015	14,657.00	14,749.00	32	MARCELLUS
2	9/23/2015	14,507.00	14,629.00	40	MARCELLUS
3	9/23/2015	14,357.00	14,479.00	40	MARCELLUS
4	9/23/2015	14,207.00	14,329.00	40	MARCELLUS
5	9/23/2015	14,057.00	14,174.00	40	MARCELLUS
6	9/24/2015	13,907.00	14,029.00	40	MARCELLUS
7	9/24/2015	13,759.00	13,879.00	40	MARCELLUS
8	9/24/2015	13,607.00	13,729.00	40	MARCELLUS
9	9/24/2015	13,457.00	13,579.00	40	MARCELLUS
10	9/25/2015	13,307.00	13,429.00	40	MARCELLUS
11	9/25/2015	13,157.00	13,279.00	40	MARCELLUS
12	9/25/2015	13,010.00	13,127.00	40	MARCELLUS
13	9/25/2015	12,857.00	12,977.00	40	MARCELLUS
14	9/26/2015	12,707.00	12,827.00	40	MARCELLUS
15	9/26/2015	12,557.00	12,679.00	40	MARCELLUS
16	9/26/2015	12,407.00	12,529.00	40	MARCELLUS
17	9/26/2015	12,257.00	12,377.00	40	MARCELLUS
18	9/27/2015	12,107.00	12,229.00	40	MARCELLUS
19	9/27/2015	11,957.00	12,079.00	40	MARCELLUS
20	9/27/2015	11,807.00	11,929.00	40	MARCELLUS
21	9/27/2015	11,657.00	11,773.00	40	MARCELLUS
22	9/28/2015	11,510.00	11,624.00	40	MARCELLUS
23	9/28/2015	11,357.00	11,477.00	40	MARCELLUS
24	9/28/2015	11,207.00	11,329.00	40	MARCELLUS
25	9/28/2015	11,057.00	11,179.00	40	MARCELLUS
26	9/28/2015	10,907.00	11,029.00	40	MARCELLUS
27	9/28/2015	10,757.00	10,879.00	40	MARCELLUS
28	9/29/2015	10,607.00	10,729.00	40	MARCELLUS
29	9/29/2015	10,455.00	10,579.00	40	MARCELLUS
30	9/29/2015	10,307.00	10,429.00	40	MARCELLUS
31	9/29/2015	10,157.00	10,279.00	40	MARCELLUS
32	9/30/2015	10,007.00	10,129.00	40	MARCELLUS
33	9/30/2015	9,857.00	9,979.00	40	MARCELLUS
34	9/30/2015	9,707.00	9,829.00	40	MARCELLUS
35	9/30/2015	9,557.00	9,679.00	40	MARCELLUS
36	9/30/2015	9,407.00	9,529.00	40	MARCELLUS
37	10/1/2015	9,257.00	9,377.00	40	MARCELLUS
38	10/1/2015	9,109.00	9,229.00	40	MARCELLUS
39	10/1/2015	8,957.00	9,079.00	40	MARCELLUS
40	10/1/2015	8,807.00	8,925.00	40	MARCELLUS
41	10/2/2015	8,657.00	8,777.00	40	MARCELLUS
42	10/15/2015	8,507.00	8,629.00	40	MARCELLUS
43	10/15/2015	8,357.00	8,479.00	40	MARCELLUS
44	10/15/2015	8,207.00	8,329.00	40	MARCELLUS
45	10/15/2015	8,057.00	8,179.00	40	MARCELLUS
	10/15/2015	7,907.00	8,027.00	40	MARCELLUS
47	10/15/2015	7,757.00	7,877.00	40	MARCELLUS
48	10/16/2015	7,607.00	7,729.00	40	MARCELLUS
49	10/16/2015	7,457.00	7,579.00	40	MARCELLUS
50	10/16/2015	7,305.00	7,429.00	40	MARCELLUS

12/02/2016



513760 - 47-085-10136-0000 - 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	9/13/2015	14.3	7,329.00	8,012.00	4,201.00	0	803	0
1	9/22/2015	91.8	8,578.00	8,852.00	3,268.00	252,820	7131	0
2	9/23/2015	100.4	8,419.00	8,730.00	3,448.00	251,380	6725	0
3	9/23/2015	100.2	8,484.00	8,744.00	3,460.00	250,500	6556	0
4	9/23/2015	97.4	8,439.00	8,601.00	3,532.00	250,240	6406	0
5	9/23/2015	100.4	8,537.00	8,687.00	4,147.00	250,220	6704	0
6	9/24/2015	87.7	8,563.00	8,897.00	3,712.00	250,910	8119	0
7	9/24/2015	99.2	8,549.00	8,768.00	3,834.00	250,660	6149	0
8	9/24/2015	101.3	8,648.00	8,858.00	4,093.00	248,920	6148	0
9	9/24/2015	98.2	8,648.00	9,002.00	4,152.00	252,530	6609	0
10	9/25/2015	100.6	8,600.00	8,718.00	3,978.00	251,330	6705	0
11	9/25/2015	100.6	8,300.00	8,546.00	3,863.00	251,980	6238	0
12	9/25/2015	100.9	8,497.00	8,724.00	4,406.00	251,040	6032	0
13	9/25/2015	101.5	8,615.00	8,766.00	4,607.00	251,460	7940	0
14	9/26/2015	101	8,435.00	8,611.00	4,514.00	249,860	6218	0
15	9/26/2015	99.6	8,621.00	9,074.00	3,944.00	247,078	6242	0
16	9/26/2015	100.8	8,481.00	8,608.00	4,165.00	254,800	6724	0
17	9/27/2015	99.9	8,418.00	8,711.00	4,550.00	250,760	6488	0
18	9/27/2015	100.8	8,199.00	8,954.00	4,748.00	254,520	6178	0
19	9/27/2015	100.8	8,186.00	8,498.00	4,034.00	251,660	6080	0
20	9/27/2015	100.8	8,360.00	8,521.00	4,616.00	251,305	6177	0
21	9/27/2015	101.10	8,175.00	8,360.00	4,665	249,890	6,275	0
22	9/28/2015	100.40	7,695.00	8,170.00	4,283	253,920	6,377	0
23	9/28/2015	102.20	8,051.00	8,312.00	4,027	249,820	5,955	0
24	9/28/2015	101.90	7,811.00	7,979.00	4,039	250,540	5,777	0
25	9/28/2015	100.00	8,299.00	8,504.00	3,882	251,670	5,937	0
26	9/28/2015	100.20	7,773.00	7,905.00	3,814	251,078	5,876	0
27	9/29/2015	100.30	7,977.00	8,373.00	3,780	251,228	5,824	0
28	9/29/2015	100.8	7,948.00	8,110.00	3,834.00	252,480	6003	0
29	9/29/2015	100.8	7,824.00	7,937.00	3,696.00	250,400	5921	0
30	9/29/2015	100.4	7,916.00	8,126.00	3,761.00	249,400	5883	0
31	9/29/2015	100.9	7,820.00	7,993.00	3,958.00	250,379	5980	0
32	9/30/2015	100.00	8,100.00	8,345.00	3,653	250,823	6,352	0
33	9/30/2015	102.30	7,660.00	7,970.00	3,726	249,545	6,066	0
34	9/30/2015	101.60	7,668.00	7,880.00	3,572	256,530	6,042	0
35	9/30/2015	100.30	7,834.00	8,206.00	3,679	253,240	6,134	0
36	9/30/2015	100.40	7,406.00	7,556.00	3,749	251,668	6,020	0
37	10/1/2015	100.50	7,505.00	7,692.00	3,678	251,593	5,871	0
38	10/1/2015	102.80	7,463.00	7,923.00	3,738	250,065	5,790	0
39	10/1/2015	102.50	7,665.00	8,118.00	3,645	251,100	5,748	0
40	10/2/2015	100.30	7,431.00	7,617.00	3,883	252,120	5,707	0
41	10/2/2015	101.20	7,365.00	7,775.00	3,803	250,656	5,778	0
42	10/15/2015	100.50	7,370.00	7,524.00	3,865	251,020	5,729	0
43	10/15/2015	100.70	7,395.00	7,607.00	4,493	250,766	5,675	0
44	10/15/2015	100.70	7,534.00	7,740.00	4,186	245,300	5,510	0
45	10/15/2015	100.70	7,445.00	7,768.00	4,006	252,060	5,524	0
46	10/15/2015	100.80	7,320.00	8,072.00	4,316	249,300	5,669	0
47	10/15/2015	101.20	7,380.00	7,507.00	3,717	249,850	5,691	0
48	10/16/2015	101.50	7,404.00	7,554.00	3,867	250,085	5,880	0
49	10/16/2015	100.90	7,278.00	7,541.00	3,774	252,540	5,790	0
50	10/16/2015	98.70	7,733.00	8,093.00	3,821	252,425	5,549	0

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	9/22/2015
Job End Date	10/16/2015
State	West Virginia
County	Richie
API Number	47-085-10136-00-00
Operator Name	EQT Production
Well Name and Number	513760
Longitude	-80.84288900
Latitude	39.13590300
Datum	NAD83
Federal/Trpnl Well	NO
True Vertical Depth	6,528
Total Base Water Volume (gal)	12,965,610
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	Kearne Group	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.25238	None
Sand (Proppant)	Kearne Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.35698	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	50.00000	0.05744	None
Hydrochloric Acid (15%)	Kearne Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.03070	None
FFR760	Kearne Group	Friction Reducer	Hydrotreated Light Distillate	84742-47-8	30.00000	0.01941	None
			Alkyl Alcohol	Proprietary	10.00000	0.00647	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00323	None
EC-830A	Kearne Group	Scale Inhibitor	Ethylene Glycol	107-21-1	5.00000	0.00125	None
			Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00125	None
AI 600	Kearne Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00020	None
			Dimethylformamide	88-12-2	20.00000	0.00010	None

			104-55-2	0.000000	None
	Glutaraldehyde		38909-18-2	15.00000	0.00000
	Pyridine, alkyl derivatives, quaternized with benzyl chloride		111-76-2	5.00000	0.00000
	2-Butoxyethanol		112-30-1	5.00000	0.00000
	1-Decanol		127087-87-0	5.00000	0.00000
	Nonyl Phenol Ethoxylate, Branched		111-67-5	5.00000	0.00000
	1-Octanol		78-40-0	2.50000	0.00000
	Triethyl Phosphate		57-56-1	2.50000	0.00000
	Methanol		68991-11-7	1.00000	0.00000
	Alkyl Pyridine				

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)

ROYALTY OWNERS		
B.M. PIERCE ET UX	84.50 AC.±	LEASE NO. 118210
CRAIG H. WILLIAMS	243.83 AC.±	LEASE NO. 987447
J.P. SMITH ET UX	130 AC.±	LEASE NO. 107857
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

**EQT PRODUCTION COMPANY  
J.E. PIERCE ET AL LEASE  
108 (98.73±) ACRES±  
WELL NO. WV 513760  
(OXF163 H5)**

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

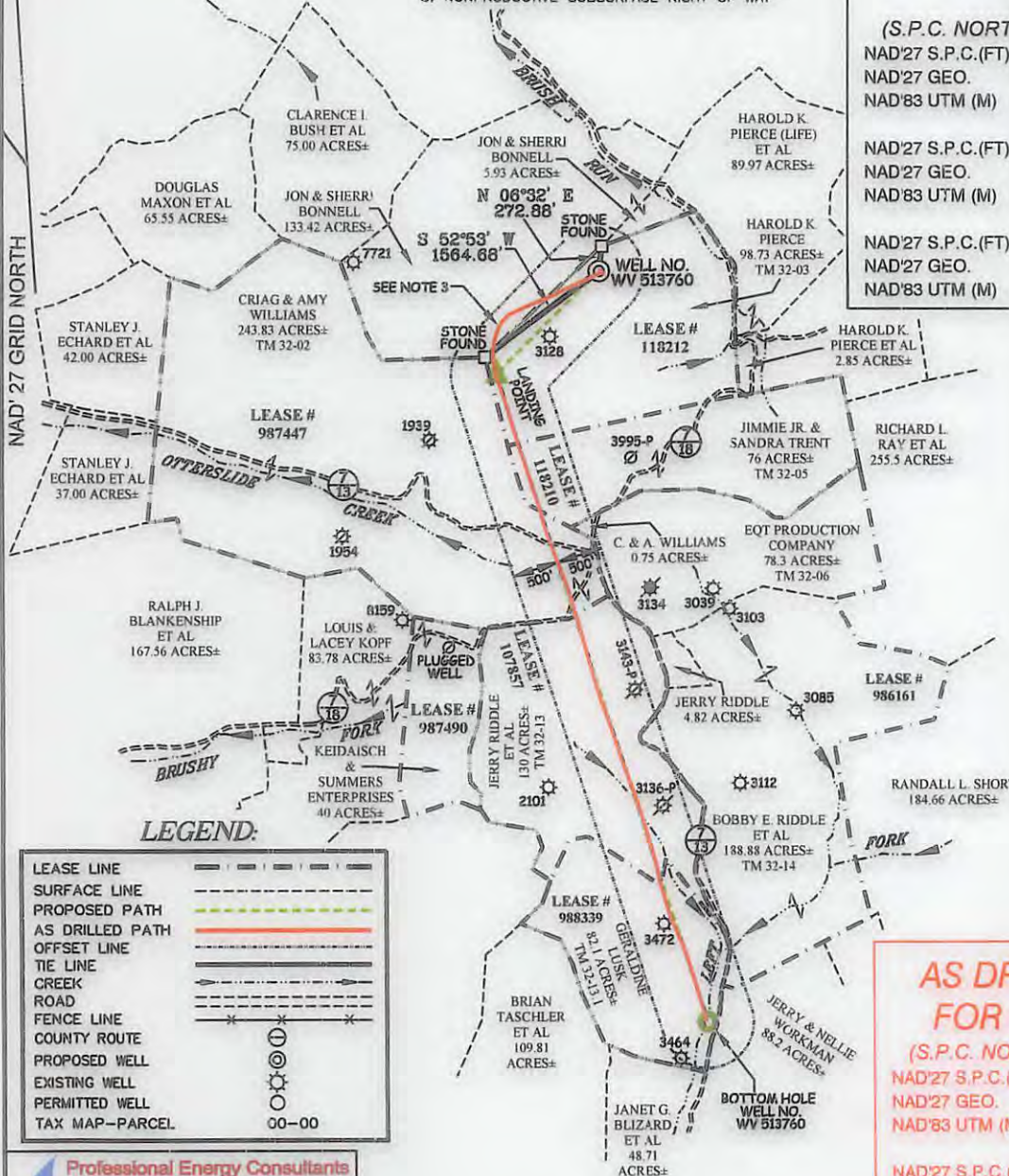
NAD'27 S.P.C.(FT)	N. 234,456.0	E. 1,619,086.0
NAD'27 GEO.	LAT-(N) 39.135903	LONG-(W) 80.842890
NAD'83 UTM (M)	N. 4,331,879.3	E. 513,593.3

**LANDING POINT**

NAD'27 S.P.C.(FT)	N. 233,325.0	E. 1,617,963.9
NAD'27 GEO.	LAT-(N) 39.132752	LONG-(W) 80.846785
NAD'83 UTM (M)	N. 4,331,529.0	E. 513,257.2

**BOTTOM HOLE**

NAD'27 S.P.C.(FT)	N. 226,277.6	E. 1,620,253.7
NAD'27 GEO.	LAT-(N) 39.113498	LONG-(W) 80.838344
NAD'83 UTM (M)	N. 4,329,393.8	E. 513,990.6



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

**AS DRILLED COORDINATES  
FOR WELL NO. WV 513760**

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

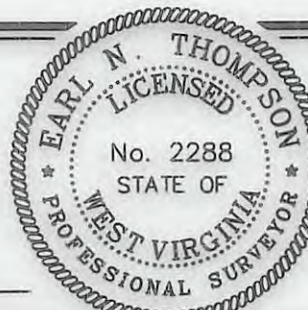
NAD'27 S.P.C.(FT)	N. 234,456.0	E. 1,619,086.0
NAD'27 GEO.	LAT-(N) 39.135903	LONG-(W) 80.842890
NAD'83 UTM (M)	N. 4,331,879.3	E. 513,593.3

**BOTTOM HOLE**

NAD'27 S.P.C.(FT)	N. 226,277.6	E. 1,620,253.7
NAD'27 GEO.	LAT-(N) 39.113498	LONG-(W) 80.838344
NAD'83 UTM (M)	N. 4,329,393.8	E. 513,990.6



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 JUNE 3, 20 14  
REVISED 08/22/14, 10/27/14, 10/31/14, 02/04/15, 05/19/15 & 12/03/15

OPERATORS WELL NO. WV 513760  
API WELL NO. 47 - 085 - 10136H  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7698AD513760  
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: ELEVATION 1,174'(GROUND)1,158.5'(PROPOSED) WATERSHED BRUSHY 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: LEASE NO. 118212  
DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER   
PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6495'

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

COUNTY NAME PERMIT