

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 513756

API: 47 - 085 - 10132

Submission: Initial Amended

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

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AUG 25 2016

NY Department of
Environmental Protection

APPROVED

NAME: Michael Doff

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 47-085-10132 County RITCHIE District UNION
Quad OXFORD 7.5' Pad Name OXF163 Field/Pool Name _____
Farm name HAROLD K. PIERCE Well Number 513756
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 4,331,892.5 Easting 513,606.0
Landing Point of Curve Northing 4,331,847.4 Easting 513,656.6
Bottom Hole Northing 4,329,697.5 Easting 514,398.4

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 12/3/2014 Date drilling ceased 6/23/2015
Date completion activities began 8/26/2015 Date completion activities ceased 9/10/2015
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

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Freshwater depth(s) ft 176',453',517' Open mine(s) (Y/N) depths _____
Salt water depth(s) ft 1156' Void(s) encountered (Y/N) depths _____
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) N

Reviewed by: _____

API 47-085 - 10132

Farm name HAROLD K. PIERCE

Well number 513756

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"	1059'	NEW	J-55 54.5LB/FT	425'	Y
Coal							
Intermediate 1	12.375"	9.625"	3024'	NEW	A-500 40LB/FT	1840'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	14,547'	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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	38	15.6	1.18	44.84	0	8
Surface	CLASS A	890	15.6	1.18	1050.2	0	8
Coal							
Intermediate 1	CLASS A	1105	15.6	1.18	1303.9	0	8
Intermediate 2							
Intermediate 3							
Production	Class H / Class H	615/995	14.2 / 15.2	1.23/1.95	2696.7	3,900' MD	72
Tubing							

Drillers TD (ft) 14,547' MD

Loggers TD (ft) N/A

Deepest formation penetrated Marcellus

Plug back to (ft) 4531

Plug back procedure Drilled pilot hole to 8650'. TOOH to 8050" and pump 152 sks/32 bbls Class A 14.2 ppg, TOOH to 5566' and pump 152 sks/32 bbls Class A 14.2 ppg, TOOH to 5216' and pump 152 sks/32 bbls Class A 14.2, then TOOH to 4380' and pump 118 sks/23.6 bbls Class A 16 ppg cement with Allied Services.

Kick off depth (ft) 4,600' 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- 245 Composite Centralizers. One on every joint from TD to 4,000 MD

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WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS

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WERE TRACERS USED Yes No TYPE OF TRACER(S) USED

API 47-085 10132 Farm name HAROLD K. PIERCE Well number 513756

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

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Please insert additional pages as applicable.

API 47- 085 - 10132 Farm name HAROLD K. PIERCE Well number 513756

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	6,534	TVD 6,863 MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1,777 psi Bottom Hole N/A psi DURATION OF TEST 144.00 hrs

OPEN FLOW Gas 7,282 mcfpd Oil N/A bpd NGL 500 bpd Water 821 bpd GAS MEASURED BY Estimated Orifice Pilot

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

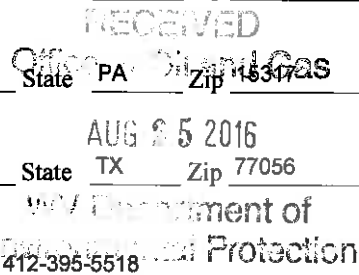
Logging Company Phoenix Technology Services
Address 1805 Brittmoore Road City HOUSTON State TX Zip 77043

Cementing Company 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 8/22/2016



API 47- 085 - 10132 Farm name HAROLD K. PIERCE Well number 513756

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 Lee Street E City Charleston State WV Zip 25301

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

Logging Company _____ Weatherford International _____
Address _____ 121 Hillpointe Dr _____ City _____ Canonsburg _____ State _____ PA _____ Zip _____ 15317

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API 47-085-10132

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	2,714
GORDON	2,715	2,714	2,803	2,802
4TH	2,803	2,802	2,959	2,958
BAYARD	2,959	2,958	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	4,764
BENSON	4,767	4,764	5,100	5,095
ALEXANDER	5,100	5,095	6,355	6,214
SONYEA	6,355	6,214	6,517	6,350
MIDDLESEX	6,517	6,350	6,707	6,470
GENESEO	6,707	6,470	6,797	6,512
TULLY	6,797	6,512	6,831	6,524
HAMILTON	6,831	6,524	6,863	6,534
MARCELLUS	6,863	6,534	14,550	6,564

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API 47-085-10132

PHOENIX
TECHNOLOGY SERVICES



EQT Production - Marcellus

Ritchie County, WV

Ritchie County 513756

Well #513756

Main Wellbore

Design: 513756 As Drilled Surveys

Standard Survey Report

13 July, 2015

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EQT

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Phoenix Technology Services
Survey Report



Database:	513756	Local Co-ordinate Reference:	West Virginia State Plane
Company:	PHX	TVD Reference:	Mean Sea Level
Project:	PHX	MD Reference:	Mean Sea Level
Site:	PHX	North Reference:	Mean Sea Level
Well:	PHX	Survey Calculation Method:	Least Squares
Wellbore:	PHX		
Design:	PHX		

Project: PHX

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: PHX

Site Position:		Northing:	234,498.60 usft	Latitude:	39.14
From:	Map	Easting:	1,619,128.20 usft	Longitude:	-80.84
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.86 °

Well: PHX

Well Position	+N-S	0.0 usft	Northing:	234,498.60 usft	Latitude:	39° 8' 9.677 N
	+E-W	0.0 usft	Easting:	1,619,128.20 usft	Longitude:	80° 50' 33.875 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,159.0 usft

Wellbore: PHX

Magnetics	Model Name	Sample Date	Declination (")	Dip Angle (")	Field Strength (nT)
	HDGM	6/8/2015	-7.72	66.57	52,084

Design: PHX

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	161.18	

Survey Program

From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	4,603.0	513756 Gyrodatta Gyro (Main Wellbore)	GYD_DP_MS	Gyrodatta gyro-compassing and drop
0.00	4,863.0	513756 PHX MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3:standard declination
0.00	14,550.0	513756 PHX MWD Curve and Lateral (Ma	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

Survey: PHX

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	0.23	125.49	103.0	-1,072.0	-0.1	0.2	0.2	0.00	0.00	0.00
203.0	0.13	126.84	203.0	-972.0	-0.3	0.4	0.4	0.10	-0.10	1.35
303.0	0.13	127.74	303.0	-872.0	-0.4	0.6	0.6	0.00	0.00	0.00
403.0	0.11	121.53	403.0	-772.0	-0.6	0.8	0.8	0.02	-0.02	-6.21
503.0	0.06	144.59	503.0	-672.0	-0.7	0.9	0.9	0.06	-0.05	23.06
603.0	0.06	144.58	603.0	-572.0	-0.7	0.9	1.0	0.00	0.00	-0.01

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Phoenix Technology Services

Survey Report



Database: Company: Project: Site: Well: Wellbore: Design:	Local Co-ordinate Reference: TVD Reference: MD Reference: North Reference: Survey Calculation Method:	
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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)	
703.0	0.07	15.37	703.0	-472.0	-0.7	1.0	1.0	0.12	0.01	-129.21	
803.0	0.24	32.99	803.0	-372.0	-0.5	1.1	0.8	0.17	0.17	17.62	
903.0	0.29	50.81	903.0	-272.0	-0.2	1.4	0.6	0.10	0.05	17.82	
1,003.0	0.45	59.16	1,003.0	-172.0	0.2	2.0	0.4	0.17	0.16	8.35	
1,103.0	0.45	57.14	1,103.0	-72.0	0.6	2.6	0.3	0.02	0.00	-2.02	
1,203.0	0.52	75.96	1,203.0	28.0	0.9	3.4	0.2	0.17	0.07	18.82	
1,303.0	0.60	86.06	1,303.0	128.0	1.1	4.4	0.4	0.13	0.08	10.10	
1,403.0	0.81	93.05	1,403.0	228.0	1.1	5.6	0.8	0.23	0.21	6.99	
1,503.0	0.83	95.04	1,503.0	328.0	1.0	7.0	1.3	0.03	0.02	1.99	
1,603.0	0.97	99.29	1,603.0	428.0	0.8	8.6	2.0	0.16	0.14	4.25	
1,703.0	1.19	105.01	1,702.9	527.9	0.4	10.4	3.0	0.24	0.22	5.72	
1,803.0	1.46	107.13	1,802.9	627.9	-0.3	12.6	4.3	0.27	0.27	2.12	
1,903.0	1.65	109.16	1,902.9	727.9	-1.1	15.2	6.0	0.20	0.19	2.03	
2,003.0	1.80	113.92	2,002.8	827.8	-2.2	18.0	7.9	0.21	0.15	4.76	
2,103.0	1.84	114.29	2,102.8	927.8	-3.5	20.9	10.1	0.04	0.04	0.37	
2,203.0	1.87	113.11	2,202.7	1,027.7	-4.8	23.9	12.3	0.05	0.03	-1.18	
2,303.0	1.92	114.08	2,302.7	1,127.7	-6.1	28.9	14.5	0.06	0.05	0.97	
2,403.0	1.98	112.23	2,402.6	1,227.6	-7.5	30.0	16.8	0.09	0.06	-1.85	
2,503.0	2.08	109.22	2,502.5	1,327.5	-8.7	33.3	19.0	0.15	0.10	-3.01	
2,603.0	2.03	106.81	2,602.5	1,427.5	-9.8	36.8	21.2	0.10	-0.05	-2.41	
2,703.0	1.96	102.32	2,702.4	1,527.4	-10.7	40.1	23.1	0.17	-0.07	-4.49	
2,803.0	1.97	97.86	2,802.4	1,627.4	-11.3	43.5	24.7	0.15	0.01	-4.46	
2,903.0	2.01	95.56	2,902.3	1,727.3	-11.7	46.9	26.2	0.09	0.04	-2.30	
3,003.0	1.98	91.88	3,002.2	1,827.2	-11.9	50.4	27.6	0.13	-0.03	-3.68	
3,103.0	1.64	87.38	3,102.2	1,927.2	-11.9	53.6	28.6	0.37	-0.34	-4.50	
3,203.0	1.32	89.85	3,202.2	2,027.2	-11.9	56.2	29.4	0.33	-0.32	2.47	
3,303.0	1.04	95.58	3,302.1	2,127.1	-12.0	58.2	30.1	0.30	-0.28	5.73	
3,403.0	0.65	98.22	3,402.1	2,227.1	-12.1	59.7	30.7	0.39	-0.39	2.64	
3,503.0	0.48	104.41	3,502.1	2,327.1	-12.3	60.6	31.2	0.18	-0.17	6.19	
3,603.0	0.39	106.25	3,602.1	2,427.1	-12.5	61.4	31.6	0.09	-0.09	1.84	
3,703.0	0.34	111.49	3,702.1	2,527.1	-12.7	62.0	32.0	0.06	-0.05	5.24	
3,803.0	0.21	129.92	3,802.1	2,627.1	-12.9	62.4	32.4	0.16	-0.13	18.43	
3,903.0	0.05	254.70	3,902.1	2,727.1	-13.1	62.5	32.5	0.24	-0.16	124.78	
4,003.0	0.14	316.27	4,002.1	2,827.1	-13.0	62.4	32.4	0.12	0.09	61.57	
4,103.0	0.24	318.77	4,102.1	2,927.1	-12.7	62.1	32.1	0.10	0.10	2.50	
4,203.0	0.46	333.74	4,202.1	3,027.1	-12.2	61.8	31.5	0.24	0.22	14.97	
4,303.0	0.60	326.25	4,302.1	3,127.1	-11.4	61.4	30.6	0.16	0.14	-7.49	
4,403.0	0.66	327.82	4,402.1	3,227.1	-10.5	60.8	29.6	0.06	0.06	1.57	
4,503.0	0.87	323.34	4,502.1	3,327.1	-9.4	60.0	28.3	0.22	0.21	-4.48	
4,603.0	1.03	321.25	4,602.1	3,427.1	-8.1	59.0	26.7	0.16	0.16	-2.09	
4,611.0	1.00	323.40	4,610.1	3,435.1	-8.0	58.9	26.6	0.61	-0.38	26.88	
4,642.0	2.70	358.30	4,641.1	3,466.1	-7.0	58.7	25.6	6.34	5.48	112.58	



Phoenix Technology Services

Survey Report



Database:	LA 50001 - Eagle Mountain	Local Co-ordinate Reference:	LA 50001 - Eagle Mountain
Company:	ET Production - Michigan	TVD Reference:	LA 50001 - Eagle Mountain
Project:	Alma County JV	MD Reference:	Right & Left
Site:	Alma County JV	North Reference:	LA
Well:	Well #1017H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Well #1017H		
Design:	11/13/14 AX Survey System		

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)
4,674.0	6.50	7.70	4,673.0	3,498.0	-4.5	58.9	23.3	12.07	11.88	29.38
4,705.0	10.90	12.50	4,703.6	3,528.6	0.1	59.8	19.2	14.37	14.19	15.48
4,737.0	13.80	13.30	4,734.8	3,559.8	6.8	61.3	13.4	9.08	9.06	2.50
4,769.0	13.30	12.10	4,766.0	3,591.0	14.1	63.0	7.0	1.79	-1.56	-3.75
4,800.0	9.40	6.80	4,796.3	3,621.3	20.1	64.0	1.6	13.01	-12.58	-17.10
4,832.0	5.80	358.70	4,828.1	3,653.1	24.3	64.3	-2.3	11.71	-11.25	-25.31
4,863.0	3.30	344.50	4,859.0	3,684.0	26.7	64.0	-4.6	8.79	-8.06	-45.81
4,875.0	1.90	326.70	4,870.9	3,695.9	27.2	63.8	-5.2	13.33	-11.67	-148.33
4,938.0	1.50	288.80	4,933.9	3,758.9	28.4	62.5	-6.7	1.85	-0.63	-60.16
4,969.0	1.50	292.60	4,964.9	3,789.9	28.7	61.7	-7.2	0.32	0.00	12.26
5,001.0	1.90	303.20	4,996.9	3,821.9	29.1	60.9	-7.9	1.58	1.25	33.13
5,032.0	4.90	333.20	5,027.8	3,852.8	30.6	59.9	-9.6	10.94	9.68	96.77
5,064.0	9.10	339.00	5,059.6	3,884.6	34.2	58.3	-13.5	13.29	13.13	18.13
5,095.0	12.80	342.30	5,090.0	3,915.0	39.7	56.4	-19.4	12.10	11.94	10.65
5,127.0	16.00	342.50	5,121.0	3,946.0	47.3	54.0	-27.3	10.00	10.00	0.63
5,158.0	18.90	339.00	5,150.6	3,975.6	56.1	50.9	-36.6	9.94	9.35	-11.29
5,190.0	21.40	337.40	5,180.6	4,005.6	66.3	46.8	-47.6	8.00	7.81	-5.00
5,221.0	24.00	337.70	5,209.2	4,034.2	77.4	42.3	-59.6	8.40	8.39	0.97
5,253.0	26.50	337.80	5,238.2	4,063.2	90.0	37.1	-73.2	7.81	7.81	0.31
5,284.0	29.50	337.40	5,265.5	4,090.5	103.4	31.5	-87.7	9.70	9.68	-1.29
5,316.0	32.50	339.10	5,293.0	4,118.0	118.7	25.4	-104.2	9.77	9.38	5.31
5,347.0	34.50	340.90	5,318.8	4,143.8	134.8	19.6	-121.3	7.20	6.45	5.81
5,379.0	36.70	341.50	5,344.8	4,169.8	152.5	13.6	-139.9	6.96	6.88	1.88
5,410.0	39.10	341.20	5,369.3	4,194.3	170.5	7.5	-159.0	7.76	7.74	-0.97
5,442.0	40.70	341.40	5,393.8	4,218.8	189.9	0.9	-179.5	5.02	5.00	0.63
5,505.0	42.20	341.50	5,441.1	4,266.1	229.5	-12.3	-221.2	2.38	2.38	0.16
5,568.0	41.80	339.40	5,487.9	4,312.9	269.2	-26.4	-263.3	2.32	-0.63	-3.33
5,631.0	40.40	340.90	5,535.3	4,360.3	308.1	-40.5	-304.7	2.72	-2.22	2.38
5,663.0	37.50	340.70	5,580.2	4,385.2	327.1	-47.1	-324.9	9.07	-9.06	-0.63
5,694.0	35.30	339.80	5,585.2	4,410.2	344.4	-53.4	-343.2	7.40	-7.10	-3.55
5,726.0	31.50	339.70	5,611.9	4,436.9	361.0	-59.5	-360.8	11.88	-11.88	0.31
5,757.0	29.30	341.50	5,638.6	4,463.6	375.8	-64.7	-376.5	7.68	-7.10	5.81
5,789.0	26.20	344.20	5,666.9	4,491.9	390.0	-69.1	-391.4	10.45	-9.69	8.44
5,820.0	22.90	348.50	5,695.1	4,520.1	402.5	-72.2	-404.2	12.10	-10.65	13.87
5,852.0	19.30	353.80	5,725.0	4,550.0	413.8	-74.0	-415.6	12.72	-11.25	16.56
5,883.0	15.70	358.90	5,754.6	4,579.6	423.1	-74.6	-424.6	12.61	-11.61	16.45
5,915.0	12.50	1.00	5,785.6	4,610.6	430.9	-74.7	-432.0	10.13	-10.00	6.56
5,946.0	10.40	1.80	5,816.0	4,641.0	437.1	-74.5	-437.7	6.79	-6.77	2.58
5,977.0	8.10	3.20	5,846.6	4,671.6	442.1	-74.3	-442.4	7.45	-7.42	4.52
6,009.0	5.40	13.10	5,878.3	4,703.3	445.8	-73.8	-445.8	9.16	-8.44	30.94
6,040.0	5.70	38.80	5,909.2	4,734.2	448.4	-72.5	-447.8	8.01	0.97	82.90
6,072.0	8.00	56.30	5,941.0	4,766.0	450.9	-69.7	-449.2	9.63	7.19	54.69



Phoenix Technology Services

Survey Report



PHOENIX TECHNOLOGY SERVICES

Database:	PHOENIX	Local Co-ordinate Reference:	PHOENIX
Company:	EQT Production Services	TVD Reference:	PHOENIX
Project:	Production - AV	MD Reference:	PHOENIX
Site:	North-Central - 11700	North Reference:	PHOENIX
Well:	Well #11700	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	11700-01-001-0000		

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)
6,103.0	9.50	70.50	5,971.6	4,796.6	452.9	-65.5	-449.8	8.45	4.84	45.81
6,135.0	10.70	91.10	6,003.1	4,828.1	453.7	-60.0	-448.8	11.82	3.75	64.38
6,167.0	11.80	111.50	6,034.5	4,859.5	452.5	-54.0	-445.7	12.83	3.44	63.75
6,198.0	13.40	125.40	6,064.8	4,889.8	449.2	-48.1	-440.7	11.02	5.16	44.84
6,230.0	15.50	134.10	6,095.8	4,920.8	444.1	-42.0	-433.9	9.42	6.56	27.19
6,261.0	16.80	142.80	6,125.6	4,950.6	437.7	-36.3	-426.0	8.69	4.19	27.42
6,293.0	18.70	150.50	6,156.0	4,981.0	429.5	-31.0	-416.6	9.57	5.94	24.69
6,324.0	21.20	154.40	6,185.2	5,010.2	420.2	-26.1	-406.1	9.13	8.06	12.58
6,356.0	24.10	155.90	6,214.7	5,039.7	409.0	-21.0	-393.9	9.24	9.06	4.69
6,387.0	27.30	157.60	6,242.6	5,067.6	396.6	-15.7	-380.5	10.59	10.32	5.48
6,419.0	30.40	159.20	6,270.7	5,095.7	382.3	-10.0	-365.0	9.98	9.69	5.00
6,451.0	34.20	160.90	6,297.7	5,122.7	366.2	-4.2	-347.9	12.21	11.88	5.31
6,482.0	37.50	160.70	6,322.8	5,147.8	349.0	1.8	-329.8	10.65	10.65	-0.85
6,514.0	40.90	160.80	6,347.6	5,172.6	329.9	8.5	-309.6	10.63	10.63	0.31
6,545.0	44.40	161.80	6,370.4	5,195.4	310.1	15.2	-288.6	11.50	11.29	3.23
6,577.0	46.90	162.80	6,392.8	5,217.8	288.3	22.2	-265.7	8.13	7.81	3.13
6,608.0	50.30	162.80	6,413.3	5,238.3	266.0	29.0	-242.5	10.97	10.97	0.00
6,640.0	53.60	161.60	6,433.0	5,258.0	242.1	36.7	-217.3	10.73	10.31	-3.75
6,671.0	56.70	161.60	6,450.7	5,275.7	217.9	44.8	-191.8	10.00	10.00	0.00
6,703.0	57.90	161.50	6,468.0	5,293.0	192.4	53.3	-164.9	3.76	3.75	-0.31
6,734.0	60.70	161.00	6,483.8	5,308.8	167.1	61.9	-138.2	9.14	9.03	-1.61
6,766.0	63.40	160.90	6,498.8	5,323.8	140.4	71.1	-110.0	8.44	8.44	-0.31
6,797.0	67.20	160.20	6,511.8	5,336.8	113.9	80.5	-81.8	12.43	12.26	-2.26
6,829.0	69.60	160.40	6,523.6	5,348.6	85.9	90.5	-52.1	7.52	7.50	0.63
6,860.0	72.80	160.50	6,533.5	5,358.5	58.2	100.3	-22.7	10.33	10.32	0.32
6,892.0	75.90	162.20	6,542.2	5,367.2	29.0	110.2	8.1	10.95	9.69	5.31
6,923.0	79.10	164.00	6,548.9	5,373.9	0.1	118.9	38.3	11.78	10.32	5.81
6,955.0	81.70	164.90	6,554.2	5,379.2	-30.3	127.4	69.8	8.59	8.13	2.81
6,986.0	84.80	164.10	6,557.9	5,382.9	-60.0	135.6	100.5	10.32	10.00	-2.58
7,010.7	87.11	162.98	6,559.6	5,384.6	-83.6	142.6	125.2	10.38	9.35	-4.52
7,017.0	87.70	162.70	6,559.9	5,384.9	-89.6	144.5	131.4	10.38	9.36	-4.51
7,081.0	89.80	162.30	6,561.3	5,386.3	-150.6	163.7	195.4	3.34	3.28	-0.63
7,114.9	90.18	162.14	6,561.3	5,386.3	-182.9	174.1	229.3	1.23	1.13	-0.48
7,143.0	90.50	162.00	6,561.1	5,386.1	-209.7	182.7	257.4	1.23	1.13	-0.48
7,207.0	90.80	161.50	6,560.4	5,385.4	-270.4	202.8	321.4	0.91	0.47	-0.78
7,269.0	89.90	161.60	6,560.0	5,385.0	-329.2	222.4	383.4	1.46	-1.45	0.16
7,332.0	90.20	161.40	6,560.0	5,385.0	-389.0	242.4	446.4	0.57	0.48	-0.32
7,395.0	88.20	162.10	6,560.8	5,385.8	-448.8	262.1	509.4	3.36	-3.17	1.11
7,458.0	88.90	162.30	6,562.4	5,387.4	-508.8	281.3	572.3	1.16	1.11	0.32
7,520.0	89.30	162.50	6,563.4	5,388.4	-567.9	300.1	634.3	0.72	0.65	0.32



Phoenix Technology Services

Survey Report



Database:	EQT Phoenix - Marcellus	Local Co-ordinate Reference:	NAD 83 - NAD 83
Company:	EQT Production - Marcellus	TVD Reference:	NA 83 (eg: 11' below)
Project:	WV - The County - WV	MD Reference:	NA 83 (eg: 11' below)
Site:	10000 - 10000 - 10000	North Reference:	NA 83
Well:	10000 - 10000	Survey Calculation Method:	Minimum Curvature
Wellbore:	10000 - 10000		
Design:	10000 - 10000		

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)	
7,583.0	89.80	162.50	6,563.9	5,388.9	-628.0	319.0	697.3	0.79	0.79	0.00	
7,646.0	90.60	162.30	6,563.7	5,388.7	-688.0	338.1	760.3	1.31	1.27	-0.32	
7,709.0	90.80	161.20	6,562.9	5,387.9	-747.8	357.8	823.3	1.77	0.32	-1.75	
7,772.0	88.90	160.70	6,563.1	5,388.1	-807.4	378.4	886.3	3.12	-3.02	-0.79	
7,835.0	89.60	160.90	6,563.9	5,388.9	-866.9	399.1	949.3	1.16	1.11	0.32	
7,897.0	91.30	162.00	6,563.4	5,388.4	-925.6	418.8	1,011.3	3.27	2.74	1.77	
7,960.0	91.50	161.70	6,561.9	5,386.9	-985.5	438.4	1,074.2	0.57	0.32	-0.48	
8,023.0	88.80	162.10	6,561.7	5,386.7	-1,045.4	458.0	1,137.2	4.33	-4.29	0.63	
8,086.0	88.70	161.50	6,563.1	5,388.1	-1,105.2	477.7	1,200.2	0.97	-0.16	-0.95	
8,149.0	89.40	162.30	6,564.1	5,389.1	-1,165.1	497.2	1,263.2	1.69	1.11	1.27	
8,212.0	90.60	162.70	6,564.1	5,389.1	-1,225.2	516.2	1,326.2	2.01	1.90	0.63	
8,275.0	92.00	163.60	6,562.7	5,387.7	-1,285.4	534.4	1,389.1	2.64	2.22	1.43	
8,338.0	92.50	163.40	6,560.2	5,385.2	-1,345.6	552.3	1,452.0	0.85	0.79	-0.32	
8,400.0	93.00	162.60	6,557.3	5,382.3	-1,405.0	570.4	1,513.9	1.52	0.81	-1.29	
8,463.0	91.70	162.40	6,554.7	5,379.7	-1,465.0	589.4	1,576.8	2.09	-2.06	-0.32	
8,526.0	91.10	163.20	6,553.1	5,378.1	-1,525.2	608.0	1,639.8	1.59	-0.95	1.27	
8,589.0	90.10	162.10	6,552.5	5,377.5	-1,585.3	626.8	1,702.8	2.36	-1.59	-1.75	
8,652.0	87.60	162.00	6,553.7	5,378.7	-1,645.3	646.2	1,765.7	3.97	-3.97	-0.16	
8,715.0	87.60	161.90	6,556.4	5,381.4	-1,705.1	665.7	1,828.7	0.16	0.00	-0.16	
8,778.0	87.90	161.60	6,558.9	5,383.9	-1,764.9	685.4	1,891.6	0.67	0.48	-0.48	
8,841.0	91.80	163.20	6,559.0	5,384.0	-1,824.9	704.4	1,954.6	6.69	6.19	2.54	
8,904.0	93.50	163.70	6,558.1	5,381.1	-1,885.2	722.4	2,017.5	2.81	2.70	0.79	
8,967.0	93.50	162.90	6,552.3	5,377.3	-1,945.5	740.4	2,080.3	1.27	0.00	-1.27	
9,030.0	91.60	162.60	6,549.5	5,374.5	-2,005.6	759.1	2,143.2	3.05	-3.02	-0.48	
9,093.0	89.50	162.90	6,548.9	5,373.9	-2,065.7	777.8	2,206.2	3.37	-3.33	0.48	
9,156.0	89.30	162.40	6,549.5	5,374.5	-2,125.9	796.6	2,269.2	0.85	-0.32	-0.79	
9,219.0	87.50	161.20	6,551.3	5,376.3	-2,185.7	816.2	2,332.2	3.43	-2.86	-1.90	
9,282.0	88.00	161.60	6,553.7	5,378.7	-2,245.4	836.3	2,395.1	1.02	0.79	0.63	
9,345.0	88.30	160.40	6,555.8	5,380.8	-2,304.9	856.8	2,458.1	1.96	0.48	-1.90	
9,408.0	90.20	161.00	6,556.6	5,381.6	-2,364.3	877.6	2,521.1	3.16	3.02	0.95	
9,471.0	92.60	161.50	6,555.1	5,380.1	-2,424.0	897.9	2,584.0	3.89	3.81	0.79	
9,534.0	90.20	158.60	6,553.5	5,378.5	-2,483.2	919.4	2,647.0	5.97	-3.81	-4.60	
9,597.0	89.80	156.70	6,553.5	5,378.5	-2,541.4	943.3	2,709.9	3.08	-0.63	-3.02	
9,659.0	91.60	157.10	6,552.8	5,377.8	-2,598.5	967.6	2,771.7	2.97	2.90	0.65	
9,722.0	94.00	157.30	6,549.7	5,374.7	-2,656.5	992.0	2,834.5	3.82	3.81	0.32	
9,785.0	94.90	158.80	6,544.8	5,369.8	-2,714.7	1,015.5	2,897.2	2.77	1.43	2.38	
9,848.0	93.40	159.80	6,540.2	5,365.2	-2,773.5	1,037.7	2,960.0	2.86	-2.38	1.59	
9,911.0	90.90	160.70	6,537.9	5,362.9	-2,832.7	1,059.0	3,022.9	4.22	-3.97	1.43	
9,974.0	91.00	160.70	6,536.8	5,361.8	-2,892.2	1,079.8	3,085.9	0.16	0.16	0.00	
10,037.0	91.30	161.00	6,535.6	5,360.6	-2,951.7	1,100.5	3,148.9	0.67	0.48	0.48	
10,100.0	89.90	162.60	6,534.9	5,359.9	-3,011.5	1,120.1	3,211.9	3.37	-2.22	2.54	
10,163.0	90.80	162.40	6,534.5	5,359.5	-3,071.6	1,139.1	3,274.9	1.46	1.43	-0.32	



Phoenix Technology Services
Survey Report



Database:	US 20150713 Survey Data	Local Co-ordinate Reference:	US 20150713 Survey Data
Company:	OTI Production Services	TVD Reference:	US 20150713 Survey Data
Project:	Winn-Dixie 2015	MD Reference:	US 20150713 Survey Data
Site:	Winn-Dixie 2015	North Reference:	US 20150713 Survey Data
Well:	Winn-Dixie 2015	Survey Calculation Method:	Minimum Curvature
Wellbore:	Winn-Dixie 2015		
Design:	Winn-Dixie 2015		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,226.0	89.80	163.20	6,534.2	5,359.2	-3,131.8	1,157.7	3,337.8	2.03	-1.59	1.27
10,289.0	90.70	163.30	6,533.9	5,358.9	-3,192.1	1,175.9	3,400.8	1.44	1.43	0.16
10,352.0	91.00	163.30	6,533.0	5,358.0	-3,252.5	1,194.0	3,463.7	0.48	0.48	0.00
10,415.0	89.30	164.30	6,532.8	5,357.8	-3,312.9	1,211.5	3,526.7	3.13	-2.70	1.59
10,478.0	89.50	164.40	6,533.5	5,358.5	-3,373.6	1,228.5	3,589.6	0.35	0.32	0.16
10,541.0	90.20	164.50	6,533.6	5,358.6	-3,434.3	1,245.4	3,652.5	1.12	1.11	0.16
10,604.0	90.40	164.00	6,533.3	5,358.3	-3,494.9	1,262.5	3,715.4	0.85	0.32	-0.79
10,667.0	91.00	163.20	6,532.5	5,357.5	-3,555.4	1,280.3	3,778.3	1.59	0.95	-1.27
10,730.0	88.80	163.80	6,532.7	5,357.7	-3,615.8	1,298.2	3,841.3	3.62	-3.49	0.95
10,793.0	89.50	163.60	6,533.6	5,358.6	-3,676.2	1,315.9	3,904.2	1.16	1.11	-0.32
10,856.0	90.70	163.80	6,533.5	5,358.5	-3,736.7	1,333.7	3,967.1	1.90	1.90	0.00
10,919.0	91.30	163.90	6,532.4	5,357.4	-3,797.1	1,351.3	4,030.1	1.06	0.95	0.48
10,982.0	89.20	163.10	6,532.1	5,357.1	-3,857.5	1,369.2	4,093.0	3.57	-3.33	-1.27
11,045.0	89.10	163.40	6,533.0	5,358.0	-3,917.9	1,387.3	4,156.0	0.50	-0.16	0.48
11,108.0	89.70	163.50	6,533.7	5,358.7	-3,978.2	1,405.3	4,218.9	0.97	0.95	0.16
11,171.0	89.30	161.50	6,534.3	5,359.3	-4,038.3	1,424.2	4,281.9	3.24	-0.63	-3.17
11,234.0	87.80	161.10	6,535.8	5,360.8	-4,098.0	1,444.4	4,344.9	2.46	-2.38	-0.63
11,297.0	88.10	160.70	6,538.1	5,363.1	-4,157.5	1,465.0	4,407.8	0.79	0.48	-0.63
11,360.0	88.70	161.50	6,539.9	5,364.9	-4,217.1	1,485.4	4,470.8	1.59	0.95	1.27
11,424.0	89.30	161.70	6,541.0	5,366.0	-4,277.8	1,505.6	4,534.8	0.99	0.94	0.31
11,487.0	89.90	161.80	6,541.4	5,366.4	-4,337.6	1,525.3	4,597.8	0.97	0.95	0.16
11,550.0	90.50	161.90	6,541.2	5,366.2	-4,397.5	1,545.0	4,660.8	0.97	0.95	0.16
11,613.0	90.90	161.40	6,540.4	5,365.4	-4,457.3	1,564.8	4,723.8	1.02	0.63	-0.79
11,676.0	91.00	161.50	6,539.4	5,364.4	-4,517.0	1,584.8	4,786.7	0.22	0.16	0.16
11,739.0	89.20	161.90	6,539.3	5,364.3	-4,576.8	1,604.6	4,849.7	2.93	-2.86	0.63
11,801.0	89.50	162.30	6,540.0	5,365.0	-4,635.8	1,623.7	4,911.7	0.81	0.48	0.65
11,864.0	90.00	162.80	6,540.3	5,365.3	-4,695.9	1,642.6	4,974.7	1.12	0.79	0.79
11,927.0	90.10	162.40	6,540.2	5,365.2	-4,756.0	1,661.4	5,037.7	0.65	0.16	-0.63
11,990.0	89.90	162.60	6,540.2	5,365.2	-4,816.1	1,680.4	5,100.7	0.45	-0.32	0.32
12,053.0	90.00	162.90	6,540.3	5,365.3	-4,876.2	1,699.0	5,163.7	0.50	0.16	0.48
12,116.0	90.70	162.70	6,539.9	5,364.9	-4,936.4	1,717.7	5,226.6	1.16	1.11	-0.32
12,179.0	91.40	162.00	6,538.7	5,363.7	-4,996.5	1,736.8	5,289.6	1.57	1.11	-1.11
12,242.0	91.60	161.50	6,537.1	5,362.1	-5,056.3	1,756.5	5,352.6	0.85	0.32	-0.79
12,305.0	89.00	161.40	6,536.7	5,361.7	-5,116.0	1,776.5	5,415.6	4.13	-4.13	-0.16
12,368.0	89.80	161.60	6,537.4	5,362.4	-5,175.7	1,796.5	5,478.6	1.31	1.27	0.32
12,431.0	90.40	161.30	6,537.3	5,362.3	-5,235.4	1,816.6	5,541.6	1.06	0.95	-0.48
12,493.0	89.40	163.00	6,537.4	5,362.4	-5,294.5	1,835.6	5,603.5	3.18	-1.61	2.74
12,556.0	90.20	162.90	6,537.6	5,362.6	-5,354.7	1,854.0	5,666.5	1.28	1.27	-0.16
12,619.0	90.10	161.80	6,537.4	5,362.4	-5,414.7	1,873.1	5,729.5	1.75	-0.16	-1.75
12,682.0	87.70	162.50	6,538.7	5,363.7	-5,474.7	1,892.4	5,792.5	3.97	-3.81	1.11
12,745.0	88.30	162.80	6,540.9	5,365.9	-5,534.7	1,911.3	5,855.4	0.97	0.95	0.16
12,808.0	88.70	162.80	6,542.5	5,367.5	-5,594.8	1,930.2	5,918.4	0.63	0.63	0.00



Phoenix Technology Services

Survey Report



Where energy meets innovation.

Database:	13118 MD/6556' TVD	Local Co-ordinate Reference:	13118 MD/6556' TVD
Company:	QEP Resources, LLC - Missouri	TVD Reference:	Height of 114.000
Project:	13118 MD/6556' TVD	MD Reference:	Height of 114.000
Site:	13118 MD/6556' TVD	North Reference:	13118 MD/6556' TVD
Well:	13118 MD/6556' TVD	Survey Calculation Method:	Minimum Curvature
Wellbore:	13118 MD/6556' TVD		
Design:	13118 MD/6556' TVD		

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)
12,871.0	89.50	162.70	6,543.5	5,368.5	-5,655.0	1,948.9	5,981.4	1.28	1.27	0.16
12,934.0	89.80	162.20	6,543.9	5,368.9	-5,715.0	1,987.9	6,044.3	0.93	0.48	-0.79
12,996.0	88.20	161.80	6,545.0	5,370.0	-5,774.0	1,987.1	6,106.3	2.66	-2.58	-0.65
13,059.0	88.40	160.90	6,546.8	5,371.8	-5,833.6	2,007.2	6,169.3	1.46	0.32	-1.43
13,122.0	89.80	161.60	6,547.8	5,372.8	-5,893.3	2,027.5	6,232.3	2.48	2.22	1.11
13,185.0	91.60	161.70	6,547.0	5,372.0	-5,953.1	2,047.3	6,295.3	2.86	2.86	0.16
13,248.0	91.50	161.50	6,545.3	5,370.3	-6,012.8	2,067.2	6,358.2	0.35	-0.16	-0.32
13,311.0	89.50	161.50	6,544.8	5,369.8	-6,072.6	2,087.2	6,421.2	3.17	-3.17	0.00
13,373.0	89.70	161.00	6,545.2	5,370.2	-6,131.3	2,107.1	6,483.2	0.87	0.32	-0.81
13,437.0	89.80	160.50	6,545.5	5,370.5	-6,191.7	2,128.2	6,547.2	0.80	0.16	-0.78
13,500.0	90.10	159.70	6,545.6	5,370.6	-6,250.9	2,149.6	6,610.2	1.36	0.48	-1.27
13,625.0	89.40	160.50	6,546.1	5,371.1	-6,368.5	2,192.2	6,735.2	0.85	-0.56	0.64
13,688.0	87.90	162.60	6,547.6	5,372.6	-6,428.2	2,212.1	6,798.2	4.10	-2.38	3.33
13,751.0	91.60	165.10	6,547.9	5,372.9	-6,488.7	2,229.6	6,861.1	7.09	5.67	3.97
13,814.0	93.10	165.40	6,545.3	5,370.3	-6,549.6	2,245.7	6,923.9	2.43	2.38	0.48
13,877.0	91.60	164.40	6,542.7	5,367.7	-6,610.4	2,262.1	6,986.7	2.86	-2.38	-1.59
13,939.0	90.20	163.20	6,541.7	5,366.7	-6,669.9	2,279.4	7,048.6	2.97	-2.26	-1.94
14,002.0	89.70	161.80	6,541.8	5,366.8	-6,730.0	2,298.3	7,111.6	2.36	-0.79	-2.22
14,065.0	88.70	160.60	6,542.7	5,367.7	-6,789.6	2,318.6	7,174.6	2.48	-1.59	-1.90
14,128.0	88.80	160.80	6,544.0	5,369.0	-6,849.0	2,339.4	7,237.6	0.35	0.16	0.32
14,191.0	88.60	160.70	6,545.5	5,370.5	-6,908.5	2,360.2	7,300.5	0.35	-0.32	-0.16
14,254.0	88.70	160.70	6,546.9	5,371.9	-6,968.0	2,381.0	7,363.5	0.16	0.16	0.00
14,317.0	88.60	160.60	6,548.4	5,373.4	-7,027.4	2,401.9	7,426.5	0.22	-0.16	-0.16
14,380.0	88.30	160.30	6,550.1	5,375.1	-7,086.7	2,422.9	7,489.5	0.67	-0.48	-0.48
14,443.0	88.00	160.20	6,552.2	5,377.2	-7,146.0	2,444.2	7,552.4	0.50	-0.48	-0.16
14,493.0	87.80	160.20	6,554.0	5,379.0	-7,193.0	2,461.1	7,602.4	0.40	-0.40	0.00
14,549.5	87.80	160.20	6,556.2	5,381.2	-7,246.1	2,480.3	7,658.8	0.00	0.00	0.00
14,550.0	87.80	160.20	6,556.2	5,381.2	-7,246.6	2,480.4	7,659.3	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,603.0	4,602.1	-8.1	59.0	Gyro Tie On=4603' MD
7,081.0	6,561.3	-150.6	163.7	LP=7081' MD/6561' TVD
8,212.0	6,564.1	-1,225.2	516.2	Deepest Point=8212' MD/6564' TVD
14,493.0	6,554.0	-7,193.0	2,461.1	Final Survey=14493' MD/6554' TVD
14,550.0	6,556.2	-7,246.6	2,480.4	PROJ to Bit=14550' MD/6556' TVD



Phoenix Technology Services
Survey Report

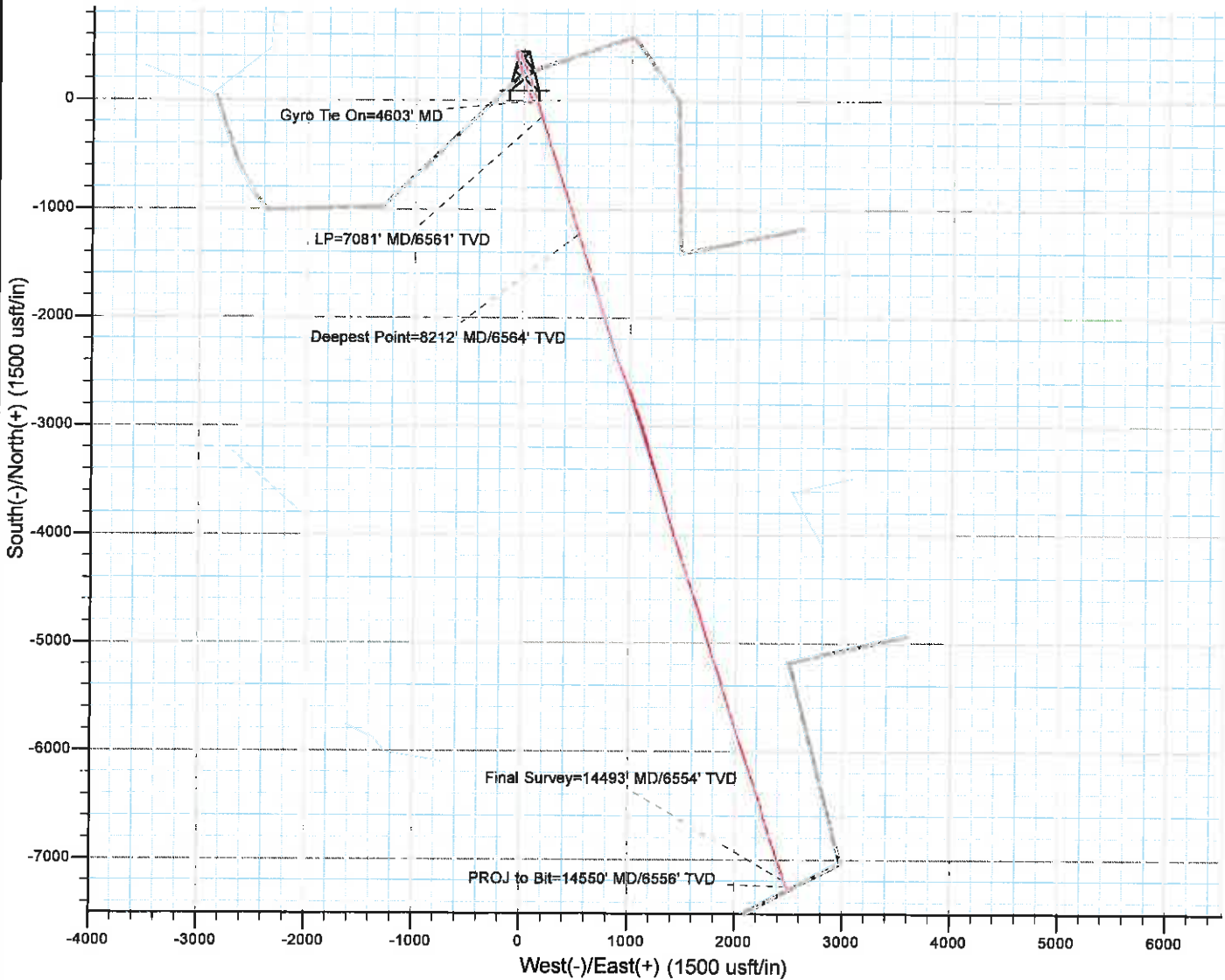
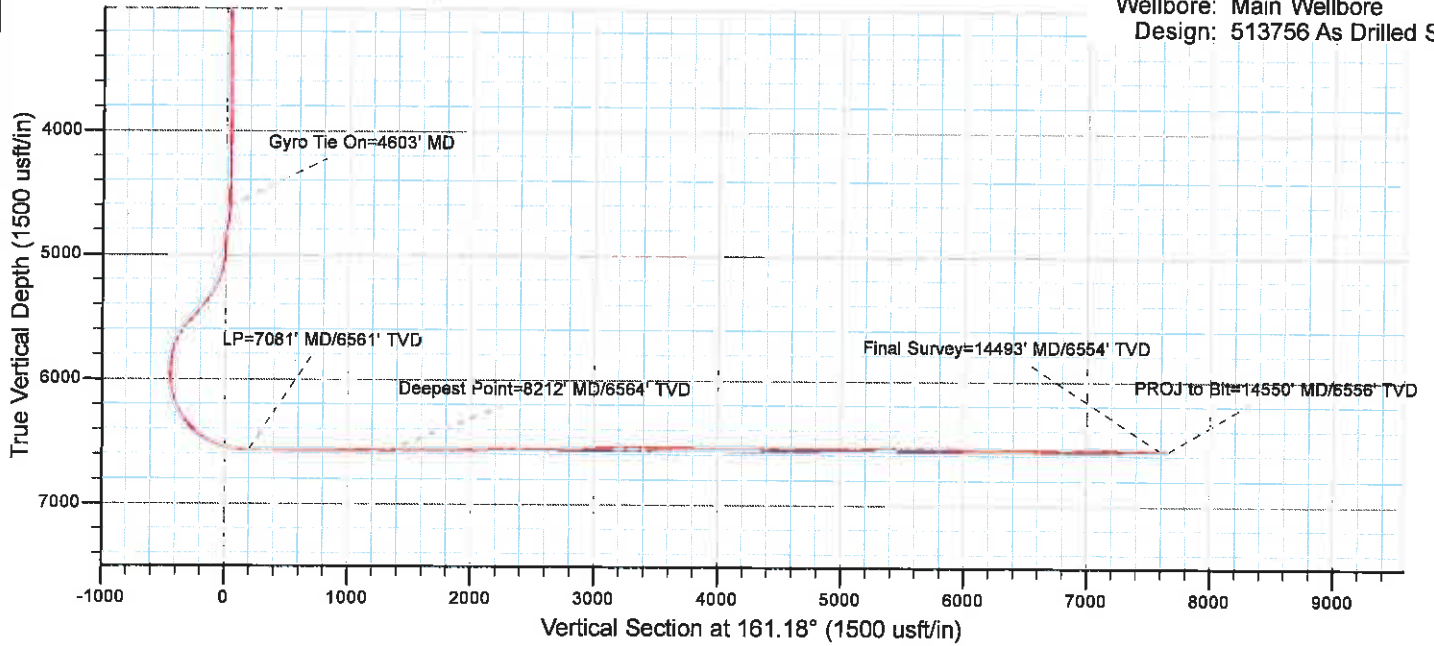


Database:	WY-10001-01-01-01-01-01	Local Co-ordinate Reference:	WY-10001-01-01-01-01-01
Company:	OT Holdings - Missouri	TVD Reference:	WY-10001-01-01-01-01-01
Project:	Radio County, WY	MD Reference:	WY-10001-01-01-01-01-01
Site:	Radio County, WY	North Reference:	WY-10001-01-01-01-01-01
Well:	Well No. 10001	Survey Calculation Method:	Minimum Curvature
Wellbore:	Well No. 10001		
Design:	10001-01-01-01-01-01		

Checked By: _____ Approved By: _____ Date: _____



Project: Ritchie County, WV
Site: Ritchie County 513756
Well: Well #513756
Wellbore: Main Wellbore
Design: 513756 As Drilled Surveys



513756- 47-085-10132-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	8/26/2015	14,545	14,547	10	MARCELLUS
1	8/26/2015	14,401	14,493	32	MARCELLUS
2	8/27/2015	14,251	14,373	40	MARCELLUS
3	8/27/2015	14,101	14,223	40	MARCELLUS
4	8/27/2015	13,951	14,073	40	MARCELLUS
5	8/28/2015	13,802	13,923	40	MARCELLUS
6	8/30/2015	13,651	13,773	40	MARCELLUS
7	8/30/2015	13,501	13,623	40	MARCELLUS
8	8/31/2015	13,351	13,473	40	MARCELLUS
9	8/31/2015	13,201	13,323	40	MARCELLUS
10	9/1/2015	13,051	13,173	40	MARCELLUS
11	9/1/2015	12,901	13,021	40	MARCELLUS
12	9/1/2015	12,751	12,871	40	MARCELLUS
13	9/1/2015	12,601	12,723	40	MARCELLUS
14	9/1/2015	12,451	12,573	40	MARCELLUS
15	9/2/2015	12,301	12,421	40	MARCELLUS
16	9/2/2015	12,151	12,271	40	MARCELLUS
17	9/2/2015	12,001	12,123	40	MARCELLUS
18	9/3/2015	11,853	11,973	40	MARCELLUS
19	9/3/2015	11,701	11,821	40	MARCELLUS
20	9/3/2015	11,551	11,671	40	MARCELLUS
21	9/3/2015	11,401	11,523	40	MARCELLUS
22	9/3/2015	11,253	11,373	40	MARCELLUS
23	9/4/2015	11,101	11,223	40	MARCELLUS
24	9/4/2015	10,951	11,071	40	MARCELLUS
25	9/4/2015	10,801	10,921	40	MARCELLUS
26	9/4/2015	10,651	10,773	40	MARCELLUS
27	9/5/2015	10,501	10,623	40	MARCELLUS
28	9/5/2015	10,351	10,471	40	MARCELLUS
29	9/5/2015	10,201	10,321	40	MARCELLUS
30	9/5/2015	10,051	10,173	40	MARCELLUS
31	9/6/2015	9,905	10,021	40	MARCELLUS
32	9/6/2015	9,751	9,871	40	MARCELLUS
33	9/6/2015	9,601	9,721	40	MARCELLUS
34	9/6/2015	9,451	9,573	40	MARCELLUS
35	9/6/2015	9,301	9,423	40	MARCELLUS
36	9/7/2015	9,151	9,271	40	MARCELLUS
37	9/7/2015	9,001	9,121	40	MARCELLUS
38	9/7/2015	8,853	8,973	40	MARCELLUS
39	9/7/2015	8,701	8,823	40	MARCELLUS
40	9/8/2015	8,551	8,672	40	MARCELLUS
41	9/8/2015	8,401	8,523	40	MARCELLUS
43	9/8/2015	8,101	8,217	40	MARCELLUS
42	9/8/2015	8,251	8,371	40	MARCELLUS
44	9/9/2015	7,951	8,071	40	MARCELLUS
45	9/9/2015	7,801	7,918	40	MARCELLUS
46	9/9/2015	7,651	7,771	40	MARCELLUS
47	9/9/2015	7,506	7,621	40	MARCELLUS
48	9/10/2015	7,351	7,471	40	MARCELLUS
49	9/10/2015	7,201	7,323	40	MARCELLUS
50	9/10/2015	7,051	7,173	40	MARCELLUS
51	9/10/2015	6,901	7,022	40	MARCELLUS

Cerro WC 7535 513756 Perf and Stim.xlsx Mon Aug 22 15:32:05 2016 Media Type: Default Color: Automatic Office: Display-sRGB Press: SWOP-Coated Print Quality: Standard
 Color Adjustments: Customized Automatic Setup

513756-47-085-10132-0000 - 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	8/26/2015	35.7	8,088	8,792	4,669			0
1	8/26/2015	89.7	8,830	9,172	2,243	250,131.00	862	0
2	8/27/2015	89.8	8,752	9,071	4,547	237,279.00	7,505	0
3	8/27/2015	101.3	8,515	8,862	3,844	250,560.00	6,546	0
4	8/27/2015	101.3	8,651	8,980	3,900	250,135.00	6,630	0
5	8/30/2015	101.8	8,573	8,832	3,736	250,058.00	6,722	0
6	8/30/2015	101.5	8,425	8,636	4,138	251,274.00	6,732	0
7	8/31/2015	101.8	8,526	8,704	3,924	253,463.00	6,435	0
8	8/31/2015	94.4	8,595	10,014	8,995	250,061.00	6,198	0
9.01	8/31/2015	6.3	4,250	6,152				0
9	8/31/2015	100.7	8,728	9,246	5,189	250,960.00	6,813	0
10	9/1/2015	101	8,543	8,790	4,053	249,840.00	6,474	0
11	9/1/2015	101.3	8,293	8,696	5,451	245,460.00	6,350	0
12	9/1/2015	101.1	8,313	8,665	5,409	246,250.00	6,927	0
13	9/1/2015	99.6	8,323	8,615	4,890	249,260.00	6,516	0
14	9/2/2015	100.9	7,859	8,301	5,109	258,800.00	6,651	0
15	9/2/2015	100.5	7,850	8,092	4,633	253,900.00	6,779	0
16	9/2/2015	100.8	8,018	9,060	5,378	250,480.00	6,573	0
17	9/2/2015	101.7	7,610	7,816	3,807	250,240.00	6,552	0
18	9/3/2015	101	7,852	8,163	3,843	250,640.00	6,486	0
19	9/3/2015	101.8	7,457	7,787	5,303	254,300.00	6,403	0
20	9/3/2015	101.2	7,724	7,928	4,992	246,490.00	6,654	0
21	9/3/2015	101.2	7,336	7,791	4,511	250,420.00	6,639	0
22	9/4/2015	100.2	7,769	7,955	3,751	254,420.00	6,299	0
23	9/4/2015	100.5	7,471	7,654	4,547	250,280.00	6,521	0
24	9/4/2015	100.1	7,603	8,728	4,622	251,790.00	6,320	0
25	9/4/2015	100.9	7,672	8,224	3,327	250,670.00	6,280	0
26	9/4/2015	101.5	7,650	8,045	3,926	249,940.00	6,273	0
27	9/5/2015	100.7	7,646	7,848	4,320	252,760.00	6,194	0
28	9/5/2015	100.5	7,582	8,465	4,529	251,420.00	6,281	0
29	9/5/2015	100.6	7,478	7,806	3,607	251,040.00	6,223	0
30	9/5/2015	101.1	7,860	8,244	3,857	250,810.00	6,179	0
31	9/6/2015	101.4	7,530	7,886	4,221	249,180.00	6,130	0
32	9/6/2015	100.3	7,367	7,561	3,712	247,180.00	6,281	0
33	9/6/2015	100.6	7,608	8,137	3,986	253,970.00	6,404	0
34	9/6/2015	101.1	8,145	8,874	4,525	252,210.00	6,173	0
35	9/7/2015	101	8,177	9,191	3,658	251,870.00	6,071	0
36	9/7/2015	102.2	7,195	7,423	3,424	246,630.00	6,335	0
37	9/7/2015	102.1	7,429	7,745	3,287	251,734.00	6,229	0
38	9/7/2015	101.4	7,385	7,641	3,300	250,428.00	6,003	0
39	9/8/2015	101.5	7,450	7,768	4,816	252,330.00	6,010	0
40	9/8/2015	101.8	7,165	7,455	3,206	251,780.00	6,137	0
41	9/8/2015	101.5	6,895	7,101	3,236	250,612.00	6,048	0
42	9/8/2015	101.3	7,274	7,460	3,492	250,099.00	6,111	0
43	9/8/2015	100.9	7,282	7,900	4,547	251,540.00	6,213	0
44	9/9/2015	100.8	7,035	7,399	3,886	254,263.00	6,277	0
45	9/9/2015	101.2	6,848	7,098	3,410	250,789.00	5,901	0
46	9/9/2015	101.9	6,865	7,003	3,622	249,750.00	5,828	0
47	9/9/2015	101.6	6,759	7,218	3,127	251,140.00	6,013	0
48	9/10/2015	103.1	6,906	7,244	3,020	252,640.00	6,021	0
49	9/10/2015	101.6	6,833	7,438	3,287	252,447.00	5,532	0
50	9/10/2015	101.3	6,942	7,295	3,180	250,363.00	5,223	0
51	9/10/2015	100.4	7,066	8,304	3,278	258,537.00	5,713	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	8/26/2015
Job End Date	9/10/2015
State	West Virginia
County	Ritchie
API Number	47-085-10132-00-00
Operator Name	EQT Production
Well Name and Number	513756
Longitude	-80 84274300
Latitude	39 13602100
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	6,534
Total Base Water Volume (gal)	13,300,140
Total Base Non Water Volume	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Service Abstract 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	89.31979	None
Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.29496	None
MC MX 437-5	Mulifi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05841	None
FFR760	Keane Group	Friction Reducer	Hydrotreated Light Distillate	64742-47-8	30.00000	0.02077	None
			Alkyl Alcohol	Proprietary	10.00000	0.00692	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00346	None
Hydrochloric Acid (15%)	Keane Group	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.02887	None
EC6330A	Keane Group	Scale Inhibitor	Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00128	None
			Ethylene Glyco:	107-21-1	5.00000	0.00128	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00020	None
			Dimethylformamide	68-12-2	20.00000	0.00010	None

				104-55-2	15.00000	0.00000	None
				68909-18-2	15.00000	0.00000	None
				111-87-5	5.00000	0.00000	None
				111-76-2	5.00000	0.00000	None
				112-30-1	5.00000	0.00000	None
				127087-87-0	5.00000	0.00000	None
				78-40-0	2.50000	0.00000	None
				67-56-1	2.50000	0.00000	None
				68391-11-7	1.00000	0.00000	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)

RECEIVED
Office of Oil and Gas
AUG 25 2016
U.S. Department of
Environmental Protection



4708510132

July 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 47-085-10132

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 2 additional tracts, for which EQT had acquired subsurface agreements. 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 L', is written over the typed name.

Vicki Roark
Permitting Supervisor-WV

Enc.

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

ROYALTY OWNERS		
B.M. PIERCE ET AL	84.50 AC±	LEASE NO. 118210
SHIRLEY & RUTH RIDDLE HEIRS AND/OR ASSIGNS	272 AC±	LEASE NO. 986161

**EQT PRODUCTION COMPANY
J.E. PIERCE ET AL LEASE
108(98.73±) ACRES±
WELL NO. WV 513756
(OXF163 H1)**

AS DRILLED COORDINATES

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

COORDINATE SYSTEM	NORTHING	EASTING
NAD'27 S.P.C.(FT)	N. 234,498.6	E. 1,619,128.2
NAD'27 GEO.	LAT-(N) 39.136021	LONG-(W) 80.842743
NAD'83 UTM (M)	N. 4,331,892.5	E. 513,606.0

LANDING POINT

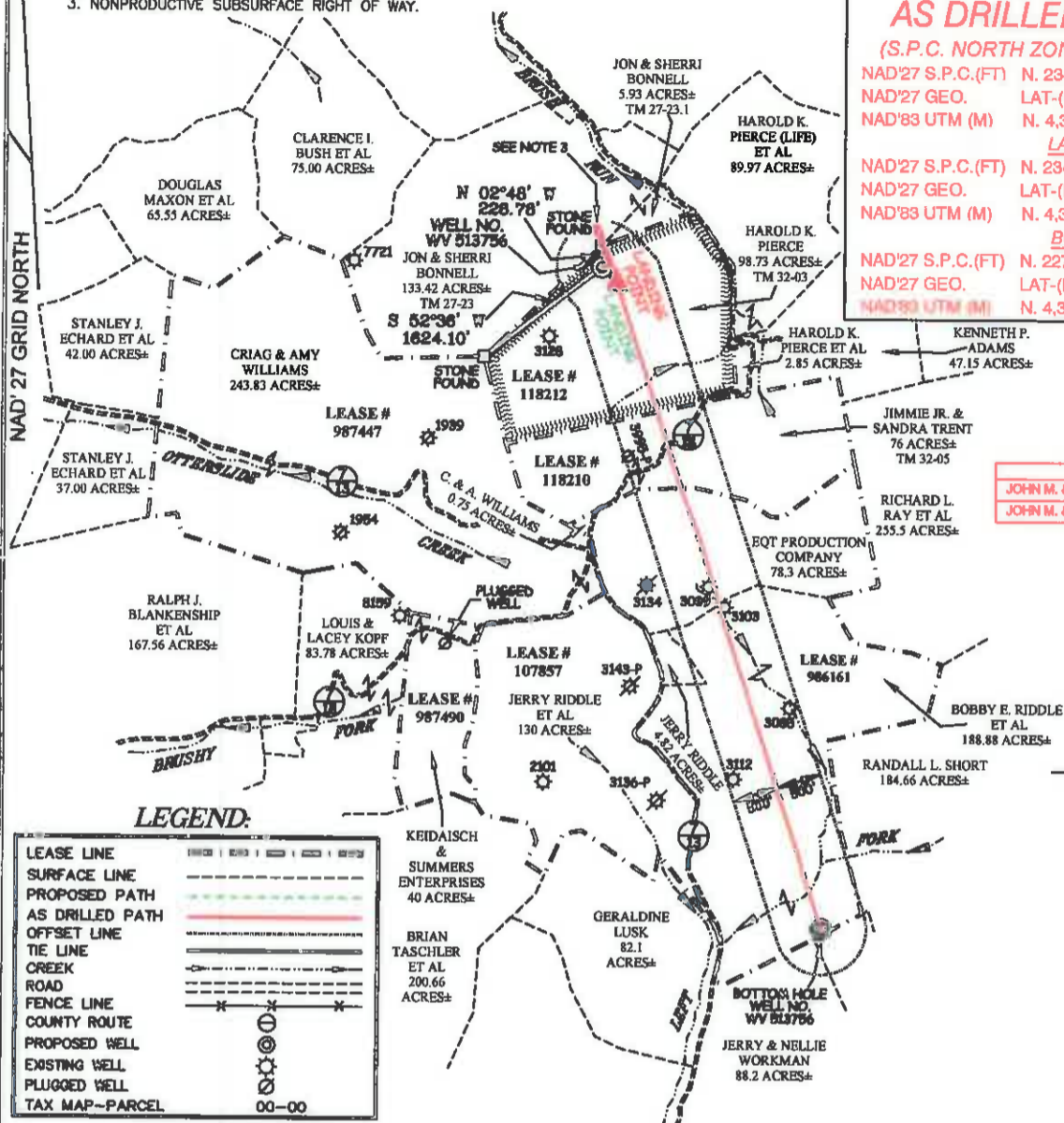
COORDINATE SYSTEM	NORTHING	EASTING
NAD'27 S.P.C.(FT)	N. 234,348.0	E. 1,619,291.9
NAD'27 GEO.	LAT-(N) 39.135615	LONG-(W) 80.842158
NAD'83 UTM (M)	N. 4,331,847.4	E. 513,656.6

BOTTOM HOLE

COORDINATE SYSTEM	NORTHING	EASTING
NAD'27 S.P.C.(FT)	N. 227,252.2	E. 1,621,608.6
NAD'27 GEO.	LAT-(N) 39.116229	LONG-(W) 80.833821
NAD'83 UTM (M)	N. 4,329,697.5	E. 514,398.4

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.



SUBSURFACE AGREEMENT		
JOHN M. & SHERRI L. BONNELL	133.42 AC±	TM 27-23
JOHN M. & SHERRI L. BONNELL	5.93 AC±	TM 27-23.1

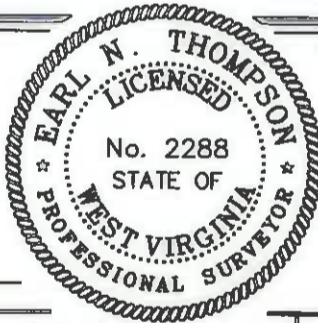
LEGEND:

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

Professional Energy Consultants
A DIVISION OF EARTH LAND SURVEYS, INC.

SURVEYING
ENGINEERING
ENVIRONMENTAL
PROJECT MGMT.

(304) 482-9834 WWW.ELSURVEYS.COM



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE MAY 27, 20 14
REVISED 07/30/14, 10/27/14, 12/03/15, 05/16/16 & 06/06/16
OPERATORS WELL NO. WV 513756
API WELL NO. 47 - 085 - 10132H
STATE COUNTY PERMIT

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*

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. 7698AD513756R2
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: 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 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