

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 515275

API: 47 - 085 - 10093

Submission:  Initial  Amended

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

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**APPROVED**

NAME: Michael Loff

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 47-085-10093 County Ritchie District Clay  
Quad Pennsboro Pad Name PEN15 Field/Pool Name \_\_\_\_\_  
Farm name DEWAYNE BRITTON ET UX Well Number 515275  
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 4,345,843.8 Easting 504,208.3  
Landing Point of Curve Northing 4,346,187.2 Easting 505,320.8  
Bottom Hole Northing 4,347,509.3 Easting 504,666.0

Elevation (ft) 1,119' 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 05/22/2014 Date drilling commenced 06/18/2014 Date drilling ceased 03/06/2015  
Date completion activities began 6/10/2015 Date completion activities ceased 6/17/2015  
Verbal plugging (Y/N) N Date permission granted N/A Granted by REINAVED  
**Office of Oil and Gas**

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug **SEP 06 2016**

Freshwater depth(s) ft 86',166',245',397',773',876' Open mine(s) (Y/N) depths \_\_\_\_\_  
Salt water depth(s) ft 1655',1946',2524' Void(s) encountered (Y/N) depths \_\_\_\_\_  
Coal depth(s) ft 17',276',382',747' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

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

API 47-085 - 10093

Farm name DEWAYNE BRITTON ET UX

Well number 515275

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	26"	20"	40'	NEW	A-500 40LB/FT	NONE	Y
Surface	17.5"	13.375"	1,074'	NEW	J-55 54.5LB/FT	254', 581'	Y
Coal							
Intermediate 1	12.25"	9.625"	5,690'	NEW	P-110 40LB/FT	NONE	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	13,835'	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

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	1.19	45.22	0	8
Surface	CLASS A	907	15.6	1.19	1079.33	0	8
Coal							
Intermediate 1	CLASS A	360/310/1245	14.2/15.6/15.6	1.28/1.18/1.18	2298.7	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class H	585/660	14.2/15.2	1.26/1.97	2037.3	4,942'	72
Tubing							

Drillers TD (ft) 13,847' 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) 3,253' 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: 1,11,24

INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1,12,24,36,48,60,72,84,96,108,120,132

Production- 222 Composite bodied centralizers on every joint from TD up to 4,383'

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WAS WELL COMPLETED AS SHOT HOLE  Yes  No    DETAILS \_\_\_\_\_

SEP 06 2016

WAS WELL COMPLETED OPEN HOLE?  Yes  No    DETAILS \_\_\_\_\_

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

Environmental Protection





API 47-085 - 10093 Farm name DEWAYNE BRITTON ET UX Well number 515275

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 NABORS CEMENTING SERVICESRS  
Address 2504 SMITH CREEK ROAD City WAYNESBURG State PA Zip 15370

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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	876	876
SAND/SHALE	0	0	17	17
WASHINGTON COAL	17	17	19	19
SAND/SHALE	19	19	276	276
COAL	276	276	284	284
SAND/SHALE	284	284	382	382
COAL	382	382	387	387
SAND/SHALE	387	387	747	747
COAL	747	747	751	751
SAND/SHALE	751	751	1,750	1,750
MAXTON	1,750	1,750	1,969	1,969
BIG LIME	1,969	1,969	2,037	2,037
KEENER	2,037	2,037	2,376	2,376
WEIR	2,376	2,376	2,581	2,581
GANTZ	2,581	2,581	2,721	2,721
50F	2,721	2,721	2,802	2,802
30F	2,802	2,802	2,846	2,846
GORDON	2,846	2,846	2,927	2,927
4TH	2,927	2,927	3,073	3,073
5TH	3,073	3,073	3,116	3,116
BAYARD	3,116	3,116	3,466	3,466
WARREN	3,466	3,466	3,549	3,549
SPEECHLEY	3,549	3,549	3,948	3,948
BALLTOWN A	3,948	3,948	4,764	4,764
RILEY	4,764	4,764	5,239	5,239
BENSON	5,239	5,239	5,591	5,591
ALEXANDER	5,591	5,591	5,626	5,626
ELKS	5,626	5,626	7,786	7,786
SONYEA	7,786	7,786	8,131	8,131
MIDDLESEX	8,131	8,131	8,310	8,310
GENESEEE	8,310	8,310	8,514	8,514
GENESEU	8,514	8,514	8,639	8,639
TULLY	8,639	8,639	8,724	8,724
HAMILTON	8,724	8,724	8,766	8,766
MARCELLUS	8,766	8,766	13,847	13,847

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**PHOENIX**  
TECHNOLOGY SERVICES USA INC.

## **EQT Production - Marcellus**

**Ritchie County, WV**

**Ritchie County 515275**

**Well #515275**

**Main Wellbore**

**Design: As Drilled Surveys**

## **Standard Survey Report**

**04 March, 2015**

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Database:	EQT Production - Marcellus	Local Coordinate Reference:	NAD 1927 (NADCON CONUS)
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 11.35 usft
Project:	North County, WV	MD Reference:	KB @ 11.35 usft
Site:	North County, 515275	North Reference:	Grid
Well:	MWD 515275	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	Standard Survey		

Project: **North County, WV**

<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	West Virginia North 4701		Using geodetic scale factor

Site: **North County, 515275**

<b>Site Position:</b>		<b>Northing:</b>	280,796.70 usft	<b>Latitude:</b>	39.26
<b>From:</b>	Map	<b>Easting:</b>	1,589,053.20 usft	<b>Longitude:</b>	-80.95
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	-0.93°

Well: **Well 515275**

<b>Well Position</b>	<b>+N-S</b>	0.0 usft	<b>Northing:</b>	280,796.70 usft	<b>Latitude:</b>	39° 15' 42.619 N
	<b>+E-W</b>	0.0 usft	<b>Easting:</b>	1,589,053.20 usft	<b>Longitude:</b>	80° 57' 5.003 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,119.0 usft

Wellbore: **Main Wellbore**

<b>Magnetics:</b>	<b>Model Name:</b>	<b>Sample Date:</b>	<b>Declination:</b>	<b>Dip Angle:</b>	<b>Field Strength:</b>
	IGRF2015	2/2/2015	-8.33	66.78	52,209

Design: **Standard Survey**

**Audit Notes:**

**Version:** 1.0      **Phase:** ACTUAL      **Tie On Depth:** 0.0

<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N-S</b>	<b>+E-W</b>	<b>Direction</b>
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	16.44

**Survey Program:** Date: 3/4/2015

From (°)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	3,156.0	515275 Gyrodata Gyros (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
0.00	13,847.0	515275 PHX MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3 standard declination

**Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	BATH Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	-1,135.0	0.0	0.0	0.0	0.00	0.00	0.00
103.0	0.13	242.07	103.0	-1,032.0	-0.1	-0.1	-0.1	0.13	0.13	0.00
203.0	0.16	255.66	203.0	-932.0	-0.1	-0.3	-0.2	0.05	0.03	13.59
303.0	0.14	284.89	303.0	-832.0	-0.1	-0.6	-0.3	0.08	-0.02	29.23
403.0	0.09	234.28	403.0	-732.0	-0.2	-0.8	-0.4	0.11	-0.05	50.61
503.0	0.04	218.30	503.0	-632.0	-0.2	-0.9	-0.5	0.05	-0.05	15.98
603.0	0.14	167.90	603.0	-532.0	-0.4	-0.9	-0.6	0.10	-0.05	50.40
703.0	0.20	183.14	703.0	-432.0	-0.7	-0.8	-0.9	0.07	0.06	15.24

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Phoenix Technologies  
Survey Report



Database:	2015 Survey - Eagle Creek CB	Local Coordinate Reference:	North American Datum 83
Company:	Phoenix Technology Services	TVD Reference:	NA 83 Mean Sea Level
Project:	Madison County - WV	MD Reference:	NA 83 Mean Sea Level
Site:	Madison County - WV	North Reference:	Grid
Well:	Well #115775	Survey Calculation Method:	Minimum Curvature
Wellbore:	Open Wellbore		
Design:	2015 Survey		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
803.0	0.22	177.42	803.0	-332.0	-1.0	-0.8	-1.2	0.03	0.02	-5.72
903.0	0.22	177.21	903.0	-232.0	-1.4	-0.8	-1.6	0.00	0.00	-0.21
1,003.0	0.18	184.47	1,003.0	-132.0	-1.8	-0.8	-1.9	0.05	-0.04	7.26
1,103.0	0.31	162.04	1,103.0	-32.0	-2.2	-0.8	-2.3	0.16	0.13	-22.43
1,203.0	0.59	182.60	1,203.0	68.0	-2.9	-0.5	-3.0	0.28	0.28	0.56
1,303.0	0.81	171.63	1,303.0	168.0	-4.1	-0.3	-4.0	0.25	0.22	9.03
1,403.0	0.81	168.89	1,403.0	268.0	-5.5	0.0	-5.3	0.04	0.00	-2.74
1,503.0	0.82	176.04	1,503.0	368.0	-6.9	0.2	-3.6	0.10	0.01	7.15
1,603.0	0.84	177.56	1,603.0	468.0	-8.4	0.2	-8.0	0.03	0.02	1.52
1,703.0	0.76	177.45	1,702.9	567.9	-9.8	0.3	-9.3	0.08	-0.08	-0.11
1,803.0	0.72	177.18	1,802.9	667.9	-11.1	0.4	-10.5	0.04	-0.04	-0.27
1,903.0	0.67	181.48	1,902.9	767.9	-12.3	0.4	-11.7	0.07	-0.05	4.30
2,003.0	0.58	194.34	2,002.9	867.9	-13.3	0.2	-12.7	0.17	-0.09	12.86
2,103.0	0.46	212.58	2,102.9	967.9	-14.2	-0.1	-13.6	0.20	-0.12	18.28
2,203.0	0.44	218.37	2,202.9	1,067.9	-14.8	-0.6	-14.4	0.05	-0.02	5.78
2,303.0	0.48	207.18	2,302.9	1,167.9	-15.5	-1.0	-15.1	0.10	0.04	-11.19
2,403.0	0.50	218.35	2,402.9	1,267.9	-16.2	-1.4	-15.9	0.10	0.02	11.17
2,503.0	0.53	203.92	2,502.9	1,367.9	-17.0	-1.9	-16.8	0.13	0.03	-14.43
2,603.0	0.56	218.24	2,602.9	1,467.9	-17.8	-2.4	-17.7	0.12	0.03	12.32
2,703.0	0.60	217.95	2,702.9	1,567.9	-18.6	-3.0	-18.7	0.04	0.04	1.71
2,803.0	0.54	222.16	2,802.9	1,667.9	-19.4	-3.6	-19.6	0.07	-0.06	4.21
2,903.0	0.55	221.44	2,902.9	1,767.9	-20.1	-4.3	-20.4	0.01	0.01	-0.72
3,003.0	0.42	230.63	3,002.9	1,867.9	-20.7	-4.9	-21.2	0.15	-0.13	9.19
3,103.0	0.36	234.94	3,102.9	1,967.9	-21.1	-5.4	-21.7	0.07	-0.06	4.31
3,168.0	0.36	230.21	3,167.9	2,032.9	-21.3	-5.7	-22.1	0.05	0.00	-7.28
3,183.0	0.40	231.30	3,182.9	2,047.9	-21.4	-5.8	-22.1	0.27	0.27	7.27
3,214.0	0.30	218.30	3,213.9	2,078.9	-21.5	-5.9	-22.3	0.41	-0.32	-41.94
3,246.0	0.40	92.50	3,245.9	2,110.9	-21.6	-5.9	-22.4	1.95	0.31	-393.13
3,278.0	1.60	83.40	3,277.9	2,142.9	-21.5	-5.3	-22.2	3.77	3.75	-28.44
3,309.0	2.90	81.50	3,308.8	2,173.8	-21.4	-4.1	-21.7	4.20	4.19	-6.13
3,341.0	4.40	82.40	3,340.8	2,205.8	-21.1	-2.1	-20.8	4.69	4.69	2.81
3,372.0	5.70	83.00	3,371.7	2,236.7	-20.7	0.6	-19.7	4.20	4.19	1.94
3,404.0	7.10	83.30	3,403.5	2,268.5	-20.3	4.1	-18.3	4.38	4.38	0.94
3,435.0	8.30	84.00	3,434.2	2,299.2	-19.9	8.3	-16.7	3.88	3.87	2.26
3,467.0	9.20	84.90	3,465.8	2,330.8	-19.4	13.1	-14.9	2.84	2.84	2.84
3,498.0	10.00	86.60	3,496.4	2,361.4	-19.0	18.3	-13.1	2.74	2.58	5.48
3,530.0	11.00	88.70	3,527.8	2,392.8	-18.8	24.1	-11.2	3.35	3.19	6.56
3,562.0	11.80	88.60	3,559.2	2,424.2	-18.6	30.4	-9.3	2.50	2.50	
3,593.0	12.30	87.80	3,589.5	2,454.5	-18.4	36.9	-7.2	1.70	1.61	-2.58
3,625.0	12.50	86.60	3,620.8	2,485.8	-18.1	43.8	-5.0	1.02	0.63	-3.75
3,656.0	12.90	86.00	3,651.0	2,516.0	-17.6	50.6	-2.6	1.36	1.29	
3,688.0	14.10	85.10	3,682.1	2,547.1	-17.1	58.0	0.0	3.81	3.75	-2.81

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Database:	2015-05-13-1327A	Local Co-ordinate Reference:	2015-05-13-1327A
Company:	Phoenix Technology Services USA, Inc.	TVD Reference:	NA 83 1327A UNIT
Project:	2015-05-13-1327A	MD Reference:	NA 83 1327A UNIT
Site:	Rocky County, OK	North Reference:	NA 83 1327A UNIT
Well:	NA 83 1327A	Survey Calculation Method:	Minimum Curvature
Wellbore:	NA 83 1327A		
Design:	NA 83 1327A		

**Survey**

Measured Depth (ustf)	Inclination (°)	Azimuth (°)	Vertical Depth (ustf)	Subsea Depth (ustf)	+N-S (ustf)	+E-W (ustf)	Vertical Section (ustf)	Dogleg Rate (°/100ustf)	Built Rate (°/100ustf)	Turn Rate (°/100ustf)
3,719.0	15.30	84.80	3,712.1	2,577.1	-16.4	65.8	2.9	3.88	3.87	-0.97
3,751.0	16.60	84.30	3,742.9	2,607.9	-15.5	74.0	6.2	4.09	4.06	-1.56
3,782.0	17.60	83.70	3,772.5	2,637.5	-14.6	83.7	9.7	3.28	3.23	-1.94
3,814.0	18.30	84.40	3,803.0	2,668.0	-13.6	93.5	13.4	2.29	2.19	2.19
3,846.0	19.20	83.70	3,833.3	2,698.3	-12.5	103.7	17.4	2.90	2.81	-2.19
3,877.0	20.50	83.10	3,862.4	2,727.4	-11.3	114.2	21.5	4.24	4.19	-1.94
3,909.0	22.20	84.10	3,892.2	2,757.2	-10.0	125.7	26.0	5.43	5.31	3.13
3,940.0	24.00	85.70	3,920.7	2,785.7	-8.9	137.8	30.5	6.15	5.81	5.16
3,972.0	25.60	85.70	3,949.8	2,814.8	-7.9	151.2	35.2	5.00	5.00	0.00
4,003.0	26.40	85.60	3,977.6	2,842.6	-6.9	164.8	40.0	2.58	2.58	-0.32
4,035.0	27.30	85.90	4,006.2	2,871.2	-5.8	179.2	45.1	2.84	2.81	0.94
4,066.0	28.00	85.60	4,033.7	2,898.7	-4.7	193.5	50.2	2.30	2.26	-0.97
4,098.0	29.00	85.00	4,061.8	2,926.8	-3.5	208.8	55.7	3.25	3.13	-1.88
4,130.0	29.80	84.20	4,089.7	2,954.7	-2.0	224.4	61.6	2.78	2.50	-2.50
4,161.0	30.90	84.50	4,116.4	2,981.4	-0.5	240.0	67.5	3.58	3.55	0.97
4,193.0	31.80	84.10	4,143.7	3,008.7	1.2	256.5	73.7	2.89	2.81	-1.25
4,225.0	32.70	84.10	4,170.8	3,035.8	2.9	273.5	80.2	2.81	2.81	0.00
4,256.0	33.50	83.80	4,196.8	3,061.8	4.7	290.4	86.7	2.65	2.58	-0.97
4,288.0	34.60	84.10	4,223.3	3,088.3	6.6	308.2	93.6	3.48	3.44	0.94
4,319.0	36.50	84.30	4,248.5	3,113.5	8.4	326.1	100.4	6.14	6.13	0.65
4,351.0	38.70	84.40	4,273.8	3,138.8	10.4	345.5	107.7	6.88	6.88	0.31
4,382.0	41.10	84.10	4,297.6	3,162.6	12.4	365.3	115.2	7.77	7.74	-0.97
4,414.0	43.50	84.20	4,321.3	3,186.3	14.6	386.7	123.4	7.50	7.50	0.31
4,445.0	43.90	85.00	4,343.7	3,208.7	16.6	408.1	131.4	2.20	1.29	2.58
4,506.0	43.60	86.60	4,389.2	3,254.2	19.8	451.5	146.7	1.82	-0.48	2.54
4,571.0	42.90	86.80	4,435.1	3,300.1	22.2	494.6	161.3	1.13	-1.11	0.32
4,634.0	42.00	86.50	4,481.6	3,346.6	24.7	537.1	175.7	1.46	-1.43	-0.48
4,697.0	41.20	86.70	4,528.7	3,393.7	27.2	578.8	189.9	1.29	-1.27	0.32
4,760.0	41.20	86.90	4,576.1	3,441.1	29.5	620.2	203.8	0.21	0.00	0.32
4,824.0	41.80	86.30	4,624.0	3,489.0	32.0	662.6	218.2	1.12	0.94	-0.94
4,887.0	41.30	85.30	4,671.2	3,536.2	35.1	704.2	233.0	1.32	-0.79	-1.59
4,950.0	41.30	83.60	4,718.5	3,583.5	38.1	745.6	248.5	1.78	0.00	-2.70
5,013.0	40.90	83.90	4,766.0	3,631.0	43.6	786.8	264.5	0.71	-0.63	0.48
5,076.0	40.70	83.00	4,813.7	3,678.7	48.3	827.7	280.6	0.99	-0.32	-1.43
5,139.0	40.40	82.70	4,861.6	3,726.6	53.4	868.3	297.0	0.57	-0.48	-0.48
5,202.0	40.40	83.00	4,909.5	3,774.5	58.5	908.8	313.3	0.31	0.00	0.48
5,265.0	41.10	83.30	4,957.3	3,822.3	63.4	949.7	329.6	1.15	0.48	0.48
5,328.0	41.40	83.20	5,004.6	3,869.6	68.3	990.9	345.9	0.49	0.48	-0.16
5,392.0	41.70	83.90	5,052.5	3,917.5	73.1	1,033.1	362.4	0.86	0.47	1.00
5,455.0	41.40	83.60	5,099.7	3,964.7	77.6	1,074.6	378.6	0.57	-0.48	-0.48
5,518.0	40.00	83.30	5,147.4	4,012.4	82.3	1,115.5	394.8	2.24	-2.22	0.48
5,581.0	38.20	82.90	5,196.3	4,061.3	87.1	1,154.9	410.3	2.89	-2.88	0.65

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Database:	2015 Survey - Survey Data	Local Co-ordinate Reference:	WGS 84
Company:	Phoenix Technologies	TVD Reference:	NA 83
Project:	Phoenix County - WY	MD Reference:	NA 83
Site:	Phoenix County - WY	North Reference:	Grid
Well:	WY 83 15273	Survey Calculation Method:	Minimum Curvature
Wellbore:	NA 83 15273		
Design:	NA 83 15273		

**Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (1/100usft)	Build Rate (1/100usft)	Turn Rate (1/100usft)
5,624.0	37.80	82.80	5,230.2	4,095.2	90.4	1,181.2	420.9	0.94	-0.93	-0.23
5,721.0	38.10	84.50	5,306.7	4,171.7	97.0	1,240.5	444.0	1.12	0.31	1.75
5,753.0	38.20	84.60	5,331.9	4,196.9	98.8	1,260.1	451.4	0.37	0.31	0.31
5,784.0	39.90	84.40	5,355.9	4,220.9	100.7	1,279.6	458.7	5.50	5.48	-0.65
5,816.0	41.50	84.80	5,380.2	4,245.2	102.7	1,300.3	466.5	5.07	5.00	1.25
5,847.0	44.40	81.90	5,402.9	4,267.9	104.6	1,321.4	474.2	9.36	9.35	0.32
5,878.0	47.30	84.90	5,424.5	4,289.5	106.5	1,343.5	482.4	9.35	9.35	0.00
5,910.0	50.20	85.90	5,445.6	4,310.6	108.5	1,367.5	491.0	9.36	9.08	3.13
5,941.0	53.20	86.10	5,464.8	4,329.8	110.2	1,391.8	499.5	9.69	9.68	0.65
5,973.0	55.50	86.30	5,483.2	4,348.2	111.9	1,417.9	508.6	10.33	10.31	0.63
6,005.0	59.00	87.10	5,500.3	4,365.3	113.4	1,444.9	517.7	8.09	7.81	2.50
6,036.0	61.60	86.50	5,515.6	4,380.3	115.0	1,471.8	526.8	8.55	8.39	-1.94
6,068.0	64.10	85.70	5,530.2	4,395.2	116.9	1,500.2	536.7	8.12	7.81	-2.50
6,099.0	67.10	84.90	5,543.0	4,408.0	119.2	1,528.3	546.8	9.96	9.68	-2.58
6,131.0	69.20	85.20	5,554.9	4,419.9	121.8	1,557.9	557.7	6.82	6.56	0.94
6,194.0	70.30	85.10	5,576.7	4,441.7	126.8	1,616.8	579.1	1.75	1.75	-0.16
6,257.0	70.80	84.30	5,597.7	4,462.7	132.3	1,675.9	601.1	1.44	0.79	-1.27
6,320.0	71.40	84.20	5,618.1	4,483.1	138.2	1,735.3	623.6	0.96	0.95	-0.16
6,383.0	71.10	83.10	5,638.4	4,503.4	144.8	1,794.5	646.7	1.72	-0.48	-1.75
6,446.0	71.40	82.60	5,658.6	4,523.6	152.2	1,853.7	670.6	0.89	0.48	-0.79
6,509.0	70.80	83.30	5,679.0	4,544.0	159.6	1,912.9	694.4	1.42	-0.95	1.11
6,572.0	69.60	84.30	5,700.4	4,565.4	166.0	1,971.8	717.2	2.42	-1.90	1.59
6,636.0	68.20	64.50	5,723.4	4,588.4	171.8	2,031.2	739.6	2.21	-2.19	0.31
6,699.0	68.40	84.20	5,746.7	4,611.7	177.6	2,089.5	761.6	0.54	0.32	-0.48
6,762.0	68.10	85.50	5,770.1	4,635.1	182.8	2,147.8	783.1	1.97	-0.48	2.06
6,825.0	68.60	85.90	5,793.3	4,658.3	187.2	2,206.2	803.9	0.99	0.79	0.63
6,888.0	68.80	86.00	5,816.2	4,681.2	191.3	2,264.7	824.4	0.35	0.32	0.16
6,951.0	69.10	85.90	5,838.8	4,703.8	195.5	2,323.4	845.0	0.50	0.48	-0.16
7,014.0	70.50	85.60	5,860.6	4,725.6	199.9	2,382.3	865.9	2.27	2.22	-0.48
7,077.0	70.80	85.40	5,881.4	4,746.4	204.5	2,441.6	887.1	0.56	0.48	-0.32
7,140.0	71.30	85.50	5,901.9	4,766.9	209.3	2,501.0	908.5	0.81	0.79	0.16
7,203.0	71.60	85.70	5,921.9	4,786.9	213.9	2,560.5	929.7	0.56	0.48	0.32
7,266.0	72.00	84.40	5,941.6	4,806.6	219.0	2,620.1	951.6	2.06	0.63	-2.06
7,329.0	72.30	84.30	5,960.8	4,825.8	224.9	2,679.8	974.1	0.50	0.48	-0.16
7,392.0	70.90	83.60	5,980.8	4,845.8	231.2	2,739.3	997.0	2.46	-2.22	-1.11
7,455.0	70.90	83.70	6,001.4	4,866.4	237.8	2,798.4	1,020.0	0.15	0.00	0.16
7,518.0	71.40	84.40	6,021.8	4,886.8	244.0	2,857.7	1,042.7	1.32	0.79	0.48
7,581.0	72.00	84.10	6,041.6	4,906.6	250.0	2,917.2	1,065.3	1.05	0.95	0.48
7,645.0	72.40	84.50	6,061.1	4,926.1	256.0	2,977.9	1,088.3	0.86	0.63	0.63
7,708.0	71.40	84.10	6,080.7	4,945.7	262.0	3,037.5	1,110.9	1.70	-1.59	-0.95
7,771.0	70.40	83.50	6,101.3	4,966.3	268.4	3,096.6	1,133.8	1.82	-1.59	-0.95
7,834.0	70.50	83.30	6,122.4	4,987.4	275.2	3,155.6	1,157.0	0.34	0.16	-0.32
7,897.0	70.90	83.80	6,143.2	5,008.2	281.9	3,214.7	1,180.1	0.98	0.63	-0.79

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Database:	North Carolina - Eagle Creek	Local Coordinate Reference:	North Carolina - Eagle Creek
Company:	EQE International - Macedonia	TVD Reference:	NA 83 1125 Data
Project:	Adams County, WV	MD Reference:	NA 83 1125 Data
Site:	Adams County - 310275	North Reference:	Old
Well:	Well AD-1472	Survey Calculation Method:	Minimum Curvature
Wellbore:	Adams Wellbore		
Design:	W.D. - 310275		

**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)
7,929.0	70.80	81.40	6,153.7	5,018.7	285.8	3,244.7	1,192.3	7.09	-0.31	-7.50
7,960.0	70.50	78.60	6,164.0	5,029.0	290.9	3,273.5	1,205.4	8.58	-0.97	-9.03
7,992.0	70.50	75.80	6,174.7	5,039.7	297.6	3,302.9	1,220.1	8.25	0.00	-8.75
8,023.0	70.60	73.70	6,185.0	5,050.0	305.2	3,331.1	1,235.5	6.40	0.32	-6.77
8,055.0	71.00	70.60	6,195.5	5,060.5	314.5	3,359.8	1,252.5	9.23	1.25	-9.69
8,087.0	71.90	67.90	6,205.7	5,070.7	325.3	3,388.2	1,270.8	8.48	2.81	-8.44
8,118.0	72.10	64.70	6,215.3	5,080.3	337.1	3,415.2	1,289.8	9.34	0.65	-10.32
8,150.0	71.70	61.80	6,225.2	5,090.2	350.8	3,442.4	1,310.6	8.70	-1.25	-9.06
8,182.0	71.80	58.50	6,235.3	5,100.3	365.9	3,468.7	1,332.6	9.80	0.31	-10.31
8,213.0	72.20	55.50	6,244.8	5,109.8	382.0	3,493.4	1,355.0	9.29	1.29	-9.68
8,245.0	72.60	52.50	6,254.5	5,119.5	399.9	3,518.1	1,379.2	9.02	1.25	-9.38
8,278.0	72.30	49.40	6,263.9	5,128.9	418.5	3,541.1	1,403.5	9.58	-0.97	-10.00
8,308.0	72.60	45.80	6,273.5	5,138.5	439.1	3,563.6	1,429.6	10.77	0.94	-11.25
8,339.0	72.50	42.30	6,282.8	5,147.8	460.3	3,584.1	1,455.8	10.78	-0.32	-11.29
8,371.0	73.00	39.30	6,292.3	5,157.3	483.5	3,604.1	1,483.7	9.09	1.56	-9.38
8,402.0	73.50	36.20	6,301.3	5,163.3	506.9	3,622.3	1,511.3	9.71	1.61	-10.00
8,434.0	74.10	33.00	6,310.2	5,175.2	532.2	3,639.7	1,540.5	9.78	1.88	-10.00
8,465.0	75.00	30.10	6,318.4	5,183.4	557.7	3,655.4	1,569.4	9.47	2.90	-9.35
8,497.0	75.90	27.10	6,326.5	5,191.5	584.9	3,670.2	1,599.6	9.50	2.81	-9.38
8,529.0	76.40	23.50	6,334.1	5,199.1	613.0	3,683.5	1,630.3	11.03	1.56	-11.25
8,560.0	76.70	19.90	6,341.4	5,206.4	641.0	3,694.6	1,660.3	11.34	0.97	-11.61
8,592.0	77.20	16.20	6,348.6	5,213.6	670.6	3,704.3	1,691.5	11.37	1.56	-11.56
8,623.0	78.20	13.20	6,355.2	5,220.2	699.9	3,711.9	1,721.8	9.99	3.23	-9.68
8,655.0	78.80	10.30	6,361.6	5,226.6	730.6	3,718.3	1,753.0	9.08	1.88	-9.06
8,686.0	79.10	6.10	6,367.5	5,232.5	760.7	3,722.7	1,783.1	13.33	0.97	-13.55
8,718.0	80.00	3.10	6,373.3	5,238.3	792.1	3,725.2	1,813.9	9.64	2.81	-9.38
8,750.0	81.40	359.90	6,378.5	5,243.5	823.6	3,726.0	1,844.4	10.79	4.38	-10.00
8,731.0	82.70	357.00	6,382.8	5,247.8	854.3	3,725.2	1,873.8	10.17	4.19	-9.35
8,813.0	83.10	353.10	6,386.7	5,251.7	886.0	3,722.4	1,903.2	12.16	1.25	-12.19
8,844.0	83.20	350.00	6,390.4	5,255.4	916.4	3,717.9	1,931.1	9.93	0.32	-10.00
8,875.0	83.60	346.60	6,394.0	5,259.0	946.5	3,711.7	1,958.2	10.97	1.29	-10.97
8,907.0	84.80	343.70	6,397.2	5,262.2	977.3	3,703.5	1,985.4	9.76	3.75	-9.06
8,939.0	85.80	340.60	6,399.8	5,264.9	1,007.7	3,693.7	2,011.8	10.15	3.13	-9.69
8,970.0	86.00	337.70	6,402.1	5,267.1	1,036.6	3,682.7	2,036.4	9.35	0.65	-9.35
9,002.0	86.60	333.80	6,404.1	5,269.1	1,065.7	3,669.6	2,060.6	12.31	1.88	-12.19
9,033.0	88.40	331.00	6,405.5	5,270.5	1,093.1	3,655.3	2,082.9	10.73	5.81	-9.03
9,096.0	89.90	329.30	6,406.4	5,271.4	1,147.7	3,623.9	2,126.4	3.60	2.38	-2.70
9,159.0	90.00	330.50	6,406.5	5,271.5	1,202.2	3,582.3	2,169.7	1.91	0.16	1.90
9,222.0	90.40	331.30	6,406.3	5,271.3	1,257.3	3,561.7	2,213.8	1.42	0.63	1.27
9,285.0	90.50	332.50	6,405.8	5,270.8	1,312.9	3,532.0	2,258.7	1.91	0.16	1.90
9,348.0	91.30	333.90	6,404.8	5,269.8	1,369.1	3,503.6	2,304.6	2.56	1.27	2.22

Database:	2014 Survey - Phoenix Tech	Local Coordinate Reference:	State Plane - NAD 83 - N
Company:	Phoenix Technologies USA Inc	TVD Reference:	Mean Sea Level
Project:	W&A - County - WV	MD Reference:	Mean Sea Level
Site:	Richard County 11572	North Reference:	Mean Sea Level
Well:	WV 451572	Survey Calculation Method:	Minimum Curvature
Wellbore:	Mean Wellbore		
Depth:	Mean Depth		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	N-S (usft)	E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,411.0	89.80	334.50	6,404.2	5,269.2	1,425.8	3,476.2	2,351.3	2.56	-2.38	0.95
9,474.0	89.70	334.90	6,404.4	5,269.4	1,482.8	3,449.3	2,396.3	0.65	-0.16	0.63
9,537.0	88.30	335.20	6,405.5	5,270.3	1,539.9	3,422.7	2,445.5	2.27	-2.22	0.48
9,601.0	89.10	334.90	6,407.0	5,272.0	1,597.9	3,395.7	2,493.5	1.33	1.25	-0.47
9,664.0	89.30	334.40	6,407.9	5,272.9	1,654.8	3,368.7	2,540.5	0.85	0.32	-0.79
9,727.0	88.40	334.30	6,409.1	5,274.1	1,711.6	3,341.5	2,587.2	1.44	-1.43	-0.16
9,790.0	88.40	334.30	6,410.9	5,275.9	1,768.3	3,314.2	2,633.9	0.00	0.00	0.00
9,853.0	88.50	333.70	6,412.6	5,277.6	1,824.9	3,286.6	2,680.4	0.97	0.16	-0.95
9,916.0	89.30	334.60	6,413.8	5,278.8	1,881.3	3,259.1	2,727.0	1.91	1.27	1.43
9,979.0	89.60	334.80	6,414.4	5,279.4	1,938.6	3,232.2	2,774.0	0.57	0.48	0.32
10,043.0	89.70	334.10	6,414.8	5,279.8	1,996.3	3,204.6	2,821.6	1.10	0.16	-1.09
10,106.0	89.50	334.50	6,415.3	5,280.3	2,053.1	3,177.3	2,868.3	0.71	-0.32	0.63
10,168.0	89.70	333.90	6,415.7	5,280.7	2,109.9	3,150.3	2,914.2	1.02	0.32	-0.97
10,232.0	89.00	335.10	6,416.4	5,281.4	2,166.7	3,122.7	2,961.8	2.17	-1.09	1.88
10,294.0	89.30	335.20	6,417.3	5,282.3	2,222.9	3,096.7	3,008.4	0.51	0.48	0.16
10,357.0	89.50	334.20	6,418.0	5,283.0	2,279.9	3,069.7	3,055.4	1.62	0.32	-1.59
10,421.0	88.60	335.90	6,419.1	5,284.1	2,337.9	3,042.8	3,103.4	3.01	-1.41	2.66
10,483.0	88.70	335.60	6,420.5	5,285.5	2,394.4	3,017.3	3,150.4	0.51	0.16	-0.48
10,547.0	88.80	335.50	6,421.9	5,286.9	2,452.6	2,990.6	3,198.8	0.22	0.16	-0.16
10,610.0	89.10	335.00	6,423.1	5,288.1	2,509.8	2,964.4	3,246.2	0.93	0.48	-0.79
10,673.0	89.20	334.60	6,424.0	5,289.0	2,566.8	2,937.6	3,293.3	0.65	0.16	-0.63
10,736.0	88.00	334.90	6,425.5	5,290.5	2,623.8	2,910.8	3,340.3	1.96	-1.90	0.48
10,799.0	87.80	334.80	6,427.8	5,292.8	2,680.8	2,884.0	3,387.4	0.35	-0.32	-0.16
10,863.0	88.00	335.60	6,430.2	5,295.2	2,738.9	2,857.2	3,435.5	1.29	0.31	1.25
10,925.0	89.60	337.00	6,431.5	5,296.5	2,795.6	2,832.3	3,482.8	3.43	2.58	2.26
10,988.0	91.90	337.70	6,430.7	5,295.7	2,853.7	2,808.0	3,531.7	3.82	3.65	1.11
11,052.0	91.30	336.60	6,428.3	5,293.9	2,912.7	2,783.2	3,581.3	1.96	-0.94	-1.72
11,115.0	91.40	336.00	6,427.4	5,292.4	2,970.4	2,757.8	3,629.4	0.97	0.16	-0.95
11,178.0	90.70	336.40	6,426.2	5,291.2	3,028.0	2,732.4	3,677.5	1.28	-1.11	0.63
11,241.0	91.10	335.90	6,425.2	5,290.2	3,085.6	2,707.0	3,725.5	1.02	0.63	-0.79
11,304.0	89.80	335.60	6,424.8	5,289.8	3,143.1	2,681.1	3,773.3	2.12	-2.06	-0.48
11,367.0	90.00	335.30	6,424.9	5,289.9	3,200.4	2,654.9	3,820.9	0.57	0.32	-0.48
11,430.0	90.10	335.50	6,424.8	5,289.8	3,257.6	2,628.7	3,868.4	0.35	0.16	0.32
11,493.0	90.00	335.40	6,424.8	5,289.8	3,314.9	2,602.5	3,915.9	0.22	-0.16	-0.16
11,557.0	90.40	334.40	6,424.5	5,289.5	3,372.9	2,575.4	3,963.8	1.68	0.63	-1.56
11,620.0	90.80	334.00	6,423.9	5,288.9	3,429.6	2,547.9	4,010.5	0.90	0.63	-0.63
11,683.0	90.80	332.70	6,423.0	5,288.0	3,485.9	2,519.7	4,056.5	2.06	0.00	-2.06
11,746.0	90.20	332.40	6,422.4	5,287.4	3,541.8	2,490.6	4,101.9	1.06	-0.95	-0.48
11,810.0	90.50	332.60	6,422.1	5,287.1	3,598.6	2,461.1	4,148.0	0.56	0.47	0.31
11,873.0	90.90	332.10	6,421.3	5,286.3	3,654.4	2,431.9	4,193.2	1.02	0.63	-0.79
11,935.0	90.60	332.30	6,420.5	5,285.5	3,709.2	2,402.9	4,237.6	0.58	-0.48	0.32
11,957.0	90.70	332.80	6,420.2	5,285.2	3,728.7	2,392.8	4,253.5	2.32	0.45	0.27
12,020.0	87.90	335.40	6,421.0	5,286.0	3,785.4	2,365.3	4,300.0	6.06	-4.44	4.13

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Phoenix Technologies  
Survey Report



Database:	EQT - 13786 - 13786	Local Coordinate Reference:	NAD 83 - NAD 83
Company:	EQT Technology Services, Inc.	TVD Reference:	VD = 1130.000
Project:	13786 - 13786	MD Reference:	MD = 1130.000
Site:	13786 - 13786	North Reference:	NAD 83
Well:	13786 - 13786	Survey Calculation Method:	Minimum Curvature
Wellbore:	13786 - 13786		
Design:	13786 - 13786		

Measured Depth (ustf)	Inclination (°)	Azimuth (°)	Vertical Depth (ustf)	Subsea Depth (ustf)	+N/S (ustf)	+E/W (ustf)	Vertical Section (ustf)	Dogleg Rate (°/100ustf)	Build Rate (°/100ustf)	Turn Rate (°/100ustf)
12,082.0	87.20	334.80	6,423.6	5,288.6	3,841.6	2,339.2	4,346.5	1.49	-1.13	-0.97
12,146.0	87.20	334.50	6,426.8	5,291.8	3,899.4	2,311.8	4,394.2	0.47	0.00	-0.47
12,209.0	87.50	335.20	6,429.7	5,294.7	3,956.3	2,285.1	4,441.3	1.21	0.48	1.11
12,272.0	88.50	335.60	6,431.9	5,296.9	4,013.6	2,258.9	4,488.8	1.71	1.59	0.63
12,335.0	89.10	336.60	6,433.2	5,298.2	4,071.2	2,233.4	4,536.8	1.85	0.95	1.59
12,397.0	90.80	337.00	6,433.3	5,298.3	4,128.1	2,208.9	4,584.5	2.82	2.74	0.65
12,461.0	90.90	338.30	6,432.3	5,297.3	4,187.3	2,184.6	4,634.4	2.04	0.16	2.03
12,524.0	91.20	336.60	6,431.1	5,296.1	4,245.5	2,160.5	4,683.3	2.74	0.48	-2.70
12,587.0	90.60	334.60	6,430.2	5,295.2	4,302.9	2,134.4	4,731.0	3.31	-0.95	-3.17
12,650.0	90.30	334.80	6,429.7	5,294.7	4,359.8	2,107.5	4,778.0	0.57	-0.48	0.32
12,713.0	91.00	334.20	6,428.9	5,293.9	4,416.7	2,080.4	4,824.9	1.46	1.11	-0.95
12,776.0	91.20	333.80	6,427.7	5,292.7	4,473.3	2,052.8	4,871.4	0.71	0.32	-0.63
12,840.0	91.00	333.60	6,426.5	5,291.5	4,530.6	2,024.4	4,918.3	0.44	-0.31	-0.31
12,903.0	90.60	333.40	6,425.6	5,290.6	4,587.0	1,996.3	4,964.5	0.71	-0.63	-0.32
12,966.0	90.30	332.40	6,425.1	5,290.1	4,643.1	1,967.6	5,010.1	1.66	-0.48	-1.59
13,029.0	90.20	331.50	6,424.9	5,289.9	4,698.7	1,938.0	5,055.1	1.44	-0.16	-1.43
13,092.0	90.30	332.80	6,424.6	5,289.6	4,754.4	1,908.6	5,100.2	2.07	0.16	2.06
13,155.0	91.00	335.10	6,423.9	5,288.9	4,811.0	1,880.9	5,146.6	3.82	1.11	3.65
13,218.0	90.90	334.80	6,422.8	5,287.8	4,868.1	1,854.2	5,193.8	0.50	-0.16	-0.40
13,281.0	90.80	335.00	6,421.9	5,286.9	4,925.1	1,827.5	5,241.0	0.35	-0.16	0.32
13,344.0	90.20	334.80	6,421.3	5,286.3	4,982.2	1,800.8	5,288.1	1.00	-0.95	-0.32
13,407.0	89.70	334.70	6,421.4	5,286.4	5,039.1	1,773.9	5,335.2	0.81	-0.79	-0.16
13,470.0	90.00	335.30	6,421.6	5,286.6	5,096.2	1,747.3	5,382.4	1.06	0.48	0.95
13,533.0	89.90	336.20	6,421.6	5,286.6	5,153.7	1,721.4	5,430.2	1.44	-0.16	1.43
13,596.0	89.70	336.30	6,421.8	5,286.8	5,211.3	1,696.0	5,478.3	0.35	-0.32	0.16
13,659.0	89.50	335.90	6,422.3	5,287.3	5,268.9	1,670.5	5,526.3	0.71	-0.32	-0.63
13,722.0	89.10	335.80	6,423.0	5,288.0	5,326.4	1,644.8	5,574.1	0.65	-0.63	-0.16
13,786.0	89.00	335.70	6,424.1	5,289.1	5,384.8	1,618.5	5,622.7	0.22	-0.16	-0.16
13,847.0	89.00	335.70	6,425.2	5,290.2	5,440.3	1,593.4	5,668.9	0.00	0.00	0.00

Measured Depth (ustf)	Vertical Depth (ustf)	+N/S (ustf)	+E/W (ustf)	Comment
3,168.0	3,167.9	-21.3	-5.7	Gyro Tie In= 3168' MD
9,002.0	6,404.1	1,065.7	3,689.6	LP= 9002' MD/6404' TVD
12,397.0	6,433.3	4,128.1	2,208.9	Deepest Point of Well= 12397' MD/6433' TVD
13,786.0	6,424.1	5,384.8	1,618.5	Final Survey= 13786' MD/6424' TVD
13,847.0	6,425.2	5,440.3	1,593.4	Projection to TD= 13847' MD/6425' TVD

SEP 0 0 00  
WV Department of Environmental Protection

Database:	1046 South 1100 West	Local Coordinate Reference:	State Plane (Zone 11) NAD 83
Company:	EQT Production Services	TVD Reference:	NA 83 1130 9907
Project:	Wade County, WV	MO Reference:	NA 83 1130 9908
Site:	Wade County, WV	North Reference:	G114
Well:	WV 9152715	Survey Calculation Method:	Minimum Curvature
Wellbore:	M101 Wellbore		
Design:	1046 South 1100 West		

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

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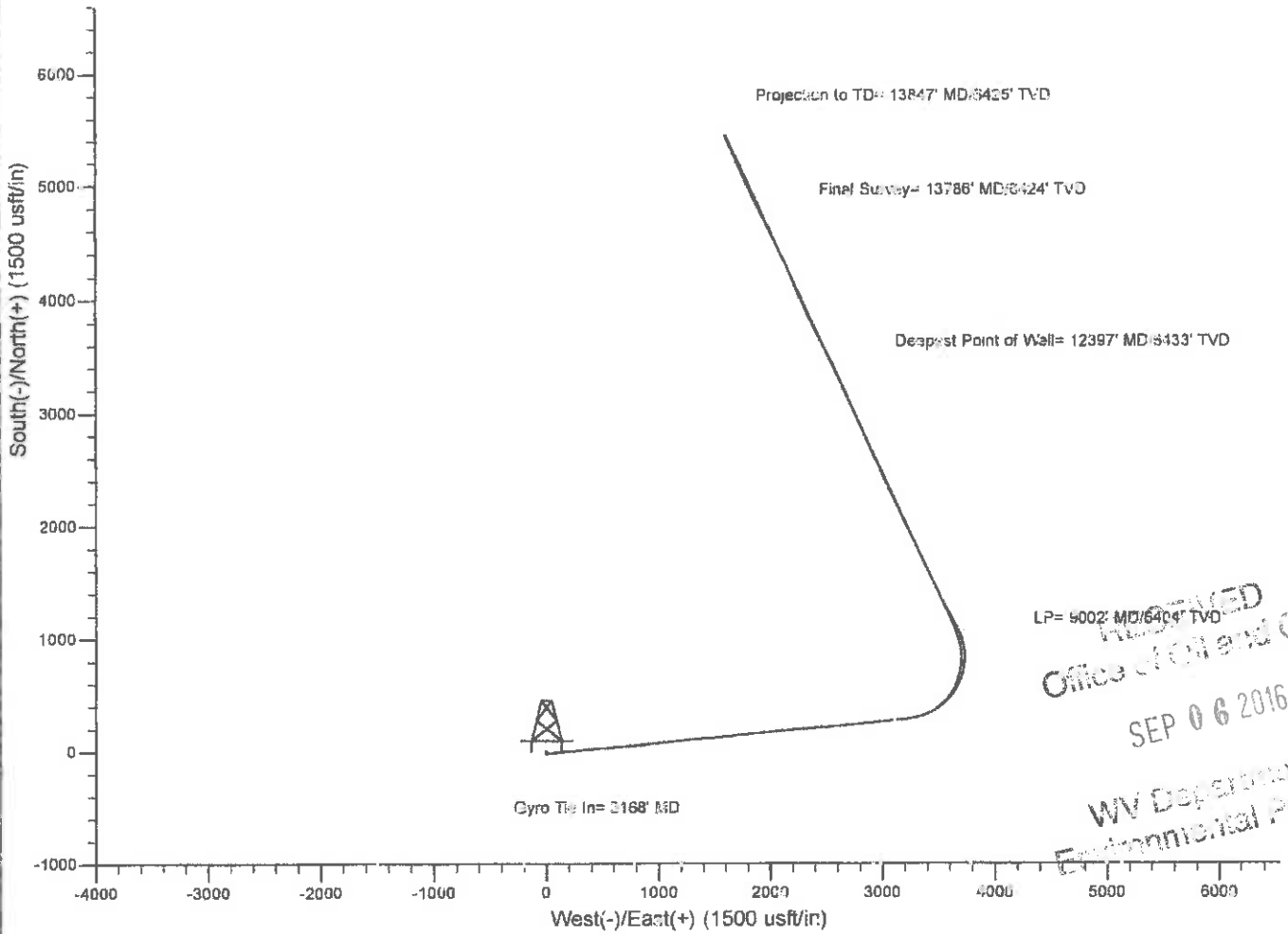
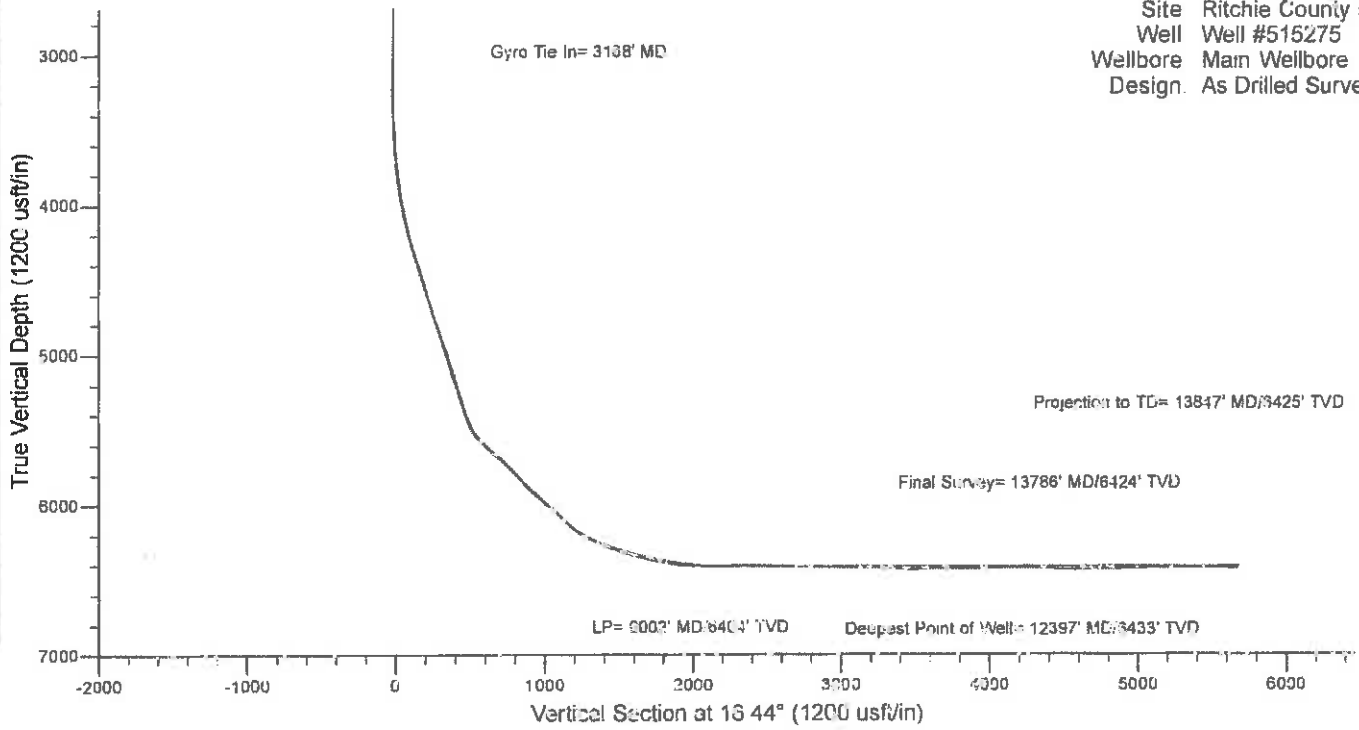




**PHOENIX**  
TECHNOLOGY SERVICES USA INC.

# EQT Production - Marcellus

Project: Ritchie County, WV  
 Site: Ritchie County 515275  
 Well: Well #515275  
 Wellbore: Mam Wellbore  
 Design: As Drilled Surveys



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**515275-47-085-10093-0000- 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	6/10/2015	27.3	7,750.00	8,123.00	5,441.00	0	374	0
1	6/10/2015	94	8,350.00	8,552.00	3,397.00	200,480	5564	0
2	6/11/2015	96.8	8,411.00	8,618.00	3,423.00	200,980	5751	0
3	6/11/2015	93.3	8,160.00	8,495.00	3,657.00	198,760	5868	0
4	6/11/2015	96.3	8,260.00	8,624.00	3,545.00	202,780	5467	0
5	6/11/2015	95.2	8,352.00	8,575.00	3,421.00	200,060	5429	0
6	6/11/2015	91.1	8,366.00	8,682.00	3,316.00	200,580	5407	0
7	6/12/2015	96.5	8,564.00	8,771.00	3,702.00	200,940	5117	0
8.01	6/12/2015	9.7	4,652.00	6,007.00	4,903.00	0	3021	0
8	6/12/2015	90	8,220.00	8,551.00	3,795.00	203,140	5552	0
9	6/12/2015	96.5	8,066.00	8,222.00	3,638.00	200,320	5295	0
10	6/13/2015	93.7	7,914.00	8,197.00	3,417.00	200,040	5695	0
11	6/13/2015	95.2	7,845.00	8,070.00	3,506.00	200,780	5258	0
12	6/14/2015	95.7	7,894.00	8,080.00	3,504.00	202,220	5295	0
13	6/14/2015	97.7	7,910.00	8,182.00	4,063.00	201,220	5214	0
14	6/14/2015	92.6	8,256.00	8,674.00	3,868.00	203,200	5231	0
15	6/14/2015	98	8,147.00	8,569.00	3,533.00	200,360	5271	0
16	6/14/2015	98.2	8,283.00	8,509.00	3,829.00	201,180	5330	0
17	6/14/2015	99.2	8,011.00	8,301.00	3,830.00	200,120	5089	0
18	6/15/2015	97.8	8,008.00	8,213.00	3,713.00	201,360	5184	0
19	6/15/2015	98.2	7,949.00	8,309.00	3,827.00	200,480	5201	0
20	6/15/2015	97.9	8,238.00	8,628.00	4,255.00	198,700	5440	0
21	6/15/2015	96.3	8,267.00	8,527.00	3,958.00	199,320	5338	0
22	6/15/2015	96.1	8,275.00	8,519.00	3,784.00	200,140	5282	0
23	6/15/2015	99.2	7,789.00	8,076.00	3,731.00	200,320	5156	0
24	6/16/2015	98.4	7,906.00	8,238.00	4,920.00	199,840	5087	0
25	6/16/2015	100	7,563.00	7,877.00	3,705.00	199,340	5154	0
26	6/16/2015	99.1	8,012.00	8,532.00	4,055.00	201,820	5267	0
27	6/16/2015	98.5	8,238.00	8,631.00	3,681.00	199,300	5194	0
28	6/16/2015	97.8	8,322.00	8,593.00	3,783.00	199,460	5101	0
29	6/16/2015	99.8	7,918.00	8,308.00	3,664.00	198,860	5128	0
30	6/16/2015	99.50	7,887.00	8,215.00	3,976	200,940	4,887	0
31	6/17/2015	100.30	7,954.00	8,415.00	3,387	204,020	4,973	0
32	6/17/2015	98.20	8,108.00	8,789.00	3,350	204,520	5,094	0
33	6/17/2015	98.60	7,986.00	8,803.00	3,602	199,560	5,023	0

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	6/10/2015
Job End Date	6/17/2015
State	West Virginia
County	Ritchie
API Number	47-085-10093-00-00
Operator Name	EQT Production
Well Name and Number	515275
Longitude	-80.95139000
Latitude	39.26183900
Padway Total Volume	NAD83
Fuel/Vent Gas Disposal	NO
Total Base Water Volume (Gal)	9,381
Total Base Non-Water Volume	7,464,954
	0



## Hydraulic Fracturing Fluid Composition:

Trace Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (l/w by mass)**	Maximum Ingredient Concentration in HFF Field (% by mass)**	Comments
Water	Slingray Pressure Pumping, LLC	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.99292	None
Sand (Proppant)	Slingray Pressure Pumping, LLC	Proppant	Silica Substrate	14808-60-7	100.00000	9.57084	None
MC MIX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.07116	None
FRA-405	Slingray Pressure Pumping, LLC	Friction reducer	Petroleum distillates	84742-47-8	40.00000	0.02742	None
			Sodium chloride	7647-14-5	16000000	0.00885	None
			Ammonium chloride	12125-02-9	7.00000	0.00480	None
			Alcohols, C12-16, Ethoxylated	88551-12-2	7.00000	0.00480	None
Hydrochloric Acid (15%)	Slingray Pressure Pumping, LLC	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.03525	None
ScaleClear 125	Slingray Pressure Pumping, LLC	Scale inhibitor	Phosphonated polyamine amine, w/ substituted amine	12125-02-0	2.50000	0.00062	None

Division of Oil & Gas Production

Material	Supplier	Product Name	Chemical Name	UN	HAZ	PL	PG	SI	ST	TD	TC	TD	TC	TD	TC	TD	TC	TD	TC		
Flexgel 907L-EB	Slingshot Pressure Pumping, LLC	Acid corrosion inhibitor	Ethylene glycol	107-21-1																0.00062	None
			N,N-Dimethylformamide	28-12-2																0.00033	None
			2-Butoxyethanol	111-76-2																0.00023	None
			Cinnamaldehyde	104-65-2																0.00023	None
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7																0.00023	None
			1-Decanol	112-30-1																5.00000	None
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)- omega-hydroxy-branched	127087-87-9																5.00000	None
			Isopropanol	67-53-0																2.50000	None
			Triethyl phosphate	78-40-0																2.50000	None
			1-Octanol	111-87-5																2.50000	None
Flexgel 907L-EB	Slingshot Pressure Pumping, LLC	Slurried Guar	Distillates, hydrocracked light	84742-47-8																50.00000	None
			Organophilic clay	Proprietary																2.00000	None
			Alcohol ethoxylate	34368-01-1																1.00000	None
			Crystalline silica	14808-60-7																0.10000	None

Ingredients shown above are subject to 29 CFR 1910.1200 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)



June 8, 2016

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

Re: Modification of 47-085-10093

Dear Mr. Smith,

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

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

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark', is written over the word 'Sincerely,'.

Vicki Roark  
Permitting Supervisor-WV

WV  
Office of Oil and Gas  
SEP 06 2016  
WV Department of  
Environmental Protection

Enc.



**EQT PRODUCTION COMPANY  
TAYLOR LEASE  
1,600 ACRES±  
WELL NO. WV 515275  
(PEN15 H6)**

**AS DRILLED COORDINATES**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
 NAD'27 S.P.C.(FT) N. 280,796.7 E. 1,589,053.2  
 NAD'27 GEO. LAT-(N) 39.261839 LONG-(W) 80.951390  
 NAD'83 UTM (M) N. 4,345,843.8 E. 504,208.3

**LANDING POINT**  
 NAD'27 S.P.C.(FT) N. 281,862.3 E. 1,592,722.7  
 NAD'27 GEO. LAT-(N) 39.264926 LONG-(W) 80.938492  
 NAD'83 UTM (M) N. 4,346,187.2 E. 505,320.8

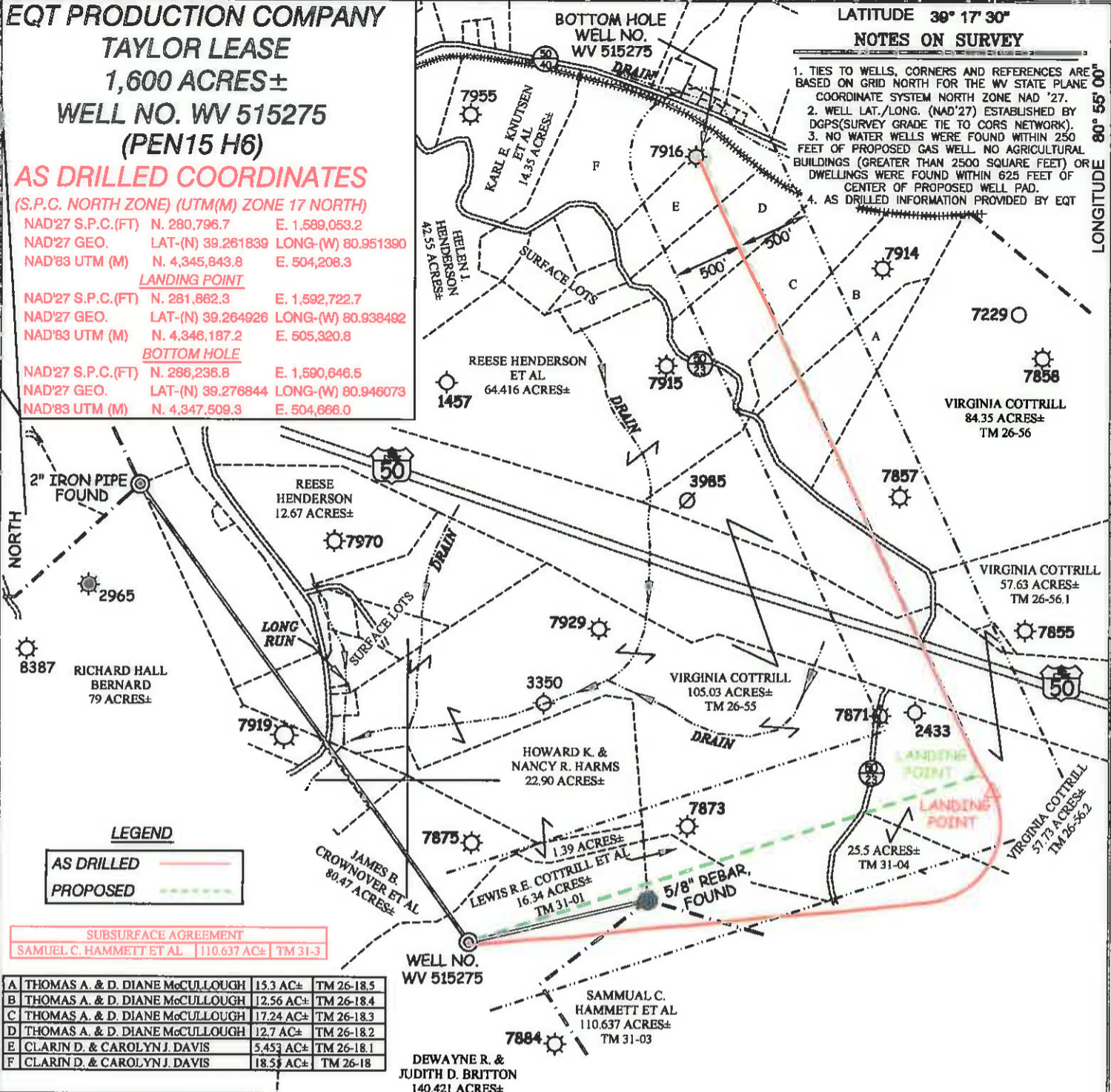
**BOTTOM HOLE**  
 NAD'27 S.P.C.(FT) N. 286,236.8 E. 1,590,646.5  
 NAD'27 GEO. LAT-(N) 39.276844 LONG-(W) 80.946073  
 NAD'83 UTM (M) N. 4,347,509.3 E. 504,666.0

LATITUDE 39° 17' 30"

**NOTES ON SURVEY**

1. TIES TO WELLS, CORNERS AND REFERENCES ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE TIE TO CORS NETWORK).
3. NO WATER WELLS WERE FOUND WITHIN 250 FEET OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS (GREATER THAN 2500 SQUARE FEET) OR DWELLINGS WERE FOUND WITHIN 625 FEET OF CENTER OF PROPOSED WELL PAD.
4. AS DRILLED INFORMATION PROVIDED BY EQT

LONGITUDE 80° 55' 00"



**LEGEND**

AS DRILLED (Red line)  
 PROPOSED (Green dashed line)

**SUBSURFACE AGREEMENT**  
 SAMUEL C. HAMMETT ET AL | 110.637 AC± | TM 31-3

A	THOMAS A. & D. DIANE McCULLOUGH	15.3 AC±	TM 26-18.5
B	THOMAS A. & D. DIANE McCULLOUGH	12.56 AC±	TM 26-18.4
C	THOMAS A. & D. DIANE McCULLOUGH	17.24 AC±	TM 26-18.3
D	THOMAS A. & D. DIANE McCULLOUGH	12.7 AC±	TM 26-18.2
E	CLARIN D. & CAROLYN J. DAVIS	5.453 AC±	TM 26-18.1
F	CLARIN D. & CAROLYN J. DAVIS	18.53 AC±	TM 26-18

**Professional Energy Consultants**  
 A DIVISION OF SURVEY LAND SOLUTIONS, INC.  
  
 (304) 482-6684  
 WWW.SLSURVEYS.COM

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. *Earl N. Thompson*  
 2288



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE JANUARY 10, 20 14  
 REVISED MARCH 12, 2015, MAY 16, 2016 & JUNE 06, 2016  
 OPERATORS WELL NO. WV 515275  
 API WELL NO. 47 - 085 - 10093-H  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7496ASDRILLED515275R2  
 PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 1000'

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 1,118.7' WATERSHED LONG RUN OF NORTH FORK HUGHES RIVER  
 DISTRICT CLAY COUNTY RITCHIE QUADRANGLE PENNSBORO 7.5'  
 SURFACE OWNER DEWAYNE BRITTON ET UX ACREAGE 140.421  
 ROYALTY OWNER E. R. TAYLOR HEIRS ACREAGE 1,600±  
 PROPOSED WORK:  
 DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER   
 PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH 6,374'

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 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT