

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 513830

API: 47 - 103 - 02988

Submission:  Initial  Amended

Notes: Correction to Production Cement Top  
(MD)

RECEIVED  
Office of Oil and Gas

DEC 21 2015

WV Department of  
Environmental Protection

AR 04/01/2016

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

API 47-103-02988 County WETZEL District GRANT  
Quad BIG RUN Pad Name BIG176 Field/Pool Name \_\_\_\_\_  
Farm name JOHN W. AND FLORENCE E. KILCOYNE Well Number 513830  
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 4,379,094 Easting 537,753  
Landing Point of Curve Northing 4,379,339 Easting 538,152  
Bottom Hole Northing 4,380,626 Easting 537,593

Elevation (ft) 860 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) (Intermediate Hole Only)

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 06/12/2014 Date drilling commenced 06/30/2014 Date drilling ceased 12/04/2014  
Date completion activities began 3/3/2015 Date completion activities ceased 3/10/2015  
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

Freshwater depth(s) ft 135 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1457,1459,1390,1521 Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 109,174,239,495,602 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:

Dmt

04/01/2016

API 47- 103 - 02988 Farm name JOHN W. AND FLORENCE E. KILCOYNE Well number 513830

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	28"	26"	80'	NEW	A-500 40LB/FT	NONE	Y
Surface	24"	20"	283'	NEW	J-55 94LB/FT	119'	Y
Coal							
Intermediate 1	17.5"	13.375"	826'	NEW	J-55 54.5LB/FT	449'	Y
Intermediate 2	12.375"	9.625"	2405'	NEW	A-500 40LB/FT	NONE	Y
Intermediate 3							
Production	8.5"	5.5"	12,300'	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	98	15.6	1.18	115.64	0	8
Surface	CLASS A	545	15.6	1.19	648.55	0	8
Coal							
Intermediate 1	CLASS A	715	15.6	1.19	850.85	0	8
Intermediate 2	CLASS A / CLASS A	475 / 390	15.6 / 15.6	1.18 / 1.19	1124.6	0	8
Intermediate 3							
Production	CLASS A / CLASS H	750/635	14.2 / 15.2	1.26 / 1.97	2196	2,827'	72
Tubing							

Drillers TD (ft) 12,319' MD Loggers TD (ft) N/A  
 Deepest formation penetrated Middlesex Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 4,716'

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, 6  
 INTERMEDIATE- JOINTS: 1, 13  
 INTERMEDIATE 2- RAN AT LEAST EVERY 500' FEET JOINTS: 1,12,23,34,45,56  
 PRODUCTION- 195 Composite bodied centralizers on every joint from TD up to 3,700'

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

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

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

API 47- 103 - 02988 Farm name JOHN W. AND FLORENCE E. KILCOYNE Well number 513830

**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.

API 47- 103 - 02988

Farm name JOHN W. AND FLORENCE E. KILCOYNE Well number 513830

PRODUCING FORMATION(S)	DEPTHS		
Middlesex	6,773'	TVD	7,416' MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1,929 psi Bottom Hole N/A psi DURATION OF TEST 137.5 hrs

OPEN FLOW Gas 3,457 mcfpd Oil 0 bpd NGL 111.2 bpd Water 3,413 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 ALPHA HUNTER DRILLING (RIG 5)  
Address P.O. BOX 430 City RENO State OH Zip 45773

Logging Company HOSSCO SERVICES, LLC  
Address 614 TROTTERS LANE City CHARLESTON State WV Zip 25312

Cementing Company NABORS CEMENTING SERVICES  
Address 2504 SMITH CREEK ROAD City WAYNESBURG State PA Zip 15370

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

Please insert additional pages as applicable.

Completed by Brad Maddox Telephone 412-395-7053  
Signature  Title Director of Drilling Date 12/9/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WR-35  
Rev. 8/23/13

Page \_\_\_ of \_\_\_

API 47- 103 - 02988 Farm name JOHN W. AND FLORENCE E. KILCOYNE Well number 513830

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 \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Mud Type(s) and Additive(s) (Production Hole Only)

SBM 12.5 ppg powdered hydrocarbon resin, calcium carbonate, ground almond hulls, barium sulfate, calcium chloride, lecithin liquid, organophilic clay, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

API 47-103-02988

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	138	138
SAND/SHALE	0	0	112	112
WAHINGTON COAL	112	112	114	114
SAND/SHALE	114	114	177	177
WAYNESBURG A COAL	177	177	178	178
SAND/SHALE	178	178	242	242
WAYNESBURG COAL	242	242	244	244
SAND/SHALE	244	244	498	498
SEWICKLY COAL	498	498	500	500
SAND/SHALE	500	500	605	605
PIITSBURGH COAL	605	605	611	611
SAND/SHALE	611	611	1,710	1,710
MAXTON	1,710	1,710	1,842	1,842
SAND/SHALE	1,842	1,842	1,866	1,866
BIG LIME	1,866	1,866	1,958	1,958
SAND/SHALE	1,958	1,958	1,967	1,967
BIG INJUN	1,967	1,967	2,125	2,125
SAND/SHALE	2,125	2,125	2,262	2,262
WEIR	2,262	2,262	2,361	2,361
SAND/SHALE	2,361	2,361	2,412	2,412
GANTZ	2,412	2,412	2,421	2,421
SAND/SHALE	2,421	2,421	2,462	2,462
50F	2,462	2,462	2,508	2,508
SAND/SHALE	2,508	2,508	2,555	2,555
30F	2,555	2,555	2,579	2,579
SAND/SHALE	2,579	2,579	2,680	2,680
GORDON	2,680	2,680	2,730	2,730
SAND/SHALE	2,730	2,730	3,463	3,463
FORTH SAND	2,772	2,772	2,784	2,784
SAND/SHALE	2,784	2,784	2,928	2,928
BAYARD	2,928	2,928	3,111	3,111
SAND/SHALE	3,111	3,111	3,309	3,309
WARREN	3,309	3,309	3,358	3,358
B-5	3,358	3,358	3,462	3,462
SPEECHLEY	3,462	3,462	3,873	3,873
BALLTOWN A	3,873	3,873	4,342	4,340
RILEY	4,342	4,340	4,995	4,983
BENSON	4,995	4,983	5,433	5,326
ALEXANDER	5,433	5,326	5,513	5,388
ELKS	5,513	5,388	7,066	6,554
SONYEA	7,066	6,554	7,416	6,723
MIDDLESEX	7,416	6,723	12,319	6,773

04/01/2016





**513830 - 47-103-02988-0000 - Perforations**

<i>Stage Number</i>	<i>Perforation Date</i>	<i>Top Perf Depth (ftKB)</i>	<i>Bottom Perf Depth (ftKB)</i>	<i>Number of Shots</i>	<i>Formation</i>
Initiation Sleeve	1/26/2015	12,298.00	12,300.00	10	MIDDLESEX
1	3/4/2015	12,105.00	12,219.00	32	MIDDLESEX
2	3/4/2015	11,881.00	12,051.00	40	MIDDLESEX
3	3/5/2015	11,657.00	11,827.00	40	MIDDLESEX
4	3/5/2015	11,433.00	11,603.00	40	MIDDLESEX
5	3/5/2015	11,209.00	11,379.00	40	MIDDLESEX
6	3/7/2015	10,985.00	11,155.00	40	MIDDLESEX
7	3/7/2015	10,761.00	10,931.00	40	MIDDLESEX
8	3/7/2015	10,537.00	10,707.00	40	MIDDLESEX
9	3/7/2015	10,315.00	10,483.00	40	MIDDLESEX
10	3/8/2015	10,089.00	10,259.00	40	MIDDLESEX
11	3/8/2015	9,865.00	10,035.00	40	MIDDLESEX
12	3/8/2015	9,641.00	9,811.00	40	MIDDLESEX
13	3/8/2015	9,417.00	9,587.00	40	MIDDLESEX
14	3/8/2015	9,193.00	9,363.00	40	MIDDLESEX
15	3/8/2015	8,969.00	9,139.00	40	MIDDLESEX
16	3/9/2015	8,745.00	8,919.00	40	MIDDLESEX
17	3/9/2015	8,524.00	8,691.00	40	MIDDLESEX
18	3/9/2015	8,297.00	8,467.00	40	MIDDLESEX
19	3/9/2015	8,073.00	8,243.00	40	MIDDLESEX
20	3/9/2015	7,849.00	8,019.00	40	MIDDLESEX
21	3/9/2015	7,625.00	7,795.00	40	MIDDLESEX

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/3/2015
Job End Date:	3/10/2015
State:	West Virginia
County:	Wetzel
API Number:	47-103-02988-00-00
Operator Name:	EQT Production
Well Name and Number:	513830
Longitude:	-80.56070800
Latitude:	39.56062600
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,773
Total Base Water Volume (gal):	4,933,866
Total Base Non Water Volume:	0



## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Keane Group	Carrier/Base Fluid	Water	7732-18-5	100.00000	90.29426	None
Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	9.26291	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05586	None
Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.04000	None
SL 1072	Keane Group	Friction Reducer	Petroleum distillates, hydrotreated light	64742-47-8	25.00000	0.01470	None
EC6330A	Keane Group	Scale Inhibitor	Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00114	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00027	None
			N, N-Dimethylformamide	68-12-2	20.00000	0.00014	None
			Cinnamialdehyde	104-55-2	15.00000	0.00010	None
			2-Butoxyethanol	111-76-2	15.00000	0.00010	None

			Tar bases, quinoline derivs, benzyl chloride-quaternized	72490-70-7	15.00000	0.00010	None
			1-Decanol	112-30-1	5.00000	0.00003	None
			Poly (oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-branched	127097-87-0	5.00000	0.00003	None
			Trehalyl Phosphate	78-40-0	2.50000	0.00002	None
			1-Octanol	111-87-5	2.50000	0.00002	None
			sopropyl alcohol	67-63-0	2.50000	0.00002	None
LEB-10X	Keane Group	Gel Breaker	Ethylene Glycol	107-21-1	30.00000	0.00023	None

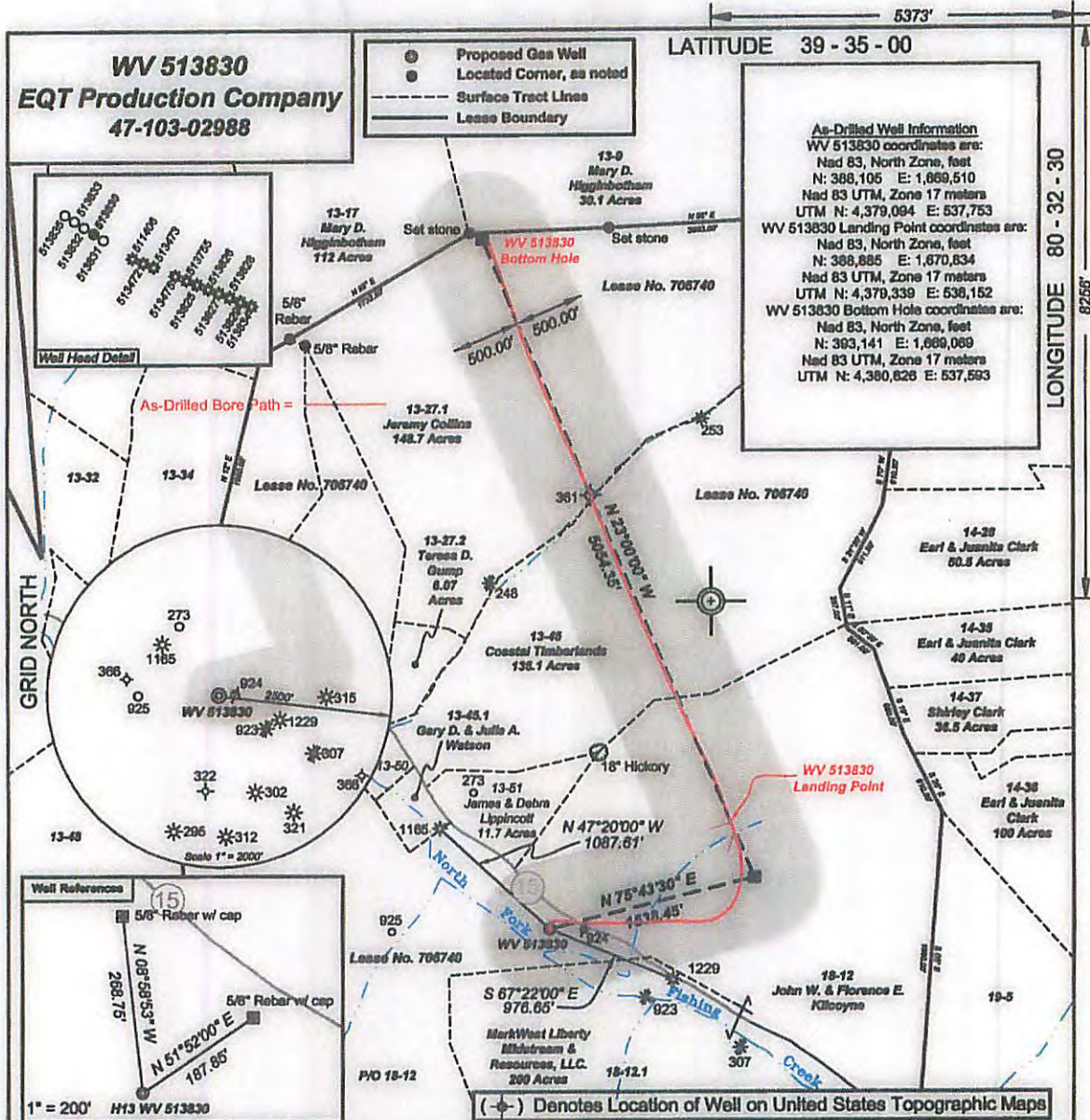
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* 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)



I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Department of Environmental Protection.

*Ben R. Singleton*  
P.S. 2092



FILE NO: 145-34-G-10  
DRAWING NO: 145-10 Big 178 H13  
SCALE: 1" = 1000'  
MINIMUM DEGREE OF ACCURACY: 1:2500  
PROVEN SOURCE OF ELEVATION: NGS CORS Station

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

DATE: December 18 20 14  
OPERATOR'S WELL NO. 513830  
API WELL NO 47 - 103 - 02988  
STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
(IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION: As-built 860' WATERSHED North Fork of Fishing Creek QUADRANGLE: Big Run

DISTRICT: Grant COUNTY: Wetzel

SURFACE OWNER: John W. and Florence E. Kilcoyne ACREAGE: 377.06

ROYALTY OWNER: EQT Production Company, Inc. LEASE NO: 706740 ACREAGE: 1003.75

PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Middlesex ESTIMATED DEPTH: 1007.00'

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray  
ADDRESS: 115 Professional Place PO Box 280 ADDRESS: 115 Professional Place PO Box 280  
Bridgeport, WV 26330 Bridgeport, WV 26330

04/01/2016