

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

API 47 - 017 - 06386 County Doddridge District West Union
Quad West Union 7.5' Pad Name WEU51 Field/Pool Name _____
Farm name Jane Hardin Trustee/Mary Well Number 514662
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 4,345,181 Easting 520,437
Landing Point of Curve Northing 4,344,956 Easting 520,368
Bottom Hole Northing 4,342,710 Easting 521,462

Elevation (ft) 1208 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)
SBM 12.5ppg - powdered hydrocarbon resin, calcium carbonate, ground almond hulls, barium sulfate, calcium chloride, lecithin liquid, organophilic clay, polyaminated fatty acid, calcium hydroxide, polyimide surfactant, modified fatty acid, dimer.trimer fatty acid, ground walnut hulls, refined base oil.

Date permit issued 1/31/2014 Date drilling commenced 5/29/2014 Date drilling ceased 10/20/2014
Date completion activities began 3/2/2015 Date completion activities ceased 3/15/2015
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

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10/20/2014
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Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 334 Open mine(s) (Y/N) depths N
Salt water depth(s) ft _____ Void(s) encountered (Y/N) depths N
Coal depth(s) ft 101,170,294,314,486,555 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
8/21/15 JH
10/23/2015

API 47-017 - 06386 Farm name Jane Hardin Trustee/Mary Well number 514662

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	30"	26"	40'	New	82.6#/ft	None	Y
Surface	17-1/2"	13-3/8"	1,169'	New	54.5#/ft	279', 481'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	5,293'	New	40#/ft	595', 3150'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	15,598'	New	20#/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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	49	15.6	1.18	57.82	0	8
Surface	Class A	1030	15.6	1.19	1225.7	0	8
Coal							
Intermediate 1	Class A	375/340/1165	14.2/15.6/15.6	1.26/1.18/1.18	2248.4	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	310/1120	14.2/15.2	1.26/1.97	2597	5,375'	72
Tubing							

Drillers TD (ft) 15,598' Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5,571'

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-N/A

Surface-bow spring centralizers set at 1125', 683', 159'
 Intermediate-bow spring centralizers set at 5247', 4811', 4287', 3806', 3500', 3107', 2869', 2301', 1821', 1297', 814', 333'
 Production- Composite bodied centralizers on every joint from TD up to 5,000'

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6,675'</u>	<u>TVD</u>	<u>6,911'</u> <u>MD</u>

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2,292 psi Bottom Hole n/a psi DURATION OF TEST 180.5 hrs

OPEN FLOW Gas 13,030 mcfpd Oil 0 bpd NGL 115.4 bpd Water 1,314.6 bpd GAS MEASURED BY Estimated Orifice Pilot

<u>LITHOLOGY/ FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H₂S, ETC)</u>
	<u>DEPTH IN FT NAME TVD</u>	<u>DEPTH IN FT TVD</u>	<u>DEPTH IN FT MD</u>	<u>DEPTH IN FT MD</u>	
	<u>0</u>		<u>0</u>		

Please insert additional pages as applicable.

Drilling Contractor Alpha Hunter 4
Address 28407 State Route 7 City Marietta State OH Zip 45750

Logging Company Hoss Co. Services LLC
Address 614 Trotters Lane City Charleston State WV Zip 25312

Cementing Company Nabors
Address 380 Southpointe Boulevard Suite 210 City Canonsburg State PA Zip 15317

Stimulating Company FTSI
Address 301 E 18TH STREET City CISCO State TX Zip 75705

Please insert additional pages as applicable.

Completed by James Abbott Telephone 412-553-5996
Signature [Signature] Title Director of Completions Date 7/14/2015

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

Received
Office of Oil & Gas
Jul 15 2015

API 47- 017 - 06385

Drilling Contractor: Savanna Drilling

Address: 2204 Timberloch Place Suite 230

City: Woodlands

State: TX

Zip: 77380

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Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FESH WATER ZONE	0	0	334	334
SAND / SHALE	0	0	101	101
WASHINGTON COAL	101	101	104	104
SAND / SHALE	104	104	170	170
WAYNESBURG A COAL	170	170	172	172
SAND / SHALE	172	172	294	294
COAL	294	294	298	298
SAND / SHALE	298	298	314	314
UNIONTOWN COAL	314	314	317	317
SAND / SHALE	317	317	486	486
REDSTONE COAL	486	486	487	487
SAND / SHALE	487	487	555	555
PITTSBURGH COAL	555	555	558	558
SAND / SHALE	558	558	1,478	1,478
MAXTON	1,478	1,478	1,874	1,874
BIG LIME	1,874	1,874	1,943	1,943
KEENER	1,943	1,943	2,173	2,173
WEIR	2,173	2,173	2,369	2,369
BEREA	2,369	2,369	2,375	2,375
GANTZ	2,375	2,375	2,489	2,489
50F	2,489	2,489	2,579	2,579
30F	2,579	2,579	2,723	2,723
4TH	2,723	2,723	2,916	2,916
BAYARD	2,916	2,916	3,233	3,233
WARREN	3,233	3,233	3,294	3,294
SPEECHLEY	3,294	3,294	3,965	3,965
BALLTOWN A	3,965	3,965	4,241	4,241
BRADFORD	4,241	4,241	4,447	4,447
RILEY	4,447	4,447	4,884	4,884
BENSON	4,884	4,884	5,131	5,131
ALEXANDER	5,131	5,131	6,386	6,305
SONYEA	6,381	6,301	6,562	6,455
MIDDLESEX	6,562	6,455	6,635	6,511
GENESEE	6,635	6,511	6,763	6,596
GENESEO	6,763	6,596	6,808	6,622
TULLY	6,808	6,622	6,859	6,650
HAMILTON	6,859	6,650	6,911	6,675
MARCELLUS	6,911	6,675	15,598	6,745

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514662 - 47-017-06386-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	1/29/2015	15,596.00	15,598.00	10	MARCELLUS
1	3/2/2015	15,453.00	15,511.00	28	MARCELLUS
2	3/2/2015	15,271.00	15,391.00	42	MARCELLUS
3	3/3/2015	15,091.00	15,211.00	42	MARCELLUS
4	3/3/2015	14,911.00	15,033.00	42	MARCELLUS
5	3/3/2015	14,731.00	14,853.00	42	MARCELLUS
6	3/3/2015	14,551.00	14,673.00	42	MARCELLUS
7	3/3/2015	14,371.00	14,493.00	42	MARCELLUS
8	3/5/2015	14,191.00	14,313.00	42	MARCELLUS
9	3/6/2015	14,011.00	14,133.00	42	MARCELLUS
10	3/7/2015	13,831.00	13,953.00	42	MARCELLUS
11	3/7/2015	13,651.00	13,773.00	42	MARCELLUS
12	3/7/2015	13,471.00	13,593.00	42	MARCELLUS
13	3/7/2015	13,291.00	13,413.00	42	MARCELLUS
14	3/8/2015	13,111.00	13,233.00	42	MARCELLUS
15	3/8/2015	12,931.00	13,053.00	42	MARCELLUS
16	3/8/2015	12,751.00	12,873.00	42	MARCELLUS
17	3/8/2015	12,571.00	12,693.00	42	MARCELLUS
18	3/9/2015	12,391.00	12,513.00	42	MARCELLUS
19	3/9/2015	12,211.00	12,333.00	42	MARCELLUS
20	3/9/2015	12,031.00	12,153.00	42	MARCELLUS
21	3/9/2015	11,851.00	11,973.00	42	MARCELLUS
22	3/9/2015	11,674.00	11,793.00	42	MARCELLUS
23	3/10/2015	11,491.00	11,613.00	42	MARCELLUS
24	3/10/2015	11,311.00	11,433.00	42	MARCELLUS
25	3/10/2015	11,131.00	11,253.00	42	MARCELLUS
26	3/10/2015	10,951.00	11,073.00	42	MARCELLUS
27	3/11/2015	10,771.00	10,893.00	42	MARCELLUS
28	3/11/2015	10,593.00	10,713.00	42	MARCELLUS
29	3/11/2015	10,411.00	10,533.00	42	MARCELLUS
30	3/11/2015	10,231.00	10,353.00	42	MARCELLUS
31	3/12/2015	10,051.00	10,173.00	42	MARCELLUS
32	3/12/2015	9,871.00	9,993.00	42	MARCELLUS
33	3/12/2015	9,691.00	9,813.00	42	MARCELLUS
34	3/12/2015	9,511.00	9,633.00	42	MARCELLUS
35	3/13/2015	9,331.00	9,451.00	42	MARCELLUS
36	3/13/2015	9,151.00	9,273.00	42	MARCELLUS
37	3/13/2015	8,971.00	9,093.00	42	MARCELLUS
38	3/13/2015	8,791.00	8,913.00	42	MARCELLUS
38.1	3/13/2015	8,791.00	8,913.00	42	MARCELLUS
39	3/14/2015	8,611.00	8,733.00	42	MARCELLUS
40	3/14/2015	8,431.00	8,553.00	42	MARCELLUS
41	3/14/2015	8,251.00	8,373.00	42	MARCELLUS
42	3/14/2015	8,071.00	8,193.00	42	MARCELLUS
43	3/14/2015	7,891.00	8,015.00	42	MARCELLUS
44	3/14/2015	7,713.00	7,832.00	42	MARCELLUS
45	3/14/2015	7,531.00	7,653.00	42	MARCELLUS
46	3/14/2015	7,351.00	7,473.00	42	MARCELLUS
47	3/15/2015	7,174.00	7,293.00	42	MARCELLUS

10/23/2015

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/2/2015
Job End Date:	3/15/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06386-00-00
Operator Name:	EQT Production
Well Name and Number:	514662
Longitude:	-80.76330100
Latitude:	39.25562800
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,745
Total Base Water Volume (gal):	15,282,456
Total Base Non Water Volume:	0



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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	FTS International	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.74040	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	9.89339	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05680	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02545	None
FRW-600	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02000	None
			Ammonium acetate	631-61-8	6.00000	0.00400	None
CI-150	FTS International	Acid Corrosion Inhibitor	Isopropanol	67-63-0	30.00000	0.00728	None
			Dimethylformamide	68-12-2	10.00000	0.00243	None
			Ethylene glycol	107-21-1	30.00000	0.00009	None
			Organic amine resin salt	Proprietary	30.00000	0.00009	None
			Aromatic aldehyde	Proprietary	10.00000	0.00003	None

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B-10	FTS International	High pH buffer	Quaternary ammonium compound	Proprietary	10.00000	0.00003	None			
			Potassium carbonate	584-08-7	48.00000	0.00424	None			
			Potassium hydroxide	1310-58-3	20.00000	0.00177	None			
CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10.00000	0.00243	None			
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00027	None			
			Guar gum	5000-30-0	50.00000	0.00024	None			
			Surfactant	58439-51-0	2.00000	0.00007	None			
			Clay	14808-60-7	2.00000	0.00007	None			
APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95.00000	0.00029	None			
FE-100L	FTS International	Iron control	Citric acid	77-92-9	55.00000	0.00017	None			
NE-100	FTS International	Non-emulsifier	2-Butoxyethanol	111-76-2	10.00000	0.00010	None			
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00007	None			
			2-Propanol	67-63-0	10.00000	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)

EQT PRODUCTION COMPANY LEEMAN MAXWELL LEASE 1000 ACRES± WELL NO. WV 514662

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

NAD'27 S.P.C.(FT)	N. 277,730.2	E. 1,842,273.2
NAD'27 GEO.	LAT-(N) 39.255628	LONG-(W) 80.763301
NAD'83 UTM (M)	N. 4,345,180.6	E. 520,437.2
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 276,998.0	E. 1,842,033.9
NAD'27 GEO.	LAT-(N) 39.253608	LONG-(W) 80.764109
NAD'83 UTM (M)	N. 4,344,958.3	E. 520,368.0
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 269,566.3	E. 1,645,499.4
NAD'27 GEO.	LAT-(N) 39.233339	LONG-(W) 80.751507
NAD'83 UTM (M)	N. 4,342,709.9	E. 521,461.6



LEGEND
 AS DRILLED ———
 PROPOSED - - - - -

AS DRILLED INFORMATION

BOTTOM HOLE WELL NO. WV 514662 STATE PLANE COORDINATES (NORTH ZONE) NAD 27	WELL NO. WV 514662 STATE PLANE COORDINATES (NORTH ZONE) NAD 27
N. 269,554.8 E. 1,645,471.3	N. 277,730.2 E. 1,842,273.2
LAT=(N) 39.233306 LONG=(W) 80.751606	LAT=(N) 39.255628 LONG=(W) 80.763301
UTM (NAD83)(METERS) N. 4,342,706.2 E. 521,453.0	UTM (NAD83)(METERS) N. 4,345,180.6 E. 520,437.2

Professional Energy Consultants
 A DIVISION OF BARTH LAND SURVEYING, INC.

 SURVEYORS
 ENGINEERS
 ENVIRONMENTAL
 PROJECT MGMT.
 (304) 433-6654 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. 677
Gregory A. Smith



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE OCTOBER 1, 20 13
 REVISED 02/25/14 & 10/29/14
 OPERATORS WELL NO. WV 514662
 API WELL NO. 47-017-06386
 STATE STATE COUNTY COUNTY PERMIT PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8051ASDRILLED514662
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2,000'

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

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

LOCATION:
 ELEVATION 1,224'(GRO/IND) 1,208'(PROPOSED) WATERSHED BLUESTONE CREEK
 DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE WEST UNION 7.5'
 SURFACE OWNER JANE HARDIN (TRUSTEE) OF MARY HOLLAND TRUST ACREAGE 1207.637±
 ROYALTY OWNER LEEMAN MAXWELL HEIRS (1000 AC.±) (2164 AC.±)

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 6661'

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