

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

API 47-017-6384 County Doddridge District West Union
Quad West Union 7.5' Pad Name WEU51 Field/Pool Name _____
Farm name Jane Hardin Trustee/Mary Well Number 514664
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 4,345,189 Easting 520,433
Landing Point of Curve Northing 4,345,221 Easting 520,835
Bottom Hole Northing 4,343,293 Easting 521,774

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 9/28/2014
Date completion activities began 3/29/2015 Date completion activities ceased 4/11/2015
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 334 Open mine(s) (Y/N) depths _____
Salt water depth(s) ft _____ Void(s) encountered (Y/N) depths _____
Coal depth(s) ft 101,170,294,314,486,555 Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) N

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Reviewed by:
JK 7/25/15
07/24/2015

API 47-017 - 6384 Farm name Jane Hardin Trustee/Mary Well number 514664

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"	40'	New	82.6#/ft		Y
Surface	17-1/2"	13-3/8"	1173.64'	New	54.5#/ft	213.82', 545'	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	5302.42'	New	40#/ft	627', 3177', 4543'	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	15,024'	New	20#/ft	N/A	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	882	15.6	1.19	1049.58	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	330/985	14.2/15.2	1.26/1.97	2356	5,724	72
Tubing							

Drillers TD (ft) 15,024' Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5,744

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 1127', 670', 213'
 Intermediate-bow spring centralizers set at 5255', 4838', 4384', 3929', 3473', 3100', 2957', 2584', 2128', 1672', 1215', 758'
 Production- Composite bodied centralizers on every joint from Shoe track up to 5,000' MD.

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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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	6,436	6,314
SONYEA	6,436	6,314	6,799	6,456
MIDDLESEX	6,799	6,456	6,950	6,511
GENESEE	6,950	6,511	7,176	6,593
GENESEO	7,176	6,593	7,258	6,621
TULLY	7,258	6,621	7,355	6,649
HAMILTON	7,355	6,649	7,445	6,674
MARCELLUS	7,445	6,674	15,024	6,756

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514664 - 47-017-06383-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	2/3/2015	15,022.00	15,024.00	10	MARCELLUS
1	2/5/2015	14,878.00	14,995.00	42	MARCELLUS
2	3/29/2015	14,698.00	14,820.00	42	MARCELLUS
3	3/29/2015	14,520.00	14,640.00	42	MARCELLUS
4	3/30/2015	14,342.00	14,460.00	42	MARCELLUS
5	3/30/2015	14,158.00	14,280.00	42	MARCELLUS
6	3/31/2015	13,978.00	14,100.00	42	MARCELLUS
7	3/31/2015	13,798.00	13,920.00	42	MARCELLUS
8	3/31/2015	13,618.00	13,740.00	42	MARCELLUS
9	3/31/2015	13,438.00	13,560.00	42	MARCELLUS
10	4/1/2015	13,258.00	13,382.00	42	MARCELLUS
11	4/1/2015	13,078.00	13,200.00	42	MARCELLUS
12	4/1/2015	12,898.00	13,020.00	42	MARCELLUS
13	4/1/2015	12,722.00	12,840.00	42	MARCELLUS
14	4/2/2015	12,538.00	12,660.00	42	MARCELLUS
15	4/2/2015	12,358.00	12,480.00	42	MARCELLUS
16	4/2/2015	12,178.00	12,300.00	42	MARCELLUS
17	4/2/2015	11,998.00	12,120.00	42	MARCELLUS
18	4/2/2015	11,818.00	11,940.00	42	MARCELLUS
19	4/3/2015	11,638.00	11,760.00	42	MARCELLUS
20	4/3/2015	11,458.00	11,580.00	42	MARCELLUS
21	4/3/2015	11,278.00	11,400.00	42	MARCELLUS
22	4/3/2015	11,102.00	11,220.00	42	MARCELLUS
23	4/3/2015	10,918.00	11,040.00	42	MARCELLUS
24	4/3/2015	10,738.00	10,860.00	42	MARCELLUS
25	4/4/2015	10,558.00	10,680.00	42	MARCELLUS
26	4/4/2015	10,378.00	10,500.00	42	MARCELLUS
27	4/4/2015	10,198.00	10,320.00	42	MARCELLUS
28	4/4/2015	10,018.00	10,141.00	42	MARCELLUS
29	4/5/2015	9,838.00	9,962.00	42	MARCELLUS
30	4/5/2015	9,658.00	9,780.00	42	MARCELLUS
31	4/5/2015	9,482.00	9,600.00	42	MARCELLUS
32	4/5/2015	9,298.00	9,420.00	42	MARCELLUS
33	4/5/2015	9,118.00	9,240.00	42	MARCELLUS
34	4/6/2015	8,938.00	9,060.00	42	MARCELLUS
35	4/6/2015	8,758.00	8,880.00	42	MARCELLUS
36	4/6/2015	8,578.00	8,700.00	42	MARCELLUS
37	4/6/2015	8,398.00	8,521.00	42	MARCELLUS
38	4/7/2015	8,218.00	8,338.00	42	MARCELLUS
39	4/7/2015	8,040.00	8,160.00	42	MARCELLUS
40	4/7/2015	7,858.00	7,980.00	42	MARCELLUS
41	4/10/2015	7,678.00	7,800.00	42	MARCELLUS
41.1	4/11/2015	7,628.00	7,717.00	28	MARCELLUS

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/29/2015
Job End Date:	4/11/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06384-00-00
Operator Name:	EQT Production
Well Name and Number:	514664
Longitude:	-80.76335200
Latitude:	39.25570000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,756
Total Base Water Volume (gal):	12,917,940
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	FIS International	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.56995	None
Sand (Proppant)	FIS International	Proppant	Crystalline Silica	14808-60-7	100.00000	10.06104	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05705	None
Hydrochloric Acid (15%)	FIS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02504	None
FRW-900	FIS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.01537	None
			Alkyl Alcohol	Proprietary	10.00000	0.00512	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00256	None
FRW-600	FIS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.00654	None
			Ammonium acetate	631-61-8	6.00000	0.00131	None
HVG-1	FIS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00166	None
			Guar gum	9000-30-0	50.00000	0.00151	None

			Surfactant	68439-51-0	2.00000	0.00006	None
			Clay	14808-60-7	2.00000	0.00006	None
B-10	FTS International	High pH buffer					
			Potassium carbonate	584-08-7	48.00000	0.00194	None
			Potassium hydroxide	1310-58-3	20.00000	0.00081	None
CS-500-SI	FTS International	Scale inhibitor					
			Ethylene glycol	107-21-1	10.00000	0.00252	None
FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55.00000	0.00058	None
CI-150	FTS International	Acid Corrosion Inhibitor					
			Isopropanol	67-63-0	30.00000	0.00009	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
			Dimethylformamide	68-12-2	10.00000	0.00003	None
			Quaternary ammonium compound	Proprietary	10.00000	0.00003	None
NE-100	FTS International	Non-emulsifier					
			2-Propanol	67-63-0	10.00000	0.00003	None
			2-Butoxyethanol	111-76-2	10.00000	0.00003	None
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001	None
APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95.00000	0.00006	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)

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Well Operator's Report of Well Work



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Well Number: 514664

API: 47 - 017 - 06363

Submission: Initial Amended

Notes: Inj Test - 4.01
Reperf - stg 41 (41.1)

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**EQT PRODUCTION COMPANY
LEEMAN MAXWELL LEASE
1000 ACRES±
WELL NO. WV 514664**

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

NAD'27 S.P.C.(FT) N. 277,756.7 E. 1,642,259.1
NAD'27 GEO. LAT-(N) 39.255700 LONG-(W) 80.763352
NAD'83 UTM (M) N. 4,345,221.3 E. 520,432.8

LANDING POINT

NAD'27 S.P.C.(FT) N. 277,842.0 E. 1,643,582.3
NAD'27 GEO. LAT-(N) 39.255985 LONG-(W) 80.758684
NAD'83 UTM (M) N. 4,345,221.3 E. 520,835.4

BOTTOM HOLE

NAD'27 S.P.C.(FT) N. 271,461.6 E. 1,646,557.6
NAD'27 GEO. LAT-(N) 39.238583 LONG-(W) 80.747865
NAD'83 UTM (M) N. 4,343,292.7 E. 521,774.3



LEGEND

AS DRILLED —

PROPOSED - - -

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.

AS DRILLED INFORMATION

BOTTOM HOLE WELL NO. WV 514664 STATE PLANE COORDINATES (NORTH ZONE) NAD 27	WELL NO. WV 514664 STATE PLANE COORDINATES (NORTH ZONE) NAD 27
N. 271,474.9 E. 1,646,578.4	N. 277,756.7 E. 1,642,259.1
LAT=(N) 39.238620 LONG=(W) 80.747792	LAT=(N) 39.255700 LONG=(W) 80.763352
UTM (NAD83)(METERS) N. 4,343,296.8 E. 521,780.6	UTM (NAD83)(METERS) N. 4,345,188.6 E. 520,432.8

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

SLS

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PROJECT MGMT.

(304) 462-0234 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. 849 *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE OCTOBER 01, 20 13

REVISED 03/13/14 & 10/03/14

OPERATORS WELL NO. WV 514664

API WELL NO. 47-017-06384

STATE 47 COUNTY 017 PERMIT 06365

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8051ASDRILLED514664

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 1,225'(GROUND) 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: LEASE NO. 706763 / 706764

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) MARCELLUS 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

07/24/2015