

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

API 47 - 017 - 6460 County DODDRIDGE District WEST UNION
Quad OXFORD 7.5' Pad Name OXFORD 157 Field/Pool Name _____
Farm name JUSTIN L. HENDERSON ET AL Well Number 513146
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 4,343,004 Easting 520,175
Landing Point of Curve Northing 4,343,082 Easting 520,345
Bottom Hole Northing 4,344,918 Easting 519,452

Elevation (ft) 970 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 13.0 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 04/18/2014 Date drilling commenced 08/18/2014 Date drilling ceased 12/24/2014
Date completion activities began 4/18/2015 Date completion activities ceased 4/24/2015
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

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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 144 Open mine(s) (Y/N) depths N
Salt water depth(s) ft - Void(s) encountered (Y/N) depths N
Coal depth(s) ft 337 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
JK
10/09/2015

API 47-017 - 6460 Farm name JUSTIN L. HENDERSON ET AL Well number 513146

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"	63'	NEW	A-500 40LB/FT	NONE	Y
Surface	17.5"	13.375"	950'	NEW	J-55 54.5LB/FT	236'	Y
Coal							
Intermediate 1	12.375"	9.625"	5020'	NEW	P-110 40LB/FT	1221',2938',4020'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	13,031'	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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	61	15.6	1.18	71.98	0	8
Surface	CLASS A	790	15.6	1.19	940.1	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	360 / 340	14.2 / 15.6	1.28 / 1.18	862	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class H	325 / 815	14.2 / 15.2	1.26 / 1.97	2016	5100	72
Tubing							

Drillers TD (ft) 13,054' Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5,089'

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: 1,12,21 _____
 INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1,12,24,36,48,60,72,84,96,109,124 _____
 PRODUCTION- Composite body centralizers every joint from 5,800' to 5,000' _____

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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- 017 - 6460 Farm name JUSTIN L. HENDERSON ET AL Well number 513146

Drilling Contractor Patterson UTI (Rig 252)
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

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 _____

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Formation	Top (ftGL TVD)	Bottom (ftGL TVD)
FRESH WATER ZONE	1	154
SAND/SHALE	1	347
PITTSBURGH COAL SEAM	347	351
SAND/SHALE	351	1,599.00
BIG LIME	1,599.00	1,884.00
WEIR	1,884.00	2,089.00
BEREA	2,089.00	2,093.00
GANTZ	2,093.00	2,204.00
50F	2,204.00	2,294.00
30F	2,294.00	2,349.00
GORDON	2,349.00	2,438.00
4TH	2,438.00	2,660.00
BAYARD	2,660.00	2,933.00
WARREN	2,933.00	3,010.00
SPEECHLEY	3,010.00	3,499.00
BALLTOWN A	3,499.00	4,146.00
RILEY	4,146.00	4,596.00
BENSON	4,596.00	4,849.00
ALEXANDER	4,849.00	6,008.60
SONYEA	6,008.60	6,179.60
MIDDLESEX	6,179.60	6,202.00
GENESEE	6,202.00	6,268.30
GENESEO	6,268.30	6,315.00
TULLY	6,315.00	6,339.30
HAMILTON	6,339.30	6,366.30
MARCELLUS	6,366.30	

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513146 - 47-017-06460-0000- 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	3/28/2015	13,029.00	13,031.00	10	MARCELLUS
1	4/19/2015	12,823.00	12,960.00	32	MARCELLUS
2	4/19/2015	12,599.00	12,781.00	40	MARCELLUS
3	4/19/2015	12,374.00	12,556.00	40	MARCELLUS
4	4/19/2015	12,149.00	12,331.00	40	MARCELLUS
5	4/19/2015	11,924.00	12,106.00	40	MARCELLUS
6	4/20/2015	11,699.00	11,881.00	40	MARCELLUS
7	4/20/2015	11,474.00	11,656.00	40	MARCELLUS
8	4/20/2015	11,249.00	11,431.00	40	MARCELLUS
9	4/20/2015	11,024.00	11,206.00	40	MARCELLUS
10	4/21/2015	10,799.00	10,981.00	40	MARCELLUS
11	4/21/2015	10,574.00	10,752.00	40	MARCELLUS
12	4/21/2015	10,349.00	10,531.00	40	MARCELLUS
13	4/21/2015	10,124.00	10,306.00	40	MARCELLUS
14	4/21/2015	9,899.00	10,081.00	40	MARCELLUS
15	4/22/2015	9,674.00	9,856.00	40	MARCELLUS
16	4/22/2015	9,449.00	9,627.00	40	MARCELLUS
17	4/22/2015	9,224.00	9,406.00	40	MARCELLUS
18	4/22/2015	8,999.00	9,181.00	40	MARCELLUS
19	4/22/2015	8,774.00	8,956.00	40	MARCELLUS
20	4/22/2015	8,549.00	8,727.00	40	MARCELLUS
21	4/23/2015	8,324.00	8,506.00	40	MARCELLUS
22	4/23/2015	8,099.00	8,281.00	40	MARCELLUS
23	4/23/2015	7,874.00	8,058.00	40	MARCELLUS
24	4/23/2015	7,649.00	7,831.00	40	MARCELLUS
25	4/23/2015	7,424.00	7,606.00	40	MARCELLUS
26	4/24/2015	7,199.00	7,381.00	40	MARCELLUS
27	4/24/2015	6,974.00	7,152.00	40	MARCELLUS

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/18/2015
Job End Date:	4/24/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06460-00-00
Operator Name:	EQT Production
Well Name and Number:	513146
Longitude:	-80.76640000
Latitude:	39.23601800
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,366
Total Base Water Volume (gal):	10,426,080
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	Keane Group	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.60395	None
Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.08165	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05548	None
Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.01932	None
FFR760	Keane Group	Friction Reducer	Hydrotreated Light Distillate	64742-47-8	30.00000	0.00596	None
			Alkyl Alcohol	Proprietary	10.00000	0.00199	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00099	None
FFR730	Keane Group	Friction Reducer	Oxyalkylated alcohol A	Proprietary	5.00000	0.00249	None
EC6330A	Keane Group	Scale Inhibitor	Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00115	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00013	None

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		N, N-Dimethylformamide	68-12-2	20.00000	0.00007	None
		2-Butoxyethanol	111-76-2	15.00000	0.00005	None
		Cinnamialdehyde	104-55-2	15.00000	0.00005	None
		Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	15.00000	0.00005	None
		1-Decanol	112-30-1	5.00000	0.00002	None
		Poly (oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega- hydroxy-branched	127087-87-0	5.00000	0.00002	None
		1-Octanol	111-87-5	2.50000	0.00001	None
		Triethyl Phosphate	78-40-0	2.50000	0.00001	None
		Isopropyl alcohol	67-63-0	2.50000	0.00001	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)

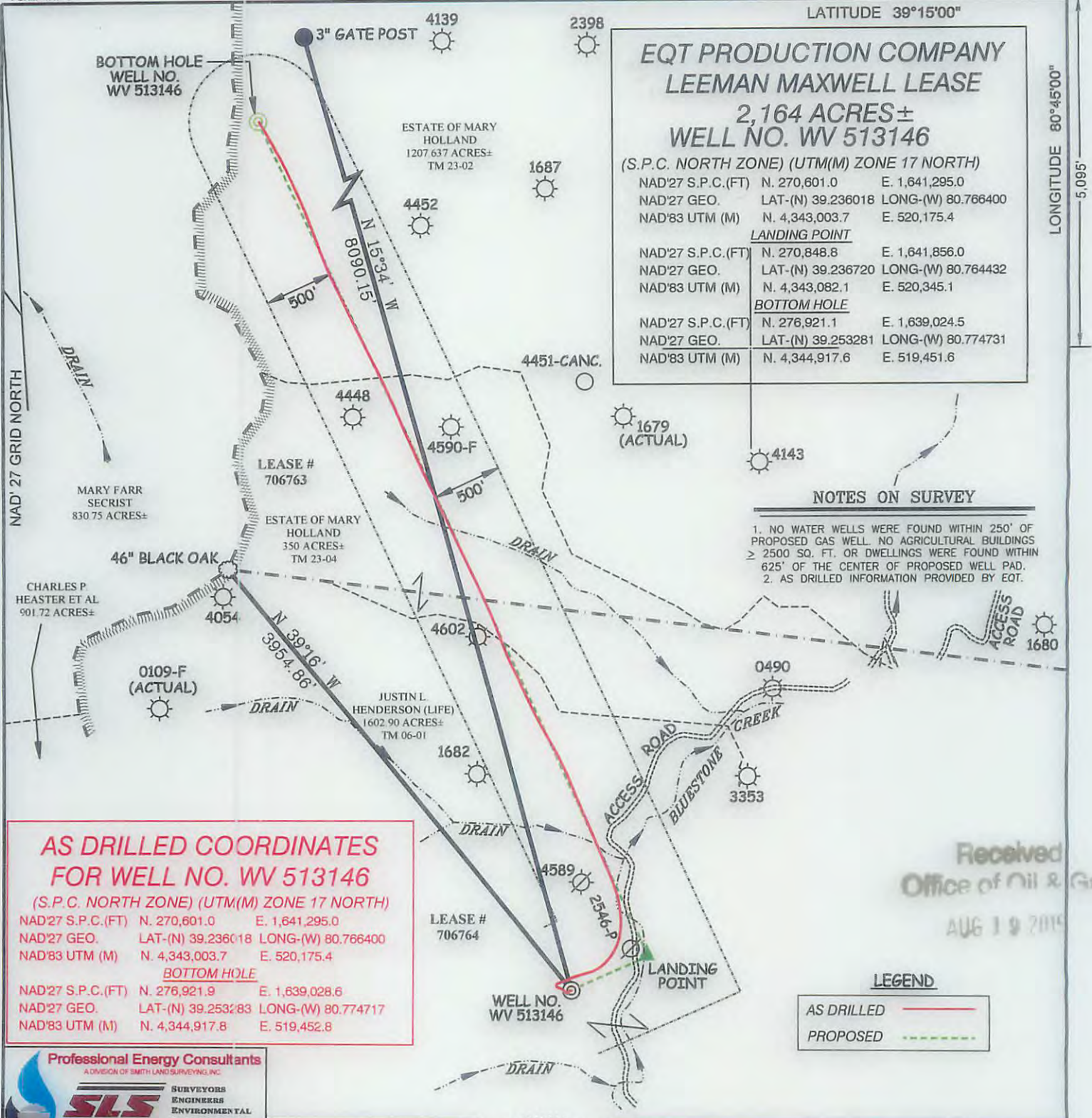
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**EQT PRODUCTION COMPANY
LEEMAN MAXWELL LEASE
2,164 ACRES±
WELL NO. WV 513146**

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

NAD'27 S.P.C.(FT)	N. 270,601.0	E. 1,641,295.0
NAD'27 GEO.	LAT-(N) 39.236018	LONG-(W) 80.766400
NAD'83 UTM (M)	N. 4,343,003.7	E. 520,175.4
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 270,848.8	E. 1,641,856.0
NAD'27 GEO.	LAT-(N) 39.236720	LONG-(W) 80.764432
NAD'83 UTM (M)	N. 4,343,082.1	E. 520,345.1
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 276,921.1	E. 1,639,024.5
NAD'27 GEO.	LAT-(N) 39.253281	LONG-(W) 80.774731
NAD'83 UTM (M)	N. 4,344,917.6	E. 519,451.6



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 COORDINATES
FOR WELL NO. WV 513146**

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

NAD'27 S.P.C.(FT)	N. 270,601.0	E. 1,641,295.0
NAD'27 GEO.	LAT-(N) 39.236018	LONG-(W) 80.766400
NAD'83 UTM (M)	N. 4,343,003.7	E. 520,175.4
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 276,921.9	E. 1,639,028.6
NAD'27 GEO.	LAT-(N) 39.253283	LONG-(W) 80.774717
NAD'83 UTM (M)	N. 4,344,917.8	E. 519,452.8

LEGEND

AS DRILLED	
PROPOSED	

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

**SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.**

(204) 482-5934 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 APRIL 16, 20 13
 REVISED 03/06/14 & 01/13/15
 OPERATORS WELL NO. WV 513146
 API WELL NO. 47-017-06460
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7889ASDRILLED513146
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY 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:
 ELEVATION 969'(GROUND) 968'(PROPOSED) WATERSHED BLUESTONE CREEK
 DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'
 SURFACE OWNER JUSTIN L. HENDERSON (LIFE) ACREAGE 1,602.90±
 ROYALTY OWNER LEEMAN MAXWELL HRS ACREAGE (2,164±) (1,090)
 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 6399'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEFORD, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEFORD, WV 26330

10/09/2015

COUNTY NAME PERMIT