

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

API 47-017-6463 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 513149
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 4342991 Easting 520169
Landing Point of Curve Northing 4343089 Easting 520699
Bottom Hole Northing 4342097 Easting 521182

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 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 04/18/2014 Date drilling commenced 08/18/2014 Date drilling ceased 1/31/2015
Date completion activities began 5/9/2015 Date completion activities ceased 5/13/2015
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 144 Open mine(s) (Y/N) depths N
Salt water depth(s) ft - Void(s) encountered (Y/N) depths N
Coal depth(s) ft 338 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

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Reviewed by: [Signature]
10/16/2015

API 47-017 - 6463 Farm name JUSTIN L. HENDERSON ET AL Well number 513149

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"	942'	NEW	J-55 54.5LB/FT	295',380'	Y
Coal							
Intermediate 1	12.375"	9.625"	5,024'	NEW	P-110 40LB/FT	1243',2947',4071'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	11,430'	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	795	15.6	1.19	946.05	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	370 / 340	14.2 / 15.6	1.28 / 1.18	874.8	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS A / CLASS H	460 / 455	14.2 / 15.2	1.26 / 1.97	1475.95	5,100	8
Tubing							

Drillers TD (ft) 11,463' Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5,228'

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
 INTERMEDIATE- RAN AT LEAST EVERY 500' FEET JOINTS: 1, 12,24,36,48,60,73,97, 109,120
 PRODUCTION- 76 Composite Body centralizers ran every joint from 4,986 to 8,145'

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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API 47- 017 - 6463 Farm name JUSTIN L. HENDERSON ET AL Well number 513149

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 BLUE DOT ENERGY SERVICES
Address P.O. BOX 784 City BIDGEPORT State WV Zip 26330

Cementing Company _____
Address _____ City _____ State _____ Zip _____

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17.06463

513149 Final Formations (API 47-1706463)

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
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		6,003.00	5,875.70
SONYEA	6,003.00	5,875.70	6,153.00	5,944.90
MIDDLESEX	6,153.00	5,944.90	6,209.00	5,963.60
GENESEE	6,209.00	5,963.60	6,286.00	5,987.90
GENESEO	6,286.00	5,987.90	7,372.00	6,338.90
TULLY	7,372.00	6,338.90	7,510.00	6,363.70
HAMILTON	7,510.00	6,363.70	7,644.00	6,393.50
MRC 3	7,644.00	6,393.50		

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513149 - 47-017-06463-0000- Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	3/29/2015	11,427.00	11,430.00	10	MARCELLUS
1	5/10/2015	11,162.00	11,344.00	32	MARCELLUS
2	5/10/2015	10,862.00	11,102.00	40	MARCELLUS
3	5/10/2015	10,562.00	10,804.00	40	MARCELLUS
4	5/11/2015	10,262.00	10,504.00	40	MARCELLUS
5	5/11/2015	9,962.00	10,204.00	40	MARCELLUS
6	5/11/2015	9,662.00	9,904.00	40	MARCELLUS
7	5/11/2015	9,362.00	9,604.00	40	MARCELLUS
8	5/11/2015	9,062.00	9,304.00	40	MARCELLUS
9	5/12/2015	8,762.00	9,004.00	40	MARCELLUS
10	5/12/2015	8,462.00	8,704.00	40	MARCELLUS
11	5/12/2015	8,162.00	8,404.00	40	MARCELLUS
12	5/13/2015	7,862.00	8,104.00	40	MARCELLUS
13	5/13/2015	7,562.00	7,804.00	40	MARCELLUS

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/9/2015
Job End Date:	5/13/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06463-00-00
Operator Name:	EQT Production
Well Name and Number:	513149
Longitude:	-80.76647000
Latitude:	39.23590700
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,394
Total Base Water Volume (gal):	6,246,030
Total Base Non Water Volume:	0



17-06463

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	88.96568	None
Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.72003	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05610	None
Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.01748	None
FFR760	Keane Group	Friction Reducer	Hydrotreated Light Distillate	64742-47-8	30.00000	0.00534	None
			Alkyl Alcohol	Proprietary	10.00000	0.00178	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00089	None
FFR730	Keane Group	Friction Reducer	Oxyalkylated alcohol A	Proprietary	5.00000	0.00307	None
EC6330A	Keane Group	Scale Inhibitor	Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00123	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00012	None

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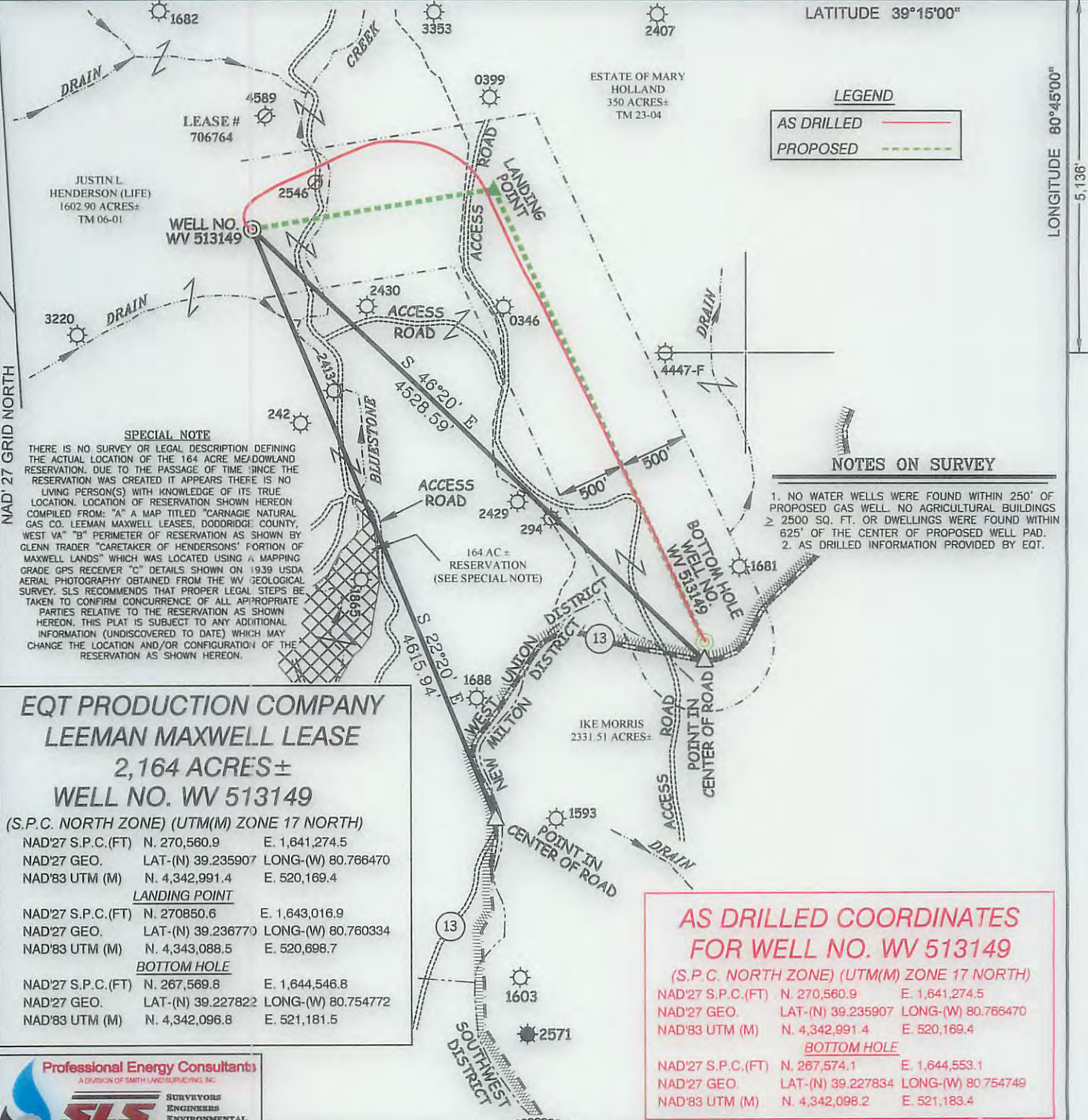
			N, N-Dimethylformamide	68-12-2	20.00000	0.00006	None
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	15.00000	0.00005	None
			Cinnamialdehyde	104-55-2	15.00000	0.00005	None
			2-Butoxyethanol	111-76-2	15.00000	0.00005	None
			Poly (oxy-1,2-ethanediyl), alpha.-(4-nonylphenyl)-.omega.-hydroxy-.branched	127087-87-0	5.00000	0.00002	None
			1-Decanol	112-30-1	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
LEB-10X	Keane Group	Gel Breaker					
			Ethylene Glycol	107-21-1	30.00000	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.							

17-06463

* 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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LEGEND
 AS DRILLED ——— (Red line)
 PROPOSED - - - - - (Green dashed line)

SPECIAL NOTE

THERE IS NO SURVEY OR LEGAL DESCRIPTION DEFINING THE ACTUAL LOCATION OF THE 164 ACRE MEADOWLAND RESERVATION. DUE TO THE PASSAGE OF TIME SINCE THE RESERVATION WAS CREATED IT APPEARS THERE IS NO LIVING PERSON(S) WITH KNOWLEDGE OF ITS TRUE LOCATION. LOCATION OF RESERVATION SHOWN HEREON COMPILED FROM: "A" A MAP TITLED "CARNAGIE NATURAL GAS CO. LEEMAN MAXWELL LEASES, DODDRIDGE COUNTY, WEST VA" "B" PERIMETER OF RESERVATION AS SHOWN BY GLENN TRADER "CARETAKER OF HENDERSONS' FORTION OF MAXWELL LANDS" WHICH WAS LOCATED USING A MAPPING GRADE GPS RECEIVER "C" DETAILS SHOWN ON 1939 USDA AERIAL PHOTOGRAPHY OBTAINED FROM THE WV GEOLOGICAL SURVEY. SLS RECOMMENDS THAT PROPER LEGAL STEPS BE TAKEN TO CONFIRM CONCURRENCE OF ALL APPROPRIATE PARTIES RELATIVE TO THE RESERVATION AS SHOWN HEREON. THIS PLAT IS SUBJECT TO ANY ADDITIONAL INFORMATION (UNDISCOVERED TO DATE) WHICH MAY CHANGE THE LOCATION AND/OR CONFIGURATION OF THE RESERVATION AS SHOWN HEREON.

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.

**EQT PRODUCTION COMPANY
 LEEMAN MAXWELL LEASE
 2,164 ACRES±
 WELL NO. WV 513149**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'27 S.P.C.(FT) N. 270,560.9 E. 1,641,274.5
 NAD'27 GEO. LAT.-(N) 39.235907 LONG.-(W) 80.766470
 NAD'83 UTM (M) N. 4,342,991.4 E. 520,169.4

LANDING POINT
 NAD'27 S.P.C.(FT) N. 270850.6 E. 1,643,016.9
 NAD'27 GEO. LAT.-(N) 39.236770 LONG.-(W) 80.760334
 NAD'83 UTM (M) N. 4,343,088.5 E. 520,698.7

BOTTOM HOLE
 NAD'27 S.P.C.(FT) N. 267,569.8 E. 1,644,546.8
 NAD'27 GEO. LAT.-(N) 39.227822 LONG.-(W) 80.754772
 NAD'83 UTM (M) N. 4,342,096.8 E. 521,181.5

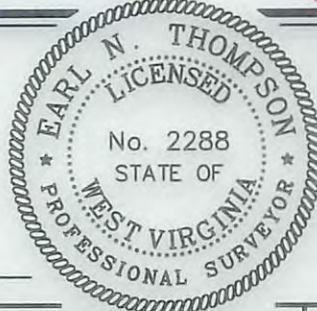
**AS DRILLED COORDINATES
 FOR WELL NO. WV 513149**
 (S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'27 S.P.C.(FT) N. 270,560.9 E. 1,641,274.5
 NAD'27 GEO. LAT.-(N) 39.235907 LONG.-(W) 80.766470
 NAD'83 UTM (M) N. 4,342,991.4 E. 520,169.4

BOTTOM HOLE
 NAD'27 S.P.C.(FT) N. 267,574.1 E. 1,644,553.1
 NAD'27 GEO. LAT.-(N) 39.227834 LONG.-(W) 80.754749
 NAD'83 UTM (M) N. 4,342,096.2 E. 521,183.4



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 DECEMBER 06, 20 13
 REVISED 03/06/14 & 02/10/15
 OPERATORS WELL NO. WV 513149
 API WELL NO. 47 - 017 - 6463
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7889ASDRILLED513149
 SCALE 1" = 1000'
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

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 967'(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± LEASE NO. 706764

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 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME
 PERMIT

10/16/2015