

02/15/2019



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Tuesday, February 12, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

EQT PRODUCTION COMPANY
625 LIBERTY AVE., SUITE 1700
PITTSBURGH, PA 15222

Re: Permit Modification Approval for BIG177H15
47-103-03191-00-00

Adjusting Landing Point from E 536248.551, N 4381455.646 to E 535830.083, N 4382277.302
Shortening the Horizontal leg from 12350' to 7437'

EQT PRODUCTION COMPANY

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

A handwritten signature in blue ink, appearing to read "James A. Martin".

James A. Martin
Chief

Operator's Well Number: BIG177H15
Farm Name: COASTAL FOREST RESOURCES CO. D/B/A COASTAL
U.S. WELL NUMBER: 47-103-03191-00-00
Horizontal 6A New Drill
Date Modification Issued: 02/12/2019

Promoting a healthy environment.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: EQT Production Company

<u>306686</u>	<u>Wetzel</u>	<u>Grant</u>	<u>Big Run</u>
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Operator ID County District Quadrangle

2) Operator's Well Number: BIG177H15 Well Pad Name: BIG177

3) Farm Name/Surface Owner: Coastal Forest Resources Co. DBA Coastal Timberlands Co. Public Road Access: Rt. 19

4) Elevation, current ground: 811' Elevation, proposed post-construction: 811'

5) Well Type (a) Gas Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

6) Existing Pad: Yes or No Yes *DMAH 12/12/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 6881', 53', 2620 PSI

8) Proposed Total Vertical Depth: 6881

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15400

11) Proposed Horizontal Leg Length: 7437

12) Approximate Fresh Water Strata Depths: 173,283,483,633

13) Method to Determine Fresh Water Depths: By offset wells

14) Approximate Saltwater Depths: 1138, 1453

15) Approximate Coal Seam Depths: 103,156,434,544

16) Approximate Depth to Possible Void (coal mine, karst, other): None reported

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No

(a) If Yes, provide Mine Info: Name: _____

Depth: _____

Seam: _____

Owner: _____

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WW-6B
(04/15)

API NO. 47-103 - 03191 02/15/2019
 OPERATOR WELL NO. BIG177H15
 Well Pad Name: BIG177

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	26	New	A-500	85.6	80	80	98 ft ³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	768	768	811 ft ³ / CTS
Coal							
Intermediate	9 5/8	New	A-500	40	2731	2731	1073 ft ³ / CTS
Production	5 1/2	New	P-110	20	15400	15400	500' above top producing zone
Tubing	2 3/8		J-55	4.7		May not be run, if run set 40' above top perf or 80° inclination	
Liners							

DMH 12/12/18

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	26	30	.312	884	35	Class A	1.18
Fresh Water	13 3/8	17 1/2	.38	2700	2160	See Variance 2014-17	1.19
Coal							
Intermediate	9 5/8	12 3/8	.395	3950	3160	Class H	1.07
Production	5 1/2	8 1/2	.361	12640	10112	Class A/H	1.123/2.098
Tubing	2 3/8	NA	.19	7700			
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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WV Department of
Environmental Protection

WW-6B
(10/14)

API NO. 47- 103 - 03191 02/15/2019
OPERATOR WELL NO. BIG177H15
Well Pad Name: BIG177

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and complete a new horizontal well in the Marcellus Formation. Drill the vertical to an approximate depth of 4030'. Kick off and drill curve. Drill the lateral in the Marcellus. Cement casing.

DMAH 12/12/18

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.1%) of chemicals (including 15% Hydrochloric acid, friction reducer, biocide, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum anticipated internal casing pressure is expected to be approximately 10000 psi, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 350,000 gallons of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 400,000 pounds of proppant per stage.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): no additional

22) Area to be disturbed for well pad only, less access road (acres): no additional

23) Describe centralizer placement for each casing string:

- Freshwater: Bow spring centralizers – One at the shoe and one spaced every 500'.
- Intermediate: Bow spring centralizers – One cent at the shoe and one spaced every 500'.
- Production: One solid body cent spaced every joint from production casing shoe to KOP

24) Describe all cement additives associated with each cement type:

Conductor: Class A no additives
Surface (Type 1 Cement): 0-3% Calcium Chloride. Used to speed the setting of cement slurries. .25% Flake Loss Circulation Material (LCM)
Intermediate (Class H Cement): 0-3% Calcium Chloride. Used to speed the setting of cement slurries. 0.25% flake. Loss Circulation Material (LCM) .6% Super FL-300 (fluid loss/lengthens thickening time)
Production:
Lead (Class A Cement): 0.2% CD-20 (dispersant makes cement easier to mix). .15% SuperFL-300 (fluid loss/lengthens thickening time) .15% SEC-10 (fluid loss) 50.50 POZ (extender)
Tail (Class H Cement): 0.2% Super CR-1 (Retarder). Lengthens thickening time. .3% Super FL-200 (fluid loss) .2% SEC-10 (Fluid loss). .2% SuperFL-350 (fluid loss) Reduces amount of water lost to formation. 60 % Calcium Carbonate. Acid solubility

25) Proposed borehole conditioning procedures:

Surface: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.

Intermediate: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.

Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume. Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across the shakers every 15 minutes.

*Note: Attach additional sheets as needed.

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WV Department of
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47-103-03191
02/15/2019

December 12, 2018

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Casing plan on Wells (BIG177)

Dear Mr. Smith,

EQT is requesting the 13-3/8" surface casing be set at 768' KB, 135' below the deepest fresh water. We will set the 9-5/8" intermediate string at 2731' KB, 50' below the base of the Gordon formation.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Erin Spine'.

Erin Spine
Regional Land Supervisor

Enc.

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WEST VIRGINIA GEOLOGICAL PROGNOSIS

Horizontal Well
BIG177H15

Drilling Objectives:	Marcellus			
County:	Wetzel			
Quad:	Big Run			
Elevation:	824 KB		811 GL	
Surface location	Northing: 396134.06	Easting: 1694465.38		
Landing Point	Northing: 398618.12	Easting: 1694813.32		
Toe location	Northing: 405333.10	Easting: 1691616.57		
Recommended Azimuth	332 Degrees			TVD: 6881 Recommended LP to TD: 7,437'

Proposed Logging Suite: No pilot hole logs on BIG177 pad, formation tops based on logs run in BIG7 and BIG176 pilot holes
Please have mudloggers rigged up on location by 6362.5' TVD.

Recommended Gas Tests: 1800, 2050, 2600, Intm Csg. Pl., 3400, 4900, 5250, KOP, (Gas test at any mine void)
Gas test during any trip or significant downtime while drilling the lateral section.

ESTIMATED FORMATION TOPS

Formation	Top (TVD)	Base (TVD)	Lithology	Comments	Top RR	Base RR
Fresh Water Zone	1	633		FW @ 173,283,483,633,.	14	22
Coal	103	106	Coal		195	208
Waynesburg	156	160	Coal		266	279
Mapletown	434	438	Coal		396	401
Pittsburgh	544	551	Coal	Planned future mining in Pittsburgh seam elev. 280' thickness 60" to 72"	585	598
Maxton	1695	1739	Sandstone	SW @ 1138,1453,.	677	748
Possible Storage Zone	1757	1813		Possible Storage Zone	718	738
Big Lime	1811	1864	Limestone		792	877
Weir	2193	2221	Sandstone		1616	1654 Base of Red
Top Devonian	2367					
Gantz	2367	2405	Silty Sand			
Fifty foot	2518	2563	Silty Sand			
Thirty foot	2589	2623	Silty Sand			
Gordon	2636	2681	Silty Sand			
Int. csg pt	2731					
Forth Sand	2723	2734	Silty Sand			
Bayard	2775	2848	Silty Sand			
Warren	3232	3278	Silty Sand	Base of Offset Well Perforations at 2877' TVD		
Speechley	3382	3396	Silty Sand			
Balltown A	3771	3788	Silty Sand			
Riley	4231	4244	Silty Sand			
Benson	4883	4922	Silty Sand			
Alexander	5231	5257	Silty Sand			
Elks	5257	6421	Gray Shales and Silts			
Sonyea	6421	6591	Gray shale			
Middlesex	6591	6636	Shale			
Genesee	6636	6713	Gray shale interbedded			
Genesee	6713	6747	Black Shale			
Tully	6747	6770	Limestone			
Hamilton	6770	6862	Gray shale with some			
Marcellus	6862	6914	Black Shale			
Purcell	6871	6873	Limestone			
-Lateral Zone	6881			Start Lateral at 6880.5'		
Cherry Valley	6891	6892	Limestone			
Onondaga	6914		Limestone			

Target Thickness	53 feet
Max Anticipated Rock Pressure	2620 PSI

Comments:
Note that this is a TVD prog for a horizontal well (azimuth of 332 degrees; target formation = Marcellus). All measurements taken from estimated KB elevation. Water and coal information estimated from surrounding well data.
Intermediate casing point is recommended 50' beneath the Gordon to shut off any water production from the Upper Devonian sands. Intermediate casing should be cemented into the surface string, per WV regulations.
The estimated landing point TVD is 6880.5', rig geologist may adjust landing point. After the well is landed, drill to reported bed dips/ geologists' recommendation. The geologic structure is unknown at this time.

**AH6 (KB 13') hit redrock at 810' KB when drilling first well on BIG177 pad (511407). Do not drill deeper than 790' to avoid hitting RR prior to running casing (this will give us 30' rat-hole).

LATERAL DRILLING TOLERANCES

Mapview - Lateral: Deviate as little as possible to the left or right of the planned wellbore.
Mapview - TD: DO NOT EXTEND beyond recommended wellbore to avoid lease line.

RECOMMENDED CASING POINTS

Coal	CSG OD	13 3/8	CSG DEPTH:	768	Beneath water show at 633'
Intermediate 1:	CSG OD	9 5/8	CSG DEPTH:	2731	Beneath the Gordon formation
Production:	CSG OD	5 1/2	CSG DEPTH:	@ TD	

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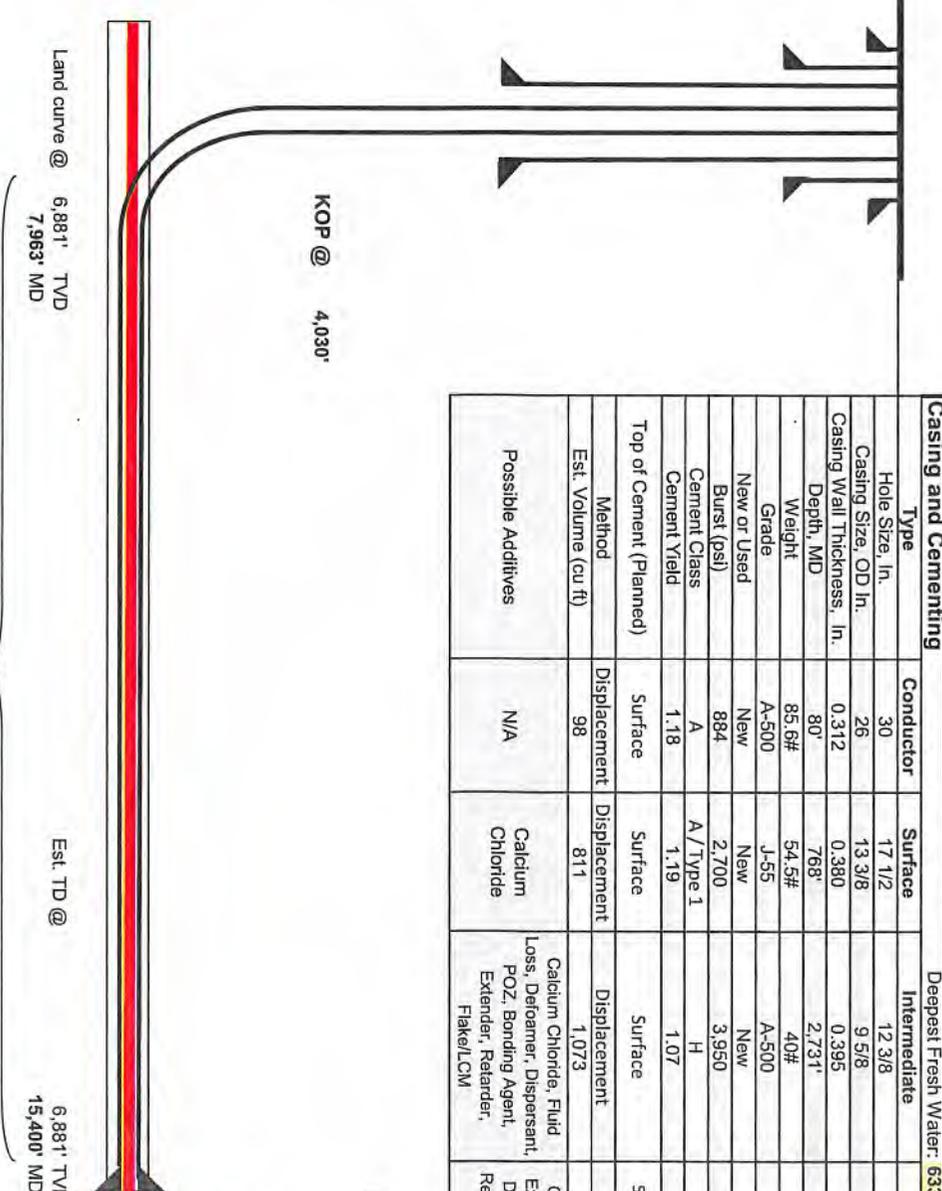
Well
EQAT Production
Big Run Quad
Wetzel County, WV

BIG177H15

Azimuth 332
 Vertical Section 9630

Note: Diagram is not to scale

Formations	Top TVD	Base TVD
Conductor	80	
Base Fresh Water	633	
Surface Casing	768	
Base Red Rock	1654	
Maxton	1695 - 1739	
Big Lime	1811 - 1864	
Weir	2193 - 2221	
Gantz	2367 - 2405	
Fifty foot	2518 - 2563	
Thirty foot	2589 - 2623	
Gordon	2636 - 2681	
Forth Sand	2723 - 2734	
Intermediate Casing	2731	
Bayard	2775 - 2848	
Warren	3232 - 3278	
Speechley	3382 - 3396	
Balktown A	3771 - 3788	
Riley	4231 - 4244	
Benson	4883 - 4922	
Alexander	5231 - 5257	
Sonyea	6421 - 6591	
Middlesex	6591 - 6636	
Genesee	6636 - 6713	
Genesee	6713 - 6747	
Tully	6747 - 6770	
Hamilton	6770 - 6862	
Marcellus	6862 - 6914	
Production Casing	15400	MD
Onondaga	6914	



Casing and Cementing		Deepest Fresh Water: 633'		
Type	Conductor	Surface	Intermediate	Production
Hole Size, In.	30	17 1/2	12 3/8	8 1/2
Casing Size, OD In.	26	13 3/8	9 5/8	5 1/2
Casing Wall Thickness, In.	0.312	0.380	0.395	0.361
Depth, MD	80'	768'	2,731'	15,400'
Weight	85.6#	54.5#	40#	20#
Grade	A-500	J-55	A-500	P-110
New or Used	New	New	New	New
Burst (psi)	884	2,700	3,950	12,640
Cement Class	A	A / Type 1	H	A / H
Cement Yield	1.18	1.19	1.07	1.123 / 2.098
Top of Cement (Planned)	Surface	Surface	Surface	500' above top Producing Zone
Method	Displacement	Displacement	Displacement	Displacement
Est. Volume (cu ft)	98	811	1,073	3,286
Possible Additives	N/A	Calcium Chloride	Calcium Chloride, Fluid Loss, Defoamer, Dispersant, POZ, Bonding Agent, Extender, Retarder, Flake/LCM	Calcium Carbonate, Fluid Loss, Extender, Dispersant, Viscosifier, Defoamer, POZ, Bonding Agent, Retarder, Anti-Settling/Suspension Agent

Proposed Well Work:
 Drill and complete a new horizontal well in the Marcellus formation.
 Drill the vertical to an approximate depth of 4030'.
 Kick off and drill curve. Drill lateral in the Marcellus. Cement casing.

7.437' Lateral

Land curve @ 6,881' TVD
 7,963' MD

Est. TD @ 6,881' TVD
 15,400' MD

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BIG177H15
BIG177
EQT PRODUCTION COMPANY

TAG	TAX MAP/PL	SURFACE OWNERS	ACREAGE
A	G-TM-8-09	ROBERT W. DULANEY	22.47 AC±
B	G-TM-2-10	HARLEY R. DULANEY, JR.	38.00 AC±
C	G-TM-5-10-1	TEORA L. & SANDRA J. DULANEY	1.53 AC±
D	G-TM-2-10-2	ROBERT W. DULANEY	0.45 AC±
E	G-TM-2-10-4	ROBERT W. DULANEY	9.03 AC±
F	G-TM-2-10-4	HARLEY R. DULANEY, JR.	0.18 AC±
G	G-TM-2-11	EDWIN LEO & LINDA L. DULANEY	28.4 AC±
H	G-TM-2-12	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	3.23 AC±
I	G-TM-2-12-1	TEORA L. & SANDRA J. DULANEY	4.72 AC±
J	G-TM-2-12-2	TEORA L. & SANDRA J. DULANEY	66.84 AC±
K	G-TM-2-13	ROBERT W. DULANEY	2.14 AC±
L	G-TM-2-14	TEORA L. & SANDRA J. DULANEY	0.286 AC±
M	G-TM-2-15	TEORA L. & SANDRA J. DULANEY	1.023 AC±
N	G-TM-2-16	TEORA L. DULANEY	3.187 AC±
O	G-TM-3-05	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	179.00 AC±
P	G-TM-3-13	EDWARD L. DULANEY	154.75 AC±
Q	G-TM-3-14	DOUGLAS J. STONBERG	79.50 AC±
R	G-TM-3-23	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	197.75 AC±
S	G-TM-3-24	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	35.08 AC±
T	G-TM-7-01	ROBERT W. DULANEY	19.90 AC±
U	G-TM-7-02-1	HARLEY R. DULANEY, JR.	2.80 AC±
V	G-TM-7-02-2	CODY N. & WALTER N. JR. MORRIS	2.43 AC±
W	G-TM-7-02	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	178 AC±
X	G-TM-7-02-1	ROBERT W. DULANEY	3.00 AC±
Y	G-TM-7-03-2	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	169.88 AC±
Z	G-TM-7-9	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	170.675 AC±
AA	G-TM-7-10	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	129.80 AC±
BB	G-TM-7-32	STELLA & LEEK POSTDETRAWIT, ET AL.	28.46 AC±
CC	G-TM-7-33	JOHN P. & ROSAMUNDE LEEA COOK	20.00 AC±
DD	G-TM-7-34	KENNETH & LORRAINE WIDMAN	44.20 AC±
EE	G-TM-7-60	CODY N. & WALTER N. JR. MORRIS	10.00 AC±
FF	G-TM-8-16	C. J. & MINNIE M. WYATT HEIBS	25.48 AC±
GG	G-TM-8-17	KENNETH & LORRAINE WIDMAN	29.88 AC±
HH	G-TM-8-01	DARIN STOCKSBAUER	17.00 AC±
II	G-TM-8-10	GARLAND E. WINDR	48.18 AC±

TAG	TAX MAP/PL	SURFACE OWNERS	ACREAGE
JJ	G-TM-8-18	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	337.80 AC±
KK	G-TM-8-19	PHILIP & KIMBERLY SHREVE	46.48 AC±
LL	G-TM-8-23	DALL DULANEY ET AL.	70.41 AC±
MM	G-TM-8-24	HALLIE HARDARGER	54.01 AC±
NN	G-TM-8-25	DEBORAH FRUNGZEK ET AL.	15.50 AC±
OO	G-TM-8-26	JAMES L. & KAREN DULANEY	16.10 AC±
PP	G-TM-8-27	JAMES L. & KAREN DULANEY	14.10 AC±
QQ	G-TM-8-28	DALE K. & SHARON L. DULANEY	288.2 AC±
RR	G-TM-8-43	JUDY K. UTT	3.25 AC±
SS	G-TM-8-66	HIGGINS CHAPEL CHURCH OF CHRIST	0.29 AC±
TT	G-TM-8-64	MARY EASTHAM ET AL.	1.45 AC±
UU	G-TM-8-65	KEY & TINA WILLEY	2.15 AC±
VV	G-TM-8-68	DOM GATHERING OPOC LLC	0.42 AC±
WW	G-TM-13-04	JEFF VIRGIL, JR. & DONNAH WILLEY	258.0 AC±
XX	G-TM-13-04.1	JEFFERY L. WILLEY	1.33 AC±
YY	G-TM-13-06	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	217.18 AC±
ZZ	G-TM-13-06.1	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	55.08 AC±
AAA	G-TM-13-07	MANSEL McDIRPITT ET AL.	51.8 AC±
BBB	G-TM-13-12	LESLIE LYDICK & SUSAN MIRACLE	5.2 AC±
CCC	G-TM-13-13	LEEMAN E. & LINDA L. DUMM	47.5 AC±
DDD	G-TM-13-14	LEEMAN E. & LINDA L. DUMM	47.5 AC±
EEE	G-TM-13-15	ROBERT COLE ET AL.	27.75 AC±

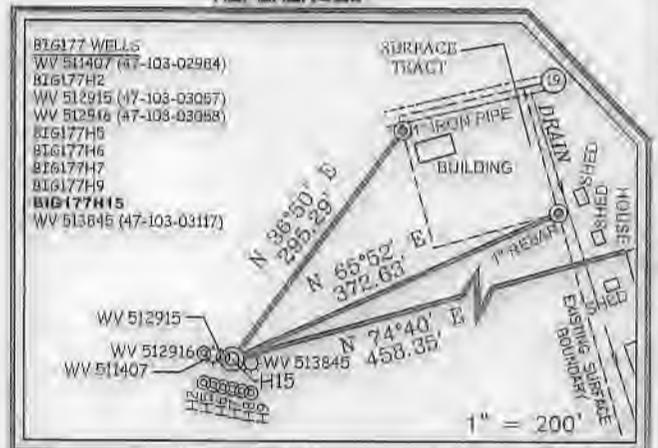
02/15/2019

ROYALTY OWNERS			
ET BLUE GRASS, LLC ET AL.	15 AC±	LEASE NO. 121102	
EQT PRODUCTION COMPANY	300 AC±	LEASE NO. 102894	
JOSEPH LEBIBEN & MINNIE SHIBEN ESTATE ET AL.	1030 AC±	LEASE NO. 102814	

NOTES ON SURVEY

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS 2500 SQ. FT. OR GREATER WERE FOUND WITHIN 525' OF THE CENTER OF PROPOSED WELL PAD. SEE REFERENCE BOX FOR DWELLING WITHIN 525' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE (SHEET 3) AND TOP MARK (SHEETS 1, 2 & 3) SCALE IS 1" = 2000'.

REFERENCES



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

NAD27 S.P.C.(FT)	N. 595,784.07	E. 1,894,460.35
NAD27 GEO.	LAT. (N) 39.582858	LONG. (W) 80.564050
NAD83 UTM (M)	N. 4,381,519.735	E. 595,735.680
LANDING POINT		
NAD27 S.P.C.(FT)	N. 398,818.12	E. 1,894,813.32
NAD27 GEO.	LAT. (N) 39.589389	LONG. (W) 80.582922
NAD83 UTM (M)	N. 4,382,277.302	E. 595,820.083
BOTTOM HOLE		
NAD27 S.P.C.(FT)	N. 405,333.76	E. 1,891,915.67
NAD27 GEO.	LAT. (N) 39.607717	LONG. (W) 80.594555
NAD83 UTM (M)	N. 4,384,306.812	E. 434,322.073

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Land & Energy Development
Solutions from the ground up.
P.O. Box 1571 • Vashon Bluffs • Chesapeake, WV 26834 • 2041 362-524
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



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

DATE MAY 4 20 17
 REVISED 8/07/17, 12/05/17, 12/12/18
 OPERATORS WELL NO. BIG177H15
 API WELL NO. 47-103-03191
 STATE 47 COUNTY 103 PERMIT 03191

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. 6806PBIG177H15R3.dwg
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE SEE NOTE 2

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



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

LOCATION: PAD ELEVATION 811' WATERSHED WILLEY FORK OF NORTH FORK FISHING CREEK
 DISTRICT GRANT COUNTY WETZEL QUADRANGLE BIG-RUN 7.5'

SURFACE OWNER COASTAL FOREST RESOURCES CO. d/b/a COASTAL TIMBERLANDS CO. ACREAGE 27± OF 217±
 ROYALTY OWNER HIGGINS FAMILY TRUST ACREAGE 242.5

PROPOSED WORK: LEASE NO. 103021
 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 6,881'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT JASON RANSON
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLAGE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME
PERMIT

BIG177H15
BIG177
EQT PRODUCTION COMPANY

BOTTOM HOLE LATITUDE 39°37'30"

3,182'

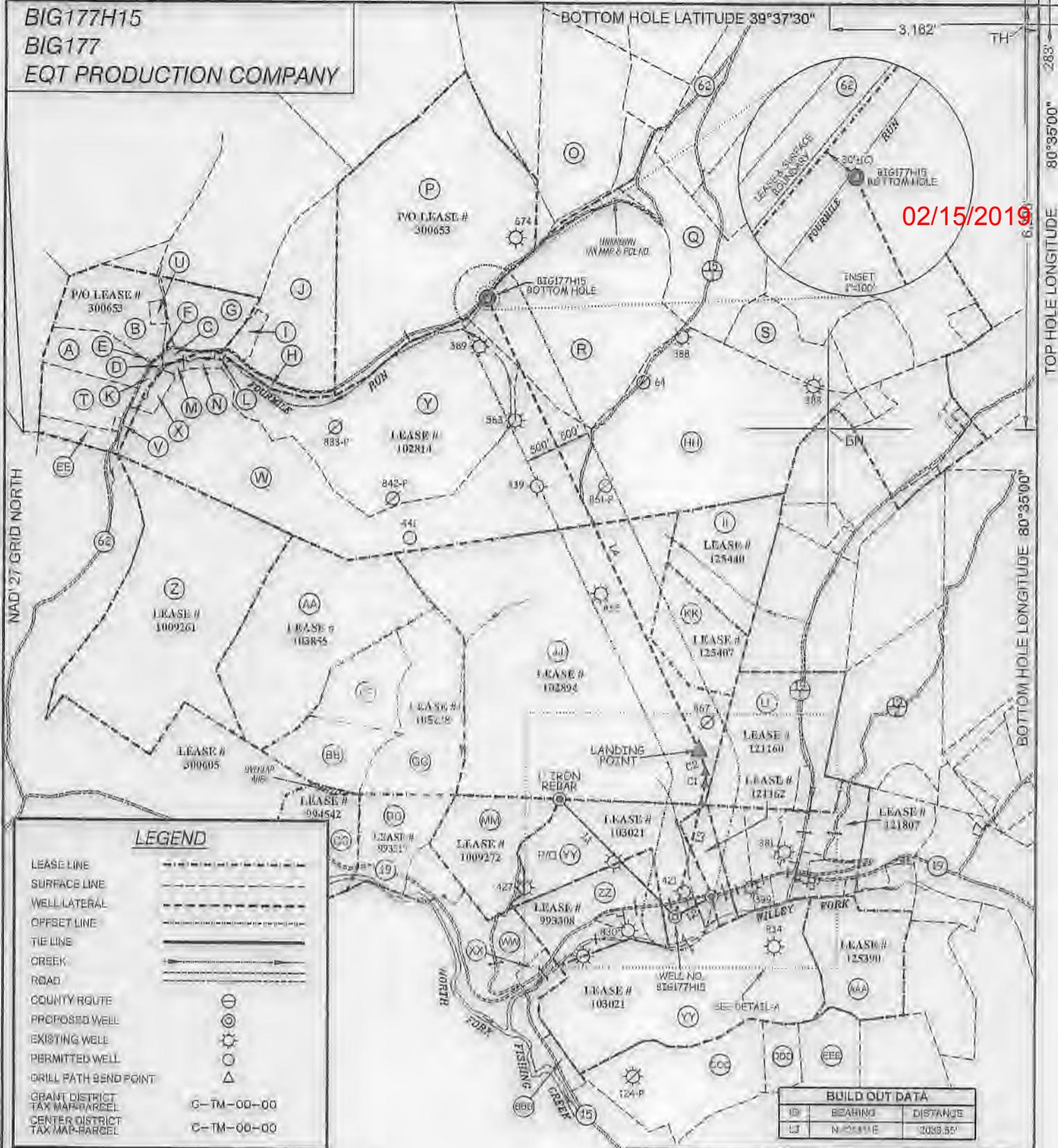
TH

TOP HOLE LONGITUDE 80°35'00"

BOTTOM HOLE LONGITUDE 80°35'00"

02/15/2019

NAD 27 GRID NORTH



LEGEND

- LEASE LINE
- SURFACE LINE
- WELL/LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- GRILL PATH BEND POINT
- GRANT DISTRICT TAX MAP-PARCEL
- CENTER DISTRICT TAX MAP-PARCEL

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'27 S.P.C.(FT) N. 396,134.07 E. 1,694,465.38
 NAD'27 GEO. LAT-(N) 39.582568 LONG-(W) 80.564060
 NAD'83 UTM (M) N. 4,381,518.733 E. 535,736.600
LANDING POINT
 NAD'27 S.P.C.(FT) N. 396,616.12 E. 1,694,813.32
 NAD'27 GEO. LAT-(N) 39.589339 LONG-(W) 80.562922
 NAD'83 UTM (M) N. 4,382,277.302 E. 535,830.083
BOTTOM HOLE
 NAD'27 S.P.C.(FT) N. 405,333.10 E. 1,691,616.57
 NAD'27 GEO. LAT-(N) 39.607717 LONG-(W) 80.592955
 NAD'83 UTM (M) N. 4,384,306.812 E. 534,822.073

BUILD OUT DATA

ID	BEARING	DISTANCE
L1	N 20°11'E	2039.55'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	178.28'	571.51'	N 07°29'42"E	177.08'
C2	337.18'	1071.77'	N 16°58'32"W	326.79'

LATERAL DATA

ID	BEARING	DISTANCE
L1	N 25°27'W	7437.08'

WELL TIES

ID	BEARING	DISTANCE
L1	N 44°54'W	2463.04'
L2	N 60°35' E	623.81'

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 www.slsenergy.com



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 FILE NO. 6806PBIG177H15R3.dwg SCALE 1" = 2000'
 DATE MAY 4, 2017
 REVISED 8/07/17, 12/05/17, 12/12/18
 OPERATORS WELL NO. BIG177H15

API WELL NO. **47-103-03191**
 STATE COUNTY PERMIT

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



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*

WELL OPERATOR EQT PRODUCTION COMPANY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

DESIGNATED AGENT JASON RANSON
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME

PERMIT

BIG177H15
BIG177
EQT PRODUCTION COMPANY

BOTTOM HOLE LATITUDE 39°37'30"

3,162'

TH

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD27 S.P.C.(FT) N: 309,134.07 E: 1,694,465.68
 NAD27 GEO. LAT-(N) 39.582558 LONG-(W) 80.584958
 NAD83 UTM (M) N: 4,381,018.733 E: 535,736.690
LANDING POINT
 NAD27 S.P.C.(FT) N: 398,618.12 E: 1,694,813.32
 NAD27 GEO. LAT-(N) 39.589380 LONG-(W) 80.582922
 NAD83 UTM (M) N: 4,382,277.302 E: 535,830.083
BOTTOM HOLE
 NAD27 S.P.C.(FT) N: 405,393.10 E: 1,691,616.57
 NAD27 GEO. LAT-(N) 39.607717 LONG-(W) 80.584666
 NAD83 UTM (M) N: 4,384,306.818 E: 534,822.073

02/15/2019

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- GREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- DRILL PATH BEND POINT
- GRANT DISTRICT TAX MAP-PARCEL G-TM-00-00
- CENTER DISTRICT TAX MAP-PARCEL C-TM-00-00

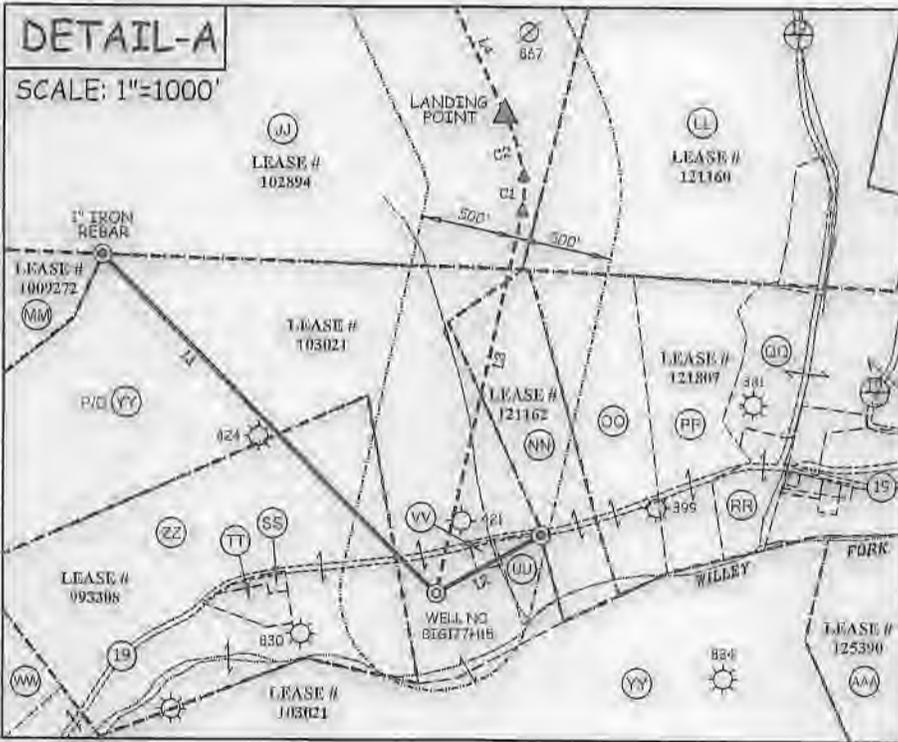


BUILD OUT DATA		
ID	BEARING	DISTANCE
L5	N 12°21' E	2033.55'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	175.88"	571.61'	N 40°29'12" E	177.88'
C2	387.18"	1071.77'	N 16°53'32" W	388.79'

LATERAL DATA		
ID	BEARING	DISTANCE
L4	N 28°27' W	7437.00'

WELL TIES		
ID	BEARING	DISTANCE
L1	N 44°54' W	2489.04'
L2	N 60°19' E	623.61'



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 www.slsurveyors.com



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

FILE NO. 5806PBIG177H15R3.dwg SCALE 1" = 2000'
 DATE MAY 4, 20 17
 REVISED 8/07/17, 12/05/17, 12/12/18
 OPERATORS WELL NO. BIG177H15

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*

API WELL NO. 47 - 103 - 03191
 STATE COUNTY PERMIT

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



WELL OPERATOR EQT PRODUCTION COMPANY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280
 BRIDGEPORT, WV 26330

DESIGNATED AGENT JASON RANSON
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280
 BRIDGEPORT, WV 26330

COUNTY NAME

PERMIT

NAD 27 GRID NORTH

BOTTOM HOLE LONGITUDE 80°35'00"

TOP HOLE LONGITUDE 80°35'00"

WW-6A1
(5/13)

Operator's Well No. BIG177H15 47-103-03191

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
See Attached				

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WV Department of
Environmental Protection

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: EQT Production Company
 By: Erin Spine 
 Its: Regional Land Supervisor

WW-6A1 attachment

Operator's Well No.

BIG177H15

Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>103021</u>	<u>Higgins Family Trust, et al. (current royalty owner)</u>		**	
	James V. Higgins (original lessor)	The Philadelphia Company of West Va.		DB 60/414
	The Philadelphia Company of West Va.	Pittsburgh & West Virginia Gas Company		22A/352
	Pittsburgh & West Virginia Gas Company	Equitable Gas Company		DB 187/321
	Equitable Gas Company	Equitrans, Inc.		OG 71A/453
	Equitrans, Inc.	Equitrans, LP		DB 105/908
	Equitrans, LP	EQT Production Company		DB 131A/81
<u>121162</u>	<u>ET Blue Grass LLC, et al (current royalty owner)</u>		**	
	Julia Willey, et al (original lessor)	Equitable Gas Company		48/147
	Equitable Gas Company	Equitrans, Inc.		71A/453
	Equitrans, Inc.	Equitrans, LP		DB 105/908
	Equitrans, LP	EQT Production Company		131A/81
<u>102894</u>	<u>EQT Production Company (current royalty owner)</u>		**	
	J. B. Hicks (original lessor)	The Philadelphia Company of West Va.		OG 47/441
	The Philadelphia Company of West Va.	Pittsburgh & West Virginia Gas Company		OG 22A/352
	Pittsburgh & West Virginia Gas Company	Equitable Gas Company		DB 187/321
	Equitable Gas Company	Equitrans, Inc.		OG 71A/453
	Equitrans, Inc.	Equitrans, LP		DB 105/908
	Equitrans, LP	Equitable Production-Eastern States Inc. (EPES)		AB 23/899 Marion Co.
	Equitable Production-Eastern States Inc. (EPES)	Equitable Production Company		see attached
	Equitable Production Company	EQT Production Company		CB 13/14
<u>102814</u>	<u>Shiben Estates, Inc</u>	EQT Production Company	**	DB 182A/84

** Per West Virginia Code Section 22-6-8.

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CORPORATION BUREAU
ROOM 308 NORTH OFFICE BUILDING
P.O. BOX 8722
HARRISBURG, PA 17105-8722

315

EQUITABLE PRODUCTION COMPANY

PA

THE CORPORATION BUREAU IS HAPPY TO SEND YOU YOUR FILED DOCUMENT.
PLEASE NOTE THE FILE DATE AND THE SIGNATURE OF THE SECRETARY OF THE
COMMONWEALTH. THE CORPORATION BUREAU IS HERE TO SERVE YOU AND WANTS
TO THANK YOU FOR DOING BUSINESS IN PENNSYLVANIA. IF YOU HAVE ANY
QUESTIONS PERTAINING TO THE CORPORATION BUREAU, CALL (717) 787-1057.

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ENTITY NUMBER: 2980374

MICROFILM NUMBER: 2001032

1297-1300

C T CORP SYSTEM
COUNTER

200132-1297

APR 30 2001

Microfilm Number _____

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Filed with the Department of State on _____

Entity Number 2980374

DEC 17 2018

Ken Pappajohn
Secretary of the Commonwealth

WV Department of
Environmental Protection

ARTICLES OF MERGER-DOMESTIC BUSINESS CORPORATION

DSCB:15-1926 (Rev 90)

JD

In compliance with the requirements of 15 Pa.C.S. § 1926 (relating to articles of merger or consolidation), the undersigned business corporations, desiring to effect a merger, hereby state that:

1. The name of the corporation surviving the merger is: Equitable Production Company

2. (Check and complete one of the following):

The surviving corporation is a domestic business corporation and the (a) address of its current registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is (the Department is hereby authorized to correct the following information to conform to the records of the Department):

(a) _____
Number and Street City State Zip County

(b) c/o: CT Corporation System Allegheny
Name of Commercial Registered Office Provider County

For a corporation represented by a commercial registered office provider, the county in (b) shall be deemed the county in which the corporation is located for venue and official publication purposes.

_____ The surviving corporation is a qualified foreign business corporation incorporated under the laws of _____ and the (a) address of its current registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is (the Department is hereby authorized to correct the following information to conform to the records of the Department):

(a) _____
Number and Street City State Zip County

(b) c/o: _____
Name of Commercial Registered Office Provider County

For a corporation represented by a commercial registered office provider, the county in (b) shall be deemed the county in which the corporation is located for venue and official publication purposes.

_____ The surviving corporation is a nonqualified foreign business corporation incorporated under the laws of _____ and the address of its principal office under the laws of such domiciliary jurisdiction is:

Number and Street City State Zip

3. The name and the address of the registered office in this Commonwealth or name of its commercial registered office provider and the county of venue of each other domestic business corporation and qualified foreign business corporation which is a party to the plan of merger are as follows:

Name of Corporation	Address of Registered Office or Name of Commercial Registered Office Provider	County
<u>Equitable Production Company</u>	<u>CT Corporation System</u>	<u>Allegheny</u>
<u>Equitable Production-Eastern States, Inc.</u>	<u>CT Corporation System</u>	<u>Allegheny</u>

200132-1298

DSCB:15-1926 (Rev 90)-2

4. (Check, and if appropriate complete, one of the following):

___ The plan of merger shall be effective upon filing these Articles of Merger in the Department of State.

The plan of merger shall be effective on: April 30, 2001 at _____ Date Hour

5. The manner in which the plan of merger was adopted by each domestic corporation is as follows:

Name of Corporation	Manner of Adoption
<u>Equitable Production Company</u>	<u>Adopted by Board of Directors pursuant to Sec. 1924 of the PA BCL</u>
_____	_____
_____	_____

6. (Strike out this paragraph if no foreign corporation is a party to the merger). The plan was authorized, adopted or approved, as the case may be, by the foreign business corporation (or each of the foreign business corporations) party to the plan in accordance with the laws of the jurisdiction in which it is incorporated.

7. (Check, and if appropriate complete, one of the following):

The plan of merger is set forth in full in Exhibit A attached hereto and made a part hereof.

___ Pursuant to 15 Pa.C.S. § 1901 (relating to omission of certain provisions from filed plans) the provisions, if any, of the plan of merger that amend or constitute the operative Articles of Incorporation of the surviving corporation as in effect subsequent to the effective date of the plan are set forth in full in Exhibit A attached hereto and made a part hereof. The full text of the plan of merger is on file at the principal place of business of the surviving corporation, the address of which is:

Number and Street	City	State	Zip	County
_____	_____	_____	_____	_____

IN TESTIMONY WHEREOF, the undersigned corporation or each undersigned corporation has caused these Articles of Merger to be signed by a duly authorized officer thereof this 26th day of April, 2001.

Equitable Production Company

(Name of Corporation)

BY: Henry E. Reich
Henry E. Reich, J (Signature)

TITLE: Vice President

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Equitable Production - Eastern States, Inc.

(Name of Corporation)

BY: Johanna G. O'Loughlin
Johanna G. O'Loughlin (Signature)

TITLE: Corporate Secretary

200132-1299

AGREEMENT AND PLAN OF MERGER
BETWEEN
EQUITABLE PRODUCTION – EASTERN STATES, INC.
AND
EQUITABLE PRODUCTION COMPANY

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WV Department of
Environmental Protection

AGREEMENT AND PLAN OF MERGER, dated this 30th day of April 2001, pursuant to Section 251 of the General Corporation Law of the State of Delaware between Equitable Production – Eastern States, Inc., a Delaware corporation, and Equitable Production Company, a Pennsylvania corporation.

WHEREAS, the constituent corporations desire to merge into a single corporation.

NOW, THEREFORE, the corporations, parties to this Agreement, in consideration of the mutual covenants, agreements and provisions hereinafter contained, do hereby prescribe the terms and conditions of said merger and mode of carrying the same into effect as follows:

FIRST: Effective on April 30, 2001, Equitable Production Company, hereby merges into itself Equitable Production – Eastern States, Inc., and Equitable Production Company shall be the surviving corporation.

SECOND: The Articles of Incorporation of Equitable Production Company as heretofore amended and as in effect on the date of the merger provided in this Agreement, shall continue in full force and effect as the Articles of Incorporation of the corporation surviving this merger.

THIRD: The outstanding shares of the capital stock of Equitable Production – Eastern States, Inc. shall be cancelled as of the effective date of the merger pursuant to this Agreement and no new shares issued therefor.

FOURTH: The terms and conditions of the merger are as follows:

- (a) The by-laws of the surviving corporation as they shall exist on the effective date of this Agreement shall be and remain the by-laws of the surviving corporation until the same shall be altered, amended and repealed as therein provided.
- (b) The directors and officers of the surviving corporation shall continue in office until the next annual meeting of the shareholders

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF STATE

APRIL 30, 2001

TO ALL WHOM THESE PRESENTS SHALL COME, GREETING:

EQUITABLE PRODUCTION COMPANY

I, Kim Pizzingrilli, Secretary of the Commonwealth of Pennsylvania do hereby certify that the foregoing and annexed is a true and correct photocopy of Articles of Merger

which appear of record in this department

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IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Seal of the Secretary's Office to be affixed, the day and year above written.

Kim Pizzingrilli

Secretary of the Commonwealth

DPOS