



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

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BUILDING II
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for 514460
47-095-02257-00-00

Change conductor casing size, lateral shifted changing landing point and bottom hole locations.

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.

James A. Martin
Chief

Operator's Well Number: 514460
Farm Name: WELLS, VIVIAN J.
U.S. WELL NUMBER: 47-095-02257-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 08/23/2017

Promoting a healthy environment.

08/25/2017

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

1) Well Operator: EQT Production Company 306686 Tyler McElroy Shirley
Operator ID County District Quadrangle

2) Operator's Well Number: 514460 Well Pad Name: SHR60

3) Farm Name/Surface Owner: Vivian J Wells et al Public Road Access: 60/2

4) Elevation, current ground: 1011 Elevation, proposed post-construction: 1011

5) Well Type (a) Gas Oil Underground Storage

Other

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No yes

DMAH 8/17/17

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 6588' TVD, 52' thick, 2747 PSI

8) Proposed Total Vertical Depth: 6588'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 21005'

11) Proposed Horizontal Leg Length: 14011'

12) Approximate Fresh Water Strata Depths: 86,136,573,909'

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

14) Approximate Saltwater Depths: 1201,1868'

15) Approximate Coal Seam Depths: 22, 423, 689, 878, 1318'

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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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	60	60	73 ft ³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	997	997	839 ft ³ / CTS
Coal							
Intermediate	9 5/8	New	A-500	40	2779	2779	1084 ft ³ / CTS
Production	5 1/2	New	P-110	20	21005	21005	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							

DMAH 8/17/17

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	1378	26	Class A	1.18
Fresh Water	13 3/8	17 1/2	.38	2700	2160	See Variance 2014-17	1.2
Coal							
Intermediate	9 5/8	12 3/8	.395	3950	3160	See Variance 2014-17	1.25 / 1.18
Production	5 1/2	8 1/2	.361	12640	10112	Class H	1.123/2.098
Tubing	2 3/8	NA	.19	7700			
Liners							

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PACKERS

Kind:				
Sizes:				
Depths Set:				

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 6723'. Tag the Onondaga not more than 100', run logs, then plug back with solid cement plug to approximately 5200'. Kick off and drill curve. Drill the lateral in the Marcellus. Cement casing.

DMD 8/17/17

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 0.3%) 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 sand 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:

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

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

Conductor: Class A no additives
 Surface (Class A Cement): 0-3% Calcium Chloride Used to speed the setting of cement slurries
 Intermediate (Class A Cement): 0-3% Calcium Chloride Used to speed the setting of cement slurries.
 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

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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.

47-095-02257 *Met*

WEST VIRGINIA GEOLOGICAL PROGNOSIS

514460(SHR60)

Horizontal Well
514460(SHR60H1)

v. 2016.5

Drilline Objectives:

County:
Quad:
Elevation:
Surface location
Landing Point
Toe location
Recommended Azimuth

Marcellus
Tyler
Shurley

1027 KB

1011 GL, as built

Northing: 328582.21
Northing: 328240.15
Northing: 315351.52
156 Degrees

Eastng: 1629438.62
Eastng: 1629438.93
Eastng: 1634933.55

TVD: 6588
Recommended LP to TD: 14,011'

Proposed Logging Suite:

Formation tops based on pilot hole logs from SHR60 well 514460 (deep) and 514463 (intermediate). An elog should be run for the first well on every horizontal well pad. Please have mudloggers rigged up on location by 6154' TVD.

Recommended Gas Tests:

1800, 2050, 2600, Intm Csg Pt., 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
Fresh Water Zone	1	909		TW @ 86, 136, 571, 000
Coal	22	26	Coal	
Coal	423	427	Coal	No past, present, or planned mining
Coal	689	693	Coal	
Coal	878	882	Coal	
Coal	1318	1322	Coal	
Maxton	1537	1590	Sandstone	SW @ 1201, 1808
Big Lume	1832	2114	Limestone	
Weir	2254	2320	Sandstone	
Top Devonian	2371			
Gantz	2371	2418	Sdy Sand	
Fifty foot	2464	1499	Sdy Sand	
Thury foot	2598	2639	Sdy Sand	
Gordon	2689	2703	Sdy Sand	
Int csg pt	2779			
Fifth Sand	2894	2923	Sdy Sand	
Bayard	3010	3070	Sdy Sand	Base of Offset Well Perforations at 5030' TVD
Warren	3342	3416	Sdy Sand	
Speechley	3436	3554	Sdy Sand	
Baltown A	3858	3928	Sdy Sand	
Raley	4551	4588	Sdy Sand	
Benson	4968	5005	Sdy Sand	
Alexander	5225	5297	Sdy Sand	
Eiks	5297	6215	Gray Shales and Silts	
Sonyca	6215	6384	Gray shale	
Mudlessex	6384	6428	Shale	
Genetee	6428	6504	Gray shale interbedded	
Genesco	6504	6533	Black Shale	
Tully	6533	6557	Limestone	
Hamilton	6557	6574	Gray shale with some	
Marcellus	6574	6626	Black Shale	
Purcell	6581	6592	Limestone	Start Lateral at 6588'
Lateral Zone	6588			
Cherry Valley	6609	6617	Limestone	
Onondaga	6626		Limestone	

Top BH	Base BH
26	562
60	70
329	348
394	405
428	668
536	993
689	704
744	755
783	816
819	848
910	940
971	975
1288	1318
1836	1879

Base of Red Rock

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Target Thickness	52 feet
Max Anticipated Rock Pressure	2747 PSI

DWH 8/17/17

Comments:
Note that this is a TVD prog for a horizontal well (azimuth of 156 074 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 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 6588'. 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.

LATERAL DRILLING TOLERANCES

Maxview - Lateral: Deviate as little as possible to the left or right of the planned wellbore
Maxview - TD: (DO NOT EXCEED) beyond recommended wellbore to avoid lease line

RECOMMENDED CASING POINTS

Fresh Water/Coal	CSG OD	13.38	CSG DEPTH	97	As set	Below the freshwater
Intermediate L:	CSG OD	9.58	CSG DEPTH	2779	As set	Beneath the Gordon formation
Production:	CSG OD	5.12	CSG DEPTH	TD		

08/25/2017

95-02257
MOT

**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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**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: Victoria J Roark
 Its: Regional Land Supervisor

Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty Book/Page	
126101	<u>George Birklein, et al (current royalty owner)</u>			**
	WM. Blaine Underwood Et ux et al (original lessor)	Equitable Gas Co.	DB186/86	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	EQT Production Company	DB396/640	
	Equitrans, L.P.	EQT Production Company	OG420/10	
5-18-7.1	Brenda J. Ashley, et al	EQT Production Company	508/181	Subsurface Attached
5-18-7.1	Patricia A. Keys	EQT Production Company	514/375	Subsurface Attached
5-18-9	Billy Joe Rayburn a/k/a William Joe Rayburn, et al	EQT Production Company	508/175	Subsurface Attached
5-18-9	Lawrence Rayburn, et al	EQT Production Company	508/177	Subsurface Attached
126167	<u>Berdina Rose, et al (current royalty owner)</u>			**
	Savannah Pratt, et al (original lessor)	Equitable Gas Co.	DB192/425	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	EQT Production Company	DB396/640	
126161	<u>John A. Dillon, et al (current royalty owner)</u>			**
	John M. Pierpoint, et al (original lessor)	Equitable Gas Co.	DB192/368	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	EQT Production Company	DB396/640	
126211	<u>Below the Fifth Sand</u>			**
	<u>John A. Dillon, et al (current royalty owner)</u>			
	Mary E. Underwood, et vir (original lessor)	Hope Natural Gas Co.	DB70/477	
	Hope Natural Gas Co.	Consolidated Gas Supply Corp.	DB169/26	
	Consolidated Gas Supply Corp.	Consolidated Gas Transmission Corp.	DB249/287	
	Consolidated Gas Transmission Corp.	CNG Development Co.	DB253/57	
	CNG Development Co.	Dominion Appalachian Development, Inc.	DB337/340	
	Dominion Appalachian Development, Inc.	Consol Gas Appalachian Development, LLC	CB9/131	name change
	Consol Gas Appalachian Development, LLC	CNX Gas Co., LLC	CB9/206	name change
	CNX Gas Co., LLC	EQT Production Co.	DB479/55	
	CNX Gas Co., LLC/Noble Energy, Inc	EQT Production Co.	AB505/222	
190034	<u>Paul Weekley (current royalty owner)</u>			**
	Paul Weekley, et al (original lessor)	EQT Production Co.	DB548/119	
126186	<u>Bruce L. Stoneking, et al (current royalty owner)</u>			**
	Addie Keys & Paul Weekley (original lessor)	Equitable Gas Company	DB195/372	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	EQT Production Company	DB396/640	
126137	<u>S.A. Smith and C. Burke Morris Trust, et al (current royalty owner)</u>			**
	Carl C. Weekley, et al (original lessor)	Equitable Gas Co.	DB191/536	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	Equitable Production Company	DB396/640	
126152	<u>Linda Sue Lamb, et al (current royalty owner)</u>			**
	Carl C. Weekley, et al (original lessor)	Equitable Gas Co.	DB191/489	
	Equitable Gas Co.	Equitrans, Inc.	DB274/471	
	Equitrans, Inc./Equitable Gas Company/Equitable Resrouces, Inc.	Equitrans, L.P.	DB433/777	
	Equitrans, L.P.	EQT Production Company	DB396/640	

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<p>126133 <u>Dorothy H. Bode (current royalty owner)</u> Mollie Scott (original lessor) Equitable Gas Co. Equitrans, Inc./Equitable Gas Company/Equitable Resources, Inc. Equitrans, L.P.</p>	<p>Equitable Gas Company Equitrans, Inc. Equitrans, L.P. EQT Production Company</p>	<p>DB191/417 DB274/471 DB433/777 DB396/640</p>
**		
<p>105456 <u>Kimberly Wilcox (current royalty owner)</u> Olive I. Stewart, et vir (original lessor) J. L. Newman The Philadelphia Company of West Virginia Pittsburgh and West Virginia Gas Company Equitable Gas Co. Equitrans, Inc./Equitable Gas Company/Equitable Resources, Inc. Equitrans, L.P.</p>	<p>J L Newman The Philadelphia Company of West Virginia Pittsburgh and West Virginia Gas Company Equitable Gas Co. Equitrans, Inc. Equitrans, L.P. EQT Production Company</p>	<p>LB69/42 OG455/390 DB101/36 132/414 DB274/471 DB433/777 DB396/640</p>
**		
<p>126138 <u>Sandra Lee Freeman-Corrao (current royalty owner)</u> E. K. Freeman, et ux. (original lessor) Equitable Gas Company Equitrans, Inc./Equitable Gas Company/Equitable Resources, Inc. Equitrans, L.P.</p>	<p>Equitable Gas Company Equitrans, Inc. Equitrans, L.P. EQT Production Company</p>	<p>DB 32/161 DB 274/471 DB 433/777 DB 396/640</p>
**		
<p>126177 <u>Regina M.Buck, et al (current royalty owner)</u> J.S. Buck, et ux (original lessor) Equitable Gas Company Equitrans, Inc Equitrans, L.P.</p>	<p>Equitable Gas Company Equitrans, Inc Equitrans, L.P. EQT Production Company</p>	<p>DB97/533 154/475 329/645 DB396/640</p>

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

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47-095-02257
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Teresea R Hamilton
TYLER County 01:21:34 PM
Instrument No 114424
Date Recorded 11/05/2015
Document Type AGR
Pages Recorded 2
Book-Page 508-181
Recording Fee \$5.00
Additional \$6.00

**MEMORANDUM OF
SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT**

EOI ATTN: TINA MAXWELL
115 PROFESSIONAL PLACE PO BOX 280
BRIDGEPORT, WV 26330-0280

1. NAME AND ADDRESS OF GRANTOR:

Brenda J. Ashley and Stephen D. Ashley
1048 Middle Island Road
Middlebourne, WV 26149

2. NAME AND ADDRESS OF GRANTEE:

EQT Production Company
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

3. SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT REFERENCE:

A SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT dated the 5th day of October, 2015, was entered into for good and valuable consideration by and between Brenda J. Ashley and Stephen D. Ashley, her husband, ("Grantor", whether one or more) and EQT Production Company ("Grantee").

4. DESCRIPTION OF PREMISES: That certain tract or parcel of land containing 102.31 acres, more or less, located on the waters of Jefferson Run in Tyler County, West Virginia, being the same lands conveyed to Grantor by Deed dated the 15th day of October, 1998, of record in the Office of the Clerk of the County Commission of Tyler County, West Virginia in Deed Book 326, at Page 372. ("the Property").

5. TERM: The SUBSURFACE RIGHT-OF-WAY AND EASEMENT shall run with the land and shall remain in full force and effect until released and relinquished by the Grantee back to the Grantor, in writing.

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IN WITNESS WHEREOF, the parties have signed their names hereto as of the date of the Agreement referenced in Section 3 above.

GRANTOR:

GRANTEE:
EQT Production Company

Brenda J. Ashley
Brenda J. Ashley

John W. Damato
By: John W. Damato
Its: Attorney in fact

Stephen D. Ashley
Stephen D. Ashley

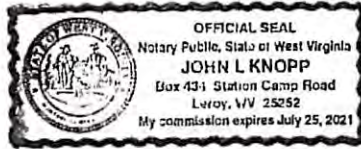
STATE OF WEST VIRGINIA;

COUNTY OF TYLER :

I, John Knopp, a Notary Public, in and for said State and County, do hereby certify that Brenda J. Ashley and Stephen D. Ashley, personally known to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be their free act and deeds for uses and purposes therein set forth.

Given under my hand this 5th day of October, 2015.

My Commission expires: July 25, 2021



John Knopp
Notary Public

STATE OF WEST VIRGINIA ;

COUNTY OF HARRISON :

I, Tina Maxwell, a Notary Public, in and for said State and County, do hereby certify that John W. Damato, personally known to be the same person whose name is subscribed to the foregoing instrument and the Attorney in fact of EQT Production Company, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be his free act and deed for uses and purposes therein set forth on behalf of said company.

Given under my hand this 12th day of October, 2015.

My Commission expires: August 29, 2019



Tina Maxwell
Notary Public

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MEMORANDUM OF
SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT

EQT - TINA MAXWELL
115 PROFESSIONAL PLACE PO BOX 280
BRIDGEPORT, WV 26330-0280

1. NAME AND ADDRESS OF GRANTOR:

Patricia A. Keys
536 Briarcliff CT
New Martinsville, WV 26155

2. NAME AND ADDRESS OF GRANTEE:

EQT Production Company
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

3. SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT REFERENCE:

A SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT dated the 29th day of September, 2015, was entered into for good and valuable consideration by and between Patricia A. Keys, a single woman ("Grantor", whether one or more) and EQT Production Company ("Grantee").

4. DESCRIPTION OF PREMISES: That certain tract or parcel of land containing 102.31 acres, more or less, located on the waters of Jefferson Run in Tyler County, West Virginia, being the same lands conveyed to Grantor by Deed dated the 15th day of October, 1998, of record in the Office of the Clerk of the County Commission of Tyler County, West Virginia in Deed Book 326, at Page 372. ("the Property").

5. TERM: The SUBSURFACE RIGHT-OF-WAY AND EASEMENT shall run with the land and shall remain in full force and effect until released and relinquished by the Grantee back to the Grantor, in writing.

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Teresasa K Hamilton
TYLER County 10:47:32 AM
Instrument No 11690
Date Recorded 12/28/2015
Document Type R04
Pages Recorded 2
Book Page 514-375
Recording Fee \$5.00
Additional \$6.00

08/25/2017

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date of the Agreement referenced in Section 3 above.

GRANTOR:

GRANTEE:
EQT Production Company

Patricia A. Keys
Patricia A. Keys

John W. Damato
By: John W. Damato
Its Attorney in fact

STATE OF WEST VIRGINIA:

COUNTY OF WETZEL:

I, John Knopp, a Notary Public, in and for said State and County, do hereby certify that Patricia A. Keys, a single woman, personally known to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be their free act and deeds for uses and purposes therein set forth.

Given under my hand this 29th day of September, 2015.

My Commission expires: July 25, 2021



John L. Knopp
Notary Public

STATE OF WEST VIRGINIA :

COUNTY OF HARRISON :

I, Tina Maxwell, a Notary Public, in and for said State and County, do hereby certify that John W. Damato, personally known to be the same person whose name is subscribed to the foregoing instrument and the Attorney in fact of EQT Production Company, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be his free act and deed for uses and purposes therein set forth on behalf of said company.

Given under my hand this 1st day of October, 2015.

My Commission expires: August 29, 2019



Tina Maxwell
Notary Public

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This instrument was prepared by EQT Production Company, 1710 Pennsylvania Avenue, Charleston, WV 25302.

47-095 - 02257
MOD
Teresea R Hamilton
TYLER County 01:11:26 PM
Instrument No 114420
Date Recorded 11/05/2015
Document Type AGR
Pages Recorded 2
Book-Page 508-175
Recording Fee \$5.00
Additional \$6.00

**MEMORANDUM OF
SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT**

ATTN: TINA HAWMELL
115 PROFESSIONAL PLACE PO BOX 280
BRUNSWICK, WV 26330-0280

1. NAME AND ADDRESS OF GRANTOR:

Billy Joe Rayburn a/k/a William Joe Rayburn and Jackie Jo Rayburn
3499 State Hwy 2078
Olive Hill, KY 41164

2. NAME AND ADDRESS OF GRANTEE:

EQT Production Company
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

3. SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT REFERENCE:

A SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT dated the 28th day of September, 2015, was entered into for good and valuable consideration by and between Billy Joe Rayburn a/k/a William Joe Rayburn and Jackie Jo Rayburn, his wife, ("Grantor", whether one or more) and EQT Production Company ("Grantee").

4. DESCRIPTION OF PREMISES:

That certain tract or parcel of land containing 100 acres, more or less, located on the waters of Morrisons Run in Tyler County, West Virginia, being the same lands conveyed to Grantor by Deed dated the 21st day of December, 1979, of record in the Office of the Clerk of the County Commission of Tyler County, West Virginia in Deed Book 223, at Page 22. ("the Property").

5. TERM:

The SUBSURFACE RIGHT-OF-WAY AND EASEMENT shall run with the land and shall remain in full force and effect until released and relinquished by the Grantee back to the Grantor, in writing.

(REMAINDER OF PAGE LEFT BLANK INTENTIONALLY)

RECEIVED
Office of Oil and Gas
AUG 21 2017
WV Department of
Environmental Protection

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date of the Agreement referenced in Section 3 above.

GRANTOR:

GRANTEE:
EQT Production Company

Billy Joe Rayburn
Billy Joe Rayburn a/k/a
William Joe Rayburn
Jackie Jo Rayburn
Jackie Jo Rayburn

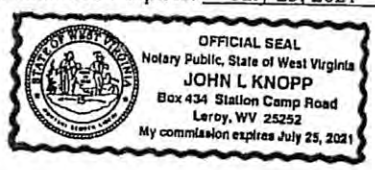
John W. Damato
By: John W. Damato
Its: Attorney in fact

STATE OF WEST VIRGINIA ;
COUNTY OF CABELL :

I, John Knopp, a Notary Public, in and for said State and County, do hereby certify that Billy Joe Rayburn a/k/a William Joe Rayburn and Jackie Jo Rayburn, his wife, personally known to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be their free act and deeds for uses and purposes therein set forth.

Given under my hand this 28th day of September, 2015.

My Commission expires: July 25, 2021.



John L. Knopp
Notary Public

STATE OF WEST VIRGINIA ;
COUNTY OF HARRISON :

I, Tina Maxwell, a Notary Public, in and for said State and County, do hereby certify that John W. Damato, personally known to be the same person whose name is subscribed to the foregoing instrument and the Attorney in fact of EQT Production Company, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be his free act and deed for uses and purposes therein set forth on behalf of said company.

Given under my hand this 6th day of October, 2015.

My Commission expires: August 29, 2019.



Tina Maxwell
Notary Public

RECEIVED
Office of Oil and Gas
AUG 21 2017
WV Department of
Environmental Protection

This instrument was prepared by EQT Production Company, 1710 Pennsylvania Avenue, Charleston, WV 25302.

47-095-02257
Teresea R Hamilton
TYLER County 01:16:15 PM
Instrument No 114421
Date Recorded 11/05/2015
Document Type AGR
Pages Recorded 2
Book-Page 508-177
Recording Fee \$5.00
Additional \$6.00
MAD

MEMORANDUM OF
SUBSURFACE RIGHT-OF-WAY AND EASEMENT AGREEMENT

EBT ATTN: TINA MAXWELL
115 PROFESSIONAL PLACE PO BOX 280
BRIDGEPORT, WV 26330-0280

1. NAME AND ADDRESS OF GRANTOR:

Lawrence Rayburn and Shelia Kay Rayburn
212 Fitch Lane
Olive Hill, KY 41164

2. NAME AND ADDRESS OF GRANTEE:

EQT Production Company
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

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08/25/2017

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date of the Agreement referenced in Section 3 above.

GRANTOR:

GRANTEE:

EQT Production Company

Lawrence Rayburn
Lawrence Rayburn

John W. Damato
By: John W. Damato
Its: Attorney in fact

Shelia Kay Rayburn
Shelia Kay Rayburn

STATE OF WEST VIRGINIA;

COUNTY OF CABELL;

I, John Knopp, a Notary Public, in and for said State and County, do hereby certify that Lawrence Rayburn and Shelia Kay Rayburn, his wife, personally known to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be their free act and deeds for uses and purposes therein set forth.

Given under my hand this 28th day of September, 2015.

My Commission expires: July 25, 2021.



John L. Knopp
Notary Public

STATE OF WEST VIRGINIA ;

COUNTY OF HARRISON ;

I, Tina Maxwell, a Notary Public, in and for said State and County, do hereby certify that John W. Damato, personally known to be the same person whose name is subscribed to the foregoing instrument and the Attorney in fact of EQT Production Company, appeared before me this day in person in the State and County aforesaid, and acknowledged and delivered the said instrument to be his free act and deed for uses and purposes therein set forth on behalf of said company.

Given under my hand this 6th day of October, 2015.

My Commission expires: August 29, 2019.



Tina Maxwell
Notary Public

RECEIVED
Office of Oil and Gas
AUG 21 2017
WV Department of
Environmental Protection

47-095-02257
MOD



EQT Production Company
2400 Zenith Ridge Rd.
Suite 200
Canonsburg, PA 15317
www.eqt.com

Todd Klaner
Manager, Permitting
tklaner@eqt.com

Via E-Mail

August 10, 2017

WV DEP Reviewer

**RE: EQT Production Company
PAD ID – SHR60
Well# - 514460
Tyler**

Dear Reviewer,

This well indicated by this permit application contains a Subsurface Easement Agreement for non-productive portions of the well bore. Attached is a Memorandum of Subsurface Use Agreement, which gives EQT the right to drill below the surface of the tracts 15-18-9 and 15-18-7.1, shown on the well plat.

EQT Production understands that the WVDEP will issue the permit in the normal process subject to the completeness of the requirements of the Office of Oil and Gas and does not take a position with regards to the property rights under this agreement.

EQT Production agrees that the WVDEP's issuance of the permit is in no way an affirmation or validation of EQT Production's claimed rights.

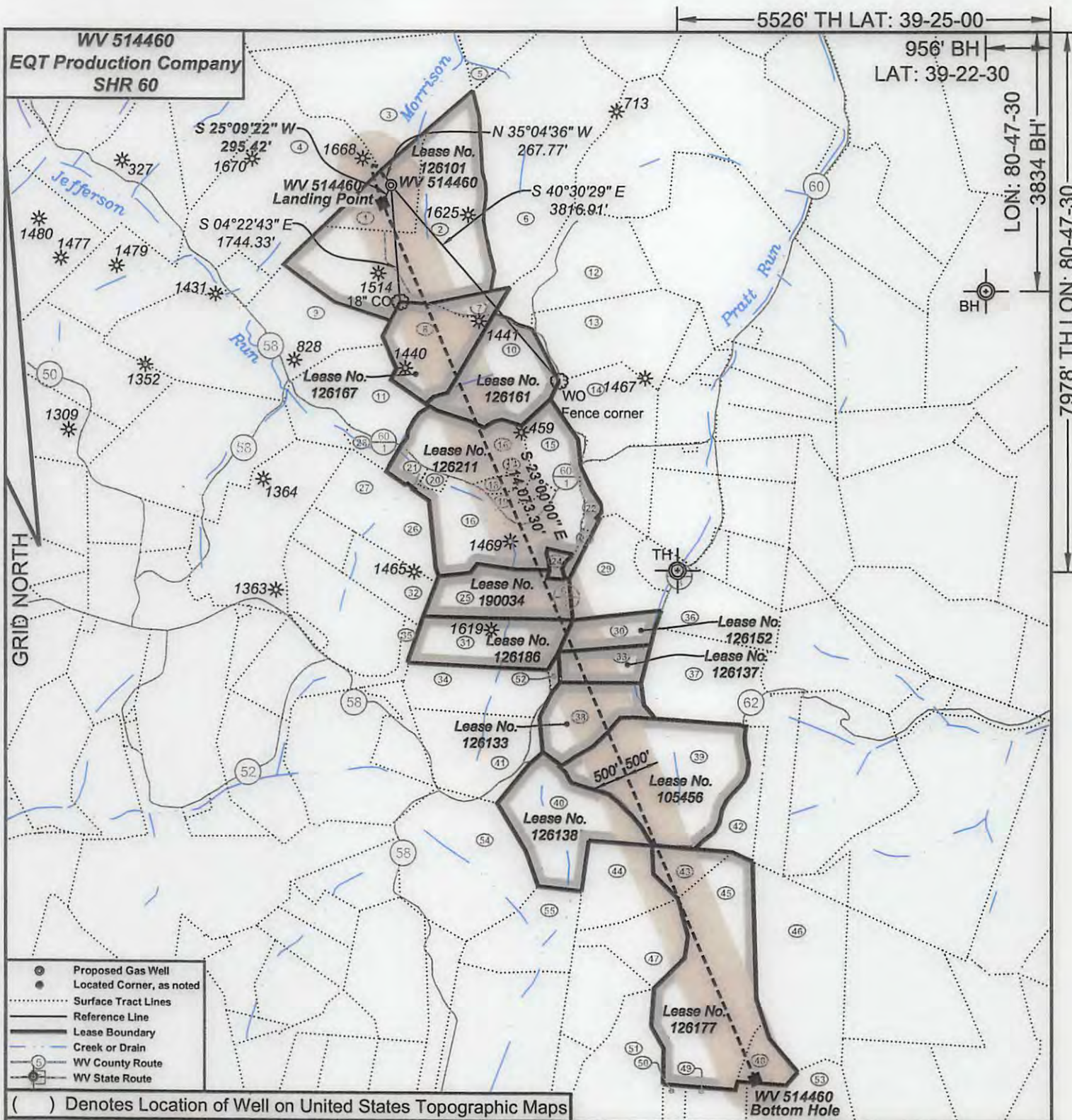
Regards,

A handwritten signature in blue ink, appearing to read 'Todd Klaner', is written over a light blue horizontal line.

Todd Klaner
Manager, Permitting
EQT Production Company

RECEIVED
Office of Oil and Gas
AUG 21 2017
WV Department of
Environmental Protection

08/25/2017



- ⊙ Proposed Gas Well
- Located Corner, as noted
- Surface Tract Lines
- Reference Line
- Lease Boundary
- Creek or Drain
- ⊖ WV County Route
- ⊖ WV State Route

() Denotes Location of Well on United States Topographic Maps



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 Department of Environmental Protection.

Ben R. Singleton
P.S. 2092



SEAL

FILE NO: 208-13
DRAWING NO: 208-13 SHR 60 H1
SCALE: 1" = 2000'
MINIMUM DEGREE OF ACCURACY: 1:2500
PROVEN SOURCE OF ELEVATION: NGS CORS Station

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

DATE: August 8 20 17
OPERATOR'S WELL NO.: WV 514460
API WELL NO. *MOD 02257*
47 - 95 -
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION: ELEVATION: As-Built 1,011' WATERSHED Morrison Run of McElroy Creek QUADRANGLE: Shirley
DISTRICT: McElroy COUNTY: Tyler
SURFACE OWNER: Vivian J. Wells, et al. ACREAGE: 55.58
ROYALTY OWNER: George Birklein, et al. LEASE NO: 126101 ACREAGE: 240
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus ESTIMATED DEPTH: 6596

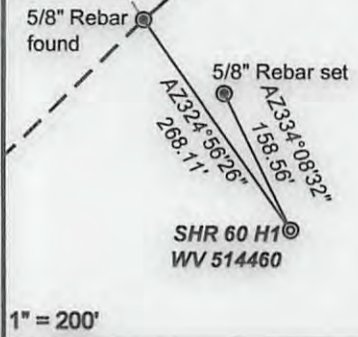
08/25/2017

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray
ADDRESS: 115 Professional Place PO Box 280 ADDRESS: 115 Professional Place PO Box 280
Bridgeport, WV 26330 Bridgeport, WV 26330

WV 514460
EQT Production Company
SHR 60

Tract I.D.	Tax Map No.	Parcel No.	County	District	Surface Tract Owner	Acres
1	18	12	Tyler	McElroy	Hanna A. Underwood Estate	35.00
2	18	13	Tyler	McElroy	Blaine Underwood Estate, et al.	104.73
3	18	9	Tyler	McElroy	Lawrence Rayburn, et al.	100.00
4	18	7.1	Tyler	McElroy	Patricia A. Keys, et al.	102.31
5	18	10	Tyler	McElroy	Susan Spencer	2.92
6	18	11	Tyler	McElroy	Susan Spencer	132.00
7	18	15	Tyler	McElroy	Susan Spencer	8.00
8	18	16	Tyler	McElroy	Donald E. Bible Sr.	35.50
9	18	23	Tyler	McElroy	Clyde Seckman Estate	111.75
10	18	17	Tyler	McElroy	Allen Dale Fornash, et al.	43.00
11	18	22	Tyler	McElroy	Donald E. Bible Sr.	39.26
12	18	14	Tyler	McElroy	Terry J. Cumberledge, et al.	54.81
13	18	18	Tyler	McElroy	Terry J. Cumberledge, et al.	49.87
14	18	19	Tyler	McElroy	John Paul Davis	35.00
15	18	20.2	Tyler	McElroy	Richard E. Hansen	19.96
16	18	20	Tyler	McElroy	Clarence G. Dillon, et al	113.42
17	18	20.6	Tyler	McElroy	Clarence G. Dillon Jr.	0.71
18	18	20.5	Tyler	McElroy	Clarence G. Dillon Jr.	2.94
19	18	20	Tyler	McElroy	Clarence G. Dillon, et al	113.42
20	18	20.4	Tyler	McElroy	John A. Dillon	2.04
21	18	20.3	Tyler	McElroy	Peter H. Mueller	4.69
22	18	20.1	Tyler	McElroy	William R. Doll Jr, et al.	3.06
23	21	44	Tyler	McElroy	William R. Doll Jr, et al.	2.43
24	21	45	Tyler	McElroy	Clarence G. Dillon, et al	2.43
25	21	15	Tyler	McElroy	Paul Weekley	36.00
26	21	14	Tyler	McElroy	Donnie N. & Kim M. Wilmoth	73.39
27	21	14	Tyler	McElroy	Donnie N. & Kim M. Wilmoth	73.39
28	18	21	Tyler	McElroy	Barbara Willier	5.90
29	22	20	Tyler	McElroy	James B. Scott	30.00
30	21	18	Tyler	McElroy	Richard E. & Barbara A. Mullins	20.00
31	21	16	Tyler	McElroy	Paul Weekley	36.00
32	21	14	Tyler	McElroy	Donnie N. & Kim M. Wilmoth	73.39
33	21	19	Tyler	McElroy	Richard E. & Barbara A. Mullins	20.00
34	21	17	Tyler	McElroy	Paul Weekley	32.95
35	21	27	Tyler	McElroy	Donnie N. & Kim M. Wilmoth	7.50
36	21	21	Tyler	McElroy	James B. Scott	30.00
37	22	19	Tyler	McElroy	Berdina Rose, et al.	55.00
38	21	21	Tyler	McElroy	James B. Scott	30.00
39	22	18	Tyler	McElroy	Bruce W. Boland	86.75
40	21	33	Tyler	McElroy	Bruce W. Boland	52.46
41	21	23	Tyler	McElroy	Peggy A. White	45.88
42	22	18.1	Tyler	McElroy	Bruce W. Boland	18.91
43	22	17	Tyler	McElroy	David R. & Elizabeth A. Beveridge	12.00
44	22	16	Tyler	McElroy	Leah Weekley	29.00
45	2	18	Doddridge	West Union	David R. & Elizabeth A. Beveridge	125.00
46	2	1	Doddridge	West Union	James M. Petrovich, et al.	70.00
47	22	15	Tyler	McElroy	Isalah Weekley	25.00
48	2	5.4	Doddridge	West Union	David R. & Elizabeth A. Beveridge	11.90
49	2	5.1	Doddridge	West Union	David R. & Elizabeth A. Beveridge	20.88
50	2	4.1	Doddridge	West Union	Robert B. & Marry E. Simpson	20.00
51	2	4	Doddridge	West Union	Robert B. & Marry E. Simpson	38.50
52	22	20	Tyler	McElroy	James B. Scott	30.00
53	2	9	Doddridge	West Union	Charles C. Hittel III	115.75
54	21	32	Tyler	McElroy	Asia Dall Cumberledge, et al.	75.75
55	21	34	Tyler	McElroy	Bruce W. Boland	35.43

Well References



- SHR 60**
- H1, 514460
 - H2, 514461
 - H3, 514462
 - H4, 514463
 - H5, 514464
 - H6, 514465
 - H7, 514466
 - H8, 515434
 - H9, 515435
 - H10, 515436
 - H11, 515437
 - H12, 515438

Notes:
 WV 514460 coordinates are
 NAD 27 N: 328,582.21 E: 1,629,438.82
 NAD 27 Lat: 39.394727 Long: -80.811240
 NAD 83 UTM N: 4,360,607.42 E: 516,268.70
 WV 514460 Landing Point coordinates are
 NAD 27 N: 328,314.5 E: 1,629,313.18
 NAD 27 Lat: 39.393988 Long: -80.811670
 NAD 83 UTM N: 4,360,525.23 E: 516,231.84
 WV 514460 Bottom Hole coordinates are
 NAD 27 N: 315,359.95 E: 1,634,812.04
 NAD 27 Lat: 39.358642 Long: -80.791556
 NAD 83 UTM N: 4,356,606.58 E: 517,972.93

West Virginia Coordinate system of 1927 (North Zone) based upon Differential GPS Measurements. Plat orientation, corner and well ties are based upon the grid north meridian. Well location references are based upon the grid north meridian. UTM coordinates are NAD83, Zone 17, Meters.



Lease No.	Acres	Owner
126167	43	Berdina Rose, et al.
126161	43	John A. Dillon, et al.
126211	145	John A. Dillon, et al.
190034	36	Paul Weekley
126186	36	Bruce L. Stoneking, et al.
126137	20	S.A. Smith & C. Burke Morris Trust, et al.
126152	20	Linda Sue Lamb, et al.
126133	40	Dorothy H. Bode
105456	96	Kimberly Wilcox
126177	138	Regina M. Buck, et al.
126138	46.57	Sandra Lee Freeman-Corrao

- Proposed Gas Well
- Located Corner, as noted
- Surface Tract Lines
- Reference Line
- Lease Boundary
- Creek or Drain
- WV County Route
- WV State Route

Sub Surface Easements

Parcel No.	Acres	Owner
05-18-9	100	Billy Joe Rayburn, et ux.
05-18-9	100	Lawrence Rayburn, et ux.
05-18-7.1	102.31	Brenda J. Ashley, et vir.
05-18-7.1	102.31	Patricia A. Keys



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 Department of Environmental Protection.

Ben R. Singleton
 P.S. 2092



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