

02/22/2019



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

Wednesday, February 20, 2014
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

CNX GAS COMPANY LLC
POST OFFICE BOX 1248

JANE LEW, WV 263786506

Re: Permit Modification Approval for SHR38GHSM
47-095-02514-00-00

Lateral Extension

CNX GAS COMPANY LLC

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", is written over a faint circular stamp.

James A. Martin
Chief

Operator's Well Number: SHR38GHSM
Farm Name: JAMES E. ASH ET AL
U.S. WELL NUMBER: 47-095-02514-00-00
Horizontal 6A New Drill
Date Modification Issued: February 20, 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: CNX Gas Company, LLC 494458046 Tyler Centerville West Union
Operator ID County District Quadrangle

2) Operator's Well Number: SHR38GHSM Well Pad Name: SHR38

3) Farm Name/Surface Owner: Ash Public Road Access: Duckworth Ridge Road

4) Elevation, current ground: 1026' Elevation, proposed post-construction: 1012'

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

(b) If Gas Shallow X Deep _____
Horizontal X

*QEB
11/29/2018*

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Target formation is Marcellus Shale @ 6460'-6505' TVD, 45' thick, expected formation pressure ~4000 psi

8) Proposed Total Vertical Depth: 6480'

9) Formation at Total Vertical Depth: Marcellus Shale (will not penetrate Onondaga)

10) Proposed Total Measured Depth: 16,957'

11) Proposed Horizontal Leg Length: 9977'

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12) Approximate Fresh Water Strata Depths: 114', 209', 225', 415'

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13) Method to Determine Fresh Water Depths: Offset well information

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14) Approximate Saltwater Depths: 1932'

15) Approximate Coal Seam Depths: No known mineable coal seams; trace @ 108', 1208'

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

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

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

WW-6B
(04/15)

API NO 47 0909502 502514 02/22/2019 ^{msD}
 OPERATOR WELL NO. SHR38GHS
 Well Pad Name: SHR38

18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20	New	L/S	<94.0	100	100	96 / CTS
Fresh Water	13.375	New	J-55	54.5	565	565	392 / CTS
Coal	N/A						
Intermediate	9.625	New	J-55	36.0	2550	2550	827 / CTS
Production	5.5	New	P-110	20.0	16957	16957	3300 / TOC @ 2050'
Tubing	2.375	New	J-55	4.7		TBD	N/A
Liners	N/A						

Handwritten signature/initials

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20	24	0.375	N/A	N/A	Type 1	1.18
Fresh Water	13.375	17.5	0.380	2730	<500	Class A	1.19
Coal	N/A						
Intermediate	9.625	12.25	0.352	3520	<2815	Class A	1.19
Production	5.5	8.75 x 8.5	0.361	12360	~10000 during frac	Class H	1.10
Tubing	2.375	N/A	0.190	7700	N/A	N/A	N/A
Liners	N/A						

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Kind:	N/A			
Sizes:				
Depths Set:				

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

Utilize conductor rig to set 20" conductor into solid rock and cement back to surface. MIRU drilling rig. Air drill 17-1/2" hole. Run and cement 13-3/8" fresh water casing. Note that there are no known mineable coal seams in this area. Air drill 12-1/4" hole. Run and cement 9-5/8" intermediate casing. Air drill 8-3/4" production hole to curve KOP (this section is typically directionally drilled with a slant/tangent profile for anti-collision and for lateral spacing). Displace hole with 12.0-12.8 ppg SOBMs. Drill 8-1/2" curve from KOP to landing point. Continue drilling 8-1/2" lateral to TD (geosteer this section to remain in Marcellus target window). Perform clean-up cycle to condition well. Run and cement 5-1/2" production casing. Suspend well and skid to next well or RDMO drilling rig.

gcb
11/29/2018

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

Run CBL to ~60 degrees in the curve and back to surface to determine production casing TOC. Test production casing and toe prep well. MIRU stimulation/hydraulic fracturing equipment. Fracture well by pumping required number of stages utilizing plug-and-perf method. Max anticipated treating pressure is ~10,000 psi and max anticipated treating pump rate is 80-90 bpm. Number of stages and stage spacing to be finalized after drilling. After last stimulation stage, drill out frac plugs and clean-out well to PBTD. Flow back and clean-up well. Tie well into production. Run tubing when required.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 15.57

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22) Area to be disturbed for well pad only, less access road (acres): 6.97

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23) Describe centralizer placement for each casing string:

Fresh water string: centralize shoe joint and every other joint to surface - utilize bow spring centralizers. Intermediate string: centralize shoe joint and every 3rd joint to surface - utilize bow spring centralizers. Production string: centralize every joint from shoe to TOC - utilize single piece/rigid bow centralizers. Actual centralizer placement may be changed based on hole conditions.

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

Fresh water string: Class A cement with 1%-3% CaCl₂ and 1/4 pps cello-flake/LCM. Intermediate string: Class A cement with 0%-2% CaCl₂ and 1/4 pps cello-flake/LCM. Production string: Class H cement or Class H: Poz blend with dry blend and/or liquid additives including retarder, suspension agent, gas block, defoamer, fluid loss control, extender, dispersant, anti-settling agent. Actual cement blends may vary slightly depending upon cementing service company utilized.

25) Proposed borehole conditioning procedures:

Air sections are typically vertical holes - will ensure the hole is clean at section TD prior to TOOH to run casing (may require mist and/or soap to clean the hole). For the production hole - once at TD, circulate at max flowrate with max rotation until the shakers clean-up (typically requires multiple bottoms-up). For the production casing - once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.

*Note: Attach additional sheets as needed.

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09 5 02 5 14 med

SHR38 Cement Additives

Fresh water string: Class A cement with 1%-3% CaCl₂ and 1/4 pps cello-flake/LCM.
Intermediate string: Class A cement with 0%-2% CaCl₂ and 1/4 pps cello-flake/LCM.
Production string: Class H cement or Class H:Poz blend with dry blend and/or liquid additives including retarder, suspension agent, gas block, defoamer, fluid loss control, extender, dispersant, anti-settling agent. Actual cement blends may vary slightly depending upon cementing service company utilized.

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DRILLING WELL PLAN
SHR38GHSM (Marcellus HZ)
Marcellus Shale Horizontal
Tyler County, WV

Ground Elevation			SHR38GHSM SHL				N 320181.66, E 1622485.25 (NAD27)			
Azimuth			SHR38GHSM LP				N 320199.53, E 1622547.81 (NAD27)			
WELLBORE DIAGRAM			SHR38GHSM BHL				N 310765.92, E 1625796.06 (NAD27)			
WELLBORE DIAGRAM	HOLE	CASING	GEOLOGY	MD	TVD	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
	24"	20" L/S	Conductor	100	100	AIR	To Surface	N/A	N/A	Stabilize surface fill/soil
	17-1/2"	13-3/8" 54.5# J-55 BTC	Shallowest Fresh Water		114	AIR / FW Mist	15.6 ppg Class A + 1% to 3% CaCl2 + 1/4 pps Flake 20% OH Excess Yield = 1.19 TOC @ surface	Centralize every other joint from shoe to surface Bow spring centralizers	Ensure the hole is clean at section TD	Set through fresh water zones Cemented to surface No known mineable coal seams
			Deepest Fresh Water		415					
			Fresh Water Casing	565	565					
	12-1/4"	9-5/8" 36.0# J-55 LTC	No known coal zones		N/A	AIR / Soap	15.6 ppg Class A + 0% to 2% CaCl2 + 1/4 pps Flake 20% OH Excess Yield = 1.19 TOC @ surface	Centralize every 3rd joint from shoe to surface Bow spring centralizers	Soap the hole as needed and ensure the hole is clean at section TD	Set through potential salt water zones Cemented to surface Casing to be set below the Big Injun and Berea and into Devonian Shale
			Big Lime		1867					
			Big Injun		1932					
			Price		2072					
			Weir		2232					
			Berea		2422					
	8-3/4" Tangent	5-1/2" 20.0# P-110 VAR	Gordon		2642	AIR	15.0 ppg Class H with additives (retarder, suspension agent, gas block, defoamer, fluid loss, extender, etc.) 10% OH Excess Yield = 1.10 TOC @ >= 500' above 9-5/8" shoe	Centralize every joint from shoe to TOC Single-piece/rigid bow centralizers	Once at TD, circulate at max flowrate with max rotation until shakers clean-up (typically requires multiple bottoms-up) Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement	Note: Actual centralizer placement may be changed due to hole conditions Note: Actual cement blends may vary slightly depending upon service company utilized
			Warren		3337					
			Benson		4917					
			Alexander		5162					
			Cashaqua		6162					
Middlesex				6267						
West River				6307						
Burkett				6377						
Tully				6407						
Hamilton				6428						
Marcellus				6447						
Production Casing	16957	6480	12.0-12.8 ppg SOB							

LP @ +/- 6480' TVD

8-3/4" x 8-1/2" Hole - Cemented Long String
 5-1/2" 20.0# P-110 VAR

+/- 9977' Lateral

TD @ +/- 6480' TVD

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SHR38 Pad Frac - SOG Review

In accordance with WVDEP 35CSR8 Section 5.11, all known shallow oil and gas (SOG) wells have been identified within a 500' radius of the SHR38 pad. Any SOG well that falls within the Area of Review (AOR) has been reviewed and is provided in a list that includes API, Operator, Well Name, Well Number, Current Status, Total Depth, and Producing Formation at Total Depth. See following pages, including (Figures 3 and 4).

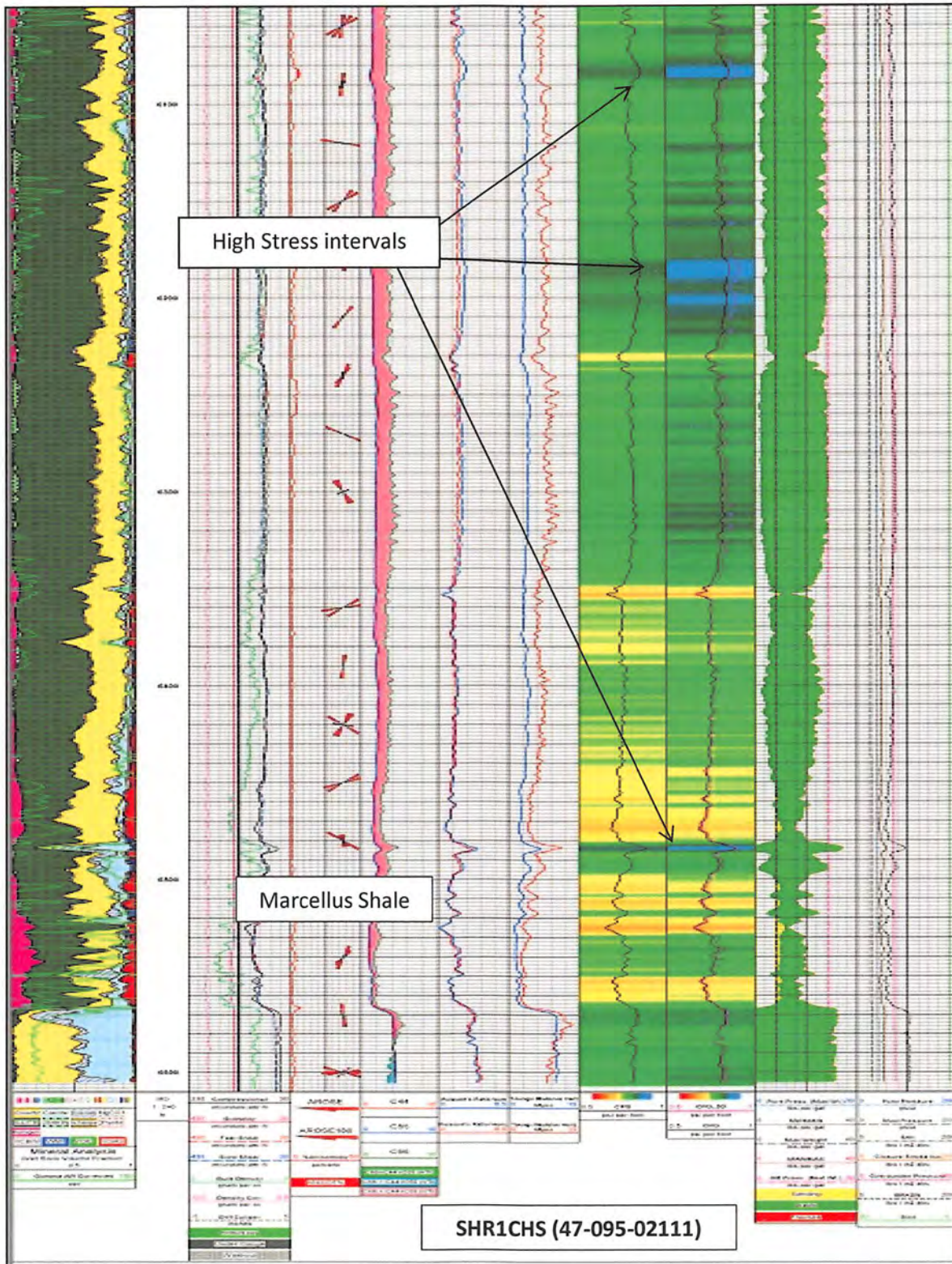
The Marcellus Shale of the Shirley area is found at an approximate True Vertical Depth (TVD) of 6500'. In the Shirley area, there are very few producing formations between the Big Injun and the Benson Sand. Most wells are either approximately 2000' or 5000' deep. Although there are a significant number of SOG Communication events in the Shirley area, it is highly unlikely that communication will occur with any wells producing from formations shallower than the Benson Sand, found at an approximate TVD of 5000'. This is based on previous experience and study of SOG Communication with Marcellus fracs throughout Ritchie and Doddridge counties.

The current hypothesis for SOG Communication is that Marcellus frac fluids and pressure intersect and migrate up a nearby fault that acts as a conduit for upward migration and intersection with high permeability reservoirs of the Alexander and Benson. Both of these reservoirs are primarily depleted, allowing an easier pressure migration throughout these formations. Geomechanical data is collected from dipole sonic logs. CNX's nearest sonic data is from the SHR1C well (Figure 1), immediately north of the SHR38 pad. Frac modeling (Figure 2) of the Marcellus in the area does not show significant upward frac growth. In fact, typical frac height would need to be more than double to reach the Alexander, approximately 1000' above the Marcellus Shale.

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SHR38 Pad Frac SOG Review / CRSD Review Thursday, November 8, 2018

Figure 1. Stratigraphic intervals of high stress should serve as adequate confining layers, or frac barriers, for a Marcellus frac, seen below in the SHR1C Stress Profile log.

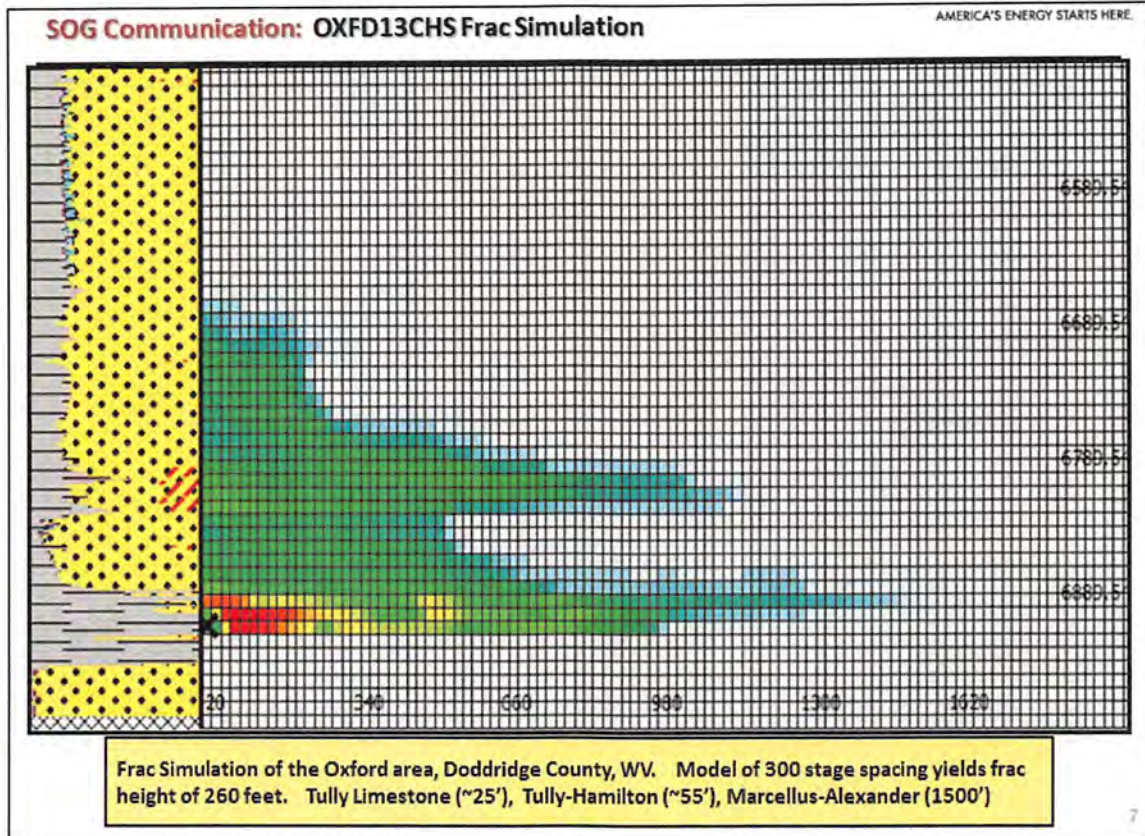


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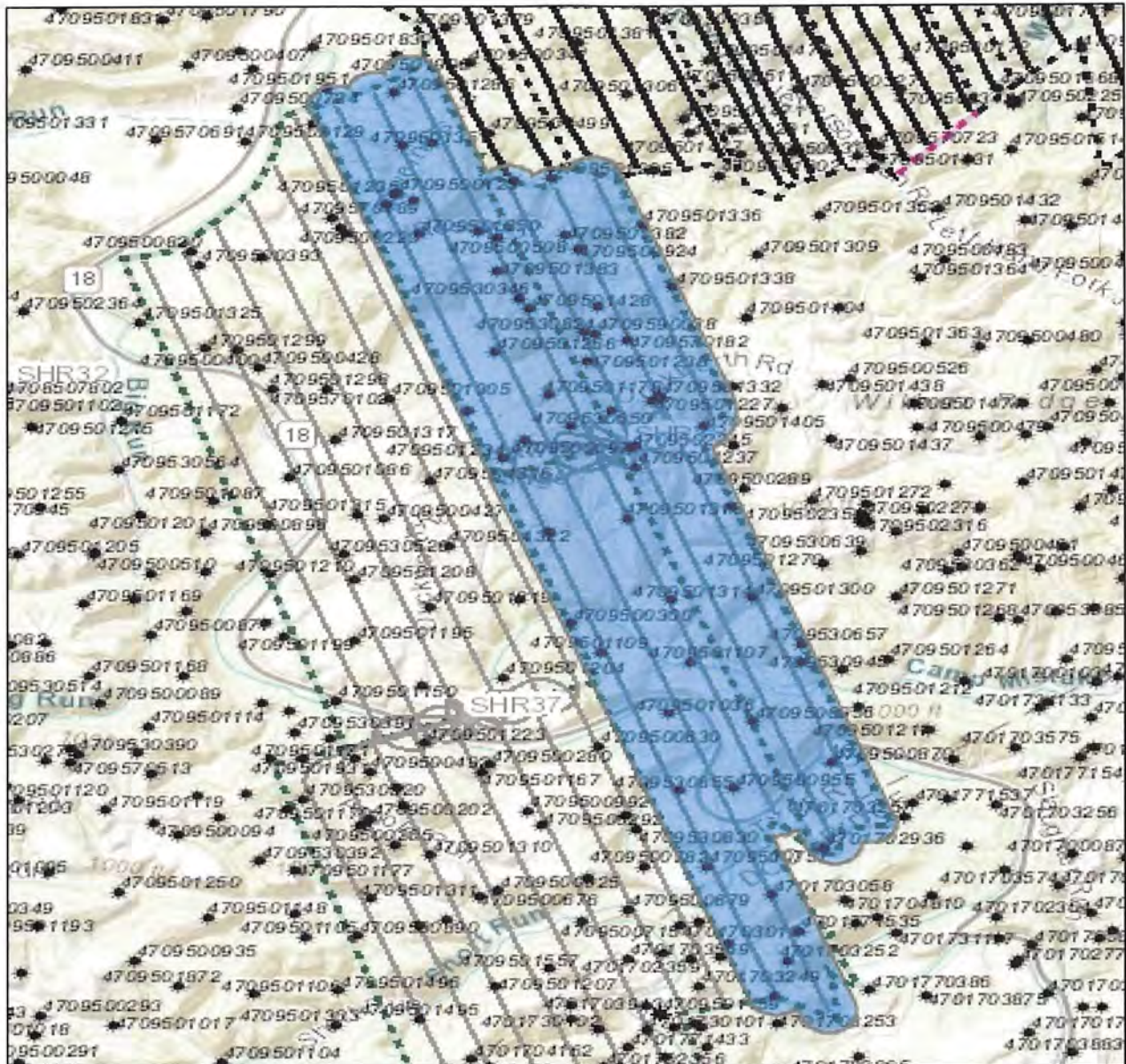
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Figure 2. Stratigraphic intervals of high stress should serve as adequate frac barriers for a Marcellus frac. The frac modeling example below is from the Oxford area of western Doddridge County, where the Marcellus and adjacent shallower shales are lithologically similar to Pennsboro. Frac modeling only yields frac height of approximately 300' and falls far short of the 1000' required to communicate with the Alexander or Benson formations. Therefore, faulting is the primary suspect for upward frac migration.



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Figure 3. All wells within 500' buffer around the SHR38 pad have been reviewed and listed below.



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SHR38 Pad Frac SOG Review / CRSD Review Thursday, November 8, 2018

Figure 4. All wells within 500' buffer around the SHR38 pad have been reviewed and listed below. Three pre-permit wells had no data (highlighted pink).

API	STATE	COUNTY	LATITUDE	LONGITUDE	OPERATOR	STATUS	WELL_NAME	WELL_NO	TD	FMTD	ELEVATION
4701702361	WV	Doddridge	39.33791934	-80.82944913	Industrial Gas Associates	Oil and Gas	LG Hammer 2		2396	Weir	930
4701702462	WV	Doddridge	39.34440133	-80.82341529	J & J Enterprises, Inc. Now Doddridge 2936	not available	Paul Strickling		Dodd 2936	Dodd 2936	830
4701702936	WV	Doddridge	39.34430633	-80.82337923	J & J Enterprises, Inc.	Gas	P Strickling 1		4900	Benson	845
4701703058	WV	Doddridge	39.34116734	-80.8266802	J & J Enterprises, Inc.	Gas	Middle Island		5117	Alexander	1039
4701703252	WV	Doddridge	39.33671524	-80.82565321	J & J Enterprises, Inc.	Gas	W & V McCutcheon		5500	Alexander	1092
4701703586	WV	Doddridge	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4701771437	WV	Doddridge	39.33436122	-80.82657418	Hope Natural Gas Company	not available	McCutchan-Haines				1135
4701771535	WV	Doddridge	39.33671526	-80.82489324	Hope Natural Gas Company	not available	NA Joseph				977
4709500097	WV	Tyler	39.37191314	-80.84222593	Piggott, L. G.	Gas	John Ash	1	2005	Big Injun (undif)	941
4709500103	WV	Tyler	39.38803655	-80.84941881	Bachelor, D.	Oil and Gas	DD Davis	1	1925	Big Injun (undif)	946
4709500113	WV	Tyler	39.38780257	-80.85102277	Oper in Min. owner fld. no code assign (Orphan well prof)	Oil and Gas	DD Davis	2	1885	Big Injun (undif)	830
4709500120	WV	Tyler	39.38944545	-80.84290196	Oper in Min. owner fld. no code assign (Orphan well prof)	Dry w/ Gas Show	W C Pierson / Josephs Mills	1	1952	Squaw	873
4709500123	WV	Tyler	39.38858257	-80.85033279	Oper in Min. owner fld. no code assign (Orphan well prof)	Oil w/ Gas Show	DD Davis	3	1883	Big Injun (undif)	803
4709500208	WV	Tyler	39.33188259	-80.84805585	Bachelor, D.	Dry w/ Oil & Gas Show	Frank H Ash	1	2109	Price Fr & equivs	927
4709500300	WV	Tyler	39.35951588	-80.83941436	Prior, Ferrell L.	Gas	Alexander Doak Heits	1	1836	Big Injun (undif)	785
4709500508	WV	Tyler	39.38548884	-80.84398493	Equitable Gas Co.	Gas	W N Moore		1900	Big Injun (undif)	867
4709500757	WV	Tyler	39.34307445	-80.83071912	Industrial Gas Associates	Oil and Gas	Delmer Mulvay	1	2209	Berea Ss	760
4709500870	WV	Tyler	39.35004941	-80.82286032	J & J Enterprises, Inc.	Gas	Izetta B Garner	6	4901	Benson	790
4709500876	WV	Tyler	39.36557401	-80.84080595	L. & M. Petroleum Co.	Gas	Jacob L Dillon	1	2387	Berea Ss	975
4709500924	WV	Tyler	39.38476329	-80.83893904	J & J Enterprises, Inc.	Gas	W Paul McCutchen		5122	Alexander	735
4709500955	WV	Tyler	39.3483235	-80.82911817	J & J Enterprises, Inc.	Gas	Jay & Mary Collins		5279	Alexander	883
4709500956	WV	Tyler	39.35286655	-80.82783921	J & J Enterprises, Inc.	Gas	Jay & Mary Collins		5430	Alexander	1028
4709501036	WV	Tyler	39.35339266	-80.83313209	J & J Enterprises, Inc.	Gas	Edwin D Mulvay et ux		5177	Benson	763
4709501101	WV	Tyler	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4709501107	WV	Tyler	39.3588727	-80.83182713	Union Drilling, Inc.	Gas	Karen Jane Osborne	3	5306	Alexander	763
4709501108	WV	Tyler	39.35687256	-80.82472829	Union Drilling, Inc.	Gas	Karen Jane Osborne	1	5240	Alexander	978
4709501109	WV	Tyler	39.35759761	-80.837443	Union Drilling, Inc.	Gas	Karen Jean Osborne	2	5325	Alexander	943
4709501178	WV	Tyler	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4709501206	WV	Tyler	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4709501226	WV	Tyler	39.3726251	-80.8393312	DAC, Inc.	Dry	Verna O Ash	1	5140	Benson	1013
4709501227	WV	Tyler	39.37456504	-80.83428712	DAC, Inc.	Gas w/ Oil Show	Verna O Ash	2	5142	Benson	986
4709501234	WV	Tyler	39.37064915	-80.8436089	DAC, Inc.	Gas	James E Ash	1	5096	Benson	909
4709501235	WV	Tyler	39.38838857	-80.85052578	DAC, Inc.	Gas	Geneva Fouts Bullman	1	4890	Benson	812
4709501237	WV	Tyler	39.37006898	-80.83520209	DAC, Inc.	Gas	Verna O Ash	3	5157	Benson	1029
4709501238	WV	Tyler	39.37722216	-80.83837803	DAC, Inc.	Gas	Edna Dillon	1	5129	Benson	957
4709501254	WV	Tyler	39.36731382	-80.82921722	Stonewall Gas Co., Inc.	Gas	Charles Lee Cumberledge	1	5150	Benson	1018
4709501266	WV	Tyler	39.37780228	-80.84417709	Arvill Oil Co., Inc	Dry	David A Preston	1	4868	Benson	747
4709501269	WV	Tyler	39.3808472	-80.83763106	Arvill Oil Co., Inc	Gas	Lawrence Mercer	1	5007	Benson	850
4709501283	WV	Tyler	39.38592343	-80.8452929	Arvill Oil Co., Inc	Gas	Bruce & Veronica Smith	1	5009	Benson	883
4709501285	WV	Tyler	39.38954841	-80.84062202	Arvill Oil Co., Inc	Gas	James C Ferrell	1	5100	Benson	1032
4709501286	WV	Tyler	39.39534969	-80.8505278	Coastal Corp. The	Gas w/ Oil Show	Robert H Tennant	1	5005	Benson	826
4709501300	WV	Tyler	39.36122369	-80.82790623	Stonewall Gas Co., Inc.	Gas	John R Pratt	2	5150	Benson	948
4709501304	WV	Tyler	39.37384024	-80.84585185	Coastal Corp. The	Gas	Duane Clark et al	1	4923	Benson	759
4709501312	WV	Tyler	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4709501314	WV	Tyler	39.36107879	-80.83295012	Eastern American Energy Corp.	Gas	Charles Daughtery et al	3	5090	Benson	926
4709501318	WV	Tyler	39.36658893	-80.83576207	Eastern American Energy Corp.	Gas	Charles Daughtery et al	1	5167	Benson	1012
4709501332	WV	Tyler	39.37483806	-80.83367761	Never Drilled (Canceled permit)	Not Drilled	Never Drilled (Canceled)		not drilled	not drilled	960
4709501336	WV	Tyler	39.38635824	-80.83482814	Arvill Oil Co., Inc	Gas	Elmer Cecil	1	5069	Benson	956
4709501338	WV	Tyler	39.38215313	-80.83277518	Arvill Oil Co., Inc	Gas	Timothy N Ingoglia	1	5045	Benson	949
4709501350	WV	Tyler	39.3857785	-80.84902981	Arvill Oil Co., Inc	Gas	Ryan J Lind et ux	1	4907	Benson	785
4709501351	WV	Tyler	39.39172362	-80.8499658	Arvill Oil Co., Inc	Gas	Robert H Tennant	2	5034	Benson	924
4709501382	WV	Tyler	39.38563332	-80.83968703	Arvill Oil Co., Inc	Gas	Matthew Ash	3	5136	Benson	1049
4709501383	WV	Tyler	39.38331337	-80.84398492	Arvill Oil Co., Inc	Gas	Matthew Ash	4	5117	Benson	1027
4709501405	WV	Tyler	39.37262494	-80.8309022	DAC, Inc.	Gas	Conrad Costlow	1-A	2136	Big Injun (undif)	976
4709501428	WV	Tyler	39.38070228	-80.84192896	Arvill Oil Co., Inc	Gas	Lawrence Mercer Hts	5	5002	Benson	893
4709501496	WV	Tyler	39.37152	-80.83520209	DAC, Inc.	Dry	Verna O Ash	4	2155	Big Injun (undif)	1036
4709501851	WV	Tyler	39.39563978	-80.8548267	Sancho Oil & Gas	Gas w/ Oil Show	Donna Marie Vandrine	2	6280	Marcellus Sh	728
4709502245	WV	Tyler	39.37127601	-80.83562008	Never Drilled (Canceled permit)	Not Drilled	JE Ash et al		SHR08L	not drilled	not drilled
4709503046	WV	Tyler	39.38142731	-80.84267595	Pittsburgh & WV Gas	Gas	Lucretia Mercer	2	2101	Squaw	954
47095030650	WV	Tyler	39.37388707	-80.83688306	Hope Natural Gas Company	Gas	PP Doak		1992	Big Injun (undif)	972
47095030657	WV	Tyler	39.35807958	-80.8247173	Hope Natural Gas Company	Gas	A U Davis		1972	Big Injun (undif)	885
47095030624	WV	Tyler	39.37910719	-80.83898504	Travis, C. D., et al	Gas	Lawrence Mercer	1	1904	Squaw	738
47095030855	WV	Tyler	39.34821857	-80.8325109	Hope Natural Gas Company	Gas	Vm Smith		1836	Big Injun (undif)	763
47095030887	WV	Tyler	39.37490217	-80.84080697	Hope Natural Gas Company	Gas	Martin M Grove	1	2010	Big Injun (undif)	903
47095070192	WV	Tyler	39.37864113	-80.8357641	South Penn Oil (S. Penn Nat. Gas)	not available	John Mercer	1	1841	Big Injun (undif)	770
4709550038	WV	Tyler	39.37907618	-80.83782105							774

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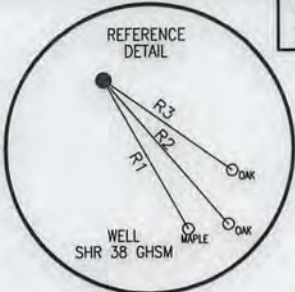
DEC 4 2018

WV Department of
Environmental Protection

BHL is located on topo map 10,653 feet south of Latitude: 39° 22' 30"
 SHL is located on topo map 1,287 feet south of Latitude: 39° 22' 30"

NOTES:

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted herein. The location of the boundary lines, as shown, are based on ~~recent~~ descriptions, field evidence found and/or tax map position, unless otherwise noted.



LEGEND

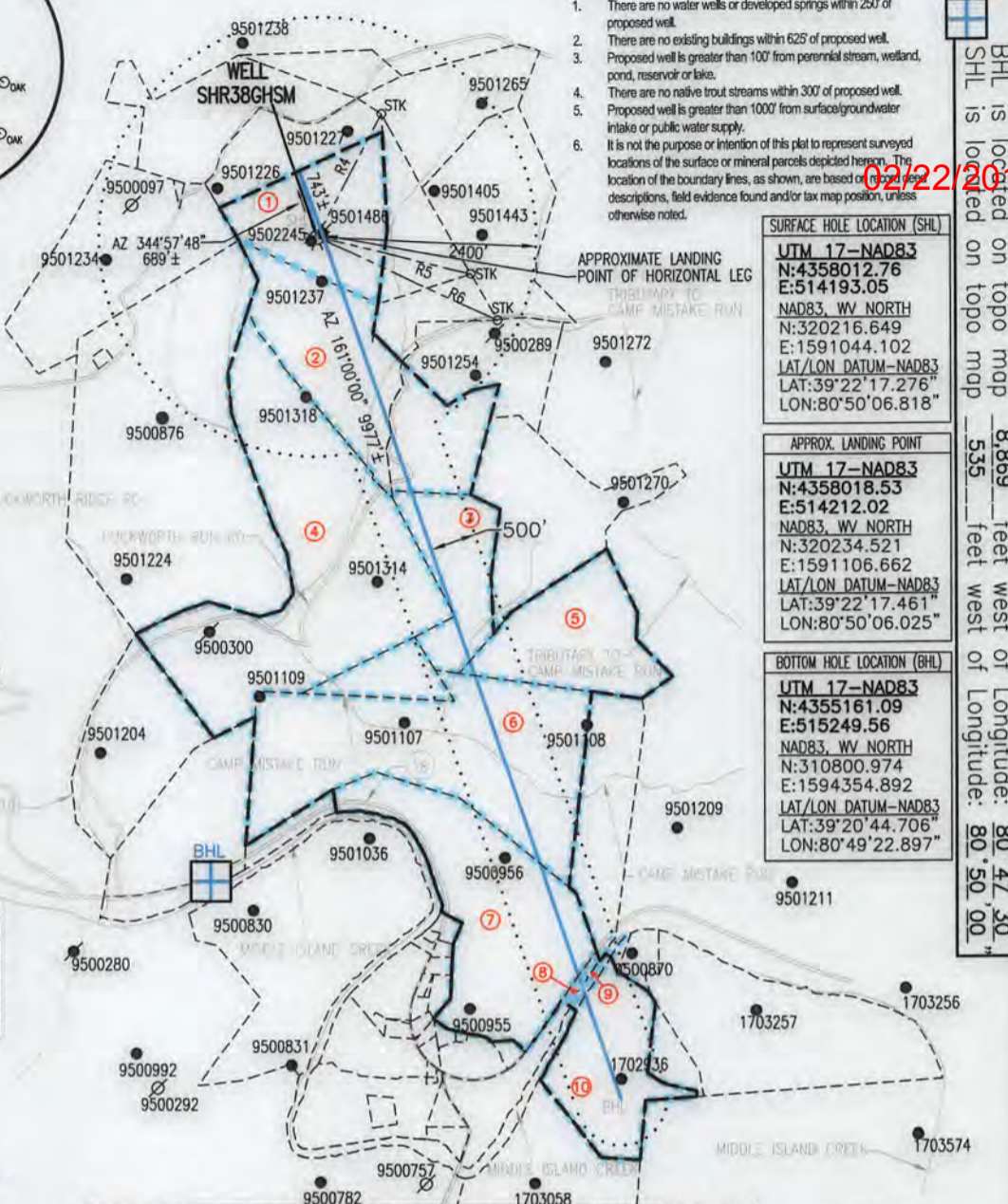
- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED.
- LEASE NUMBER
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- LEASE BOUNDARY
- PROPOSED HORIZONTAL WELL
- WELL REFERENCE
- ROAD
- STREAM CENTER LINE

GAS WELLS

- EXISTING WELLS
- PLUGGED WELLS
- ABANDON WELLS

LINE	BEARING	DISTANCE
R1	S 29°39'39" E	178.47'
R2	S 40°51'29" E	198.60'
R3	S 54°50'03" E	164.01'
R4	N 27°50'02" E	1515.66'
R5	S 76°33'49" E	1731.47'
R6	S 65°11'39" E	2175.45'

Blue Mountain
 11023 MASON DIXON HIGHWAY
 BURTON, WV 26562
 PHONE: (304) 662-6486



SURFACE HOLE LOCATION (SHL)
 UTM 17-NAD83
 N:4358012.76
 E:514193.05
 NAD83, WV NORTH
 N:320216.649
 E:1591044.102
 LAT/LON DATUM-NAD83
 LAT:39°22'17.276"
 LON:80°50'06.818"

APPROX. LANDING POINT
 UTM 17-NAD83
 N:4358018.53
 E:514212.02
 NAD83, WV NORTH
 N:320234.521
 E:1591106.662
 LAT/LON DATUM-NAD83
 LAT:39°22'17.461"
 LON:80°50'06.025"

BOTTOM HOLE LOCATION (BHL)
 UTM 17-NAD83
 N:4355161.09
 E:515249.56
 NAD83, WV NORTH
 N:310800.974
 E:1594354.892
 LAT/LON DATUM-NAD83
 LAT:39°20'44.706"
 LON:80°49'22.897"

SHL is located on topo map 8,869 feet west of Longitude: 80° 47' 30"
 SHL is located on topo map 535 feet west of Longitude: 80° 50' 00"

SEE PAGE 2 FOR SURFACE OWNERS AND LESSORS

FILE #: SHR 38 GHSM
 DRAWING #: SHR 38 GHSM
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: 1/2500
 PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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.

Signed: *George D. Six*
 R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX
 LICENSED
 No. 2000
 STATE OF
 WEST VIRGINIA
 PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304

DATE: NOVEMBER 20, 2018
 OPERATOR'S WELL #: SHR 38 GHSM
 API WELL #: 47 95 02514 MOD
 STATE COUNTY PERMIT

Well Type: Oil Waste Disposal Production Deep
 Gas Liquid Injection Storage Shallow

WATERSHED: HEADWATERS MIDDLE ISLAND CREEK ELEVATION: 1012'±
 COUNTY/DISTRICT: TYLER / CENTERVILLE QUADRANGLE: WEST UNION, WV 7.5'
 SURFACE OWNER: JAMES E. ASH ET AL ACREAGE: 111±
 OIL & GAS ROYALTY OWNER: JAMES E. ASH ET AL ACREAGE: 593.675 ±

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,480'± TMD: 16,957'±
 WELL OPERATOR CNX GAS COMPANY LLC DESIGNATED AGENT CHRIS TURNER
 Address 1000 CONSOL ENERGY DRIVE Address 1 DOMINION DR.
 City CANONSBURG State PA Zip Code 15317 City JANE LEW State WV Zip Code 26378

SHR 38 GHSM

PAGE 2 OF 2

	SURFACE OWNER	LESSOR	DIST-TM/PAR
1	JAMES E. ASH ET AL	VERNA O. ASH, JAMES E. ASH AND THELMA B. ASH, BESSIE HAUGHT AND HAROLD WARNER ERNEST G. SECKMAN AND O. JOANNE SECKMAN RALPH E. PHILLIPS AND VELINDA PHILLIPS H/W	P/O 1-16/19
2	JOHN R. ANDERS II RICHARD H. METCALF	JOHN MICHAEL LEONIAN JOSEPH ROBERT LEONIAN MARGO L. KIEHL AND CHARLES F. KIEHL, W/H BERDINA ROSE AND NORMAN W. ROSE, W/H PHILLIP LEONIAN, AKA PHILLIP MARSHALL LEONIAN MARION RAY BACHELOR, AKA MARION R. BACHELOR AND GLORIA JEAN BACHELOR RITA G. JARVIS MIKE ROSS, INC. I.L. MORRIS JO ELLEN HARPER DAY MARY LEE LILLY ARMEN LEONIAN, AKA ARMEN LANHAM LEONIAN JOHN FULTON LEONIAN NILA ASH SAYLOR REVOCABLE TRUST, BY JOSEPH F. SILEK, JR. BAILEY ANN MILLS WILLIAM PAUL HARPER DAVID PAUL LOCOCO MARY LYNNE SLATTERY, FKA MARY LYNNE LOCOCO DONALD VINCENT LOCOCO ROSE MARIE VANHEUVELN THERESA LEE ROBERTSON MARTHA SUE MUZIO, FKA MICHELLE LUCRETIA BUSHMIRE MICHELLE LOCOCO BUSHMIRE, FKA MICHELLE LUCRETIA BUSHMIRE ELIZABETH FLORENCE LOCOCO RALPH E. PHILLIPS AND VELINDA PHILLIPS H/W BRC APPALACHIAN MINERALS I, LLC BRC APPALACHIAN MINERALS I, LLC	1-16/21 P/O 1-16/17
3 4	D. RALPH THACKER & J. MAURICE CARLISLE JR.	CHARLES W. HENDERSON AND DOROTHY M. HENDERSON, H/W AND CHARLES W. HENDERSON, POWER OF ATTORNEY FOR THE A. I. DOAK HEIRS JOHN A. CONKLIN AND JEAN CONKLIN, H/W GEORGE B. CONKLIN AND BETTY M. CONKLIN, H/W BETTY L. CONKLIN ROBERT LEE REED LEWIS H. REED AND CAROL J. REED, H/W KATHY PRANGER VIRGINIA O'REAR AND RALPH O'REAR, W/H ROBERT H. MELVIN BETTY L. MELVIN MARY S. LARTZ AND WILLIAM LARTZ, W/H LILLIAN CRABILL AND WILLIAM CRABILL, W/H MELISSA COLL ROBERT BARTHOLOMEW AND BARBARA BARTHOLOMEW, H/W PHILLIP L. MELVIN JOANNE GREENMAN AND GERALD GREENMAN, H/W	1-16/26
5	PEARLIE DAVIS	LINDA C. BRITTON STEVEN BRITTON ALFRED BRITTON, ET AL BRIAN BRITTON, AKA, BRYAN L. BRITTON AND ANNETTE BRITTON, H/W	1-16/25
6	STEVEN E. MALICKI JR. FRED M. DOTSON JR. KAREN DOTSON KEVIN DOTSON STEVEN E. MALICKI JR.	PAUL W. HYLBERT AND CHARLOTTE J. HYLBERT, H/W	1-18/1 1-18/1.1
7	MARY MONNIE COLLINS	CECILIA LOUISE BOOMER AND JAMES BOOMER, W/H WOODBERRY ROYALTY, INC NANCY FOUT AND JOHN FOUT, W/H THERESA MARIE SMITH, SINGLE JAY COLLINS AND MARY M. COLLINS, H/W	1-18/15
8	STEVEN R. & SHAWNA LEA CHIPPS	CECILIA LOUISE BOOMER AND JAMES BOOMER, W/H WOODBERRY ROYALTY, INC NANCY FOUT AND JOHN FOUT, W/H GLENDA L. HEDRICK THERESA MARIE SMITH, SINGLE STEVEN R. CHIPPS AND SHAWNA L. CHIPPS, H/W	1-18/18.1
9	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	N/A
10	RALPH MCCUTCHAN II CHIPPS REVOCABLE LIVING TRUST 2004	JOSEPH C. STRICKLING AND JOSIES STRICKLING, H/W PAUL STRICKLING EARL STRICKLING AND RUTH G. STRICKLING, H/W JOHN B. STRICKLING AND LILLIAN STRICKLING	8-3/3

02/22/2019

47-095-02514 MOD

SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83 N:4358012.76 E:514193.05 NAD83, WV NORTH N:320216.649 E:1591044.102 LAT/LON DATUM-NAD83 LAT:39°22'17.276" LON:80°50'06.818"

APPROX. LANDING POINT
UTM 17-NAD83 N:4358018.53 E:514212.02 NAD83, WV NORTH N:320234.521 E:1591106.662 LAT/LON DATUM-NAD83 LAT:39°22'17.461" LON:80°50'06.025"

BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83 N:4355161.09 E:515249.56 NAD83, WV NORTH N:310800.974 E:1594354.892 LAT/LON DATUM-NAD83 LAT:39°20'44.706" LON:80°49'22.897"

**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				

**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

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Environmental Protection

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: CNX Gas Company, LLC

By: Raymond Hoon *Raymond Hoon*

Its: Permitting Supervisor

<u>Tract ID</u>	<u>Tax Map & Parcel</u>	<u>Title Opinion OLS #</u>	<u>Grantor, Lessor, etc</u>	<u>Grantee, Lessee, etc</u>	<u>Royalty</u>	<u>Book/Page</u>
5	TMP 1-16-25	258993000	Linda C. Britton Steven Britton Equitrans, L.P. EQT Production Company Noble Energy, Inc. Alfred Britton, et al Equitable Gas Company Equitable Gas Company, LLC, Equitrans, Inc. and Equitable Resources, Inc. Equitrans, L.P. EQT Production Company Noble Energy, Inc. Brian Britton, aka, Bryan L. Britton and Annette Britton, h/w Noble Energy, Inc. Noble Energy, Inc.	Equitrans, L.P. Equitrans, L.P. EQT Production Company Noble Energy, Inc and CNX Gas Company, LLC CNX Gas Company, LLC Equitable Gas Company Equitrans, Inc. Equitrans, L.P. EQT Production Company Noble Energy, Inc and CNX Gas Company, LLC CNX Gas Company, LLC Noble Energy, Inc. CNX Gas Company, LLC CNX Gas Company, LLC	Not less than 1/8 Not less than 1/8 Assignment Assignment Assignment Not less than 1/8 Assignment Assignment Assignment Assignment Assignment Not less than 1/8 Assignment Assignment	442/599 442/557 440/103 449/480 550/273 192/373 274/471 433/777 440/103 449/480 550/273 488/384 513/299 550/273
6	TMP 1-18-1 & 1-18-1.1	258995000	Paul W. Hybert and Charlotte J. Hybert, h/w KEPCO, INC. Eastern Kentucky Production Company Equitable Resources Energy Company EnerVest East Limited Partnership The Houston Exploration Company Seneca-Upshur Petroleum, Inc. Seneca-Upshur Petroleum, LLC Antero Resources Appalachian Corporation Antero Resources Corporation Noble Energy, Inc.	KEPCO, INC. Eastern Kentucky Production Company Equitable Resources Energy Company EnerVest East Limited Partnership The Houston Exploration Company Seneca-Upshur Petroleum, Inc. Seneca-Upshur Petroleum, LLC Antero Resources Appalachian Corporation Noble Energy, Inc and CNX Gas Company, LLC CNX Gas Company, LLC	Not less than 1/8 Name Change Merger Assignment Assignment Assignment Assignment Assignment Name Change Assignment Assignment	242/513 WVSOS WVSOS 313/145 342/160 344/158 381/540 402/132 WVSOS 425/701 427/564 550/273
7	TMP 1-18-15	259010000	Cecilia Louise Boomer and James Boomer, h/w Woodberry Royalty, Inc. Nancy Fout and John Fout, w/h Theresa Marie Smith, single Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Jay Collins and Mary M. Collins, h/w Exxon Corporation Exxon Mobile Corporation KTO Energy Inc. Noble Energy, Inc. Noble Energy, Inc.	Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. CNX Gas Company, LLC CNX Gas Company, LLC CNX Gas Company, LLC CNX Gas Company, LLC Exxon Corporation Exxon Mobile Corporation KTO Energy Inc. Noble Energy, Inc. CNX Gas Company, LLC CNX Gas Company, LLC	Not less than 1/8 Not less than 1/8 Not less than 1/8 Not less than 1/8 Assignment Assignment Assignment Assignment Not less than 1/8 Merger Assignment Assignment Assignment Assignment	480/823 482/760 482/296 480/831 513/299 521/80 542/134 550/273 209/152 WVSOS 496/126 515/278 542/147 550/273
8	TMP 1-18-18.1	259051000	Cecilia Louise Boomer and James Boomer, w/h Woodberry Royalty, Inc. Nancy Fout and John Fout, w/h Glenda L. Hedrick Theresa Marie Smith, single Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Steven R. Chipps and Shawna L. Chipps, h/w Antero Resources Corporation Noble Energy, Inc.	Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. Noble Energy, Inc. CNX Gas Company, LLC CNX Gas Company, LLC CNX Gas Company, LLC CNX Gas Company, LLC Antero Resources Corporation Noble Energy, Inc and CNX Gas Company, LLC CNX Gas Company, LLC	Not less than 1/8 Not less than 1/8 Not less than 1/8 Not less than 1/8 Not less than 1/8 Assignment Assignment Assignment Assignment Not less than 1/8 Assignment Assignment	480/823 482/760 482/296 458/646 480/831 513/299 521/80 542/134 550/273 463/406 503/754 550/273
9	N/A	N/A	West Virginia Division of Natural Resources Antero Resources Corporation	Antero Resources Corporation CNX Gas Company, LLC	Not less than 1/8 Affidavit of Agreement	553/295 624/332
10	TMP 8-3-3	258988000	Joseph C. Strickling and Josie Strickling, h/w Paul Strickling Earl Strickling and Ruth G. Strickling, h/w John B. Strickling and Lillian Strickling Key Oil Company J & J Enterprises, Inc. Eastern American Energy Corporation Energy Corporation of America Antero Resources Appalachian Corporation Antero Resources Corporation Noble Energy, Inc.	Key Oil Company Key Oil Company Key Oil Company Key Oil Company J & J Enterprises, Inc. Eastern American Energy Corporation Energy Corporation of America Antero Resources Appalachian Corporation Antero Resources Corporation Noble Energy, Inc and CNX Gas Company, LLC CNX Gas Company, LLC	Not less than 1/8 Not less than 1/8 Not less than 1/8 Not less than 1/8 Assignment Assignment Merger Assignment Name Change Assignment Assignment	107/529 106/693 106/691 107/355 111/326 159/139 240/498 272/307 307/321 WVSOS 323/624 377/304

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