



---

west virginia department of environmental protection

---

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Tuesday, May 7, 2019  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

ARSENAL RESOURCES LLC  
6031 WALLACE ROAD EXTENSION  
SUITE 603  
WEXFORD, PA 15090

Re: Permit Modification Approval for PRITT SOUTH 212  
47-033-05905-00-00

**Revision for the TMD and TVD due to a change in anticipated thickness of formation.**

ARSENAL RESOURCES 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 blue ink signature of James A. Martin, Chief. The signature is stylized and written in cursive. Below the signature, the name "James A. Martin" and the title "Chief" are printed in a black, sans-serif font.

James A. Martin  
Chief

Operator's Well Number: PRITT SOUTH 212  
Farm Name: IRA & LAURA PRITT  
U.S. WELL NUMBER: 47-033-05905-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 05/07/2019

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

1) Well Operator: Arsenal Resources      494519412      Harrison      Simpson      Brownton  
Operator ID      County      District      Quadrangle

2) Operator's Well Number: Pritt South 212      Well Pad Name: Pritt South

3) Farm Name/Surface Owner: Ira and Laura Pritt      Public Road Access: County Route 17

4) Elevation, current ground: 1,352.60'      Elevation, proposed post-construction: 1,354.80'

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

(b) If Gas Shallow X Deep \_\_\_\_\_ *5 Dew*  
Horizontal X *3/12/2019*

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale, 7654.0ft (TVD Heel) - 7654.0ft (TVD Toe), 90ft, 0.5 psi/ft Base of Marcellus Shale, 7744.0ft (TVD Heel) - 7744.0ft (TVD Toe)

8) Proposed Total Vertical Depth: 7,719 ft

9) Formation at Total Vertical Depth: Marcellus shale

10) Proposed Total Measured Depth: 15,274ft

11) Proposed Horizontal Leg Length: 7,172 ft <sup>pk</sup>

12) Approximate Fresh Water Strata Depths: 15', 45', 90', 219', 257', 300', 315', 345', and 385' \* *Best Casing possible*

13) Method to Determine Fresh Water Depths: Offsetting wells reported water depths (033-00660, 033-00950, 033-00960, 033-00976, 033-00980, 033-03262)

14) Approximate Saltwater Depths: 1400'

15) Approximate Coal Seam Depths: Bakerstown 492', Brush Creek 591', Upper Freeport 652', Lower Freeport 712', Upper Kittanning 787', Middle Kittanning 847', Lower Kittanning 860'

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

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: \_\_\_\_\_      RECEIVED  
Depth: \_\_\_\_\_      Office of Oil and Gas  
Seam: \_\_\_\_\_      MAR 14 2019  
Owner: \_\_\_\_\_      WV Department of  
Environmental Protection

18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<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	24	New	H-40	94	80	80	CTS
Fresh Water	13.375	New	J-55	54.5	450	450	CTS
Coal							
Intermediate	9.625	New	J-55	40	1,500	1,500	CTS
Production	5.5	New	P-110	20	15,274	15,274	TOC @ 1,350' MD
Tubing							
Liners							

*\*Best Casing Possible 3/12/2019 SDW*

<b>TYPE</b>	<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	24	36			0	Class A, 3% CaCl2	1.20
Fresh Water	13.375	17.5	0.38	2730	900	Class A, 3% CaCl2	1.20
Coal							
Intermediate	9.625	12.25	0.395	3950	1500	Class A, 3% CaCl2	1.29
Production	5.5	8.5-8.75	0.361	12,640	9,500	Class A/50:50 Poz	1.29/1.34
Tubing					5,000		
Liners					N/A		

**PACKERS**

Kind:				
Sizes:				
Depths Set:				

RECEIVED  
Office of Oil and Gas

MAR 14 2019

WV Department of  
Environmental Protection

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

The well will be started with a conductor rig drilling a 36" hole to Conductor programmed depth then running 24" casing and circulate cement back to surface. The conductor rig will move out and the drilling rig will move in and rig up. The drilling rig will then spud a 17 1/2" hole and drill to fresh water casing (Surface) to the programmed depth, Run 13- 3/8" casing and cement to surface. The rig will continue drilling a 12- 1/4" intermediate hole to the programmed depth, run 9- 5/8" casing and cement to surface. The rig will then continue to drill an 8- 3/4" hole to a designed KOP. We will then start drilling the curve and lateral section to the programmed total measured depth, run 5 1/2" casing and cement according to the program.

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

The well will be completed using a plug and perforation method and stimulated with a slickwater and sand slurry. The anticipated maximum rate will be 90 bpm and the maximum pressure will be 9,500 psi.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 29.78

22) Area to be disturbed for well pad only, less access road (acres): 9.15

23) Describe centralizer placement for each casing string:

24"- No centralizers 13 3/8" – one bow spring centralizer on every other joint 9 5/8" – one bow spring centralizer every third joint from TD to surface 5 1/2" – one semi rigid centralizer on every joint from TD of casing to end of curve. Then every other joint to KOP. Every third joint from KOP to 1,600'; there will be no centralizers from 1,600 to surface.

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

24" will be circulated to surface. The 13 3/8" casing will be cemented to surface with Class A cement and no greater than 3% CaCl (calcium chloride). The 9 5/8" casing will be cemented to surface with Class A cement, & no greater than 3% calcium chloride. The 5 1/2" production string will be cemented back to 1,350' (+/- 150' above the casing shoe for the 9 5/8") with Class A and 50/50 Poz cement retarded (to extend pumpability) cellophane flaked for fluid loss, Bentonite gel as an extender (increased pumpability and fluid loss), a defoaming agent to decrease cement foaming during mixing to insure the cement is of proper weight to placement and possibly gypsum gas blocking additive to aid in blocking/gas migration (in combination with other additive mentioned here, helps cement achieve a "right angle" set) during the plastic phase of the cement set-up.

25) Proposed borehole conditioning procedures:

Top holes will be drilled with fresh water KOP. At KOP, the wellbore will be loaded with synthetic oil based mud, barite-weighted mud system with such properties as to build a filter-cake on the face of the bore-hole. This will provide lubricity as well as stabilizing the well bore. We will begin rotating the drill string and mud will be circulated upon reaching TD until no further cuttings are observed coming across the shaker screens. Once clean mud is circulated back to surface, we will pull three stands of drill pipe, load the hole, pull three strands and load the hole. The weight indicator on the rig will be monitored for any occurrences of drag and if any are noticed, we will re-run the previous stand of pipe pulled across and circulate 2x bottoms up while watching shakers for signs of cuttings. Once at the base curve, the string will be continuously rotated while pumping 2x bottoms up. We will pull three stands and fill the hole until we reach the vertical section of the well.

\*Note: Attach additional sheets as needed.

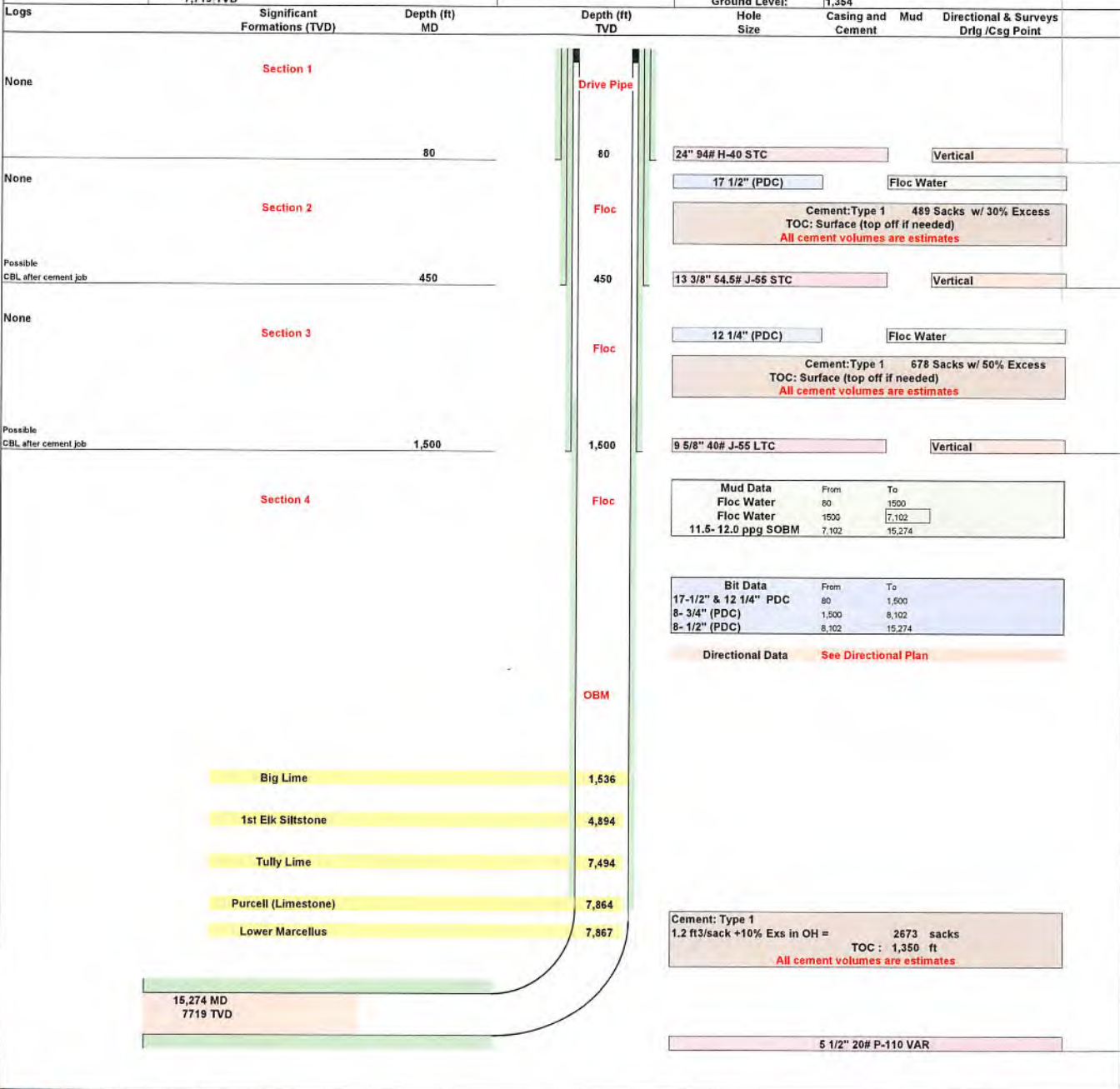
RECEIVED  
Office of Oil and Gas



Arsenal Resources  
 Prit South 212  
 Casing Design  
 Directional Plan # 4 QES

Other Names:	N/A
Surface Location:	TBD
Bottom Hole Location:	TBD
Total Depth:	15,274 MD (ft) 7,719 TVD

County:	Harrison
State:	West Virginia
AFE #:	XX   API #:   XX
RKB:	27
Ground Level:	1,354



Revision 1

Note: Not drawn to scale

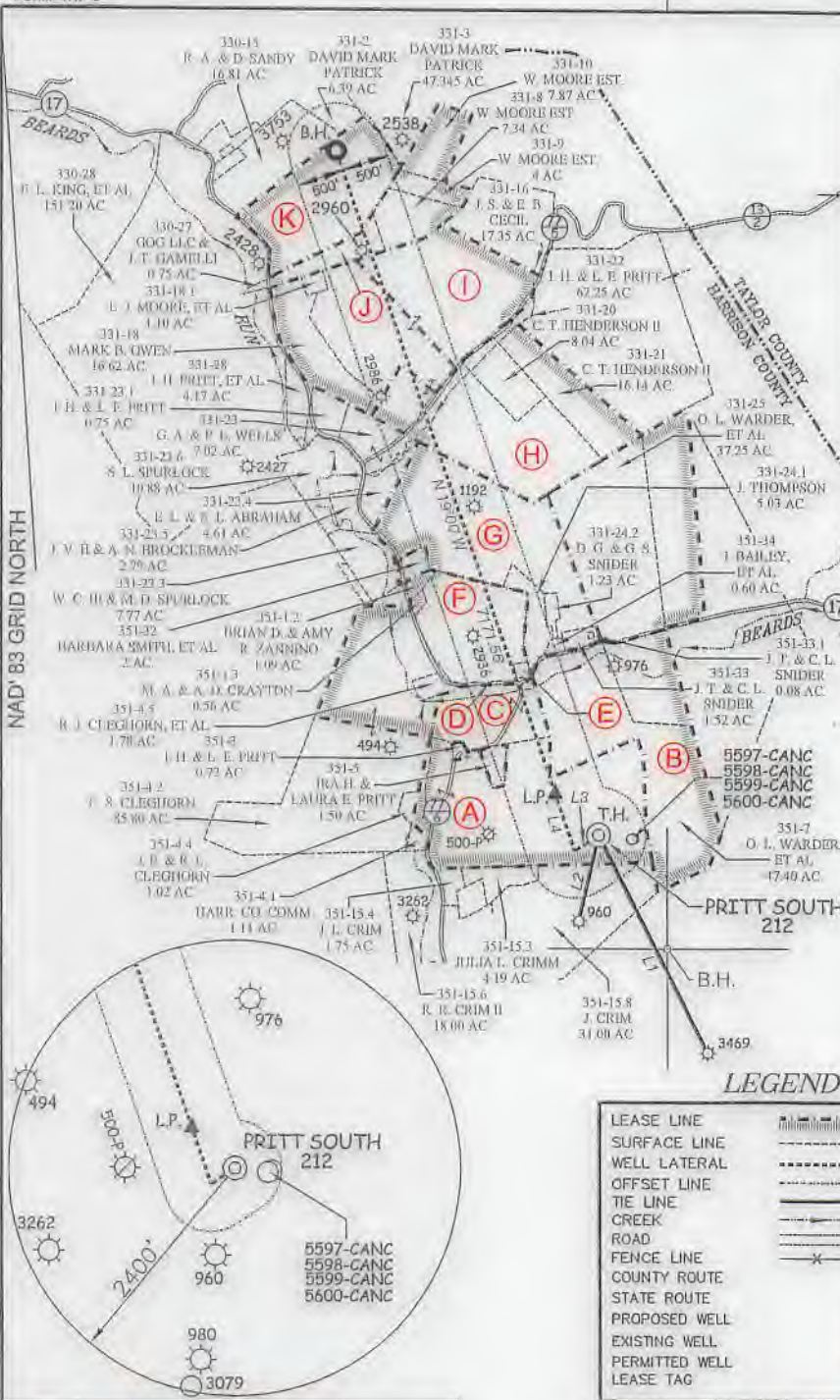
Cement Outside Casing Seal Assembly in Annulus

Date Last Revised: 11-Mar-19  
 Jarrett Toms

RECEIVED  
 Office of Oil and Gas

MAR 14 2019

WV Department of  
 Environmental Protection



### ARSENAL RESOURCES PRITT SOUTH 212

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
 NAD'83 S.P.C.(FT) N. 271,995.9 E. 1,774,058.0  
 NAD'83 GEO. LAT-(N) 39,244795 LONG-(W) 80.186660  
 NAD'83 UTM (M) N. 4,344,250.9 E. 570,104.4

**LANDING POINT**  
 NAD'83 S.P.C.(FT) N. 272,431.7 E. 1,773,588.9  
 NAD'83 GEO. LAT-(N) 39,245922 LONG-(W) 80.188193  
 NAD'83 UTM (M) N. 4,344,381.3 E. 570,052.3

**BOTTOM HOLE**  
 NAD'83 S.P.C.(FT) N. 279,212.6 E. 1,771,264.5  
 NAD'83 GEO. LAT-(N) 39,264489 LONG-(W) 80.196621  
 NAD'83 UTM (M) N. 4,346,435.4 E. 569,306.7

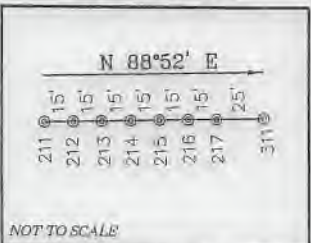
05/10/2019

TAG	SURFACE OWNER	TAX MAP / JCL	ACREAGE
A	IRA H & LAURA E PRITT	351-4	69.09±
B	O.L. WARDER ET AL.	351-7	47.40±
C	IRA H & LAURA E PRITT	351-2	18.79±
D	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS	ORAL LAKE ROAD	N/A
E	KEVIN MCNEMAR	351-1	0.37±
F	KEVIN MCNEMAR	351-4	24.22±
G	JOHN TROY & CYNTHIA R. SNIDER	351-24	48.14±
H	CLUE T. HENDERSON, II	351-19	33.43±
I	RICHARD L. KINER	351-18.2	66.80±
J	WILLIE & GOLDIE MOORE ESTATE	351-13	4.69±
K	D. M. PATRICK	351-7	31.13±

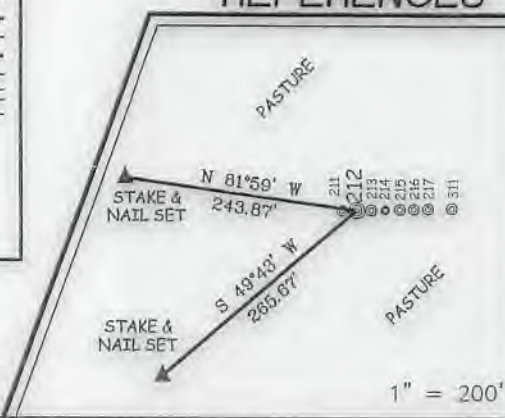
### PRITT SOUTH PAD LAYOUT

PRITT SOUTH 212 WELL TIES

LINE	BEARING	DISTANCE
L1	S 26°40' E	2569.00'
L2	S 12°54' W	931.84'
L3	S 58°36' W	301.75'
L4	N 19°00' W	838.58'



### REFERENCES

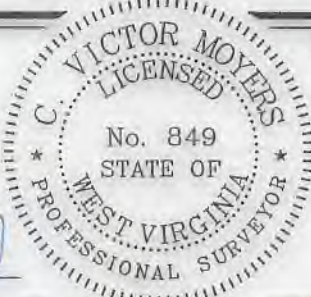


### LEGEND

LEASE LINE	
SURFACE LINE	
WELL LATERAL	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
FENCE LINE	
COUNTY ROUTE	
STATE ROUTE	
PROPOSED WELL	
EXISTING WELL	
PERMITTED WELL	
LEASE TAG	

### NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS > 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE AUGUST 21, 20 17  
 REVISED 08/15/18 & 03/11/19  
 OPERATORS WELL NO. PRITT SOUTH 212  
 API WELL NO. 47 - 033 - 05905  
 STATE COUNTY PERMIT

**SLS**  
Land & Energy Development  
Solutions from the ground up.  
P.O. Box 150 • 12' Van Horn Drive • Glenville, WV 26031 • (304) 462-9934  
www.slsww.com

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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*

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8383P212R4.dwg  
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)  
 SCALE 1" = 2000'

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

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

LOCATION:  
 ELEVATION EXISTING: 1,352.60' / PROPOSED: 1,354.80' WATERSHED BEARDS RUN & PIGTAIL RUN  
 DISTRICT SIMPSON COUNTY HARRISON QUADRANGLE BROWNTON 7.5'  
 SURFACE OWNER IRA & LAURA PRITT ACREAGE 69.096±  
 ROYALTY OWNER IRA & LAURA PRITT ET AL ACREAGE 92.06±  
 PROPOSED WORK:  
 LEASE NO. 00006622  
 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 15,274.2' TMD / 7,719' TVD

WELL OPERATOR ARSENAL RESOURCES DESIGNATED AGENT WILLIAM VEIGEL  
 ADDRESS 6031 WALLACE RD. EXT. SUITE 300 WEXFORD, PA 15090 ADDRESS 65 PROFESSIONAL PLACE BRIDGEPORT, WV 26330

COUNTY NAME PERMIT