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west virginia department of environmental protection

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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)

Friday, October 12, 2018  
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 214  
47-033-05910-00-00

**Lateral spacing modification with no top-hole change**

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, written in a cursive style.

James A. Martin  
Chief

Operator's Well Number: PRITT SOUTH 214  
Farm Name: IRA & LAURA PRITT  
U.S. WELL NUMBER: 47-033-05910-00-00  
Horizontal 6A New Drill  
Date Modification Issued: October 12, 2018

Promoting a healthy environment.

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 214      Well Pad Name: Pritt South

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

4) Elevation, current ground: 1,351.90'      Elevation, proposed post-construction: 1,354.80'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

*SDW  
8/15/2018*

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus Shale, 7799.0ft (TVD Heel) – 7799.0ft (TVD Toe), 100ft, 0.5 psi/ft Base of Marcellus Shale, 7899.0ft (TVD Heel) - 7899.0ft (TVD Toe)

8) Proposed Total Vertical Depth: 7,883 ft

9) Formation at Total Vertical Depth: Marcellus shale

10) Proposed Total Measured Depth: 18,045 ft

11) Proposed Horizontal Leg Length: 9,713 ft

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

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 880'

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  WV Department of Environmental Protection

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

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	18,045	18,045	TOC @ 1,350' MD
Tubing							
Liners							

*\* Best casing possible JA*

*SDW 8/15/2018*

<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**

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Kind:				
Sizes:				
Depths Set:				

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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.

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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<sub>2</sub> (calculated on cement weight). 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 to surface (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.

33-05910MOD

		Arsenal Resources Pritt South 214 Casing Design Directional Plan # 4 QES			County: Harrison State: West Virginia AFE #: XX API #: XX RKB: 27 Ground Level: 1,354															
Other Names:	N/A	Logs	Significant Formations (TVD)	Depth (ft) MD	Depth (ft) TVD	Hole Size	Casing and Cement	Mud	Directional & Surveys Drlg /Csg Point											
Surface Location:	TBD	None	Section 1	80	80	24" 94# H-40 STC	Vertical													
Bottom Hole Location:	TBD	None	Section 2	450	450	17 1/2" (PDC)	Floc Water													
Total Depth:	18,045 MD (ft) 7,883 TVD	Possible CBL after cement job	Section 3	1,500	1,500	13 3/8" 54.5# J-55 STC	Vertical													
		Possible CBL after cement job	Section 4			12 1/4" (PDC)	Floc Water													
						Cement: Class A 489 Sacks w/ 30% Excess TOC: Surface (top off if needed) All cement volumes are estimates														
						9 5/8" 40# J-55 LTC	Vertical													
						<table border="1"> <thead> <tr> <th>Mud Data</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>Floc Water</td> <td>80</td> <td>1500</td> </tr> <tr> <td>Floc Water</td> <td>1500</td> <td>7,332</td> </tr> <tr> <td>11.5- 12.0 ppg SOBM</td> <td>7,332</td> <td>18,045</td> </tr> </tbody> </table>	Mud Data	From	To	Floc Water	80	1500	Floc Water	1500	7,332	11.5- 12.0 ppg SOBM	7,332	18,045		
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8- 1/2" (PDC)	8,332	18,045																		
						Directional Data See Directional Plan														
						OBM														
						Big Lime	1,536													
						1st Elk Siltstone	4,894													
						Tully Lime	7,494													
						Purcell (Limestone)	7,864													
						Lower Marcellus	7,867													
						18,045 MD 7883 TVD														
						5 1/2" 20# P-110 VAR														
						Cement: Class A-50/50 POZ 1.2 ft3/sack +10% Exs in OH = 3202 sacks TOC : 1,350 ft All cement volumes are estimates														

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Revision 1  
 Note: Not drawn to scale  
 Cement Outside Casing Seal Assembly in Annulus  
 Date Last Revised: 3-Jul-18  
 Jarrett Toms



## Purpose

The purpose of this pad-specific Hydraulic Fracturing Monitoring Plan is to identify and notify conventional well operators near Arsenal Resources hydraulic fracturing in Harrison County, WV prior to hydraulic fracturing at the following Arsenal Resources wells on the Pritt South Pad, well 214.

Due to the apparent presence of unique geological conditions, the potential for communication between deep geologic zones exists in this area. This potential communication, via natural gas, water, or both, may occur between hydraulically fractured wells in the Marcellus formation (approximately 7,900' TVD) and existing conventional natural gas wells in the partially-depleted, relatively high permeability Benson formation (approximately 4,600' TVD).

The plan is being implemented as an additional safety measure to be utilized in conjunction with best management practices and emergency action plans for this site. These additional measures include pre-notification of conventional well operators of the timing and location of the hydraulic fracturing, establishment of measures conventional well operators should implement, and assurance that the Division of Oil and Gas is notified of the timeline, as well as any issues that may arise during fracturing.

### 1. Communications with Conventional Operators.

Arsenal Resources, using available data (WV Geological Survey, WVDEP Website, and IHS data service), has identified all known conventional wells and well operators within 500 feet of this pad and the lateral sections. A map showing these wells along with a list of the wells and operators is included in Attachment A.

Upon approval of this plan, Arsenal Resources will notify these operators, via letter, of the hydraulic fracturing schedule for these wells. A copy of this letter is included in Attachment B.

The letter provides recommendations to these conventional operators to 1) increase their monitoring of their wells during that time period, 2) ensure that their well head equipment is sound, and 3) provide immediate notification to Arsenal Resources and the OOG in the event of any changes in their well conditions.

Specifically, the letter recommends that conventional well operators conduct the following activities during and after fracturing operations:

1. Inspect their surface equipment prior to fracturing to establish integrity and establish pre-frac well conditions.
2. Observe wells closely during and after fracturing and monitor for abnormal increases in water, gas or pressure.
3. Inspect or install master valves rated to 3,000 psi or other necessary equipment for wellhead integrity.
4. Notify the OOG and Arsenal Resources if any changes in water, gas production, pressure or other anomalies are identified.

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**2. Reporting**

Arsenal Resources will provide information relating to the hydraulic fracturing schedule, communication with conventional operators, and ongoing monitoring of the work upon request of OOG or immediately after any event of any noted abnormalities.

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Area of Review Report - **Pritt South** Pad, **214** Lateral, **Harrison** County, WV

Well Name	API Number	Operator Name / Address	Well Type	Latitude	Longitude	Total Depth	Perforated Formation(s)	Producing Zones not Perforated
T W & A L Patrick 1	033-02538	Braxton Oil & Gas Corp.	Existing	39.264439	-80.194175	4518	Benson	NA
O Carl Morris 1	033-00976	Alliance Petroleum Corporation	Existing	39.248641	-80.184921	4375	Big Injun, Gantz, Benson	NA
Frances Morris 1	033-01192	Alliance Petroleum Corporation	Existing	39.253297	-80.191488	4994	Big Injun(Gmbr), Fifth, Benson	NA
C G Cleer 2	033-02397	Energy Corporation of America	Existing	39.271028	-80.198631	4550	Fourth, Fifth, Balltown, Benson	NA

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AOR - Attachment "A"



FORM WW 6

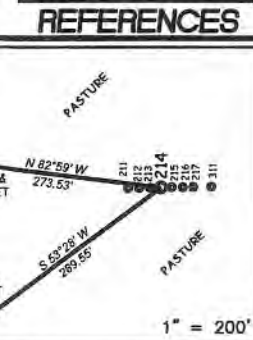
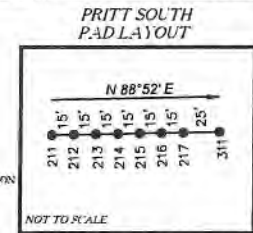


**ARSENAL RESOURCES  
PRITT SOUTH 214**  
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
NAD'83 S.P.C.(FT) N. 271,906.5 E. 1,774,086.0  
NAD'83 GEO. LAT(-N) 39.244737 LONG(-W) 80.188454  
NAD'83 UTM (M) N. 4,344,251.2 E. 570,203.5

**LANDING POINT**  
NAD'83 S.P.C.(FT) N. 272,669.8 E. 1,774,469.0  
NAD'83 GEO. LAT(-N) 39.246594 LONG(-W) 80.185127  
NAD'83 UTM (M) N. 4,344,458.3 E. 570,310.1

**BOTTOM HOLE**  
NAD'83 S.P.C.(FT) N. 281,853.5 E. 1,771,307.3  
NAD'83 GEO. LAT(-N) 39.271741 LONG(-W) 80.198542  
NAD'83 UTM (M) N. 4,347,240.2 E. 569,306.4

	SURFACE OWNER	TAX MAP PCL	AC.
A	IRA H. & LAURA E. PRITT	351-4	69.09±
B	ORAN LEE WARDER, ET AL.	351-7	47.40±
C	JOHN TROY & CYNTHIA LYNN SNIDER	351-31	1.52±
D	JOHN TROY & CYNTHIA LYNN SNIDER	351-33.1	0.8±
E	JOHN TROY & CYNTHIA LYNN SNIDER	351-24	48.14±
F	CLEE T HENDERSON, II	351-19	33.33±
G	CLEE T HENDERSON, II	351-20	1.04±
H	RICHARD L KESNER	351-18.2	46.80±
I	JAMES SCOTT & ERICA BROOK CECIL	351-16	17.25±
J	WILLIE MOORE ESTATE	351-8	7.34±
K	WILLIE MOORE ESTATE	351-0	.±
L	WILLIE MOORE ESTATE	351-10	7.87±
M	DAVID MARK PATRICK	351-3	15.00±
N	STEFAN M. & ELIZABETH J. GRAZIANO	351-11	10.00±
O	HARLAN L. & JARNA J HUTCHESON	351-13	3.93±
P	JEFFREY A. & ROBIN D BOGGO (ASSESSED IN TAYLOR COUNTY)	7-50	16.00±
Q	J. MICHAEL POOLE	350-32	23.84±



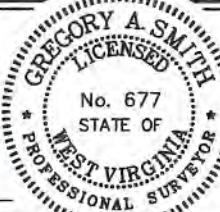
**PRITT SOUTH 214 WELL TIES**

LINE	BEARING	DISTANCE
L1	S 26°04' E	2556.29'
L2	S 14°41' W	839.57'
L3	N 83°05' E	592.53'
L4	N 19°00' W	636.77'

**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.

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www.slsenergy.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.  
677 *Gregory A. Smith*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE AUGUST 23, 20 17  
REVISED AUGUST 15, 2018  
OPERATORS WELL NO. PRITT SOUTH 214  
API WELL NO. 47  
STATE            COUNTY            PERMIT           

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. 8383P214R4.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 X INJECTION            WASTE DISPOSAL            IF "GAS" PRODUCTION X STORAGE            DEEP            SHALLOW X

LOCATION: ELEVATION EXISTING 1,351.90' / 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: DRILL X CONVERT            DRILL DEEPER            REDRILL            FRACTURE OR STIMULATE X 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 18,045' TMD / 7,883' TVD

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

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Click or tap to enter a date.

Alliance  
Address  
State

RE: Click or tap here to enter text.

Dear Sir/Madam,

Arsenal Resources has developed a Marcellus pad, Pritt South Pad, well 214, located in Harrison County, WV. As an owner or operator of conventional natural gas wells in this area, we are requesting your assistance in this matter.

Due to the apparent presence of unique geological conditions, the potential for communication between deep geologic zones exists in this area. This potential communication, via natural gas, water, or both, may occur between hydraulically fractured wells in the Marcellus formation (approximately 7,900' TVD) and existing conventional natural gas wells included in the attached well list for which you are believed to be the operator.

ARSENAL RESOURCES anticipate conducting hydraulic fracturing at the Pritt South Pad during the Quarter of 2018. We have identified conventional natural gas wells operated by your company within 500' (lateral distance) of our newly planned wells. Plats for each well on this pad are attached.

We recommend that conventional well operators conduct the following activities before, during and after fracturing operations:

1. Inspect surface equipment, prior to fracturing, to establish integrity and establish well conditions.
2. Observe wells closely during and after fracturing and monitor for abnormal increases in water, gas, or pressure.
3. Inspect or install master valves rated to 3,000 psi or other necessary equipment for wellhead integrity.
4. Notify the OOG and ARSENAL RESOURCES if any changes in water, gas production, pressure or other anomalies are identified.

Please feel free to contact me at 724-940-1218 with any questions or comments. You may also contact the WV Office of Oil and Gas at 304-926-0499.

Sincerely,

Kelly Davis  
Permitting Specialist

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AOR-Attachment'B



## Arsenal Resources

Harrison County, West Virginia NAD 83

Pritt South Pad

Pritt South #214

Wellbore #1

Plan: Design #4

## QES Well Planning Report

26 June, 2018

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Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

<b>Project</b>	Harrison County, West Virginia NAD 83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	West Virginia Northern Zone		

<b>Site</b>	Pritt South Pad				
<b>Site Position:</b>		<b>Northing:</b>	272,369.26 usft	<b>Latitude:</b>	39° 14' 44.725 N
<b>From:</b>	Map	<b>Easting:</b>	1,773,918.84 usft	<b>Longitude:</b>	80° 11' 13.422 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.44 °

<b>Well</b>	Pritt South #214					
<b>Well Position</b>	<b>+N/-S</b>	-372.8 usft	<b>Northing:</b>	271,996.47 usft	<b>Latitude:</b>	39° 14' 41.053 N
	<b>+E/-W</b>	169.2 usft	<b>Easting:</b>	1,774,088.01 usft	<b>Longitude:</b>	80° 11' 11.236 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	1,354.8 usft

<b>Wellbore</b>	Wellbore #1				
-----------------	-------------	--	--	--	--

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/18/2017	-8.93	66.45	51,826.42164041

<b>Design</b>	Design #4				
---------------	-----------	--	--	--	--

<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0	

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	344.25

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,559.7	21.19	83.08	3,535.7	23.4	192.3	2.00	2.00	0.00	83.08	
4,126.7	21.19	83.08	4,064.3	48.1	395.8	0.00	0.00	0.00	0.00	
5,186.3	0.00	360.00	5,100.0	71.4	588.2	2.00	-2.00	0.00	180.00	VP Pritt South #214
7,332.5	0.00	360.00	7,246.2	71.4	588.2	0.00	0.00	0.00	360.00	
8,332.5	90.00	341.00	7,882.8	673.4	380.9	9.00	9.00	-1.90	341.00	
18,045.2	90.00	341.00	7,882.8	9,857.1	-2,780.7	0.00	0.00	0.00	0.00	PBHL Pritt South #:

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Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Start Build 2.00</b>										
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,600.0	2.00	83.08	2,600.0	0.2	1.7	-0.3	2.00	2.00	0.00	
2,700.0	4.00	83.08	2,699.8	0.8	6.9	-1.1	2.00	2.00	0.00	
2,800.0	6.00	83.08	2,799.5	1.9	15.6	-2.4	2.00	2.00	0.00	
2,900.0	8.00	83.08	2,898.7	3.4	27.7	-4.3	2.00	2.00	0.00	
3,000.0	10.00	83.08	2,997.5	5.2	43.2	-6.7	2.00	2.00	0.00	
3,100.0	12.00	83.08	3,095.6	7.5	62.1	-9.6	2.00	2.00	0.00	
3,200.0	14.00	83.08	3,193.1	10.3	84.5	-13.1	2.00	2.00	0.00	
3,300.0	16.00	83.08	3,289.6	13.4	110.2	-17.0	2.00	2.00	0.00	
3,400.0	18.00	83.08	3,385.3	16.9	139.2	-21.5	2.00	2.00	0.00	
3,500.0	20.00	83.08	3,479.8	20.8	171.5	-26.5	2.00	2.00	0.00	
<b>Start 567.0 hold at 3559.7 MD</b>										
3,559.7	21.19	83.08	3,535.7	23.4	192.3	-29.7	2.00	2.00	0.00	
3,600.0	21.19	83.08	3,573.3	25.1	206.8	-32.0	0.00	0.00	0.00	
3,700.0	21.19	83.08	3,666.5	29.5	242.7	-37.5	0.00	0.00	0.00	
3,800.0	21.19	83.08	3,759.7	33.8	278.6	-43.1	0.00	0.00	0.00	
3,900.0	21.19	83.08	3,853.0	38.2	314.5	-48.6	0.00	0.00	0.00	
4,000.0	21.19	83.08	3,946.2	42.5	350.4	-54.2	0.00	0.00	0.00	
4,100.0	21.19	83.08	4,039.5	46.9	386.3	-59.7	0.00	0.00	0.00	
<b>Start Drop -2.00</b>										
4,126.7	21.19	83.08	4,064.3	48.1	395.8	-61.2	0.00	0.00	0.00	
4,200.0	19.73	83.08	4,133.0	51.2	421.3	-65.1	2.00	-2.00	0.00	
4,300.0	17.73	83.08	4,227.7	55.0	453.1	-70.1	2.00	-2.00	0.00	
4,400.0	15.73	83.08	4,323.5	58.5	481.7	-74.5	2.00	-2.00	0.00	
4,500.0	13.73	83.08	4,420.2	61.6	506.9	-78.4	2.00	-2.00	0.00	
4,600.0	11.73	83.08	4,517.7	64.2	528.8	-81.8	2.00	-2.00	0.00	
4,700.0	9.73	83.08	4,616.0	66.5	547.3	-84.6	2.00	-2.00	0.00	

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Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,800.0	7.73	83.08	4,714.8	68.3	562.4	-87.0	2.00	-2.00	0.00
4,900.0	5.73	83.08	4,814.1	69.7	574.0	-88.8	2.00	-2.00	0.00
5,000.0	3.73	83.08	4,913.8	70.7	582.2	-90.0	2.00	-2.00	0.00
5,100.0	1.73	83.08	5,013.7	71.3	586.9	-90.7	2.00	-2.00	0.00
<b>Start 2146.2 hold at 5186.3 MD</b>									
5,186.3	0.00	360.00	5,100.0	71.4	588.2	-90.9	2.00	-2.00	0.00
5,200.0	0.00	0.00	5,113.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,300.0	0.00	0.00	5,213.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,400.0	0.00	0.00	5,313.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,500.0	0.00	0.00	5,413.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,600.0	0.00	0.00	5,513.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,700.0	0.00	0.00	5,613.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,800.0	0.00	0.00	5,713.7	71.4	588.2	-90.9	0.00	0.00	0.00
5,900.0	0.00	0.00	5,813.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,000.0	0.00	0.00	5,913.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,100.0	0.00	0.00	6,013.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,200.0	0.00	0.00	6,113.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,300.0	0.00	0.00	6,213.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,400.0	0.00	0.00	6,313.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,500.0	0.00	0.00	6,413.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,600.0	0.00	0.00	6,513.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,700.0	0.00	0.00	6,613.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,713.7	71.4	588.2	-90.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,813.7	71.4	588.2	-90.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,913.7	71.4	588.2	-90.9	0.00	0.00	0.00
7,100.0	0.00	0.00	7,013.7	71.4	588.2	-90.9	0.00	0.00	0.00
7,200.0	0.00	0.00	7,113.7	71.4	588.2	-90.9	0.00	0.00	0.00
7,300.0	0.00	0.00	7,213.7	71.4	588.2	-90.9	0.00	0.00	0.00
<b>Start DLS 9.00 TFO 341.00</b>									
7,332.5	0.00	0.00	7,246.2	71.4	588.2	-90.9	0.00	0.00	0.00
7,350.0	1.57	341.00	7,263.6	71.7	588.1	-90.7	9.00	9.00	0.00
7,400.0	6.07	341.00	7,313.5	74.8	587.0	-87.4	9.00	9.00	0.00
7,450.0	10.57	341.00	7,363.0	81.6	584.7	-80.2	9.00	9.00	0.00
7,500.0	15.07	341.00	7,411.7	92.1	581.1	-69.1	9.00	9.00	0.00
7,550.0	19.57	341.00	7,459.4	106.2	576.2	-54.2	9.00	9.00	0.00
7,600.0	24.07	341.00	7,505.9	123.8	570.2	-35.7	9.00	9.00	0.00
7,650.0	28.57	341.00	7,550.7	144.7	562.9	-13.6	9.00	9.00	0.00
7,700.0	33.07	341.00	7,593.6	168.9	554.6	12.0	9.00	9.00	0.00
7,750.0	37.57	341.00	7,634.4	196.3	545.2	40.9	9.00	9.00	0.00
7,800.0	42.07	341.00	7,672.8	226.5	534.8	72.8	9.00	9.00	0.00
7,850.0	46.57	341.00	7,708.5	259.6	523.4	107.7	9.00	9.00	0.00
7,900.0	51.07	341.00	7,741.4	295.1	511.2	145.3	9.00	9.00	0.00
7,950.0	55.57	341.00	7,771.3	333.0	498.1	185.3	9.00	9.00	0.00
8,000.0	60.07	341.00	7,797.9	373.0	484.3	227.5	9.00	9.00	0.00
8,050.0	64.57	341.00	7,821.1	414.9	469.9	271.7	9.00	9.00	0.00
8,100.0	69.07	341.00	7,840.8	458.3	455.0	317.6	9.00	9.00	0.00
8,150.0	73.57	341.00	7,856.8	503.1	439.6	364.9	9.00	9.00	0.00
8,200.0	78.07	341.00	7,869.1	548.9	423.8	413.3	9.00	9.00	0.00
8,250.0	82.57	341.00	7,877.5	595.5	407.7	462.5	9.00	9.00	0.00
8,300.0	87.07	341.00	7,882.0	642.6	391.5	512.2	9.00	9.00	0.00
<b>Start 9712.7 hold at 8332.5 MD</b>									
8,332.5	90.00	341.00	7,882.8	673.4	380.9	544.7	9.00	9.00	0.00
8,400.0	90.00	341.00	7,882.8	737.2	359.0	612.0	0.00	0.00	0.00

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Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,500.0	90.00	341.00	7,882.8	831.7	326.4	711.8	0.00	0.00	0.00
8,600.0	90.00	341.00	7,882.8	926.3	293.9	811.7	0.00	0.00	0.00
8,700.0	90.00	341.00	7,882.8	1,020.8	261.3	911.5	0.00	0.00	0.00
8,800.0	90.00	341.00	7,882.8	1,115.4	228.8	1,011.4	0.00	0.00	0.00
8,900.0	90.00	341.00	7,882.8	1,209.9	196.2	1,111.2	0.00	0.00	0.00
9,000.0	90.00	341.00	7,882.8	1,304.5	163.7	1,211.0	0.00	0.00	0.00
9,100.0	90.00	341.00	7,882.8	1,399.0	131.1	1,310.9	0.00	0.00	0.00
9,200.0	90.00	341.00	7,882.8	1,493.6	98.6	1,410.7	0.00	0.00	0.00
9,300.0	90.00	341.00	7,882.8	1,588.1	66.0	1,510.6	0.00	0.00	0.00
9,400.0	90.00	341.00	7,882.8	1,682.7	33.5	1,610.4	0.00	0.00	0.00
9,500.0	90.00	341.00	7,882.8	1,777.2	0.9	1,710.2	0.00	0.00	0.00
9,600.0	90.00	341.00	7,882.8	1,871.8	-31.6	1,810.1	0.00	0.00	0.00
9,700.0	90.00	341.00	7,882.8	1,966.4	-64.2	1,909.9	0.00	0.00	0.00
9,800.0	90.00	341.00	7,882.8	2,060.9	-96.7	2,009.8	0.00	0.00	0.00
9,900.0	90.00	341.00	7,882.8	2,155.5	-129.3	2,109.6	0.00	0.00	0.00
10,000.0	90.00	341.00	7,882.8	2,250.0	-161.8	2,209.4	0.00	0.00	0.00
10,100.0	90.00	341.00	7,882.8	2,344.6	-194.4	2,309.3	0.00	0.00	0.00
10,200.0	90.00	341.00	7,882.8	2,439.1	-226.9	2,409.1	0.00	0.00	0.00
10,300.0	90.00	341.00	7,882.8	2,533.7	-259.5	2,509.0	0.00	0.00	0.00
10,400.0	90.00	341.00	7,882.8	2,628.2	-292.0	2,608.8	0.00	0.00	0.00
10,500.0	90.00	341.00	7,882.8	2,722.8	-324.6	2,708.6	0.00	0.00	0.00
10,600.0	90.00	341.00	7,882.8	2,817.3	-357.1	2,808.5	0.00	0.00	0.00
10,700.0	90.00	341.00	7,882.8	2,911.9	-389.7	2,908.3	0.00	0.00	0.00
10,800.0	90.00	341.00	7,882.8	3,006.4	-422.2	3,008.2	0.00	0.00	0.00
10,900.0	90.00	341.00	7,882.8	3,101.0	-454.8	3,108.0	0.00	0.00	0.00
11,000.0	90.00	341.00	7,882.8	3,195.5	-487.3	3,207.8	0.00	0.00	0.00
11,100.0	90.00	341.00	7,882.8	3,290.1	-519.9	3,307.7	0.00	0.00	0.00
11,200.0	90.00	341.00	7,882.8	3,384.7	-552.5	3,407.5	0.00	0.00	0.00
11,300.0	90.00	341.00	7,882.8	3,479.2	-585.0	3,507.4	0.00	0.00	0.00
11,400.0	90.00	341.00	7,882.8	3,573.8	-617.6	3,607.2	0.00	0.00	0.00
11,500.0	90.00	341.00	7,882.8	3,668.3	-650.1	3,707.0	0.00	0.00	0.00
11,600.0	90.00	341.00	7,882.8	3,762.9	-682.7	3,806.9	0.00	0.00	0.00
11,700.0	90.00	341.00	7,882.8	3,857.4	-715.2	3,906.7	0.00	0.00	0.00
11,800.0	90.00	341.00	7,882.8	3,952.0	-747.8	4,006.6	0.00	0.00	0.00
11,900.0	90.00	341.00	7,882.8	4,046.5	-780.3	4,106.4	0.00	0.00	0.00
12,000.0	90.00	341.00	7,882.8	4,141.1	-812.9	4,206.2	0.00	0.00	0.00
12,100.0	90.00	341.00	7,882.8	4,235.6	-845.4	4,306.1	0.00	0.00	0.00
12,200.0	90.00	341.00	7,882.8	4,330.2	-878.0	4,405.9	0.00	0.00	0.00
12,300.0	90.00	341.00	7,882.8	4,424.7	-910.5	4,505.7	0.00	0.00	0.00
12,400.0	90.00	341.00	7,882.8	4,519.3	-943.1	4,605.6	0.00	0.00	0.00
12,500.0	90.00	341.00	7,882.8	4,613.9	-975.6	4,705.4	0.00	0.00	0.00
12,600.0	90.00	341.00	7,882.8	4,708.4	-1,008.2	4,805.3	0.00	0.00	0.00
12,700.0	90.00	341.00	7,882.8	4,803.0	-1,040.7	4,905.1	0.00	0.00	0.00
12,800.0	90.00	341.00	7,882.8	4,897.5	-1,073.3	5,004.9	0.00	0.00	0.00
12,900.0	90.00	341.00	7,882.8	4,992.1	-1,105.8	5,104.8	0.00	0.00	0.00
13,000.0	90.00	341.00	7,882.8	5,086.6	-1,138.4	5,204.6	0.00	0.00	0.00
13,100.0	90.00	341.00	7,882.8	5,181.2	-1,170.9	5,304.5	0.00	0.00	0.00
13,200.0	90.00	341.00	7,882.8	5,275.7	-1,203.5	5,404.3	0.00	0.00	0.00
13,300.0	90.00	341.00	7,882.8	5,370.3	-1,236.0	5,504.1	0.00	0.00	0.00
13,400.0	90.00	341.00	7,882.8	5,464.8	-1,268.6	5,604.0	0.00	0.00	0.00
13,500.0	90.00	341.00	7,882.8	5,559.4	-1,301.1	5,703.8	0.00	0.00	0.00
13,600.0	90.00	341.00	7,882.8	5,653.9	-1,333.7	5,803.7	0.00	0.00	0.00
13,700.0	90.00	341.00	7,882.8	5,748.5	-1,366.2	5,903.5	0.00	0.00	0.00
13,800.0	90.00	341.00	7,882.8	5,843.1	-1,398.8	6,003.3	0.00	0.00	0.00

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Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,900.0	90.00	341.00	7,882.8	5,937.6	-1,431.3	6,103.2	0.00	0.00	0.00
14,000.0	90.00	341.00	7,882.8	6,032.2	-1,463.9	6,203.0	0.00	0.00	0.00
14,100.0	90.00	341.00	7,882.8	6,126.7	-1,496.4	6,302.9	0.00	0.00	0.00
14,200.0	90.00	341.00	7,882.8	6,221.3	-1,529.0	6,402.7	0.00	0.00	0.00
14,300.0	90.00	341.00	7,882.8	6,315.8	-1,561.6	6,502.5	0.00	0.00	0.00
14,400.0	90.00	341.00	7,882.8	6,410.4	-1,594.1	6,602.4	0.00	0.00	0.00
14,500.0	90.00	341.00	7,882.8	6,504.9	-1,626.7	6,702.2	0.00	0.00	0.00
14,600.0	90.00	341.00	7,882.8	6,599.5	-1,659.2	6,802.1	0.00	0.00	0.00
14,700.0	90.00	341.00	7,882.8	6,694.0	-1,691.8	6,901.9	0.00	0.00	0.00
14,800.0	90.00	341.00	7,882.8	6,788.6	-1,724.3	7,001.7	0.00	0.00	0.00
14,900.0	90.00	341.00	7,882.8	6,883.1	-1,756.9	7,101.6	0.00	0.00	0.00
15,000.0	90.00	341.00	7,882.8	6,977.7	-1,789.4	7,201.4	0.00	0.00	0.00
15,100.0	90.00	341.00	7,882.8	7,072.2	-1,822.0	7,301.3	0.00	0.00	0.00
15,200.0	90.00	341.00	7,882.8	7,166.8	-1,854.5	7,401.1	0.00	0.00	0.00
15,300.0	90.00	341.00	7,882.8	7,261.4	-1,887.1	7,500.9	0.00	0.00	0.00
15,400.0	90.00	341.00	7,882.8	7,355.9	-1,919.6	7,600.8	0.00	0.00	0.00
15,500.0	90.00	341.00	7,882.8	7,450.5	-1,952.2	7,700.6	0.00	0.00	0.00
15,600.0	90.00	341.00	7,882.8	7,545.0	-1,984.7	7,800.5	0.00	0.00	0.00
15,700.0	90.00	341.00	7,882.8	7,639.6	-2,017.3	7,900.3	0.00	0.00	0.00
15,800.0	90.00	341.00	7,882.8	7,734.1	-2,049.8	8,000.1	0.00	0.00	0.00
15,900.0	90.00	341.00	7,882.8	7,828.7	-2,082.4	8,100.0	0.00	0.00	0.00
16,000.0	90.00	341.00	7,882.8	7,923.2	-2,114.9	8,199.8	0.00	0.00	0.00
16,100.0	90.00	341.00	7,882.8	8,017.8	-2,147.5	8,299.7	0.00	0.00	0.00
16,200.0	90.00	341.00	7,882.8	8,112.3	-2,180.0	8,399.5	0.00	0.00	0.00
16,300.0	90.00	341.00	7,882.8	8,206.9	-2,212.6	8,499.3	0.00	0.00	0.00
16,400.0	90.00	341.00	7,882.8	8,301.4	-2,245.1	8,599.2	0.00	0.00	0.00
16,500.0	90.00	341.00	7,882.8	8,396.0	-2,277.7	8,699.0	0.00	0.00	0.00
16,600.0	90.00	341.00	7,882.8	8,490.6	-2,310.2	8,798.9	0.00	0.00	0.00
16,700.0	90.00	341.00	7,882.8	8,585.1	-2,342.8	8,898.7	0.00	0.00	0.00
16,800.0	90.00	341.00	7,882.8	8,679.7	-2,375.3	8,998.5	0.00	0.00	0.00
16,900.0	90.00	341.00	7,882.8	8,774.2	-2,407.9	9,098.4	0.00	0.00	0.00
17,000.0	90.00	341.00	7,882.8	8,868.8	-2,440.4	9,198.2	0.00	0.00	0.00
17,100.0	90.00	341.00	7,882.8	8,963.3	-2,473.0	9,298.1	0.00	0.00	0.00
17,200.0	90.00	341.00	7,882.8	9,057.9	-2,505.5	9,397.9	0.00	0.00	0.00
17,300.0	90.00	341.00	7,882.8	9,152.4	-2,538.1	9,497.7	0.00	0.00	0.00
17,400.0	90.00	341.00	7,882.8	9,247.0	-2,570.7	9,597.6	0.00	0.00	0.00
17,500.0	90.00	341.00	7,882.8	9,341.5	-2,603.2	9,697.4	0.00	0.00	0.00
17,600.0	90.00	341.00	7,882.8	9,436.1	-2,635.8	9,797.3	0.00	0.00	0.00
17,700.0	90.00	341.00	7,882.8	9,530.6	-2,668.3	9,897.1	0.00	0.00	0.00
17,800.0	90.00	341.00	7,882.8	9,625.2	-2,700.9	9,996.9	0.00	0.00	0.00
17,900.0	90.00	341.00	7,882.8	9,719.8	-2,733.4	10,096.8	0.00	0.00	0.00
18,000.0	90.00	341.00	7,882.8	9,814.3	-2,766.0	10,196.6	0.00	0.00	0.00
<b>TD at 18045.2</b>									
18,045.2	90.00	341.00	7,882.8	9,857.1	-2,780.7	10,241.8	0.00	0.00	0.00

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## Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Pritt South #214
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	WELL @ 1381.8usft
<b>Project:</b>	Harrison County, West Virginia NAD 83	<b>MD Reference:</b>	WELL @ 1381.8usft
<b>Site:</b>	Pritt South Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Pritt South #214	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #4		

## Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Pritt South #214 - plan hits target center - Point	0.00	360.00	7,882.8	9,857.1	-2,780.7	281,853.53	1,771,307.33	39° 16' 18.266 N	80° 11' 47.552 W
LP Pritt South #214 D - plan hits target center - Point	0.00	360.00	7,882.8	673.4	380.9	272,669.84	1,774,468.96	39° 14' 47.737 N	80° 11' 6.459 W

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,500.0	2,500.0	0.0	0.0	Start Build 2.00
3,559.7	3,535.7	23.4	192.3	Start 567.0 hold at 3559.7 MD
4,126.7	4,064.3	48.1	395.8	Start Drop -2.00
5,186.3	5,100.0	71.4	588.2	Start 2146.2 hold at 5186.3 MD
7,332.5	7,246.2	71.4	588.2	Start DLS 9.00 TFO 341.00
8,332.5	7,882.8	673.4	380.9	Start 9712.7 hold at 8332.5 MD
18,045.2	7,882.8	9,857.1	-2,780.7	TD at 18045.2

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# SITE SAFETY PLAN

## Pritt South Pad, Well #214

### 911 Address:

3460 Green Valley Road

Bridgeport, WV 26330

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SDw  
8/15/2018



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	

**ARSENAL RESOURCES  
PRITT SOUTH 214**  
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'83 S.P.C.(FT)	N. 271,996.5	E. 1,774,088.0
NAD'83 GEO.	LAT-(N) 39.244737	LONG-(W) 80.186454
NAD'83 UTM (M)	N. 4,344,251.2	E. 570,203.5

**LANDING POINT**

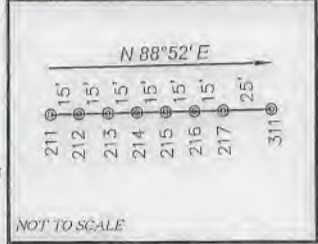
NAD'83 S.P.C.(FT)	N. 272,669.8	E. 1,774,469.0
NAD'83 GEO.	LAT-(N) 39.246594	LONG-(W) 80.185127
NAD'83 UTM (M)	N. 4,344,458.3	E. 570,316.1

**BOTTOM HOLE**

NAD'83 S.P.C.(FT)	N. 281,853.5	E. 1,771,307.3
NAD'83 GEO.	LAT-(N) 39.271741	LONG-(W) 80.196542
NAD'83 UTM (M)	N. 4,347,240.2	E. 569,306.4

	SURFACE OWNER	TAX MAP PCL	AC.
A	IRA H. & LAURA E. PRITT	351-4	69.09±
B	ORAN LEE WARDER, ET AL	351-7	47.40±
C	JOHN TROY & CYNTHIA LYNN SMIDER	351-33	1.52±
D	JOHN TROY & CYNTHIA LYNN SMIDER	351-33.1	.98±
E	JOHN TROY & CYNTHIA LYNN SMIDER	351-24	48.14±
F	CLEET T HENDERSON, II	351-19	33.43±
G	CLEET T HENDERSON, II	351-20	8.04±
H	RICHARD L KINER	351-18.7	66.80±
I	JAMES SCOTT & ERICA BROOK CRECH	351-16	17.35±
J	WILLIE MOORE ESTATE	351-8	7.54±
K	WILLIE MOORE ESTATE	351-9	.±
L	WILLIE MOORE ESTATE	351-10	7.87±
M	DAVID MARK PATRICK	351-3	15.00±
N	STEPAN M. & ELIZABETH J. GRAZIANO	351-1.7	10.00±
O	DIAN L. & LORNA J. HUTCHESON	351-1.3	3.93±
P	JEFFREY A. & ROBIN D. BOGGIO (ASSESSED IN TAYLOR COUNTY)	7-30	10.00±
Q	J. MICHAEL POOLE	350-32	23.84±

PRITT SOUTH PAD LAYOUT



REFERENCES

**PRITT SOUTH 214 WELL TIES**

LINE	BEARING	DISTANCE
L1	S 26°04' E	2556.29'
L2	S 14°41' W	939.57'
L3	N 83°05' E	592.53'
L4	N 19°00' W	636.77'

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.

**SLS**  
Land & Energy Development  
Solutions from the ground up.  
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26031 • (304) 462-5634  
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. 677 *Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE AUGUST 23, 20 17  
REVISED AUGUST 15, 2018  
OPERATORS WELL NO. PRITT SOUTH 214  
API WELL NO. 47-033-05910  
STATE MD COUNTY HGA PERMIT MD

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8383P214R4.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: 1,351.90' / 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 18,045' TMD / 7,883' TVD

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

COUNTY NAME PERMIT



33-05910  
MOD

WW-6A1  
(5/13)

Operator's Well No. Pritt South 214

**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				

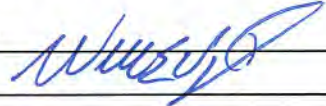
**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

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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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: Arsenal Resources  
 By: William Veigel   
 Its: Designated Agent

## Attachment to WW-6A1, Pritt S 214

Letter Designation/Number Designation on Plat	Grantor, Lessor, Assignor, etc.	Grantee, Lessee, Assignee, etc.	Royalty	Book/Page	Acreage
A ✓ (00006622)	Ira Pritt and Laura E. Pritt, husband and wife	Carrizo (Marcellus), LLC	15.00%	1448/804	92.06
	Carrizo (Marcellus), LLC	ACP II Marcellus, LLC and Carrizo (Marcellus) WV, LLC		1460/1083	
	Carrizo (Marcellus) WV, LLC and ACP II Marcellus, LLC	PDC Mountaineer, LLC		1518/395	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
B ✓ (00004364)	O. Carl Morris and Rachel L. Morris, his wife, William T. Morris and Willa R. Morris, his wife, and Mary Morris Warder and Willis E. Warder, her husband	Petroleum Development Corporation	12.50%	1018/107	122
	Petroleum Development Corporation	PDC Mountaineer, LLC		1474/612	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
C, D, E ✓ (00004031)	Frances M. Morris, single and Lummie B. Snyder, a married woman	Petroleum Development Corporation	12.50%	1058/166	58
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
F, G ✓ (00004184)	Bernard F. Joseph and Frenna J. Joseph, his wife	Petroleum Development Corporation	12.50%	1088/890	157
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
G ✓ (00008073)	Marvin L. Parli, a married man dealing in his own right	Mar Key, LLC	15.00%	1606/335	8.04

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H ✓ (00007845)	Janielle Elizabeth Williams, a single woman	Mar Key, LLC	12.50%	1599/318	37.78
H ✓ (00007842)	Mark Rodney Nuzum, a married man dealing in his sole and separate property	Mar Key, LLC	12.50%	1597/404	37.78
H ✓ (00007846)	Terry Lewis Nuzum, a single man	Mar Key, LLC	12.50%	1598/1179	37.78
I ✓ (00004035)	T.H. Butts, Widower	Petroleum Development Corporation	12.50%	1139/346	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I ✓ (00004043)	Dulcie Starkey, Widower	Petroleum Development Corporation	12.50%	1138/431	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I ✓ (00004046)	Leoma Chandler, widower	Petroleum Development Corporation	12.50%	1138/229	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I ✓ (00004041)	Robert C. Lawson and Lenore Lawson, his wife	Petroleum Development Corporation	12.50%	1139/650	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I ✓ (00004047)	Elleanor Whiteman and Paul M. Whiteman, her husband	Petroleum Development Corporation	12.50%	1102/387	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	

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	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
1 (00004038)	Mary L. Watson, single	Petroleum Development Corporation		1138/245	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
1 (00004044)	Nancy L. Munn and James R. Munn, her husband	Petroleum Development Corporation	12.50%	1138/914	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
1 (00004034)	Eileen Oldroyd and Arthur D. Oldroyd, her husband and Bernise E. Casey, widow	West Virginia Energies, Inc.	12.50%	1130/523	17.35
	West Virginia Energies, Inc.	Petroleum Development Corporation		1138/155	
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
1 (00004039)	Ernestine White and John White, her husband	Petroleum Development Corporation	12.50%	1138/250	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
1 (00004045)	Betty J. Sutton, widow	Petroleum Development Corporation	12.50%	1139/358	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	

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I (00004036) ✓	Mary Bartlett Fittro, widower	Petroleum Development Corporation	12.50%	1138/333	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I (00004042) /	Jo Ann Rose and Donald Rose, her husband	Petroleum Development Corporation	12.50%	1138/427	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I (00004037) /	Martha Roberts, widow	Petroleum Development Corporation	12.50%	1139/354	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I (00004040) /	Ruth Stanhope and Glen Stanhope, her husband	Petroleum Development Corporation	12.50%	1139/662	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
I (00004048) /	Bernard F. Joseph and Frenna Jean Joseph, his wife	Petroleum Development Corporation	12.50%	1135/107	17.35
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
J, K, L (00003783) ✓	Goldie Moore, widow	Petroleum Development Corporation	12.50%	1085/439	30
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	

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M (00008258) ✓	Clarence W. Mutschelknaus, Sr. a married man dealing in his own right	Mar Key, LLC		1614/1074	15.22
M (00008197) ✓	Mike Ross, Inc.	Mar Key, LLC		1609/787	15.22
M (00008257) ✓	Patrick D. Deem, a married man dealing in his own right	Mar Key, LLC	13.00%	1611/645	15.22
M (00008382) ✓	Helen M. Burton, aka H.M. Burton, a single woman	Mar Key, LLC	13.00%	1619/191	15.22
M (00008391) ✓	Ryan C. Radtka, a married man dealing in his own right	Mar Key, LLC	13.00%	1619/334	15.22
M (00008434) ✓	David Mark Patrick, a married man dealing in his own right	Mar Key, LLC	12.50%	Unrecorded	15.22
N, O, P, Q (00008296) ✓	Charles G. Cleer and Mary Jane Cleer, his wife	Partnership Properties, Inc.	12.50%	1043/718	112
	Partnership Properties Co.	Eastern American Energy Corporation		1124/449 1164/860	
	Eastern American Energy Corporation	Energy Corporation of America		59/879 1441/1003	
	Energy Corporation of America	Grelock Production, LLC		1603/1121	
	Grelock Production, LLC	Mar Key, LLC		1607/855	
N, O, P, Q (00008353) ✓	Charles G. Cleer and Mary Jane Cleer, his wife	Petro-Lewis Corporation		1021/20	112
	Petro-Lewis Corporation	Partnership Properties Co.		1072/213	
	Partnership Properties Co.	Eastern American Energy Corporation		1124/449	
	Eastern American Energy Corporation	Energy Corporation of America		59/879	
	Energy Corporation of America	Grelock Production, LLC		1603/1121	
	Grelock Production, LLC	Mar Key, LLC		1607/855	

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**West Virginia Secretary of State — Online Data Services**

**Business and Licensing**

Online Data Services Help

**Business Organization Detail**

*NOTICE: The West Virginia Secretary of State's Office makes every reasonable effort to ensure the accuracy of information. However, we make no representation or warranty as to the correctness or completeness of the information. If information is missing from this page, it is not in the The West Virginia Secretary of State's database.*

**MAR KEY LLC**

<b>Organization Information</b>									
Org Type	Effective Date	Established Date	Filing Date	Charter	Class	Sec Type	Termination Date	Termination Reason	
LLC   Limited Liability Company	7/11/2011		7/11/2011	Domestic	Profit				

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<b>Organization Information</b>			
<b>Business Purpose</b>	2111 - Mining, Quarrying, Oil & Gas Extraction - Oil and Gas Extraction - Crude Oil and Natural Gas Extraction		<b>Capital Stock</b>
<b>Charter County</b>		<b>Control Number</b>	99Q1F
<b>Charter State</b>	WV	<b>Excess Acres</b>	
<b>At Will Term</b>	A	<b>Member Managed</b>	MBR
<b>At Will Term Years</b>		<b>Par Value</b>	

<b>Authorized Shares</b>

<b>Addresses</b>	
<b>Type</b>	<b>Address</b>
<b>Designated Office Address</b>	65 PROFESSIONAL PLACE SUITE 200 BRIDGEPORT, WV, 26330
<b>Mailing Address</b>	6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090 USA
<b>Notice of Process Address</b>	CORPORATION SERVICE COMPANY 209 WEST WASHINGTON STREET CHARLESTON, WV, 25302
<b>Principal Office Address</b>	6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090 USA
<b>Type</b>	<b>Address</b>

<b>Officers</b>	
<b>Type</b>	<b>Name/Address</b>
<b>Member</b>	ARSENAL RESOURCES ENERGY LLC 6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090
<b>Organizer</b>	PAUL M HERZING 560 EPSILON DR. PITTSBURGH, PA, 15238 USA
<b>Type</b>	<b>Name/Address</b>

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<b>Annual Reports</b>
<b>Date filed</b>



3/30/2017
6/20/2016
6/30/2015
4/28/2014
6/28/2013
5/8/2012
Date filed

For more information, please contact the Secretary of State's Office at 304-558-8000.

Tuesday, November 28, 2017 — 9:44 AM

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**Agreement to Drill, Complete and Operate Oil & Gas Wells**

This Agreement to Drill, Complete and Operate Oil & Gas Wells (this "Agreement"), by and among Mountaineer Keystone LLC, a West Virginia limited liability company ("Mountaineer Keystone"), PDC Mountaineer, LLC, a Delaware limited liability company ("PDC"), and PDC Mountaineer Holdings, LLC, a Delaware limited liability company ("PDC Holdings"), is effective as of October 15, 2014. (the "Effective Date") and sets forth the terms pursuant to which Mountaineer Keystone will drill, complete and operate the Wells (as defined below) on behalf of PDC and PDC Holdings. Mountaineer Keystone, PDC, and PDC Holdings are each a "Party" and are collectively the "Parties". In consideration of the foregoing and the respective agreements hereinafter set forth and the mutual benefits to be derived therefrom, the Parties, intending to be legally bound, hereby agree as follows:

1. **Term:** This Agreement is effective from the Effective Date until terminated by Mountaineer Keystone on the one hand or PDC and PDC Holdings on the other hand with 30 days' written notice to the other Party or Parties, as applicable (the "Term").
2. **Authorization to Operate:** PDC and PDC Holdings authorize Mountaineer Keystone to undertake and perform, on PDC and PDC Holdings behalf, all operations, including without limitation permit applications, well pad preparation, drilling and completing wells, and marketing gas, oil and other hydrocarbons therefrom with respect to all oil and gas wells to be drilled on oil and gas leasehold acreage held by PDC or PDC Holdings. PDC, PDC Holdings and Mountaineer Keystone are affiliates with a common parent. Mountaineer Keystone was formed to operate oil and gas leasehold acreage held by PDC, PDC Holdings and certain other affiliates. Mountaineer Keystone agrees that it shall, in a good and workmanlike manner and in accordance with industry standards as they prevail in the area, drill, complete and operate oil and gas wells on leasehold acreage owned by PDC or PDC Holdings from time to time as directed by PDC or PDC Holdings (collectively, the "Wells").
3. **No Third Party Beneficiary:** This Agreement is for the benefit of the Parties and is not for the benefit of any third party.
4. **Counterparts:** This Agreement may be simultaneously executed in several counterparts and via facsimile or similar electronic transmittal, each of which shall be deemed to be an original and taken together shall constitute one and the same instrument.


[Signature Page Follows]

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IN WITNESS WHEREOF, Mountaineer Keystone, PDC, and PDC Holdings have caused their duly authorized representatives to execute this Agreement as of the Effective Date.


**MOUNTAINEER KEYSTONE LLC**

By:   
Name: Robert Kesel  
Title: CEO

**PDC MOUNTAINEER, LLC**

By:   
Name: Robert Kesel  
Title: CEO

**PDC MOUNTAINEER HOLDINGS, LLC**

By:   
Name: Robert Kesel  
Title: CEO

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**Agreement to Drill, Complete and Operate Oil & Gas Wells**

This Agreement to Drill, Complete and Operate Oil & Gas Wells (this "Agreement"), by and among Arsenal Resources LLC, a West Virginia limited liability company ("Arsenal"), River Ridge Energy, LLC, a Delaware limited liability company ("River Ridge"), and River Ridge Energy, Holdings, LLC, a Delaware limited liability company ("River Ridge Holdings"), is effective as of March 1, 2017. (the "Effective Date") and sets forth the terms pursuant to which Arsenal will drill, complete and operate the Wells (as defined below) on behalf of River Ridge and River Ridge Holdings. Arsenal, River Ridge, and River Ridge Holdings are each a "Party" and are collectively the "Parties". In consideration of the foregoing and the respective agreements hereinafter set forth and the mutual benefits to be derived therefrom, the Parties, intending to be legally bound, hereby agree as follows:

1. **Term:** This Agreement is effective from the Effective Date until terminated by Arsenal on the one hand or River Ridge and River Ridge Holdings on the other hand with 30 days' written notice to the other Party or Parties, as applicable (the "Term").
2. **Authorization to Operate:** River Ridge and River Holdings authorize Arsenal to undertake and perform, on River Ridge and River Ridge Holdings behalf, all operations, including without limitation permit applications, well pad preparation, drilling and completing wells, and marketing gas, oil and other hydrocarbons therefrom with respect to all oil and gas wells to be drilled on oil and gas leasehold acreage held by River Ridge or River Ridge Holdings. River Ridge, River Ridge Holdings and Arsenal are affiliates with a common parent. Arsenal was formed to operate oil and gas leasehold acreage held by River Ridge, River Ridge Holdings and certain other affiliates. Arsenal agrees that it shall, in a good and workmanlike manner and in accordance with industry standards as they prevail in the area, drill, complete and operate oil and gas wells on leasehold acreage owned by River Ridge or River Ridge Holdings from time to time as directed by River Ridge or River Ridge Holdings (collectively, the "Wells").
3. **No Third Party Beneficiary:** This Agreement is for the benefit of the Parties and is not for the benefit of any third party.
4. **Counterparts:** This Agreement may be simultaneously executed in several counterparts and via facsimile or similar electronic transmittal, each of which shall be deemed to be an original and taken together shall constitute one and the same instrument.

[Signature Page Follows]

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IN WITNESS WHEREOF, Arsenal, River Ridge, and River Ridge Holdings have caused their duly authorized representatives to execute this Agreement as of the Effective Date.

**ARSENAL RESOURCES LLC**

By: Joel E. Symonds  
Name: Joel E. Symonds  
Title: Vice President - Land

**RIVER RIDGE ENERGY, LLC**

By: Joel E. Symonds  
Name: Joel E. Symonds  
Title: Vice President - Land

**RIVER RIDGE HOLDINGS, LLC**

By: Joel E. Symonds  
Name: Joel E. Symonds  
Title: Vice President - Land

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People Powered. Asset Strong.

March 22, 2018

Mr. James Martin, Chief of Oil and Gas  
West Virginia Department of Environmental Protection  
601 57th Street, SE  
Charleston, WV 25304

RE: Ownership of Roadways; Pritt South Pad

Dear Mr. Martin:

In preparation of filing a permit application for the above referenced well, the Title Department of Arsenal Resources has conducted a thorough title examination in order to determine the ownership of the oil and gas underlying all roadways crossed by the proposed wells. The findings of the title examination show that some of the roadways crossed by the proposed wells are owned in fee by the West Virginia Department of Transportation, Division of Highways and that some are only right of ways. If owned in fee by the West Virginia Department of Transportation, Division of Highways, a lease covering its interest in the roadway or roadways has been properly obtained and provided in the application materials. If a right of way only, the oil and gas underlying such roadway or roadways is owned by the adjoining landowners and is also covered by the leaseholds provided in the application materials.

If you have any questions, concerns or need further information, please do not hesitate to contact me at the address listed below.

Sincerely,

A handwritten signature in blue ink that reads 'Coty Brandon'.

Coty Brandon  
Title Manager

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August 17, 2018

WVDEP  
Office of Oil and Gas  
ATTN: Laura Adkins  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

**RE: Pritt South Pad – Pritt South 214, API# 47-033-05910 – Modification due to spacing changes and extending lateral**

Dear Laura:

Enclosed please find the modification for the Pritt South 214, (API# 47-033-05910). This permit was on operator hold. We would like to remove the hold and replace it with this application. This permit is being modified due to adjusting the well bore spacing and moving it to 240' to the east. The well head locations remained the same. This well was originally permitted to 6,851.92'. We have obtained additional leasing for this site during this modification and request to extend the lateral 2,860.76' for a total of 9,712.68'. Included are the following:

- Plat
- WW-6B, Well Work Permit Application/Casing
- Well Bore Schematic
- WW-6A1, Lease Information
- Roadway Letter
- Site Safety Plan
- AOR

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Should you have any questions or need any additional information, please feel free to contact me by phone or email. Thank you!

Sincerely,

Kelly Davis  
Permitting Specialist  
1-304-517-8743 mobile  
1-724-940-1218 office  
kdavis@arsenalresources.com