

05/10/2019



west virginia department of environmental protection

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

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

Tuesday, 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 201
47-033-05900-00-00

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.

James A. Martin
Chief

Operator's Well Number: PRITT SOUTH 201
Farm Name: IRA & LAURA PRITT
U.S. WELL NUMBER: 47-033-05900-00-00
Horizontal 6A New Drill
Date Modification Issued: 05/07/2019

Promoting a healthy environment.

05/10/2019

WW-6B
(04/15)

API NO. 47- 033 - 05900 **MOD # 2**
OPERATOR WELL NO. Pritt South 201
Well Pad Name: Pritt South

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 201 Well Pad Name: Pritt South

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

4) Elevation, current ground: 1,343.80' Elevation, proposed post-construction: 1,345.90'

5) Well Type (a) Gas Oil Underground Storage

Other

(b) If Gas Shallow Deep

Horizontal

*SOW
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, 7645.0ft (TVD Heel) - 7645.0ft (TVD Toe), 90ft, 0.5 psi/ft Base of Marcellus Shale, 7735.0ft (TVD Heel) - 7735.0ft (TVD Toe)

8) Proposed Total Vertical Depth: 7,690ft

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 19,272 ft

11) Proposed Horizontal Leg Length: 11,098 ft

12) Approximate Fresh Water Strata Depths: 6', 36', 81', 210', 248', 291', 306', 336', 376' *

*Best
Casing
Available
WS*

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: 1391'

15) Approximate Coal Seam Depths: Bakerstown 463', Brush Creek 582', Upper Freeport 643', Lower Freeport 703', Upper Kittanning 778', Middle Kittanning 838', Lower Kittanning 851'

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

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

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MAR 14 2019

WV Department of
Environmental Protection

Mod #5

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Faint, mirrored text at the bottom of the page, likely bleed-through from the reverse side, including the word "PRINTED" and other illegible characters.

WW-6B
(04/15)

API NO. 47- 033 - 05900
 OPERATOR WELL NO. Pritt South 201
 Well Pad Name: Pritt South

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	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	1500	1500	CTS
Production	5.5	New	P-110	20	19,272	19,272	TOC @ 1,350' MD
Tubing							
Liners							

SDW
3/12/2019

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	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	3,950	1500	Class A, 3% CaCl2	1.29
Production	5.5	8.5-8.75	0.361	12,640	9500	Class A, 50:50 Poz	1.29/1.34
Tubing					5000		
Liners					N/A		

PACKERS

Kind:				
Sizes:				
Depths Set:				

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WW-6B
(10/14)

API NO. 47- 033 - 05900

OPERATOR WELL NO. Pritt South 201

Well Pad Name: Pritt South

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) callophane 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 to 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 stands 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.

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5,768' T.H.

2,996' B.H.

T.H. LATITUDE 39°15'00"
B.H. LATITUDE 39°15'00"

ARSENAL RESOURCES PRITT SOUTH 201

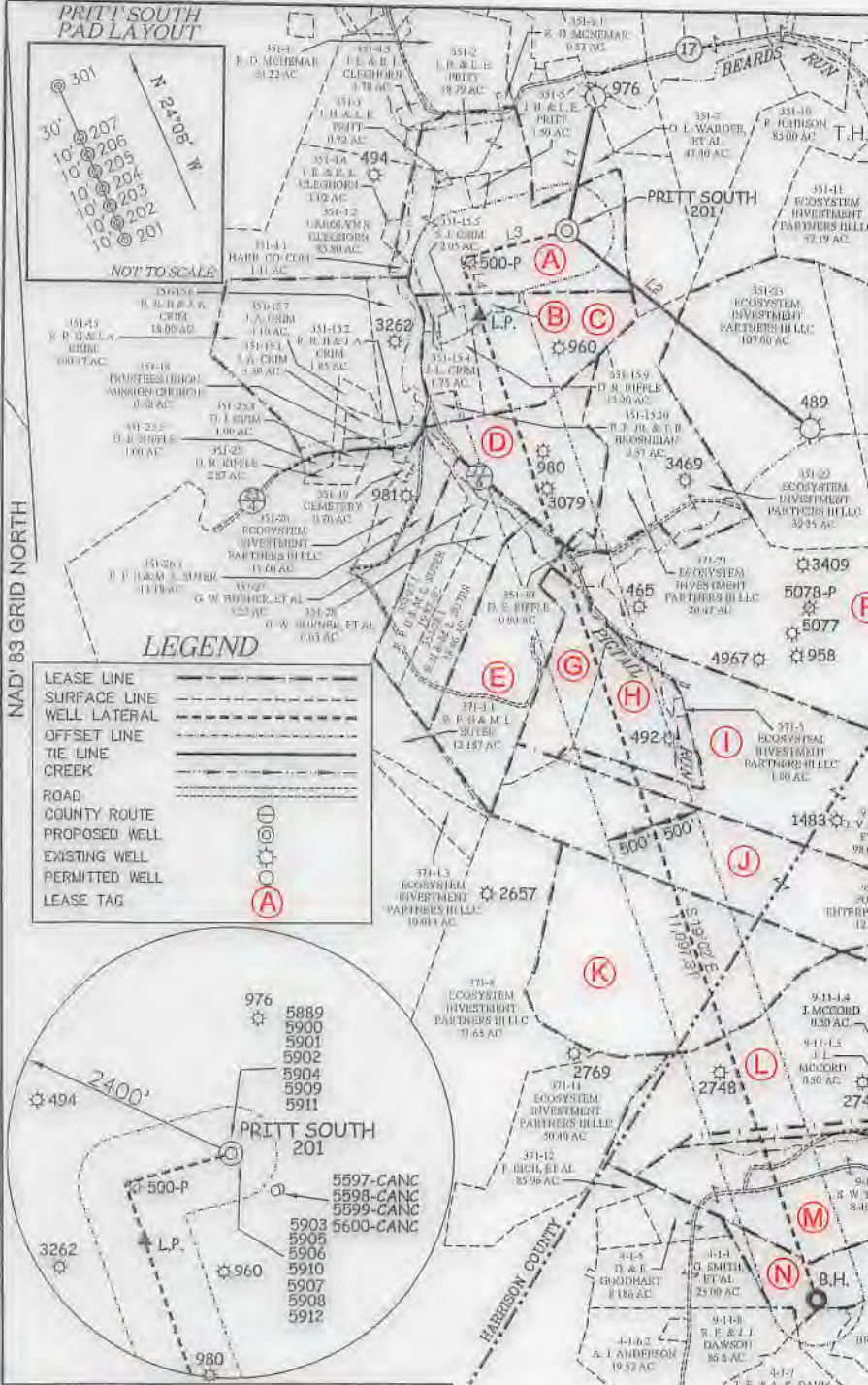
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'83 S.P.C.(FT) N. 272,351.0 E. 1,773,927.0
 NAD'83 GEO. LAT-(N) 39.245707 LONG-(W) 80.167032
 NAD'83 UTM (M) N. 4,344,358.4 E. 570,152.6
LANDING POINT
 NAD'83 S.P.C.(FT) N. 271,430.8 E. 1,772,996.0
 NAD'83 GEO. LAT-(N) 39.243161 LONG-(W) 80.167032
 NAD'83 UTM (M) N. 4,344,073.3 E. 569,873.7
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 280,939.9 E. 1,776,614.0
 NAD'83 GEO. LAT-(N) 39.214434 LONG-(W) 80.177241
 NAD'83 UTM (M) N. 4,340,895.4 E. 571,029.1

T.H. LONGITUDE 80°10'00"
B.H. LONGITUDE 80°10'00"

PRITT SOUTH 201 WELL TIES

LINE	BEARING	DISTANCE
L1	N 71°33' E	7483.30'
L2	S 51°23' E	3343.70'
L3	S 74°23' W	1182.26'
L4	S 19°02' E	636.74'

TAG	SURFACE OWNER	TAX MAP PARCEL	ACREAGE
HARRISON COUNTY			
A	IRA H. & LAURA E. PRITT	351-4	69.09±
B	JULIA L. CRIM	351-13.3	4.19±
C	JULIA CRIM	351-13.6	31.00±
D	GERALD BURNER, ET AL.	351-20	40.25±
E	ROGER P. II & MELISSA L. SUTER	351-29	51.00±
F	ECOSYSTEM INVESTMENT PARTNERS III LLC	351-31	120.73±
G	ROGER P. II & MELISSA L. SUTER	371-1.1	27.69±
H	ECOSYSTEM INVESTMENT PARTNERS III LLC	371-4	27.79±
I	ECOSYSTEM INVESTMENT PARTNERS III LLC	371-6	99.83±
J	ECOSYSTEM INVESTMENT PARTNERS III LLC	371-3	95.08±
K	ECOSYSTEM INVESTMENT PARTNERS III LLC	371-9	105.48±
BARBOUR COUNTY			
L	DECKWITH LUMBER CO. INC	11-1.2	177.5±
M	ELLEN MARIE MILLER	11-2	59.3±
N	RANDY & KIMBERLY SPELLMAN	11-3.1	23.21±

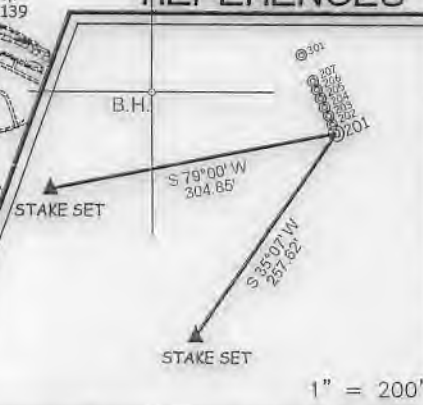


LEGEND

- LEASE LINE: Dashed line
- SURFACE LINE: Solid line
- WELL LATERAL: Dotted line
- OFFSET LINE: Long dashed line
- TIE LINE: Short dashed line
- CREEK: Wavy line
- ROAD: Double line
- COUNTY ROUTE: Line with 'R' symbol
- PROPOSED WELL: Circle with 'A' symbol
- EXISTING WELL: Circle with 'B' symbol
- PERMITTED WELL: Circle with 'C' symbol
- LEASE TAG: Circle with letter symbol



REFERENCES



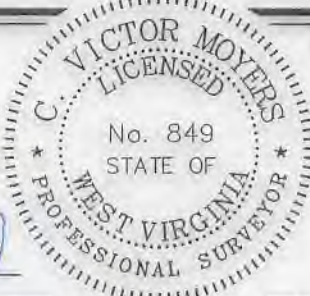
NOTES ON SURVEY

- 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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Solutions from the ground up.
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www.sls-wv.com

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE AUGUST 15, 20 17
 REVISED 09/07/18, 09/12/18 & 03/11/19
 OPERATORS WELL NO. PRITT SOUTH 201
 API WELL NO. 47 - 033 - 5900
 STATE MD COUNTY #2 PERMIT MD#2

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8383P201R6.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: 1,343.80' / PROPOSED: 1,345.90' 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 69.096±
 PROPOSED WORK:
 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 19,271.9' TMD / 7,690' 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