

05/10/2019



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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)

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 202  
47-033-05901-00-00

**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 202  
Farm Name: IRA & LAURA PRITT  
U.S. WELL NUMBER: 47-033-05901-00-00  
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 - 05901 MOD#2  
OPERATOR WELL NO. Pritt South 202  
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 202      Well Pad Name: Pritt South

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

4) Elevation, current ground: 1,343.50'      Elevation, proposed post-construction: 1,345.90'

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

Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_

Horizontal  3/12/2019

6) Existing Pad: Yes or No Yes SDW

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: 7,705 ft

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 19,180 ft

11) Proposed Horizontal Leg Length: 11,070 ft

12) Approximate Fresh Water Strata Depths: 6', 36', 81', 210', 248', 291', 306', 336', 376' \* 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: 1391'

15) Approximate Coal Seam Depths: Bakerstown 483', 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: \_\_\_\_\_

RECEIVED  
Office of Oil and Gas  
MAR 14 2019  
WV Department of Environmental Protection  
Page 1 of 3



WW-6B  
(04/15)

API NO. 47- 033 - 05901  
OPERATOR WELL NO. Pritt South 202  
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                     | 19,180                     | 19,180                       | 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% CaCl <sub>2</sub> | 1.20                     |
| Fresh Water  | 13.375    | 17.5                   | 0.38                | 2730                 | 900                                      | Class A, 3% CaCl <sub>2</sub> | 1.20                     |
| Coal         |           |                        |                     |                      |                                          |                               |                          |
| Intermediate | 9.625     | 12.25                  | 0.395               | 3,950                | 1500                                     | Class A, 3% CaCl <sub>2</sub> | 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: |  |  |  |  |

WW-6B  
(10/14)

API NO. 47- 033 - 05901

OPERATOR WELL NO. Pritt South 202

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) 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 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.

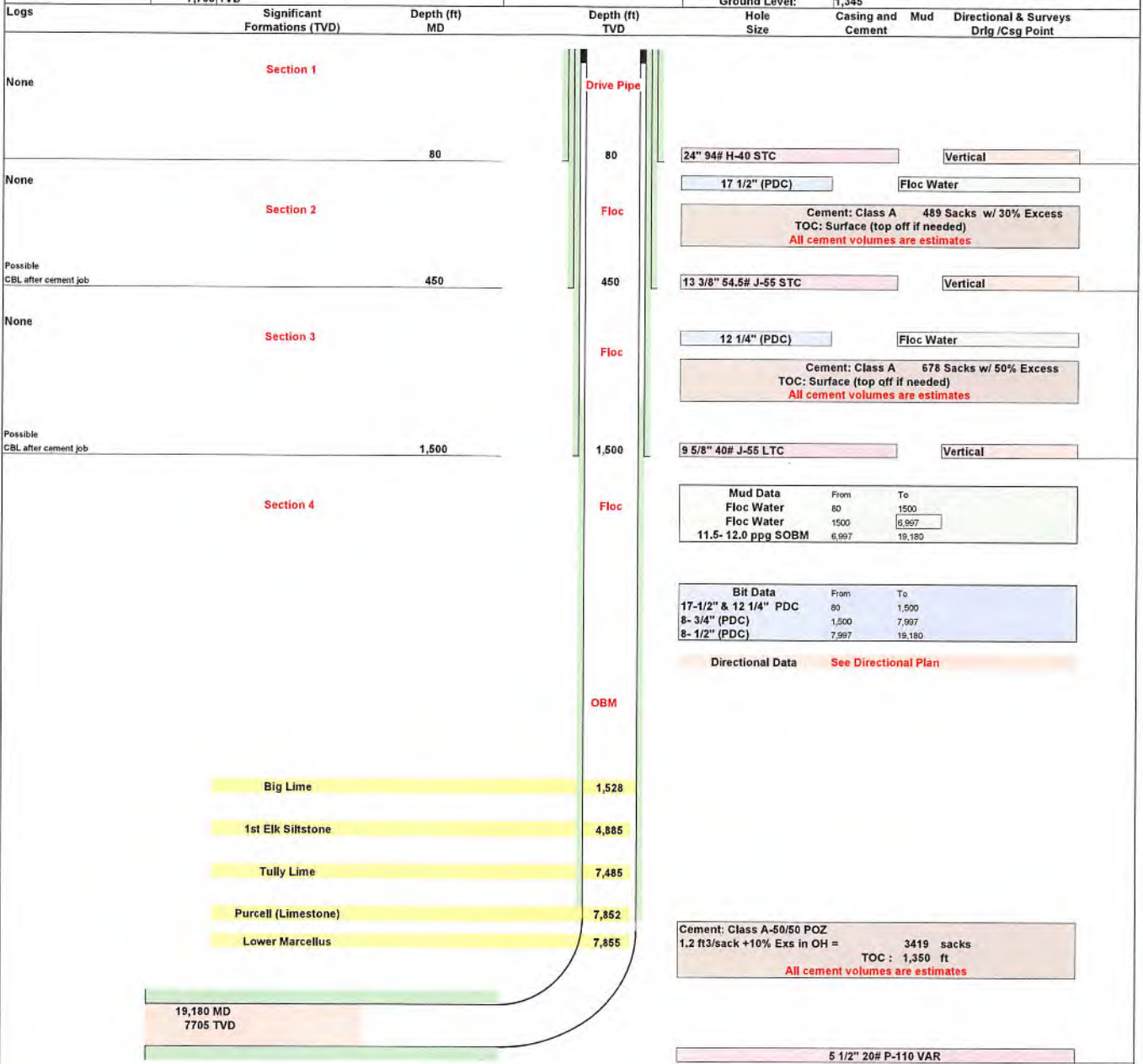
\*Note: Attach additional sheets as needed.



Arsenal Resources  
Pritt South 202  
Casing Design  
Directional Plan # 8 QES

|                       |                             |
|-----------------------|-----------------------------|
| Other Names:          | N/A                         |
| Surface Location:     | TBD                         |
| Bottom Hole Location: | TBD                         |
| Total Depth:          | 19,180 MD (ft)<br>7,705 TVD |

|               |               |
|---------------|---------------|
| County:       | Harrison      |
| State:        | West Virginia |
| AFE #:        | XX API #: XX  |
| RKB:          | 27            |
| Ground Level: | 1,345         |



Revision

1

Note: Not drawn to scale

Cement Outside Casing  
Seal Assembly in Annulus

Date Last Revised: 11-Mar-19  
Jarrett Toms



# ARSENAL RESOURCES PRITT SOUTH 202

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'83 S.P.C.(FT) N. 272,360.1 E. 1,773,922.9  
NAD'83 GEO. LAT-(N) 39,245732 LONG-(W) 80.187047  
NAD'83 UTM (M) N. 4,344,361.2 E. 570,151.4

### LANDING POINT

NAD'83 S.P.C.(FT) N. 271,681.2 E. 1,773,988.7  
NAD'83 GEO. LAT-(N) 39,243865 LONG-(W) 80.187432  
NAD'83 UTM (M) N. 4,344,153.7 E. 570,120.0

### BOTTOM HOLE

NAD'83 S.P.C.(FT) N. 261,213.7 E. 1,777,411.4  
NAD'83 GEO. LAT-(N) 39,215202 LONG-(W) 80.174435  
NAD'83 UTM (M) N. 4,340,982.9 E. 571,270.6

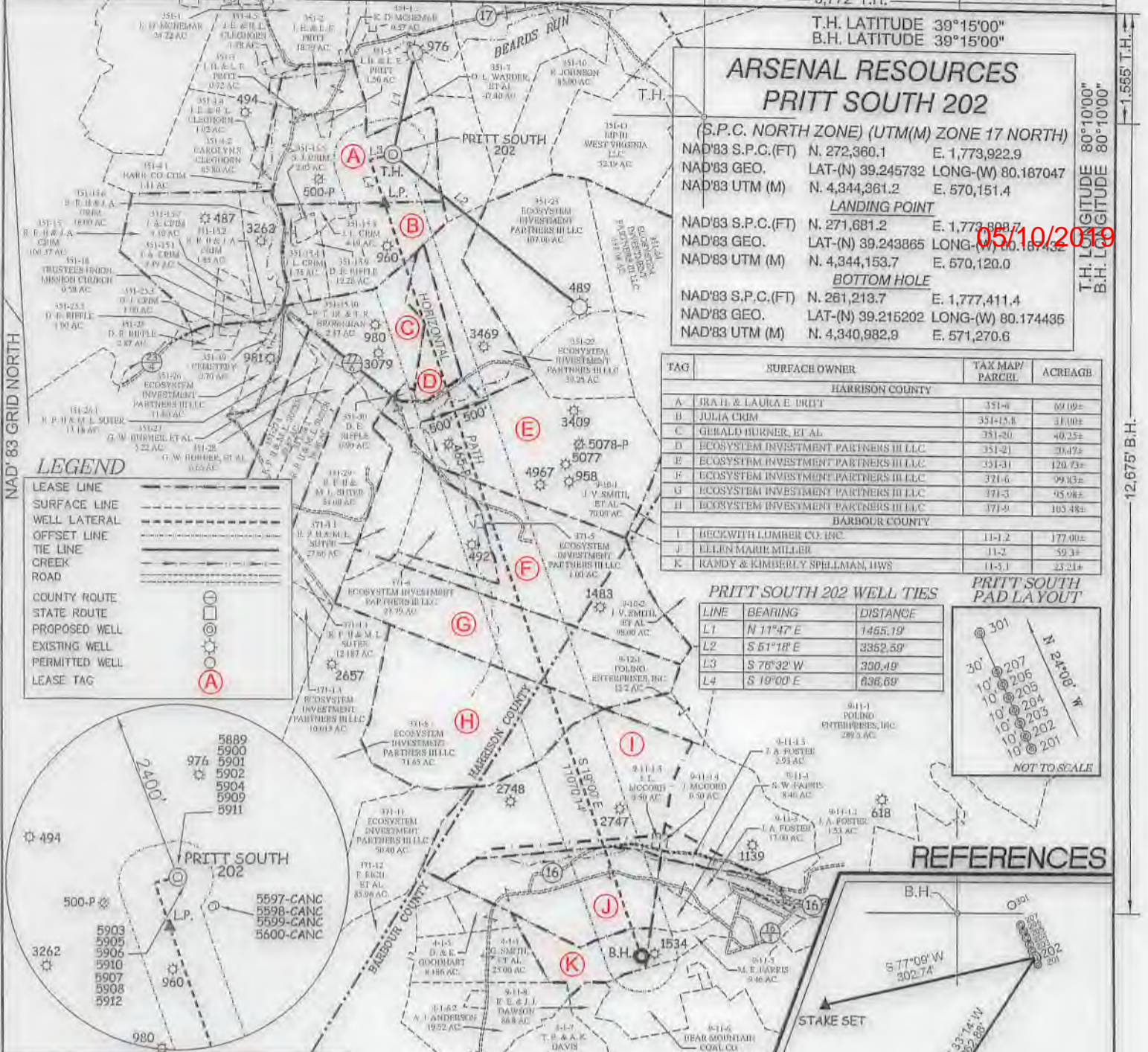
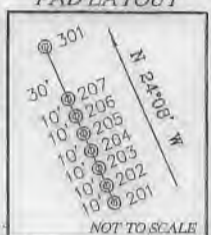
T.H. LATITUDE 80°10'00"  
B.H. LATITUDE 80°10'00"

| TAG             | SURFACE OWNER                         | TAX MAP/<br>PARCEL | ACREAGE |
|-----------------|---------------------------------------|--------------------|---------|
| HARRISON COUNTY |                                       |                    |         |
| A               | IRA H. & LAURA E. PRITT               | 351-6              | 69.09±  |
| B               | JULIA CRIM                            | 351-15.8           | 31.00±  |
| C               | GERALD BURNER, ET AL.                 | 351-20             | 40.25±  |
| D               | ECOSYSTEM INVESTMENT PARTNERS III LLC | 351-21             | 36.47±  |
| E               | ECOSYSTEM INVESTMENT PARTNERS III LLC | 351-31             | 120.73± |
| F               | ECOSYSTEM INVESTMENT PARTNERS III LLC | 371-6              | 99.33±  |
| G               | ECOSYSTEM INVESTMENT PARTNERS III LLC | 371-3              | 95.98±  |
| H               | ECOSYSTEM INVESTMENT PARTNERS III LLC | 371-9              | 105.48± |
| BARBOUR COUNTY  |                                       |                    |         |
| I               | BECKWITH LUMBER CO. INC.              | 11-1.2             | 177.00± |
| J               | ELEEN MARIE MILLER                    | 11-2               | 59.3±   |
| K               | KANDY & KIMBERLY SPELLMAN, HWS        | 11-3.1             | 23.21±  |

### PRITT SOUTH 202 WELL TIES

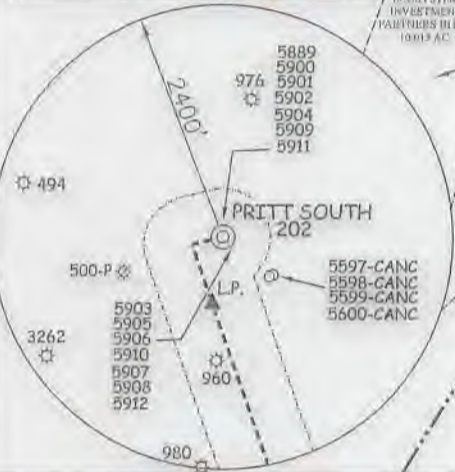
| LINE | BEARING    | DISTANCE |
|------|------------|----------|
| L1   | N 11°47' E | 1455.19' |
| L2   | S 57°18' E | 3352.59' |
| L3   | S 78°32' W | 390.49'  |
| L4   | S 19°00' E | 836.69'  |

### PRITT SOUTH PAD LAYOUT

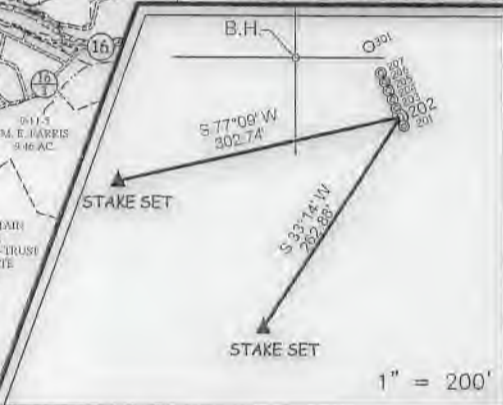


### LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TI E LINE
- CREEK
- ROAD
- COUNTY ROUTE
- STATE ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- LEASE TAG



### 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 825' OF THE CENTER OF PROPOSED WELL PAD.



SLS Land & Energy Development  
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www.slsco.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 08/28/18, 09/12/18 & 03/11/2019  
OPERATORS WELL NO. PRITT SOUTH 202  
API NO. 47 - 033 - 5901  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8383P202R5.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: 1,343.50' / 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: 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 19,180.4' TMD / 7,705' 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