



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 206
47-033-05909-00-00

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 206
Farm Name: IRA & LAURA PRITT
U.S. WELL NUMBER: 47-033-05909-00-00
Horizontal 6A New Drill
Date Modification Issued: 05/07/2019

Promoting a healthy environment.

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

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

2) Operator's Well Number: Pritt South 206 Well Pad Name: Pritt South

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

4) Elevation, current ground: 1,342.20' Elevation, proposed post-construction: 1,345.90'

5) Well Type (a) Gas Oil Underground Storage

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

*SDW
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: 7,758 ft

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 20,045 ft

11) Proposed Horizontal Leg Length: 11,518.27 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: _____

18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	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	20,045	20,045	TOC @ 1,350'MD
Tubing							
Liners							

SDW
3/12/2019

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	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	1,500	Class A, 3% CaCl2	1.29
Production	5.5	8.5-8.75	0.361	12,640	9,500	Class A, 50:50 Poz	1.29/1.34
Tubing					5,000		
Liners					N/A		

PACKERS

Kind:				
Sizes:				
Depths Set:				

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 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.



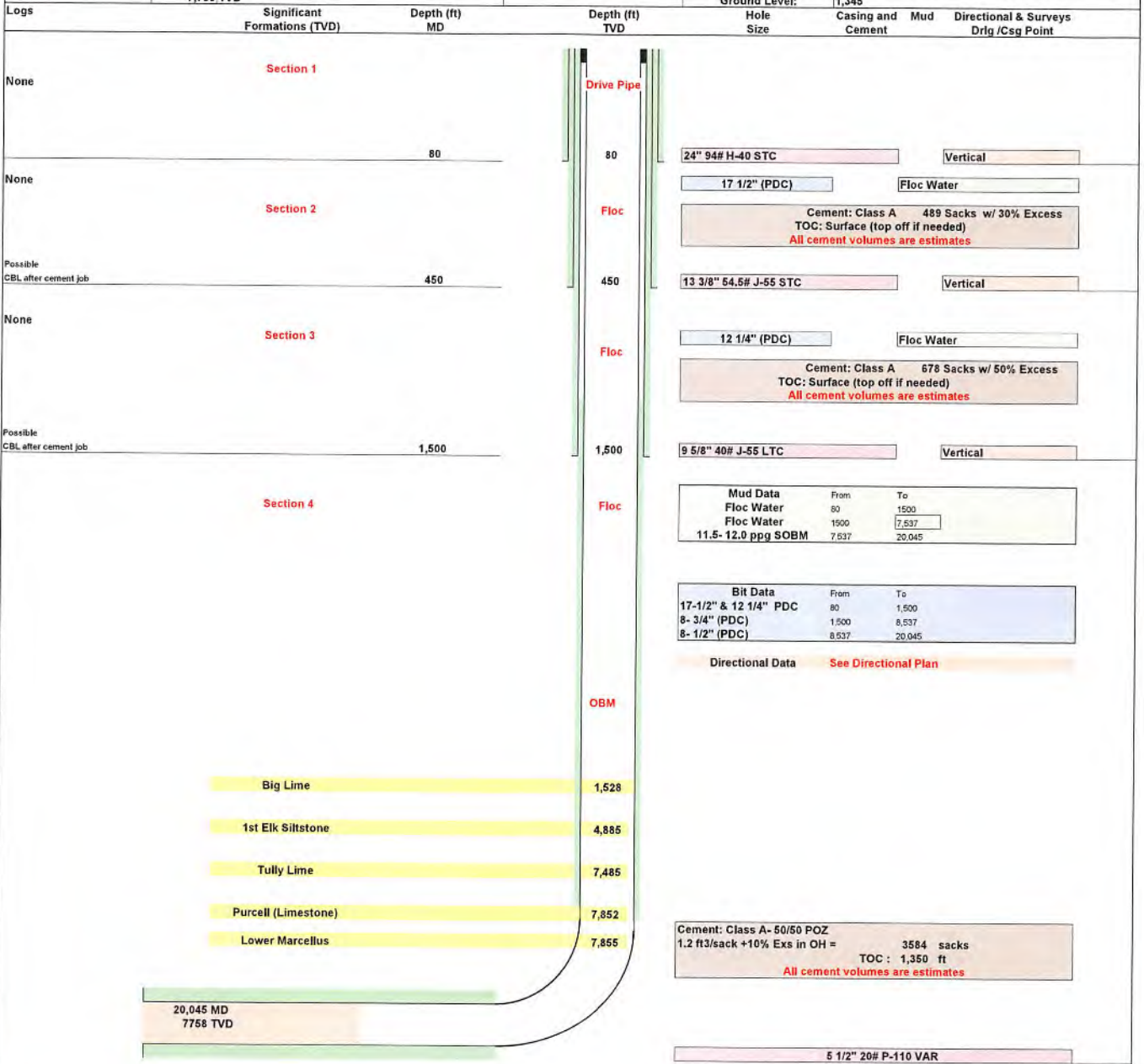
Arsenal Resources
Pritt South 206
Casing Design

05/10/2019

Directional Plan # 6 QES

Other Names:	N/A
Surface Location:	TBD
Bottom Hole Location:	TBD
Total Depth:	20,045 MD (ft) 7,758 TVD

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



24" 94# H-40 STC Vertical

17 1/2" (PDC) Floc Water

Cement: Class A 489 Sacks w/ 30% Excess
TOC: Surface (top off if needed)
All cement volumes are estimates

13 3/8" 54.5# J-55 STC Vertical

12 1/4" (PDC) Floc Water

Cement: Class A 678 Sacks w/ 50% Excess
TOC: Surface (top off if needed)
All cement volumes are estimates

9 5/8" 40# J-55 LTC Vertical

Mud Data	From	To
Floc Water	80	1500
Floc Water	1500	7,537
11.5- 12.0 ppg SOBM	7,537	20,045

Bit Data	From	To
17-1/2" & 12 1/4" PDC	80	1,500
8- 3/4" (PDC)	1,500	8,537
8- 1/2" (PDC)	8,537	20,045

Directional Data See Directional Plan

OBM

Cement: Class A- 50/50 POZ
1.2 ft3/sack +10% Exs in OH = 3584 sacks
TOC : 1,350 ft
All cement volumes are estimates

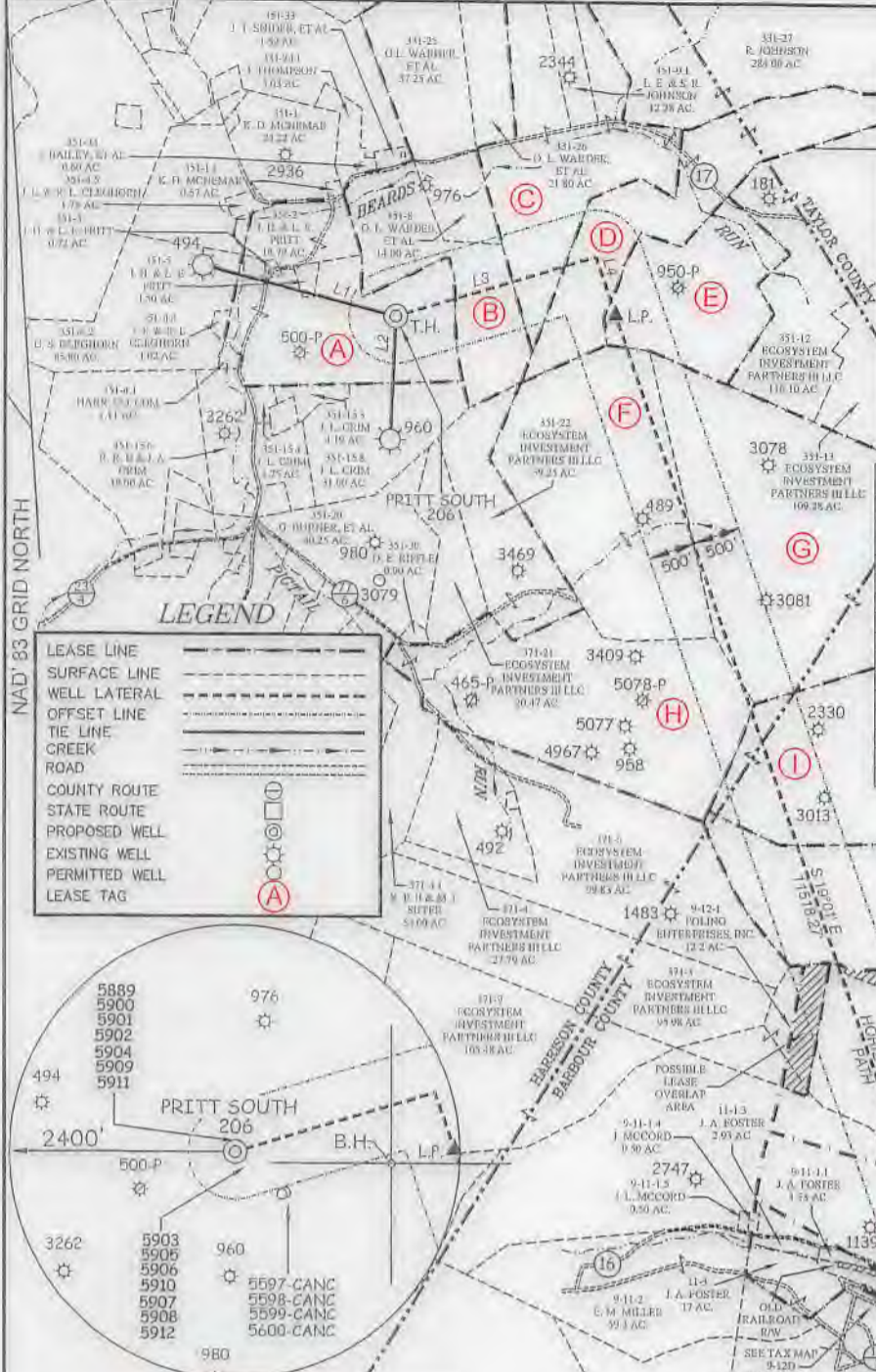
5 1/2" 20# P-110 VAR

Revision 1

Note: Not drawn to scale

Cement Outside Casing
Seal Assembly in Annulus

Date Last Revised: 11-Mar-19
Jarrett Toms



ARSENAL RESOURCES
T.H. **PRITT SOUTH 206**
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
NAD'83 S.P.C.(FT) N. 272,396.6 E. 1,773,906.6
NAD'83 GEO. LAT-(N) 39.245832 LONG-(W) 80.187106
NAD'83 UTM (M) N. 4,344,372.2 E. 570,146.2

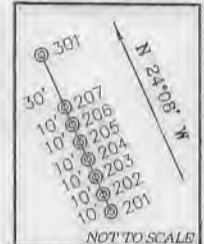
LANDING POINT
NAD'83 S.P.C.(FT) N. 272,432.9 E. 1,776,246.9
NAD'83 GEO. LAT-(N) 39.245980 LONG-(W) 80.187106
NAD'83 UTM (M) N. 4,344,395.1 E. 570,858.7

BOTTOM HOLE
NAD'83 S.P.C.(FT) N. 261,543.3 E. 1,779,999.2
NAD'83 GEO. LAT-(N) 39.216160 LONG-(W) 80.165310
NAD'83 UTM (M) N. 4,341,096.4 E. 572,057.4

TAG	SURFACE OWNER	TAX MAP/PARCEL	ACRAGE
HARRISON COUNTY			
A	IRA H. & LAURA E. PRITT	351-4	69.09±
B	DRAN LEE WARDER, ET AL	351-7	31.00±
C	RENEE JOHNSON	351-9	97.72±
D	RENEE JOHNSON	351-19	85.00±
E	ECOSYSTEM INVESTMENT PARTNERS III LLC	351-11	52.19±
F	ECOSYSTEM INVESTMENT PARTNERS III LLC	351-23	107.06±
G	ECOSYSTEM INVESTMENT PARTNERS III LLC	351-24	153.08±
H	ECOSYSTEM INVESTMENT PARTNERS III LLC	351-31	120.75±
BARBOUR COUNTY			
I	JO ANN V SMITH & GARY M. BROWN, JR.	10-1	70.00±
J	JO ANN V SMITH & GARY M. BROWN, JR.	10-2	98.00±
K	POLINO ENTERPRISES, INC.	11-1	280.5±
L	BECKWITH LUMBER CO., INC.	11-2	177.0±
M	DENNIS ALBIN ZBOSNIK	12-40	51.89±

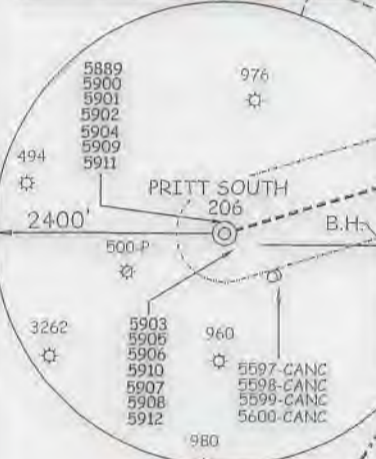
PRITT SOUTH 206 WELL TIES

LINE	BEARING	DISTANCE
L1	N 75°49' W	2123.55'
L2	S 02°29' W	1310.29'
L3	N 73°20' E	2225.92'
L4	S 19°01' E	836.80'



LEGEND

LEASE LINE ————
SURFACE LINE ————
WELL LATERAL ————
OFFSET LINE ————
TIE LINE ————
CREEK ————
ROAD ————
COUNTY ROUTE ————
STATE ROUTE ————
PROPOSED WELL ————
EXISTING WELL ————
PERMITTED WELL ————
LEASE TAG (A)



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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.
- Location of 625 sq. ft. grave site as recorded in db 80 pg 433, situated within 71.5 acres and 11.5 acres, unable to be determined. Proper leasing of 625 sq. ft. tract to be obtained prior to drilling within the 71.5 and 11.5 acre tracts.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE AUGUST 28, 20 17
REVISED 9/27/18, 01/03/19 & 03/11/19
OPERATORS WELL NO. PRITT SOUTH 206
API WELL NO. 47-033-05909
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8383P206R7.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: 1,342.20' / 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 20,045.0' TMD / 7,758' 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