

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

Monday, May 6, 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 216
47-033-05908-00-00

Revised Horizontal Lateral from 7530.55' to 7465.26'. Target Formation estimated depth 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.

James A. Martin
Chief

Operator's Well Number: PRITT SOUTH 216
Farm Name: IRA & LAURA PRITT
U.S. WELL NUMBER: 47-033-05908-00-00
Horizontal 6A New Drill
Date Modification Issued: 05/06/2019

Promoting a healthy environment.

05/10/2019



March 13, 2019

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

RE: Pritt South 216 (API 47-033-05908)

Dear Ms. Adkins:

Enclosed, please find the revised WW6B and mylar for the Pritt South 216, API 47-033-05908. The following changes occurred within the WW6B:

- Depths (#7)
- anticipated thickness (#7)
- expected pressures (#7)
- TMD (#10)
- TVD (#8)
- production for the footage for drilling and intervals in the well (page 2)
- lateral length (#11)

The lateral length was permitted to 7,530.55'. The lateral length is now 7,465.26'. The lateral was shortened by 65.29'. Sam Ward approved of these changes and signed off on them.

If you need any additional information, please let me know. Thank you!

Sincerely,

A handwritten signature in blue ink that reads 'Kelly Davis'.

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

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MAR 14 2019

WV Department of
Environmental Protection

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 216 Well Pad Name: Pritt South

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

4) Elevation, current ground: 1,351.20' Elevation, proposed post-construction: 1,354.80'

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, 7654.0ft (TVD Heel) - 7654.0ft (TVD Toe), 90ft, 0.5 psi/ft Base of Marcellus Shale, 7744.0ft (TVD Heel) - 7744.0ft (TVD Toe)

8) Proposed Total Vertical Depth: 7,755 ft

9) Formation at Total Vertical Depth: Marcellus shale

10) Proposed Total Measured Depth: 16,124 ft

11) Proposed Horizontal Leg Length: 7,465.26 ft

12) Approximate Fresh Water Strata Depths: 15', 45', 90', 219', 257', 300', 315', 345', and 385'. * *Best casing possible 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: 1400'

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

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

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____ RECEIVED Office of Oil and Gas
Seam: _____ MAR 14 2019
Owner: _____ WV Department of Environmental Protection

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	16,124	16,124	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	3950	1500	Class A, 3% CaCl2	1.29
Production	5.5	8.5-8.75	0.361	12,640	9,500	Class A/50:50 Poz	1.29/1.34
Tubing					5,000		
Liners					N/A		

PACKERS

Kind:				
Sizes:				
Depths Set:				

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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.

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 above). Plus cement achieve a "right angle" set) during the plastic phase of the cement set-up.

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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 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.

WV Department of
Environmental Protection

*Note: Attach additional sheets as needed.

05/10/2019

LAURENZA



Header section containing various fields and labels, including 'LAURENZA' and '05/10/2019'.

Second section of text, appearing to be a list or table of data with multiple columns.

Third section of text, continuing the list or table structure.

Fourth section of text, containing more data entries.

Fifth section of text, showing a continuation of the data.

Sixth section of text, possibly a summary or final part of the document.

Final section of text at the bottom of the page.



Arsenal Resources
 Pritt South 215
 Casing Design
 Directional Plan # 1 QES

Other Names:	N/A
Surface Location:	TBD
Bottom Hole Location:	TBD
Total Depth:	16,123 MD (ft) 7,765 TVD

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

Logs	Significant Formations (TVD)	Depth (ft) MD	Depth (ft) TVD	Hole Size	Casing and Cement	Mud	Directional & Surveys Drg / Csg Point
None	Section 1		80	24" 94# H-40 STC	Vertical		
None	Section 2		80	17 1/2" (PDC)	Floc Water		
Possible CB: after cement job		450	450	13 3/8" 54.5# J-55 STC	Vertical		
None	Section 3		450	12 1/4" (PDC)	Floc Water		
Possible CB: after cement job		1,500	1,500	9 5/8" 40# J-55 LTC	Vertical		
	Section 4		1,500				
			1,536				
	Big Lime		4,894				
	1st Elk Siltstone		7,494				
	Tully Lime		7,864				
	Purcell (Limestone)		7,867				
	Lower Marcellus						
		16,123 MD 7,765 TVD					
				5 1/2" 20# P-110 VAR			

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

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

	From	To
Floc Water	80	1500
Floc Water	1500	8,421
11.5- 12.0 ppg SOBMs	8,421	16,123

	From	To
17- 1/2" & 12 1/4" PDC	80	1,500
8- 3/4" (PDC)	1,500	9,421
8- 1/2" (PDC)	9,421	16,123

Directional Data See Directional Plan

Cement: Class A-50/50 POZ
 1.2 ft3/sack +10% Exs in OH = 7536 Sacks
 TOC 1,360 ft
 All cement volumes are estimates

Revised

Note: Not drawn to scale

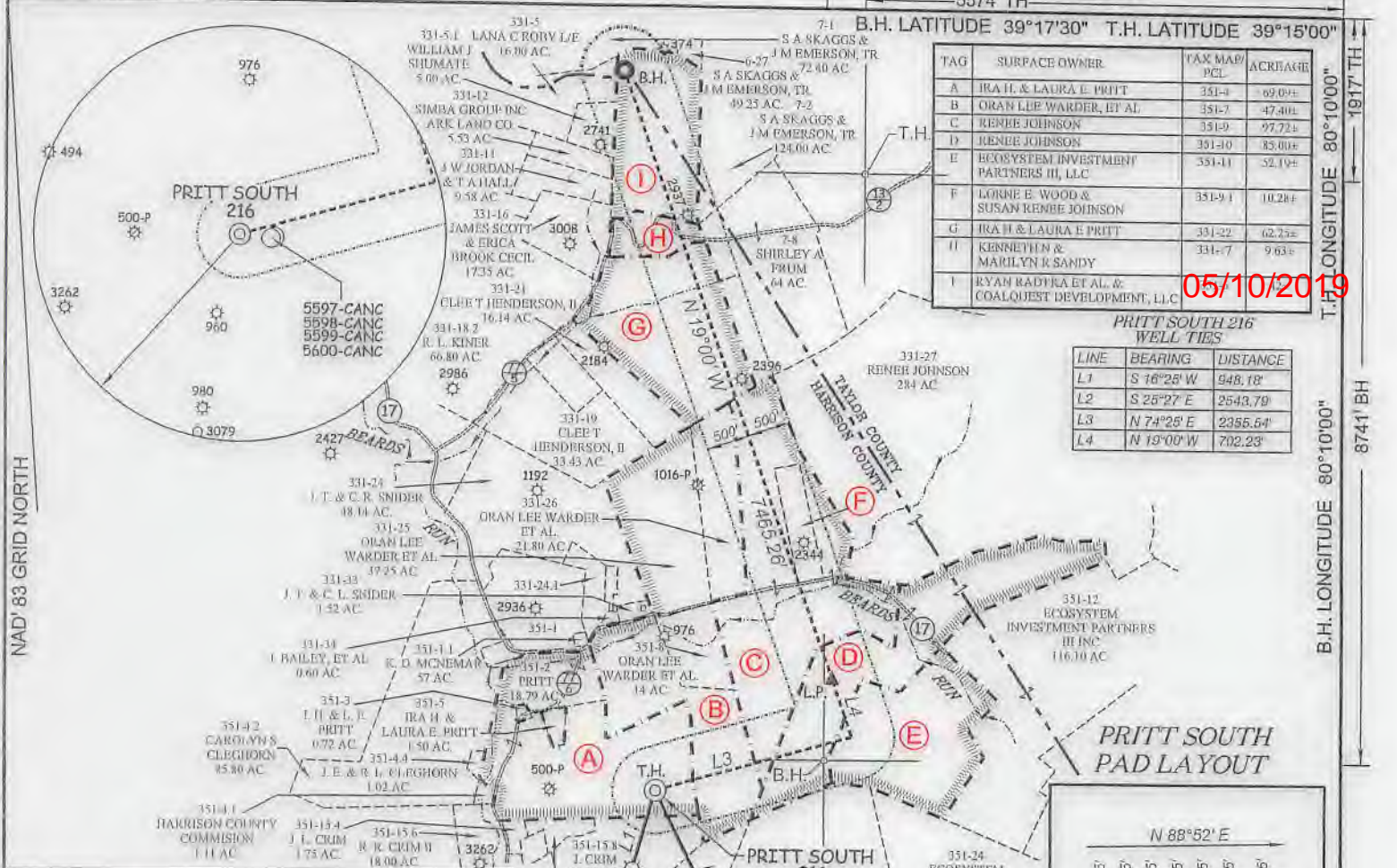
Date Last Revised: 11-Mar-19
 Jarrett Toms

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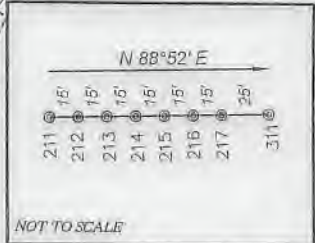
5574' TH 6026' BH
 B.H. LATITUDE 39°17'30" T.H. LATITUDE 39°15'00"



TAG	SURFACE OWNER	TAX MAP/PCL	ACREAGE
A	IRA H. & LAURA E. PRITT	351-1	69.09±
B	ORAN LEE WARDER, ET AL.	351-7	47.40±
C	RENBE JOHNSON	351-9	97.72±
D	RENBE JOHNSON	351-30	85.01±
E	ECOSYSTEM INVESTMENT PARTNERS III, LLC	351-11	52.19±
F	LORNE E. WOOD & SUSAN RENBE JOHNSON	351-9-1	10.28±
G	IRA H. & LAURA E. PRITT	351-22	62.73±
H	KENNETH N. & MARILYN R. SANDY	351-7	9.63±
I	RYAN RADTKE ET AL. & COALQUEST DEVELOPMENT, LLC		

PRITT SOUTH 216 WELL TIES

LINE	BEARING	DISTANCE
L1	S 16°28' W	948.18'
L2	S 25°27' E	2643.79'
L3	N 74°25' E	2355.54'
L4	N 19°00' W	702.23'



ARSENAL RESOURCES PRITT SOUTH 216

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

NAD'83 S.P.C.(FT)	N. 271,997.1	E. 1,774,118.0
NAD'83 GEO.	LAT-(N) 39.244739	LONG-(W) 80.186348
NAD'83 UTM (M)	N. 4,344,251.5	E. 570,212.6

LANDING POINT

NAD'83 S.P.C.(FT)	N. 273,293.5	E. 1,776,158.5
NAD'83 GEO.	LAT-(N) 39.248341	LONG-(W) 80.179179
NAD'83 UTM (M)	N. 4,344,656.9	E. 570,827.7

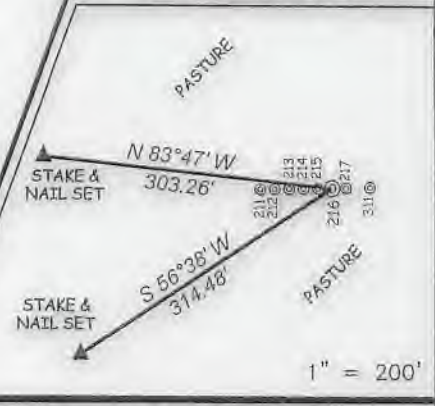
BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 280,352.2	E. 1,773,728.4
NAD'83 GEO.	LAT-(N) 39.267670	LONG-(W) 80.187950
NAD'83 UTM (M)	N. 4,346,795.1	E. 570,051.6

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

REFERENCES



NOTES ON SURVEY

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



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE AUGUST 24, 20 17
 REVISED 08/15/18 & 03/11/19
 OPERATORS WELL NO. PRITT SOUTH 216
 API WELL NO. 47-033-05908
 STATE COUNTY PERMIT

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 www.sls-wv.com

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

P.S. C. Victor Moyers
 849

MINIMUM DEGREE OF ACCURACY 1" / 2500 FILE NO. 8383P216R3.dwg
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

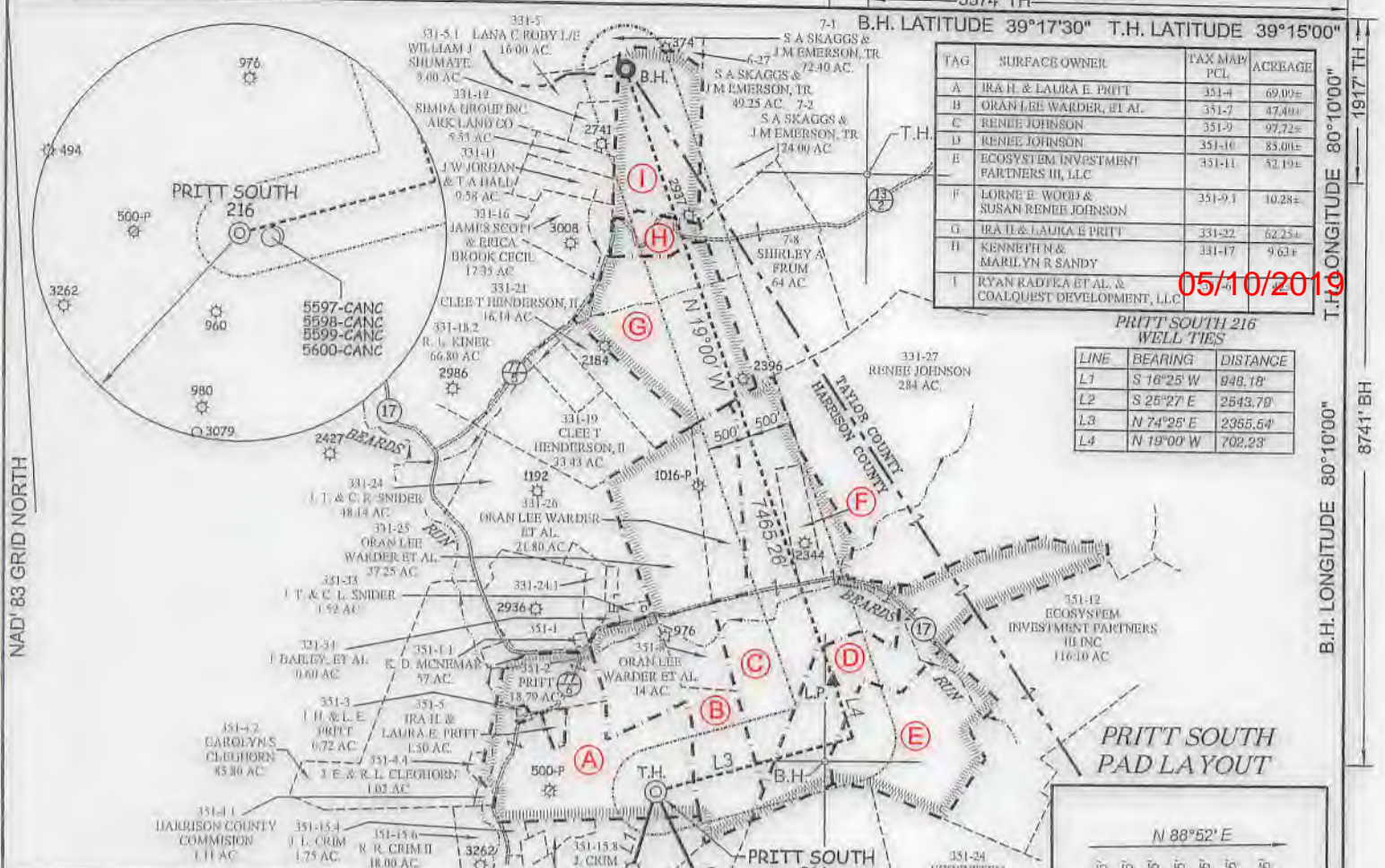
STATE OF WEST VIRGINIA
 DIVISION OF ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS

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

LOCATION: ELEVATION EXISTING: 1,351.28' / 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 16,123.9' TMD / 7,755' 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



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PRITT SOUTH 216**

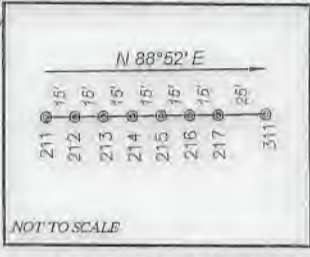
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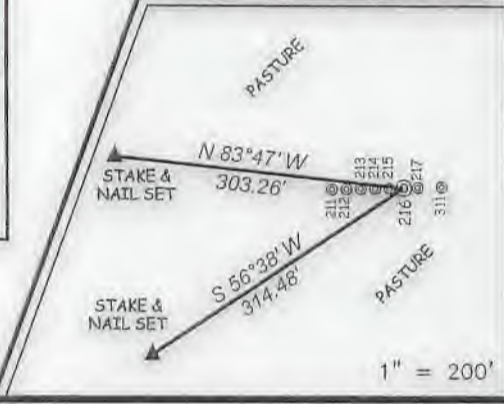
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