

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

1) Well Operator: Arsenal Resources 494519412 Taylor Courthouse Grafton
Operator ID County District Quadrangle

2) Operator's Well Number: Veltri 5HM Well Pad Name: Veltri

3) Farm Name/Surface Owner: Anthony Veltri Public Road Access: CR's 119/28, 119/27, 13/6

4) Elevation, current ground: 1474 Elevation, proposed post-construction: 1474

5) Well Type (a) Gas Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale, 7881 ft (Top)- 7968 ft (Bottom), 87 ft, 0.5 psi/ft

8) Proposed Total Vertical Depth: 7954 ft

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 14966 ft

11) Proposed Horizontal Leg Length: 6441 ft

12) Approximate Fresh Water Strata Depths: 550 ft

13) Method to Determine Fresh Water Depths: Offsetting wells reported water depths (091-00825, 091-00826, 091-00967, 091-00991)

14) Approximate Saltwater Depths: 2010 ft.

15) Approximate Coal Seam Depths: Approximate Coal Seam Depths: Harlem - 420, Bakewell - 503, Brush Creek - 590, Upper Freeport - 673, Lower Freeport - 720, Upper Kittanning - 780, Middle Kittanning - 818, Lower Kittanning - 840

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

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No None known

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

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#	630'	630'	CTS
Coal							
Intermediate	9.625"	New	J-55	40#	2700'	2700'	CTS
Production	5.5"	New	P-110	20#	14,966'	14,966'	TOC @ 2,550'MD
Tubing							
Liners							

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% Calcium	1.20
Fresh Water	13.375"	17.5"	0.38"	2730	0	Class A, 3% CaCl2	1.20
Coal					0		
Intermediate	9.625"	12.25"	0.395"	3950psi	0	Class A, 2% CaCl2	1.29
Production	5.5"	8.5-8.75	0.361"	12,640psi	9500	Class A	1.64/1.32
Tubing					5000		
Liners					N/A		

PACKERS

Kind:				
Sizes:				
Depths Set:				

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

24" conductor casing has been set to the permitted depth on this well and cement has been circulated to surface. 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): 14.4

22) Area to be disturbed for well pad only, less access road (acres): 3.36

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 2,700'; there will be no centralizers from 2,700 to surface.

24) Describe all cement additives associated with each cement type:

24" will circulate cement back 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 2,450' (+/- 150' above the casing shoe for the 9-5/8") with Class A cement retarder (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 a 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 to 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 notices, we will re-run the previous stand of pipe pulled across and circulate 2X bottoms up while watching the shakers for signs of cuttings. Once at the base of the 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.