

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

2 638

1) Well Operator: Mountaineer Keystone, LLC 494501227 Barbour Cove Thornton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Mackey Wolfe No. 203 3) Elevation: 1,626

4) Well Type: (a) Oil _____ or Gas X
 (b) If Gas: Production X / Underground Storage _____
 Deep _____ / Shallow X

5) Proposed Target Formation(s): MARCELLUS SHALE Proposed Target Depth: 7,614

6) Proposed Total Depth: 7,785 Feet Formation at Proposed Total Depth: MARCELLUS SHALE

7) Approximate fresh water strata depths: 100' - 750'

8) Approximate salt water depths: 1,350' - 1,700'

9) Approximate coal seam depths: 155', 275', 335', 375', 440', 530' & 535'

10) Approximate void depths, (coal, Karst, other): NONE

11) Does land contain coal seams tributary to active mine? NO

12) Describe proposed well work and fracturing methods in detail (attach additional sheets if needed)
Drill vertically to a depth of 7,049 ft., enter the Marcellus at approx. 7,614 ft. Then drill horizontally through the
Marcellus Shale in bearings and distances as shown on the attached plat and drilling plan
(see attached Directional Drilling Plan: Well #203, Original Hole, Plan #1)

13) CASING AND TUBING PROGRAM

| TYPE | SPECIFICATIONS | | | FOOTAGE INTERVALS | | CEMENT |
|--------------|----------------|-------|---------------|-------------------|--------------|----------------------------|
| | Size | Grade | Weight per ft | For Drilling | Left in Well | Fill -up (Cu. Ft.) |
| Conductor | 20" | H-40 | 94.0# | 32' | 32' | GROUT AND/OR SAND IN |
| Fresh Water | 13 3/8" | J-55 | 54.5# | 900' | 900' | CEMENT TO SURFACE |
| Coal | | | | B-O-H. | 1-16-12 | |
| Intermediate | 9 5/8" | J-55 | 36.0# | 1,930' | 1,930' | CEMENT TO SURFACE |
| Production | 5 1/2" | P-110 | 20.0# | 12,050' | 12,050' | 2,244 SX FLUID LOSS CEMENT |
| Tubing | | | | | | |
| Liners | | | | | | |

Packers: Kind: _____
 Sizes: 0600 10 226
 5, 000
 Depths Set _____

DEPARTMENT OF ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS
 JAN 28 2012

Overview of Casing Design Criteria
Supplement to Form WW-2B
Mackey-Wolfe No. 201-204
Cove District, Barbour County, West Virginia

1-3267

As a result of the recent well control incidents in West Virginia, Mountaineer Keystone, LLC has elected to modify the design of our casing program in Barbour County with an additional casing string above the anticipated top of the Pittsburgh coal. Implementing the new design, our casing programs would be implemented as follows:

- 20" Conductor set into competent rock, usually found between 30' and 120'.
- 20" Fresh Water casing string set a minimum of 100' above the top of the Bakerstown Coal (possible gas/lost circulation zone) or to a maximum depth of 500'. The addition of this casing string allows us to rig up an annular preventer for well control purposes and gives us the ability to shut the well in if gas is encountered.
- 13-3/8" Coal casing string is planned to be set through the Lower Kittaning Coal, usually 375' to 450' below the Bakerstown Coal. However, if gas and/or lost circulation is encountered, we will continue drilling +/- 50' into competent rock before running and cementing the 13-3/8" casing.
- 9-5/8" Intermediate casings intended to be set through the Weir Formation, approximately 1725'.
- 5-1/2" Production casing setting depth will be dependent on our measured depth at TD.

Mountaineer Keystone, LLC has made no changes to the setting depth criteria for the 13-3/8", 9-5/8" or 5-1/2" casing strings. The design is the institution of the 20" Fresh Water casing string for both well control and ground water purposes.