

Staff Comments and Recommendations for Conditions Related to SUP-028 for Applicant Carrizo (Marcellus) LLC

Property Tax ID: 10-(A)-24

Requested Use: Gas Well Drilling, Completion, Stimulation, and Production

The applicant has submitted a request to fully develop a Marcellus gas well to production on the above-referenced property. The applicant has stated that the application is for a vertical test well to be followed, if the test well provides beneficial results, by a production well. The applicant stipulates that the production well will be vertical only. This application is for one well at the stated location.

The state regulatory authority for gas well development is the Department of Mines, Minerals and Energy (DMME). Mr. David Asbury is the Director of the Division that has responsibility for natural gas. Mr. Gary Eide is the inspector for DMME for this project. Attached is information from Mr. Asbury, which includes a copy of the regulations provided from the DMME website (<http://www.dmme.virginia.gov/DGO/gasoilregulation.shtml>), regarding the process used to permit and monitor gas well development. While this is the first Virginia well in the Marcellus Shale formation, Virginia currently has about 1,700 active conventional gas wells that produce in formations of the Devonian Shale, Big Lime, Red and Green Sands, and other formations. These formations are accessed and stimulated at depths between 4,500 and 7,500 feet. In addition to these formations, Virginia has separate compliance and reporting regulations for coal-bed methane gas.

There has been considerable discussion regarding the process to be used for the initial test well development and the potential development of the well, should it be determined that sufficient quantities of gas exist to enable economic production. If the application is approved, staff recommends that the Board consider the conditions outlined on Pages 3, 4, and 5 of this report. The drafting of these conditions is neither a recommendation for approval or for denial. The specified conditions are the minimum recommended by staff to be placed on the special use permit. Under the special use permit process, the Board may change these conditions or add new conditions as deemed necessary.

Highlights of the Development Plan

This section provides a summary of selected information for the phased process outlined in a document entitled “Carrizo (Marcellus) LLC Development Plan for Ennis #1 Well Rockingham County, VA dated February 1, 2010 (Revised March 22, 2010)”, discussions, and staff research.

Drilling Phase

1. The process used in the initial drilling phase involves a symmetrix drilling system. Air is used as circulation media and small amounts of soap and lubricating oil may be pumped into the well to lift rock cuttings and to lubricate the drill hammer.
2. Subsurface water may be encountered and will be jetted to the surface. All such drilling fluids defined as a mixture of fluids and solids brought to the surface during the drilling phase, will be captured in a closed system and placed in a drilling pit as shown on the attached site plan.
3. The well will be triple-cased and grouted through and beyond the groundwater zone and in accordance with the attached casing and cement detail.
4. Fresh water and recycled drilling fluids will be used during this phase to control dust from the drilling process. All wastewater will be captured in the drilling pit.
5. Drilling fluids will be sampled by a 3rd party authorized by DMME. Drilling fluids will be disposed of as approved by DMME. The applicant indicated a willingness to remove all water used in the process from the site due to the sensitive ecology of the area. Applicant will provide a copy of the written record of the disposal to the County.

Completion/Stimulation Phase

6. The project is limited to a vertical well with fracturing. No horizontal drilling using hydraulic fracturing is a part of this project.
7. During the fracturing process, the solution used will be 99.5% water and .5% proprietary friction reducing agents.
8. The applicant indicated a willingness to use municipal water for this project and agreed that no area ground or surface water will be used.
9. Fracturing fluids defined as a mixture of fluids, solids, and additives brought to the surface during the fracturing phase will be sampled by a 3rd party authorized by DMME. Fluids will be disposed of as approved by DMME.

Site Reclamation Phase

10. At each stage, the site shall be reclaimed to the original condition as unused areas are no longer required for the well.

Attached Background Information

- 1) Carrizo (Marcellus) LLC Development Plan for R. Ennis #1 Well – Rockingham County, VA dated February 1, 2010 (Revised March-22-2010).
- 2) Supporting Carrizo (Marcellus) LLC information:
 - a. Site plan
 - b. Casing and Cement detail
 - c. Casing View (Vertical)
 - d. Typical Pit Wall Cutaway
 - e. Frac Facts
 - f. Pit Facts
- 3) Marcellus Shale Hydraulic Fracturing – Chesapeake Energy
- 4) Marcellus Shale in Virginia – Va Chapter of American Fisheries Society
- 5) Wild Trout Streams in Virginia over Marcellus Shale Formation
- 6) Shenandoah Riverkeeper – Letter to Board of Supervisors and Staff – March 19, 2010
- 7) Letter to Board of Supervisors – JMU Department of Geology and Environmental Science – March 30, 2010
- 8) Information from David E. Asbury, Jr., Director, Division of Gas and Oil
- 9) Letter from Department of Game & Inland Fisheries
- 10) Email from Charley Banks, Virginia Department of Conservation and Recreation, FEMA liaison, regarding floodplain issues – April 1, 2010

Staff Recommended Conditions for SUP-028:

Staff drafting conditions for the request is neither a recommendation for approval or for denial. It provides conditions to be considered by the Board of Supervisors if the members decide to approve the special use permit. The specified conditions are the minimum recommended by staff to be placed on the permit. If approved, the Board of Supervisors may change these conditions or add new conditions as deemed necessary.

General Conditions

1. This permit shall be for a single Marcellus shale gas test well located substantially in accordance with the attached site plan.
2. All facilities constructed for the gas well system shall be located substantially in accordance with the attached site plan.
3. All structures shall be constructed in accordance with the Virginia Uniform Statewide Building Code.
4. The applicant shall comply with all County floodplain regulations in accordance with Federal Emergency Management Association (FEMA).
5. All existing water wells within 1500 feet of the well site constructed under this permit shall be tested by an independent Virginia-licensed lab prior to drilling. Surface water from Bennett Run and Rader Run shall be tested above and below the site prior to drilling to establish base line data. A copy of all test results shall be provided to the County.
6. The applicant shall construct no fewer than two monitoring wells located within 10 feet of the property boundary, down gradient of the site. Testing shall be conducted once a week until one (1) week after the drilling pit has been emptied. A copy of all test results shall be provided to the County.
7. Testing shall include but not be limited to:

- a. Total dissolved solids
 - b. Chloride ion concentrations
 - c. Benzene
 - d. Arsenic
 - e. Methane
 - f. Radioactivity
8. Pits used for fluid disposal shall be double lined or lined with a limestone material and a minimum of a 30 mil liner.
 9. No fluids from this project shall be land applied in the County.
 10. A full span bridge shall be constructed prior to the initial drilling to cross either Bennett Run or Rader Run to access the property. Any required permits for access to secondary state roads shall be obtained from the Virginia Department of Transportation's Harrisonburg Residency Office (VDOT). VDOT reserves the right to require additional improvements, to include relocation of the entrance, if well site is to be developed beyond the test phase.
 11. The County shall be notified as soon as possible but not less than 30 days of the date the fracturing will occur at this site.
 12. The applicant shall notify the Rockingham County Commissioner of the Revenue prior to initiating gas withdrawal and shall comply with all reporting and tax requirements related to gas withdrawal in Rockingham County.
 13. The applicant shall meet all federal and state regulations necessary for gas well development and extraction. The applicant shall copy the County Department of Community Development on all correspondence related to activities under this permit.
 14. An emergency plan for the site shall be prepared and submitted for approval to the Department of Fire & Rescue. A copy shall be on file at the site.

Drilling Phase Conditions

15. The process used in the initial drilling phase shall include a symmetrix drilling system for the conductor setting and conventional air drilling for the remainder. Air is used as circulation media and small amounts of soap and lubricating oil may be pumped into the well to lift rock cuttings and to lubricate the drill hammer.
16. All such drilling fluids shall be captured in a closed system and placed in a drilling pit as shown on the attached site plan.
17. The well shall be triple-cased and grouted through and beyond the groundwater zone and in accordance with the attached casing and cement detail.
18. Fresh water and recycled drilling fluids may be used during the drilling phase to control dust from the drilling process. All drilling fluids shall be captured in the drilling pit.
19. Drilling fluids shall be sampled by a 3rd party authorized by DMME. Except as provided in Condition #9, drilling fluids will be disposed of as approved by DMME. All water used in the process shall be removed from the site. The applicant shall provide a copy of the written record of the disposal to the County.

Completion/Stimulation Phase Conditions

20. This application shall be limited to a single vertical well.
21. During the fracturing process, there shall be no benzene or benzene-derivative used in the processes. All chemicals used shall meet or exceed state and federal safety standards and a

list of all chemical used and the MSDS sheets shall be provided to the County and be on location.

22. All water used shall be transported to the site. Ground or surface water in the Bergton-Criders area shall not be used in this operation.
23. All fracturing fluids shall be stored in enclosed, appropriately lined steel tanks and all return fracturing fluids shall be captured in enclosed steel tanks until removed from the site.
24. Fracturing fluids shall be sampled by a 3rd party authorized by DMME. Fluids will be disposed of as approved by DMME. All water used in the process shall be removed from the site. The applicant shall provide a copy of the written record of the disposal to the County.

Site Reclamation Phase Conditions

25. At each stage, the site shall be reclaimed to the original condition as unused areas are no longer required for the well. The drilling pit may be reopened on a temporary basis with written notification to the County 30 days prior to the activity restarting.