

Section II – Overview

A. Marcellus Shale

Geologists have long known about the gas-bearing underground formation known as the Marcellus Shale, which lies deep beneath portions of the Appalachian Basin, including parts of Western Maryland. Until advances in horizontal drilling and high volume hydraulic fracturing (HVHF) and the combination of these two technologies, few thought that significant amounts of natural gas could be recovered from the Marcellus Shale. Drilling in the Marcellus Shale using horizontal drilling and HVHF began around 2005 in Pennsylvania and has accelerated rapidly.

The production of natural gas has the potential to benefit Maryland and the United States. Tapping domestic sources could advance energy security for the United States. When burned to generate electricity, natural gas produces lower greenhouse gas emissions than oil and coal, which could help to reduce the impact of energy usage as we transition to more renewable energy sources. The exploration for and production of natural gas could boost economic development in Maryland, particularly in Garrett and Allegany Counties.

As gas production from deep shale and the use of HVHF has increased, however, so have concerns about its potential impact on public health, safety, the environment and natural resources. Although accidents are relatively rare, exploration for and production of natural gas from the Marcellus Shale in nearby states have resulted in injuries, well blowouts, releases of fracturing fluids, releases of methane, spills, fires, forest fragmentation, damage to roads, and allegations of contamination of ground water and surface water. Other states have revised or are in the process of reevaluating their regulatory programs for gas production or assessing the environmental impacts of gas development from the Marcellus Shale. A significant amount of research has been completed on HVHF and gas production from the Marcellus Shale, but additional research by governmental entities, academic organizations, environmental groups and industry is currently underway focused on drinking water, natural resources, wildlife, community and economic implications, production technologies and best practices.

B. Developments in Maryland

The Maryland General Assembly has entrusted the permitting and regulation of oil and gas exploration and development in Maryland to the Department of the Environment. With a few notable exceptions, the statutory language is general and MDE is authorized to promulgate rules and regulations and to place in permits conditions it deems reasonable and appropriate to assure that the operations are carried out in compliance with the law and provide for public safety and the protection of the State's natural resources. Md. Env. Code Ann., §§ 14-103 and 14-110. The Department's regulations on oil and gas wells have not been revised since 1993 and thus were written before recent advances in technology and without the benefit of more recent research.

The Maryland Departments of the Environment (MDE) and Natural Resources (DNR) have roles in the evaluation of natural gas projects. Each would be involved in any future permitting decisions for drilling in the Marcellus Shale.

The mission of the Maryland Department of the Environment is to protect and restore the quality of Maryland's air, water, and land resources, while fostering smart growth, economic development, healthy and safe communities, and quality environmental education for the benefit of the environment, public health, and future generations. In addition, MDE is specifically authorized by statute to issue permits for gas exploration and production. The Department of the Environment is required to coordinate with the Department of Natural Resources in its evaluation of the environmental assessment of any proposed oil or gas well.

The Department of Natural Resources leads Maryland in securing a sustainable future for our environment, society, and economy by preserving, protecting, restoring, and enhancing the State's natural resources. In addition, DNR owns or has conservation easements on substantial acreage in the State, including western Maryland.

The first application for a permit to produce gas from the Marcellus Shale in Maryland using horizontal drilling and HVHF was received in 2009.¹ To address the need for information to evaluate these permit applications properly, the Governor issued the Marcellus Shale Safe Drilling Initiative in Executive Order 01.01.2011.11 on June 6, 2011.

C. The Executive Order and the Advisory Commission

Executive Order 01.01.2011.11 directs MDE and DNR to assemble and consult with an Advisory Commission in the study of specific topics related to horizontal drilling and HVHF in the Marcellus Shale.² The Advisory Commission is to assist State policymakers and regulators in determining whether and how gas production from the Marcellus Shale in Maryland can be accomplished without unacceptable risks of adverse impacts to public health, safety, the environment, and natural resources. The Advisory Commission includes a broad range of stakeholders. Members include elected officials from Allegany and Garrett Counties, two members of the General Assembly, representatives of the scientific community, the gas industry, business, agriculture, environmental organizations, citizens, and a State agency. A representative of the public health community was added in 2013. Appendix A is a list of the Commissioners.

The Executive Order tasks MDE and DNR, in consultation with the Advisory Commission, with conducting a three-part study and reporting findings and recommendations. The Commission is staffed by DNR and MDE. The completed study will include:

- (i) By December 31, 2011, a presentation of findings and related recommendations regarding the desirability of legislation to establish revenue sources, such as a State-level severance tax, and the desirability of legislation to establish standards of liability for damages caused by gas exploration and production;

¹ Additional applications were received in 2011. Applications for a total of seven wells were received by MDE, but all have been withdrawn. In general, drilling has migrated to areas where not only natural gas, but also natural gas liquids that are more valuable, can be produced from formations.

² Although the Governor's Executive Order is directed specifically at the Marcellus Shale and HVHF, there is a potential for gas extraction from other tight shale gas formations, including the Utica Shale, and by well stimulation techniques other than HVHF. The findings and conclusions regarding gas exploration in the Marcellus Shale may also apply to other formations and techniques.

(ii) By August 1, 2012, recommendations for best practices for all aspects of natural gas exploration and production in the Marcellus Shale in Maryland; and

(iii) No later than August 1, 2014, a final report with findings and recommendations relating to the impact of Marcellus Shale drilling including possible contamination of ground water, handling and disposal of wastewater, environmental and natural resources impacts, impacts to forests and important habitats, greenhouse gas emissions, and economic impact.

Part I of the [study](#)³, a report on findings and recommendations regarding sources of revenue and standards of liability, in anticipation of gas production from the Marcellus Shale that may occur in Maryland, was completed in December 2011. The schedule was extended by one year for the second report.

D. The Work of the Advisory Commission

The Governor announced the membership of the Advisory Commission in July, 2011, and the Commission has met 18 times through June 10, 2013. Most meetings were in Allegany or Garrett Counties, but two were held in Hagerstown and two in Annapolis. The Departments have provided written information and briefings to the Advisory Commission on issues relating to HVHF. Speakers representing scientific organizations, industry and agencies from Maryland and other states have presented information to the Advisory Commission and the Departments. The Commissioners were able to visit active drilling sites. The Departments have consulted with the federal government and neighboring states regarding policy, programmatic issues and enforcement experiences. The Commissioners themselves, a well-informed and diverse assemblage, shared information and brought their expertise to bear.

The Commission recognized the importance of obtaining background data on air and water quality in advance of any drilling. DNR has begun collecting data to establish pre-drilling baseline conditions. Limited by existing funding and staff, DNR and MDE were not able to implement the comprehensive baseline monitoring program recommended by the Departments and the Advisory Commission in its Part I report. DNR has, however, expanded and modified its monitoring program to include 12 continuous water monitoring sites chosen for their relevance to potential gas development. DNR also began a volunteer partnership with Garrett County watershed associations, Trout Unlimited and other citizens where volunteer stream waders are collecting baseline water and biological data from over 70 stream segments. More information on [stream monitoring in the Marcellus shale region](#)⁴ can be found online.

DNR conducted a natural resource assessment of Garrett County to identify high quality streams known for biodiversity and brook trout resources, landscape values, ecological resources, forest interior dwelling species habitats, areas supporting rare, threatened and endangered plants and animals, community water supplies, State lands, trail networks, recreational assets, and areas of particular scenic value that could be impacted, directly or indirectly, by drill pads, pipeline/road construction and use. The findings, [Marcellus](#)

³ http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/Marcellus_Shale_Report_Part_I_Dec_2011.pdf

⁴ <http://www.dnr.state.md.us/streams/marcellus.asp>

[*Shale Gas Development in Maryland: A Natural Resource Analysis*](#),⁵ were presented to the Commission on February 27, 2012.

MDE funded the Maryland Geological Survey to perform a limited study of methane levels in drinking water wells in Garrett County. Approximately 50 wells were sampled and a report, [*Dissolved-Methane Concentrations in Well Water in the Appalachian Plateau Physiographic Province of Maryland*](#), was issued on November 1, 2012.

The Departments, in consultation with the Advisory Commission, convened a committee to evaluate necessary revisions to existing statutes and the need for new legislation to address liability, revenue, leases and surface owner's rights. The Departments and the Advisory Commission coordinated with representatives of the House Environmental Matters Committee and the Senate Education, Health and Environment Committee. This effort is ongoing.

In the 2013 session of the General Assembly, three bills were introduced based on the recommendations of the Commission: Business Occupations – Oil and Gas Land Professionals (SB766, HB828); Environment – Gas and Oil Drilling – Financial Assurance (SB854); and Natural Gas Severance Tax and Impact Account (SB879). Of these, the first two passed. Landmen will now have to register with the Department of Labor, Licensing, & Regulation. The financial assurance bill lifts the cap on the closure and reclamation bond and requires a minimum level of environmental impairment insurance in addition to general comprehensive liability insurance. Senator George Edwards, a member of the Commission, sponsored all three bills.

At the same time, the Governor proposed and the legislature approved a supplemental Fiscal Year 2013 appropriation that provides MDE with \$1 million and DNR with \$500,000 to complete the studies required under the Executive Order. The Departments are using this money, among other things, to expand the pre-drilling monitoring of air and water, and undertake an economic study and a public health study.

In furtherance of developing Best Practices recommendations, MDE contracted with the University of Maryland Center for Environmental Science, Appalachian Laboratory (UMCES-AL), to survey best practices from several states and other sources, and to recommend a suite of best practices appropriate for Maryland. The principal investigators, Keith N. Eshleman, Ph.D. and Andrew Elmore, Ph.D., compiled best practices from five states (Colorado, New York, Ohio, Pennsylvania, and West Virginia), as well as the recommendations of expert panels and organizations. The survey was completed and made available to the Commission. The report, [*Recommended Best Management Practices for Marcellus Shale Development in Maryland*](#)⁶ (the UMCES-AL Report), was made available to the Commission and the public in February 2013 and is included as Appendix F. The Departments also charted a comparison of the recommendations of UMCES-AL and the Departments; it is included in Appendix F.

⁵ http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Eshleman_Elmore_Final_BMP_Report_22113_Red.pdf

⁶ http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/MAC_NaturalResourcesAnalysis.pdf

Draft for Public Comment

As the Departments reviewed that report and consulted with the Advisory Commission, all of the recommendations in the UMCES-AL report were considered. The Departments evaluated whether to add to, accept, reject, or modify the recommendations based on a number of factors, including the opinions of the Advisory Commission, the expertise of Departmental staff, and judgments about environmental protection, technical practicability, and administrative feasibility.

For the draft report

This document is the Departments' draft of the report on recommended best practices. The draft will be open for public comment for 30 days, after which the Departments will consider the comments and issue a final report on recommended best practices in August 2013. This draft report contains the Departments' recommendations. Following a public comment period, the report will be issued in final form.

For the final report

A draft was made available for public comment on June 25, 2013. Having considered all of the comments, including those of the Advisory Commission, the Departments submit this final report on Part II of the study, Best Practices. The State has not yet determined whether gas production can be accomplished without unacceptable risk and nothing in this report should be interpreted to imply otherwise.