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Maryland General Assembly
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FISCAL AND POLICY NOTE

Senate Bill 712 (Senator Edwards)
Budget and Taxation

Natural Gas Severance Tax and Impact Account

This bill establishes a 2.5% severance tax imposed on the market value of natural gas produced at a wellhead, subject to specified exemptions. The bill provides for the collection and administration of the tax by the Comptroller and establishes recordkeeping and payment requirements for well owners, as well as specified misdemeanor penalties for violations. Severance tax revenues are deposited into a new Natural Gas Impact Account within the existing Oil and Gas Fund administered by the Maryland Department of the Environment (MDE). The account is to be used generally to address the impact of gas exploration and production on the environment and natural resources of the State. The bill authorizes MDE to recover in a civil action costs incurred for specified remediation or mitigation activities; cost recovery revenues are directed to the new account. MDE must include information about the account in the existing Oil and Gas Fund annual report to the General Assembly.

The bill takes effect July 1, 2015.

Fiscal Summary

State Effect: Special fund revenues may increase significantly, though not likely until FY 2017 at the earliest, from the severance tax on future production in the Marcellus Shale. Special fund expenditures from the new account increase each year to address the impact of gas exploration and production, as authorized by the bill. MDE's special fund administrative expenditures may increase by more than \$65,900 on an annual basis as early as FY 2017 to hire an additional budget specialist to account for any severance tax revenues in the new account. General fund revenues from interest earnings of the new fund may increase negligibly beginning in FY 2016, but more significantly to the extent that significant Marcellus Shale production occurs. General fund expenditures for the Comptroller's Office increase by \$105,000 in FY 2016 only for one-time computer programming modifications, and by more than \$56,100 annually, potentially beginning as

early as FY 2017 for an additional revenue examiner position. The bill's penalty provisions are not anticipated to materially affect State finances.

Local Effect: Local expenditures may decrease, particularly in Allegany and Garrett counties, to the extent that State expenditures from the Natural Gas Impact Account supplant future local expenditures. The bill's penalty provisions are not anticipated to materially affect local finances.

Small Business Effect: Potential meaningful impact on any small business engaged in natural gas well drilling and related services to the extent that the bill results in any change in the demand for their services. Small business property owners in affected areas could benefit to the extent the bill reduces remediation costs.

Analysis

Bill Summary: The bill establishes exemptions from the tax for gas that is (1) used for domestic or agricultural purposes on the real property from which the gas is produced; (2) from a well that produces no more than 20,000 cubic feet of gas per day in a month; or (3) withdrawn from a storage well.

The Natural Gas Impact Account is to be used to (1) monitor for, mitigate, and remediate adverse impacts of gas exploration and production on the environment, natural resources, and infrastructure in the areas where natural gas is produced, which cannot be shown to be caused by a specific person; (2) remediate or mitigate adverse impacts of gas exploration and production that require immediate action to protect public health or safety, the environment, or natural resources that are not corrected in a timely manner; or (3) provide funding to other State agencies for these purposes. However, if during any fiscal year the balance of the account exceeds \$10 million, any funds in excess of that amount may also be used for projects that benefit the areas of the State where gas is produced. The bill states the intent of the General Assembly that the balance of the account not be transferred by an Act of the General Assembly.

Current Law/Background:

The Oil and Gas Fund

Chapter 383 of 2010 established an Oil and Gas Fund to support MDE's administration of a regulatory program that oversees the drilling, development, production, and storage of oil and gas wells in the State. Under Chapter 383, MDE is required to set and collect permit and production fees related to oil and gas well drilling. Fees must be set at a rate necessary to (1) review, inspect, and evaluate monitoring data, applications, licenses, permits, and

other reports; (2) perform and oversee assessments, investigations, and research; (3) conduct permitting, inspection, and compliance activities; and (4) develop and implement regulations to address the risks to public safety, human health, and the environment from oil and gas well drilling and development. MDE has recently developed regulations governing oil and gas exploration and production, as discussed further below, which establish the fees required by Chapter 383.

Productivity of the Marcellus Shale

Although significant quantities of shale gas have been developed using high-volume hydraulic fracturing for more than a decade in parts of the United States, significant production from the Marcellus Shale did not occur until 2009. However, production volumes in Pennsylvania and West Virginia began to grow at a nearly exponential pace beginning in 2010. For example, the Marcellus Shale represented only 1.2% of dry shale gas production in the United States by the end of 2009, but this proportion grew tenfold to 12% of national shale gas production by the end of 2010. After only six years of significant Marcellus shale production, the region is now the largest source of shale gas, accounting for 36.1% of U.S. production.

In the last several years, however, the oil and gas industry has shifted focus to more valuable resources such as oil and liquid natural gases, which in the Marcellus Shale formation, are predominantly located in Ohio and western Pennsylvania. In many areas of the Marcellus Shale that are known to produce mostly dry shale gas, such as the counties in Pennsylvania and West Virginia that border Maryland, the number of wells drilled in recent years has declined significantly. For example, in the six years from 2009 through 2014, the number of wells drilled in Somerset and Fayette counties in Pennsylvania, and in Preston County in West Virginia, have declined each year (with one exception for Preston County, which experienced a slight increase from 2013 to 2014). Overall, the number of permits issued for Marcellus Shale development in these border counties in recent years is less than half of 2009 levels. Moreover, publicly available geographic information indicates that the greatest activity in these counties resides far to the west of the border with Garrett County.

A primary cause of the decline in rates of shale development in recent years is likely the significant decline in natural gas prices, particularly in the Marcellus shale region. Natural gas prices declined nationally during the economic recession from the high levels experienced in the preceding years that led to the development of the nation's shale deposits. Although prices have rebounded from the lows of 2012, they remain low by historical standards. Furthermore, wellhead prices in Marcellus production areas are only a fraction of national benchmark indices (prices at Marcellus trading locations often dropped to half of the national benchmark in 2014). Thus, despite the tremendous development potential, interest in developing Maryland's portion of the Marcellus shale

may be relatively low in the short term and may be particularly sensitive to the content of future regulations and rates of taxation.

Severance Taxes

According to the National Conference of State Legislatures, as of February 2012, 31 states levy a severance tax on the extraction of oil or gas; for natural gas specifically, a 2013 report by the nonprofit organization Resources for the Future indicates that 26 states levy either a pure severance tax or a hybrid form of taxation (while 5 gas producing states levy no severance tax). The term “severance tax” generally refers to taxes imposed on the extraction of a natural resource from the earth or water, though an individual tax may have a different name in statute, such as a privilege or production tax. Natural gas severance taxes are common in states with rich mineral, oil, or gas deposits and are generally based on the value of the resource produced, the volume or weight of the resource, or a combination of both, but the specifics of the calculation of a tax and the tax rates vary considerably across states. In addition, there can be exemptions, reductions, or other incentives for certain types of production that can lower the total amount of tax paid.

Among the states that contain the Marcellus Shale, Ohio and West Virginia currently impose severance taxes at the state level, and Virginia authorizes localities to tax natural gas production. In Maryland, Allegany and Garrett counties, the two Maryland counties that contain the vast majority of the State’s portion of the Marcellus Shale, currently have taxes on natural gas production in their local laws. For information on severance taxes in the Marcellus Shale states and other states with high levels of gas production that are located outside of the Marcellus Shale region, see **Appendix 1 – Severance Taxes in Marcellus Shale States** and **Appendix 2 – Severance Taxes in Natural Gas-producing States Outside the Marcellus Shale Region**.

General Regulation of the Oil and Gas Industry

A person must obtain a permit from MDE before drilling a well for the exploration, production, or underground storage of gas or oil in Maryland. A permit is also required for the disposal of any product of a gas or oil well. An applicant that wants to extract gas from the Marcellus Shale may also be required to apply for a number of other State environmental permits.

MDE regulates gas exploration and production and has broad authority to impose conditions on permits to protect the State’s natural resources and to provide for public safety. Further, MDE may deny a permit based on a substantial threat to public safety or a risk of significant adverse environmental impact. However, the MDE oil and gas regulations were written prior to the use of high-volume hydraulic fracturing and, as of February 2015, have not been revised since 1993. These regulations apply to all gas wells

in Maryland, are not specific to the practice of hydraulic fracturing and, in some cases, are incompatible with modern industry practices.

MDE has recently developed regulations governing oil and gas exploration and production, which were published in the *Maryland Register* for public notice and comment on January 9, 2015. MDE advises that it has received more than 100 public comments and is currently reviewing the comments.

Marcellus Shale Safe Drilling Advisory Commission

The bill generally conforms to the severance tax concepts presented as a discussion draft to the Legislative Committee of the Marcellus Shale Safe Drilling Initiative Advisory Commission on January 2, 2013. The draft indicated that the advisory commission did not specify a tax rate, but indicated that it supported legislation to adopt a reasonable severance tax rate.

The advisory commission and departments commissioned a study of the economic impacts of natural gas production from high-volume hydraulic fracturing in the Marcellus Shale, which was undertaken by the Regional Economic Studies Institute (RESI) of Towson University. The study was released on September 22, 2014 and identified various potential impacts of natural gas exploration and extraction in the Marcellus Shale play of Western Maryland. The study focused on economic and fiscal impacts, as well as impacts on housing, tourism, roads and other infrastructure, and communities in the area. The study focused on both short-term impacts of drilling between 2017 and 2026 and long-term impacts after 2026, which was the year the last well was assumed to be drilled. This fiscal and policy note utilizes the data and assumptions provided by the study.

More information on the practice of hydraulic fracturing, the Marcellus Shale, and the Marcellus Shale Safe Drilling Initiative may be found in **Appendix 3 – High-volume Hydraulic Fracturing in the Marcellus Shale**.

State Revenues: The severance tax established by the bill may result in a negligible increase in special fund revenues beginning in fiscal 2016 from the value of natural gas that is currently produced in Maryland, as discussed below. However, the severance tax could eventually generate significant revenues from the value of any gas extracted from the Marcellus Shale, as discussed below, to the extent permits are issued for that activity in the future.

Existing Gas Production in Maryland

Special fund severance tax revenues deposited into the Natural Gas Impact Account may increase negligibly beginning in fiscal 2016 from the collection of severance tax revenues

on the value of natural gas produced by currently producing wells. According to the U.S. Energy Information Administration, about 32 million cubic feet of natural gas was produced in Maryland in 2013 from 7 wells. According to MDE, however, no existing well in Maryland currently produces more than the 20,000 cubic feet per day threshold established by the bill. Thus, no severance tax revenues are collected from owners of existing wells unless production increases; in the event production from an existing well exceeds the 20,000 cubic feet per day threshold, severance tax revenues may increase negligibly.

Future Development of Gas from the Marcellus Shale

As noted above, current oil and gas exploration and development regulations are generally inconsistent, and in some cases, incompatible with modern industry practices. Thus, it is unlikely that high-volume hydraulic fracturing occurs in Maryland until the regulations are updated. Even if current regulations are revised, it is unclear whether and when future development may occur, which is dependent on the relative stringency of the final regulatory provisions (including any baseline monitoring periods or similar provisions that prohibit extraction for a certain period of time), as well as future price levels. Currently, there are no permit applications related to hydraulic fracturing pending before MDE.

To the extent that State regulations are updated and Marcellus Shale development does occur, a reliable estimate of any increase in special fund revenues from the severance tax imposed on the future extraction of natural gas from the Marcellus Shale cannot be made, as several variables affect the amount of production that may occur in the future and the price of natural gas. However, as noted above, RESI has developed a model to study the economic impacts of Marcellus Shale development, including fiscal impacts, and has utilized the model to study the effect of a 2.5% severance tax rate. Thus, while a reliable estimate may not be possible at this time, the RESI model shows the fiscal impact under one set of data and assumptions, as described below.

Special fund severance tax revenues for the Natural Gas Impact Account could increase by between \$489,200 and \$2.20 million in fiscal 2017 and by between \$1.29 million and \$5.79 million in fiscal 2018. This range is based on the extraction scenarios shown in **Exhibit 1**.

Exhibit 1
Estimated Number of Wells and Production for Each Production Scenario
Fiscal 2016-2026

<u>Fiscal Year</u>	<u>Low Production Case</u>		<u>High Production Case</u>	
	<u>Wells</u>	<u>Gas (bcf)</u>	<u>Wells</u>	<u>Gas (bcf)</u>
2016	0	0	0	0
2017	8	4.96	36	22.32
2018	16	11.86	72	53.38
2019	29	22.84	63	60.91
2020	22	23.13	54	59.80
2021	18	21.31	63	65.62
2022	15	18.88	42	55.04
2023	12	16.05	36	47.50
2024	12	14.79	36	43.96
2025	12	14.10	36	41.95
2026	6	9.94	12	26.04
Total	150	157.87	450	476.54

bcf: billion cubic feet

Note: Numbers may not sum to total due to rounding.

Source: Regional Economic Studies Institute, Towson University

Exhibit 1 shows the number of wells and amount of gas extraction that might occur under a low- and high-extraction scenario, which is based on a recent U.S. Geological Survey resource projection and several assumptions made regarding the average decline in production of each well and the pace of well development. As shown in the exhibit, RESI assumes that the initial extraction of gas does not occur until fiscal 2017, although the application for, and approval of, permits may occur in fiscal 2016. Under these scenarios, peak production occurs in fiscal 2020 under the low extraction scenario and fiscal 2021 under the high extraction scenario.

Exhibit 2 shows the fiscal 2017 and 2018 revenue estimates under the low- and high-extraction scenarios incorporated within the RESI model. The estimates do not account for any income from the reinvestment of money within the Natural Gas Impact Account or interest earned, which accrues to the general fund. This analysis also does not account for the collection of any penalties imposed under the bill for failure to file the required tax returns or to pay the tax. It is assumed that the penalty provisions do not materially affect State revenues.

Exhibit 2
Estimated Severance Tax Revenue Totals
(\$ in Millions)

<u>Scenario</u>	<u>FY 2017</u>	<u>FY 2018</u>
Low Extraction	\$0.49	\$1.29
High Extraction	\$2.20	\$5.79

Source: Regional Economic Studies Institute, Towson University

Revenue estimates for the peak production years total \$2.5 million under the low-extraction scenario (in fiscal 2020) and \$7.4 million under the high-extraction scenario (in fiscal 2021).

State Expenditures: General fund expenditures increase in fiscal 2016 only for the Comptroller to undertake significant computer reprogramming and increase to a lesser extent on an annual basis beginning as early as fiscal 2017 for the Comptroller to hire one revenue examiner. The Comptroller advises that, as a new type of tax, several programming modifications of its SMART tax processing system are needed, which are estimated to cost \$105,000 in fiscal 2016. Additionally, the Comptroller advises that an additional revenue examiner is needed to process tax returns and all other functions associated with administering the new tax. Thus, general fund expenditures increase by an additional \$56,068 on an annual basis potentially beginning in fiscal 2017, the first year that significant revenues may accrue under the bill; however, if oil or gas permit applications are not received by MDE in fiscal 2016, it is assumed that the Comptroller will defer adding the revenue examiner position until severance tax revenues appear to be forthcoming.

Although the bill directs the Comptroller to distribute severance tax revenues necessary to administer the severance tax to an administrative cost account prior to depositing the revenues into the Natural Gas Impact Account, this analysis assumes that the Comptroller must make the computer reprogramming changes and hire the additional position prior to any tax revenues being received; thus, general funds are needed. It is assumed that any ongoing costs can be absorbed with existing budgeted resources.

Special fund administrative expenditures may increase by \$65,851 beginning in fiscal 2017 for MDE to hire an additional budget specialist to administer the Natural Gas Impact Account, as required by the bill. This estimate assumes that the new employee is not hired until severance tax revenues are received in the newly established account from production in the Marcellus Shale; thus, the additional personnel costs are delayed or avoided to the

extent that production does not occur in fiscal 2017. The estimate includes a salary, fringe benefits, one-time start-up costs, and ongoing operating expenses. Additionally, once future production of natural gas from the Marcellus Shale is more significant, MDE may need additional staff, including a geologist to monitor and oversee mitigation and remediation activities funded by the account. In particular, if the balance in the Natural Gas Impact Account exceeds \$10 million in any fiscal year, workloads may increase significantly for MDE to implement projects designed to benefit producing regions, which is outside the scope of current departmental activities.

Special fund expenditures from the Natural Gas Impact Account may increase, beginning in fiscal 2017 under the assumptions discussed above, to address the impact of gas exploration and production that cannot be attributed to a specified operator that can be held liable, as authorized by the bill.

Finally, it is assumed that the bill's incarceration provisions do not materially affect State expenditures.

Local Fiscal Effect: Local government expenditures associated with monitoring and remediating the impacts of gas drilling may decrease. The bill specifies that severance tax revenues must be used by the State to address the impacts of gas exploration and production. Thus, State expenditures from the Natural Gas Impact Account may supplant local expenditures related to monitoring or remediating the impacts of drilling, particularly in Allegany and Garrett counties.

It is assumed that the bill's penalty provisions do not materially affect local finances.

Additional Comments: This fiscal and policy note is based upon an analysis conducted by RESI, for the Marcellus Shale Safe Drilling Initiative, utilizing the model that it has developed for MDE, the Department of Natural Resources, and the Marcellus Shale Safe Drilling Initiative Advisory Commission. The Department of Legislative Services has independently evaluated the inputs used for the RESI model and advises that the data and assumptions selected appear to be generally reasonable and reflect recent information from credible sources. It should be noted that in comparison with previous estimates produced by the Department of Legislative Services, the RESI model results in the accrual of significantly greater revenues in the fiscal 2017 through 2019 period, but fewer revenues in the future, particularly after fiscal 2025. This generally reflects assumptions by RESI of a greater pace in well development, a sharper production decline curve for individual wells, and a shorter life span for each well as compared to previous estimates.

Additional Information

Prior Introductions: SB 535 of 2014 received a hearing in the Senate Budget and Taxation Committee, but no further action was taken. Similar bills, SB 879 of 2013 and SB 768 of 2012, received hearings in the Senate Budget and Taxation Committee, but no further action was taken on either bill.

Cross File: None.

Information Source(s): Garrett County, Department of Natural Resources, Maryland Department of the Environment, Comptroller's Office, Regional Economic Studies Institute, U.S. Energy Information Administration, Department of Legislative Services

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Appendix 1 – Severance Taxes in Marcellus Shale States

<u>States</u>	<u>Severance Taxes</u>
Maryland	No statewide severance tax or production fee on gas extraction. Garrett County – 5.5% tax on value of gas at wellhead paid by the producer. Allegany County – 7.0% tax on value of gas at wellhead paid by the producer (60.0%) and the purchaser (40.0%).
New York	No statewide severance tax or production fee on gas extraction.
Ohio	Imposes a severance tax of \$0.025 per thousand cubic feet to be paid by the person who actually removes the gas.
Pennsylvania	No statewide severance tax or production fee on gas extraction. House Bill 1950, signed by Governor Corbett in February 2012, established an impact fee that may be imposed by counties on wells drilled into unconventional gas formations.
Virginia	No statewide severance tax or production fee on gas extraction. Authorizes local governments to impose local license taxes on the value of the gas at sale, to be paid by the person engaging in the business of severing the gas. Several local governments currently impose a 1% tax.
West Virginia	Imposes a severance tax of 5.0% of the market value of the gas in the immediate vicinity of where it is produced.

Note: This appendix does not reflect other taxes and fees assessed on the production or sale of natural gas. A number of states impose additional taxes and fees, such as conservation taxes or regulatory fees, on natural gas wells or the volume or value of gas produced. Information was updated in October and November of 2014.

Source: Department of Legislative Services

Appendix 2 – Severance Taxes in Natural Gas-producing States Outside of the Marcellus Shale Region

<u>States</u>	<u>Severance Taxes</u>
Colorado	Imposes severance taxes ranging from 2.0% to 5.0% of the gross income attributable to the sale of the gas (the rate reaches 5.0% when an operator's income is at least \$300,000).
Louisiana	Imposes a rate of \$0.163 per thousand cubic feet of gas (adjusted annually based on changes in natural gas prices).
New Mexico	Imposes a severance tax of 3.75% of the taxable value of the gas.
Oklahoma	Imposes a 7.0% severance tax on the gross value of the production of gas (the rate is lower for the first 36 months of production).
Texas	Imposes a severance tax of 7.5% of the market value of gas.
Wyoming	Imposes a severance tax of 6.0% of the fair market value of gas after completion of the production process.

Note: This appendix does not reflect other taxes and fees assessed on the production or sale of natural gas. A number of states impose additional taxes and fees, such as conservation taxes or regulatory fees, on natural gas wells or the volume or value of gas produced. Information was updated in October and November of 2014.

Source: Department of Legislative Services

Appendix 3 – High-volume Hydraulic Fracturing in the Marcellus Shale

The Marcellus Shale formation is a geologic feature that has attracted significant attention from the energy industry for its rich natural gas and liquids resources contained within seven states. In Maryland, the only anticipated areas of potential gas production are in Garrett and western Allegany counties. Applications for permits to produce natural gas in Maryland using horizontal drilling and high-volume hydraulic fracturing were first filed with the Maryland Department of the Environment (MDE) in 2010, but were subsequently withdrawn.

Concerns Regarding High-volume Hydraulic Fracturing

As the use of hydraulic fracturing has increased, so has concern about its potential impacts. MDE has advised that, although accidents are relatively rare, exploration for and production of natural gas in nearby states have resulted in injuries, well blowouts, releases of fracturing fluids, releases of methane, spills, fires, forest fragmentation, road damage, and evidence of water contamination.

In 2010, the U.S. Environmental Protection Agency (EPA) raised several concerns regarding the impact of hydraulic fracturing on water supplies, water quality, and air quality, among other issues, and is currently examining the practice more closely. In April 2012, EPA adopted a final rule to address air emissions from hydraulic fracturing, and in December 2012, EPA released a progress report on its comprehensive study of hydraulic fracturing impacts on water resources; a full draft report is expected to be released for public comment and peer review in 2015, although a series of peer-reviewed studies of various aspects of hydraulic fracturing have been published and are publicly available on the agency's website. Other states, academic and environmental organizations, and the oil and gas industry are also conducting research into the impacts of hydraulic fracturing on public health, safety, and the environment. On December 17, 2014, Governor Andrew M. Cuomo of New York prohibited the practice of high-volume hydraulic fracturing in New York State following the release of a multi-year study conducted by the State's Department of Health that recommended a ban until sufficient information on the risks of the practice became available.

Marcellus Shale Safe Drilling Initiative

Governor Martin O'Malley established the Marcellus Shale Safe Drilling Initiative by executive order in June 2011 to ensure that, if drilling for natural gas from the Marcellus Shale proceeds in Maryland, it is done in a way that protects public health, safety, natural resources, and the environment. The executive order directed MDE and the Department of Natural Resources (DNR) to assemble and consult with an advisory commission.

Specifically, the executive order tasked MDE and DNR, in consultation with the advisory commission, with conducting a three-part study and reporting recommendations.

Part I of the study, a report on findings and recommendations regarding sources of revenue and standards of liability for damages caused by gas exploration and production, was released in December 2011. The findings and recommendations of the report led to the introduction of several bills during the 2012 legislative session; the General Assembly passed only one of the bills, however. Chapter 703 of 2012 (House Bill 1123) established a presumptive impact area applicable to areas around a well for which MDE has issued a gas exploration or production permit. In a presumptive impact area, it is presumed that the contamination of a “water supply” was caused by the activities of gas exploration or production; this presumption may be rebutted.

Part II of the study – a report on best practices – was completed in August 2013 and reflected changes made after consideration of more than 4,000 public comments. This report was based upon work conducted by two experts at the University of Maryland Center for Environmental Science, Appalachian Laboratory. The experts provided MDE and DNR with a suite of recommendations that have been used or studied in other states. The departments considered each recommended best practice and decided, in consultation with the advisory commission, which practices to accept. While the report contained many recommendations, the centerpiece was the use of a Comprehensive Gas Development Plan (CDP), which a drilling applicant would be required to submit as a prerequisite to an individual well permit. A CDP would address, before any well is drilled, the broad and cumulative issues associated with the completion of numerous wells and the effects that the well construction and resource extraction and transportation would have on a large scale.

The third and final report required by the executive order was scheduled to be released by August 1, 2014. However, the departments released a draft report on July 11, 2014, and announced that public comments would be accepted through November 17, 2014. A draft of the final report of the Marcellus Shale Safe Drilling Initiative Study was released on November 25, 2014, and contained information from a risk assessment, a public health study, and an economic impact study commissioned by the departments. The final report contained all final findings and recommendations and addressed all remaining issues identified by the executive order.

The report incorporated findings from the risk assessment, including several impacts that were characterized as high, moderate, or low risks. Impacts identified as high-risk include (1) road repair costs; (2) disruptive noise and vibrations from truck traffic; (3) temporary and localized air emissions during the drilling process (under a “high-extraction” development scenario only); and (4) ecosystem fragmentation from pipeline development (high-extraction scenario only). The report also identified several moderate risks,

including (1) air emissions from combustion equipment, well pads, pipelines, and trucks; (2) ecological and agricultural impacts from land clearing; (3) community health and safety impacts from a significant increase in truck traffic; (4) the effect on aquatic ecosystems from large water withdrawals; (5) land fragmentation from the construction of natural gas gathering lines; and (6) exposure of dissolved methane to drinking water wells and groundwater. The characterization of a risk as “low,” “moderate,” or “high” results from a weighing of both the probability of an event’s occurrence and its severity. Ultimately, the departments concluded that the risks to public health and the environment can be adequately managed under a stringent regulatory regime that relies on the best practices identified in their report. MDE subsequently developed such regulations, which were published in the *Maryland Register* on January 9, 2015.