

2012 REPORT OF THE

VIRGINIA COAL AND ENERGY COMMISSION

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



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REPORT OF THE COAL AND ENERGY COMMISSION

EXECUTIVE SUMMARY

The Coal and Energy Commission is a 20-member legislative body established by Chapter 25 (§ 30-188 et seq.) of Title 30 of the Code of Virginia. It is charged with studying all aspects of coal as an energy resource and endeavoring to stimulate, encourage, promote, and assist in the development of renewable and alternative energy resources.

The Commission created the Uranium Mining Subcommittee by motion on November 6, 2008, asking that it (i) oversee any study conducted by the National Academy of Sciences, (ii) review and comment on all aspects of the study prior to the execution of any agreement regarding its commissioning, (iii) determine whether the proposed study is acceptable, (iv) undertake the study of other issues including economic, environmental, public health, and social factors, and (v) hold sufficient public hearings to assist the full Commission in its determination and recommendation of the appropriate policy for the Commonwealth. The nine-member Subcommittee has three members of the Senate and six members of the House of Delegates. Delegate R. Lee Ware, Jr., serves as the Subcommittee's chairman. The Senate members are Senators John Watkins, Phillip P. Puckett, and Frank W. Wagner. The other House of Delegates members are Delegates Charles W. Carrico, Sr., William R. Janis, Watkins M. Abbitt, Jr., Onzlee Ware, and Clarence E. Phillips.

Meetings

During the 2011 interim, the Coal and Energy Commission did not meet but deferred to its Uranium Mining Subcommittee, which met twice and received two substantial reports.

The Uranium Mining Subcommittee held its first meeting of the interim on December 6, 2011, in the Pittsylvania Educational and Cultural Center Auditorium in Chatham. Christine Chmura, President and Chief Economist for Chmura Economics & Analytics (Chmura), and Daniel Meges, an Economist and Business Development Manager with the firm, presented the subcommittee with the findings of Chmura's study *Socioeconomic Impact of Uranium Mining & Milling in the Chatham Labor Shed, Virginia*. The study was commissioned by the Subcommittee at the direction of the Coal & Energy Commission and was funded by a grant from the Virginia Tobacco Commission.

In conducting its study, Chmura defined four scenarios that assume various levels of environmental contamination. The first involves a negligible environmental impact; the second involves a moderate environmental impact, although within limits set by current federal standards for quality of air, water, noise, and soil; the third involves a significant environmental impact, with contamination exceeding federal standards in at least one category other than water; and the fourth involves a severe environmental impact caused by excessive contamination of both water and at least one other area (air, soil, or noise). The second scenario became the "baseline" scenario and the focus of Chmura's report.

Assuming the existence of the "baseline" contamination scenario, Chmura is of the opinion that uranium mining and milling at Coles Hill would bring substantial economic benefits to the area and the state over 35 years, including an annual net positive economic impact of about \$135 million and the maintenance of more than 1,000 jobs, whether direct, indirect, or induced.¹ Assuming that the site will be operated within federal guidelines, Chmura judges the likely socioeconomic costs and stigma effects to be minimal.²

Significant questions raised by members of the public in writing following the presentation of the Chmura study include questions on these topics:

Regarding the conduct of the study, Mr. Meges explained that Chmura had a short conversation with Virginia Uranium, Inc. (VUI) about the scope of the study; that the firm talked to the Roanoke River Basin Association and other groups and looked at information from the Piedmont Environmental Council, the Sierra Club, and the Southern Environmental Law Center; and that the risks of uranium mining are reflected in the study's conclusion, without sugar-coating.

Mr. Meges answered a question regarding severance taxes by noting that Virginia presently has no severance tax for uranium mining and that if such a tax is instituted, it might cover the cost of regulation.

The study predicts that the health effects will not be substantial because it assumes that any milling would comply with federal regulations and that such regulations could be presumed, for the purpose of the study, to protect the public sufficiently. Mr. Meges noted, however, that no mill follows federal standards completely. An increase in asthma in the area might occur, although the Chmura study was very general on this topic, and questions about specific health effects might be better answered by the forthcoming National Academies study. Mr. Meges understands that a milling permit would require a dust analysis, largely based on the general particulate matter placed into the air by truck traffic. Mr. Meges also stated that traffic accidents may occur, and that procedures must be in place to account for a spill of yellowcake on an area roadway.

There is no evidence that agriculture in the area would not be contaminated, and it is possible that contamination would occur — but under the federal guidelines, Mr. Meges stated, such contamination should not occur. The study does not presume harm to agriculture, whether through actual contamination or stigma effects, as long as (1) federal guidelines are followed and (2) a credible, transparent, and well-publicized monitoring program is followed. Such a program, which can involve residents sending samples from their properties to a laboratory for free testing, is in use in France but would be novel in the United States, where most milling sites are not located in agricultural areas. Regarding wildlife, Mr. Meges stated that animals would have to be

¹ Chmura Economics & Analytics, *Socioeconomic Impact of Uranium Mining & Milling in the Chatham Labor Shed, Virginia* (2011), 6.

² Chmura Economics & Analytics, *Socioeconomic Impact of Uranium Mining & Milling in the Chatham Labor Shed, Virginia* (2011), 6-7.

kept off the property by fences to avoid harm and that birds would likely be harmed. No harm is predicted for hunting and fishing, assuming federal guidelines are followed. Mr. Meges stated that it is possible that some agricultural use could be allowed on the reclaimed land following the closure of the operation.

In answer to questions regarding water use, Mr. Meges stated that VUI had indicated that it planned to use water from the Town of Chatham's system and that there was no reason to assume otherwise. The cost of any failure of local wells was not considered in the study, Mr. Meges stated. Finally, the study addresses the state Total Maximum Daily Load (TMDL) pollution limits indirectly, since compliance with TMDLs is accounted for in the general presumption of compliance with federal and state regulations.

The types of businesses that would benefit from the advent of mining and milling are listed in section 5 of the study. It is not known how many new businesses would be needed, but a trucking firm is one type of business that would be likely to be hired. Economic benefits would come in two phases, Mr. Meges explained: a construction phase and an ongoing operations phase, in which salaries would likely be higher. Mr. Meges stated that the likelihood that hiring is lower than predicted in the report is only one percent. While the amount of a "low" salary cannot be stated with certainty, Mr. Meges stated, it is likely that the higher-paying jobs for engineers could be filled locally.

The study did consider the stigma effects on area institutions, particularly its private schools, and it suggests that such stigma effects can be overcome. Although research here is tentative, as long as federal guidelines are followed and that fact is clear to all, no effect on Chatham Hall is predicted in either national or international markets. Chmura also considered effects on Hargrave Military Academy, although Hargrave did not provide the same level of detail as did Chatham Hall. Chmura did not conduct a specific public-relations study for Chatham Hall because that was beyond the scope of the study.

The study did not include the costs of litigation in its analysis of the economic effects of uranium mining and milling. Mining was not found to have an effect on the cost of health insurance in the area, but the effects on the costs of health care for the uninsured were not examined. Mr. Meges is not aware of any study stating that residents will be unable to obtain homeowner's insurance.

At the subcommittee's second meeting of the interim on December 19, 2011, in Richmond, Dr. David Feary, Senior Program Officer at the National Research Council (NRC), and Dr. Paul A. Locke, Director of the Public Health Program at the Johns Hopkins Bloomberg School of Public Health, presented the NRC's Study of the Health, Safety, and Environmental Impacts of Uranium Mining. The study was commissioned by the Subcommittee at the direction of the Coal & Energy Commission and supported by a grant from Virginia Polytechnic Institute and State University with funding provided by VUI.

The report identified "steep hurdles to be surmounted" before mining and processing could take place appropriately.³ If Virginia were to lift the moratorium, the committee cautioned, it should adopt and rigorously implement internationally accepted best practices in uranium mining and milling, including practices "founded on principles of openness, transparency, and public involvement in oversight and decision-making."⁴ A necessary site-specific analysis, including a thorough site characterization, air quality and hydrological modeling, and site-specific risk assessments, including accident and failure analyses, has not yet been conducted.⁵ For that reason, the report is unable to predict which uranium mining or processing methods might be used at Coles Hill or what the exact nature of any adverse impacts might be.⁶

After the presentation, members of the Subcommittee asked a number of questions. Delegate Abbitt asked about how long the tailings piles would need to keep out water and how long they could be expected to hold up. Dr. Locke responded that although tailings management has gotten better internationally and seems to work well in computer models and in experience over the past 25 years, there are no data available to answer the question over a period of 1,000 years. To predict the performance of tailings piles at Coles Hill would require a site-specific analysis, which the NRC study committee did not perform. Delegate Abbitt also asked Dr. Locke to expand on the report's point regarding radon risks to miners. Dr. Locke cited chapter 5 of the report, which states that a 1987 National Institute for Occupational Safety and Health study of radon levels and risks to miners concluded that current levels were too high, and that neither the Occupational Safety and Health Administration nor the Mine Safety and Health Administration had yet changed its regulations in response.

Delegate Abbitt asked whether it would be better to obtain a mining plan first or to lift the moratorium first. Dr. Locke responded that that was a policy question left for the legislature, but that it might be driven by economics: to do a site-specific assessment, one would have to have a good reason. Dr. Locke added that internationally accepted best practices start with a regulatory level as simply a place where the company has to be and then push that level down as far as possible: this is called ALARA, As Low As Reasonably Achievable.

Senator Wagner asked about the procedure for mitigating the risks of radon gas. Dr. Locke explained that mitigation is simple in the home, but that radon has different effects in mining. Underground mining poses the highest risk and requires a ventilation system to take the radon out. The committee noted that these ventilation systems had improved quite a bit over

³ National Research Council of the National Academies, *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia* (Washington, D.C.: The National Academies Press, 2011), 19.

⁴ National Research Council of the National Academies, *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia* (Washington, D.C.: The National Academies Press, 2011), 17.

⁵ National Research Council of the National Academies, *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia* (Washington, D.C.: The National Academies Press, 2011), 16.

⁶ National Research Council of the National Academies, *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia* (Washington, D.C.: The National Academies Press, 2011), 13, 15.

recent years. Radon exposure also comes from tailings piles. Best practices have evolved to prevent the tailings from getting into the environment. The particular practices appropriate for any site will depend on what tailings look like, how much radiation they have in them, and where they are located.

Senator Wagner inquired about whether any best practices the committee observed might be applied in Virginia. Dr. Locke said that that question would be hard to answer until a detailed site analysis was available. The committee did not find a site exactly like Virginia, considering its topography and water table and the nature of the ore in the rock. Senator Wagner also asked about the difference between international mining standards and U.S. standards. Dr. Locke cited the report's appendices and noted that the committee had not found a set model code. Dr. Locke provided the example of Canada, where there is one law regarding uranium mining, unlike in the United States.

Senator Watkins asked about risk and whether best management practices have improved demonstrably over the past 30 years. Dr. Locke stated that although the committee did not do any site-specific assessments, it did try to obtain a high-level picture of risks. Best practices have indeed improved over the past 25 years. Some gaps in the laws that existed during the 1970s and early 1980s have been filled. Although the question is very site-specific, there are places in the world where things are being done a lot better today than in the past. Sen. Watkins also asked whether it is the norm around the world for individual uranium mines to be subject to their own specific regulations, as in Canada. Dr. Locke answered that the committee did not study other countries, but that Canada sets levels only as starting points, and that the regulatory culture then pushes the regulators and the industry to reduce exposure to the maximum extent possible. Under this philosophy, mere compliance is not a best practice.

Delegate Onzlee Ware inquired about the incidence of lung cancer in the western United States as a result of uranium mining. Dr. Locke stated that there is quite a bit of information in the literature about the results of poor mining practices; although the committee looked at some of that information, it wanted to be forward-looking and not dwell on past practices. All studies on uranium mining and lung cancer are based on data acquired from the 1950s through the 1980s. Some of the mining practices that were used during that period should not occur anywhere today under any circumstances. Some of the studies that examined surrounding communities used a method called Ecologic Study Analysis, which cannot be used to assess either causation or non-causation, and therefore the committee did not feel comfortable saying any more than that those studies are out there. Dr. Feary added that getting logical results from newer mining practices will require the passage of a certain period of time.

Delegate Janis noted that the report had a somewhat schizophrenic tone and asked whether the committee adopted the report unanimously or first prepared a preliminary report that it then amended to soften or remove the dissenting opinions. Del. Janis also asked whether a minority of committee members had prepared a dissenting report; whether any committee member had complained about the fairness of the process or the methods by which consensus was reached; and whether a formal signoff had taken place. Dr. Locke responded that if the report seemed to touch on varied topics, it was because the volunteer committee had sought

specifically to address every question in the statement of task and to avoid those areas that were off-limits, and that the committee met, discussed, and reached a common position on each issue. Dr. Feary added that the 13 members of the committee, despite any divergences of opinion, were comfortable with all of the report's conclusions. Dr. Feary was not aware of any formal complaints about any part of the process and stated that there was a formal signoff for this report: all committee members had to say that they had signed off. The NRC has a process for creating minority reports, but that process was not used in this study.

After the discussion, the public had an opportunity to ask questions in writing and expressed numerous concerns, including several related to the use of international best practices. One question asked whether Dr. Locke believed that best practices could even be applied in Virginia; he answered that the NRC hopes that its report will be useful to Virginians in designing the regulatory and legal structure that would institute best practices if the moratorium were lifted. Dr. Locke stated that if best practices are used, some but not all risks could be mitigated. Because of the way the statement of task read and the nature of state programs, the committee did not review the permits of individual facilities or their monitoring reports to determine whether any operation in the United States has consistently operated within the federal guidelines or whether any Canadian operation appropriately protects the environment and human health, stated Dr. Locke.

Questions also focused on the differences between the conditions at Coles Hill and other mining sites. Dr. Locke stated that the committee looked for a site that would match any place in Virginia where an occurrence of uranium has been identified but did not find one. He stated also that the report stresses the great importance of protecting both groundwater and surface water, and that it discusses below-grade storage as a best practice for tailings storage. The most recently permitted mill, however, is at Piñon Ridge in Colorado, and it uses a partially above-grade system. Although the committee described extreme weather events in generalities, it did not look at the impact of Hurricane Hazel on uranium mining in the Elliott Lake area of Ontario, Canada. Dr. Feary noted that the NRC does not perform site-specific analyses and did not do so here: the report emphasizes how important a comprehensive environmental impact assessment would be.

One question involved the possibility that acid mine drainage could be a problem at Coles Hill. Dr. Locke's understanding is that sulfides or other compounds are necessary to create an acidic situation, and that the data available to the committee did not show that Coles Hill has those rock formations. Based on what is known, acid mine drainage probably would not be a problem at Coles Hill.

The transparency of the process of establishing a mining and milling operation came up in several questions. Dr. Locke responded that the committee believes that transparency is absolutely essential and lists it as one of the overarching best practices in public participation. Transparency is promoted when the process is done right, which requires broad and timely notification and the creation of conversation. Canadian mines may provide some examples of best practices for citizen involvement. The report notes that the existing system for active public participation does not necessarily match the best practice in the industry.

Finally, a number of questions focused on the parameters and terms of the report itself. In response to a question about the lack of information on underground mines in Utah and Arizona, for example, Dr. Locke stated that the committee had a limited amount of time and would have visited some of those sites if it had had another six months. The committee went to Colorado because the state had just finished licensing the Piñon Ridge site. The committee did not look at the costs to Virginia of becoming an "agreement state" for uranium mill tailings, although, Dr. Locke pointed out, Virginia may have experience in other federal agreements that would be relevant. Also outside the statement of task were the description of individual jobs in mining or milling and the discussion of "well-being" from a broad socioeconomic standpoint. Drs. Locke and Feary declined to offer personal opinions as to whether uranium mining in Virginia would be a good thing.

Dr. Locke noted that the terms "deposit," "resource," and "reserve" are defined differently in different parts of the world and even in the United States among various federal agencies. Because the committee members pushed for a standard definition, the committee used the definition provided by the Securities and Exchange Commission. Dr. Feary added that the report contains a box that looks at international definitions and the United States definitions and tries to explain this fairly arcane topic. Dr. Feary also stated that the report describes Coles Hill as a "potentially economically viable" deposit, which is a determination based on the price of uranium, and that it is distinguished from a mere occurrence of uranium. When asked about the possibility of a global surplus of uranium following the Fukushima disaster and Germany's plans to reduce its use of nuclear power, both Dr. Locke and Dr. Feary stated that both events are too recent to support any coherent assessment of the effects on the demand for uranium. Dr. Locke stated that both events are discussed in chapter 3 of the report.

While the study, focusing as it does on a high level of analysis, states that certain best practices exist and should be studied, it does not provide a cookbook that sets out the steps for creating regulations for uranium mining in Virginia. The study's goal is to help the legislature understand what the parameters are, whatever its decision. When asked to propose a newspaper headline to summarize the report, Dr. Locke recommended reading the conclusion of the non-technical summary.

On January 18, 2012, the Uranium Subcommittee, through its Chairman, Delegate R. Lee Ware, wrote a letter requesting that Governor Robert F. McDonnell initiate the process of preparing draft uranium mining regulations that would inform the General Assembly as to what a regulatory program for Coles Hill would appropriately include (Appendix A). The letter requested that the Department of Mines, Minerals and Energy, in consultation with the Departments of Environmental Quality and Health, have the opportunity to engage the necessary technical assistance, provide opportunities for public review and comment consistent with the Administrative Process Act, and develop a proposed regulatory structure and process that incorporates the safeguards and international best practices identified by the National Academy of Sciences and other reputable institutions.

Additional information regarding the Coal and Energy Commission's activities is available through its website at <http://dls.state.va.us/cec.htm>. The Commission does not intend to submit a further report for publication.

Respectfully submitted,

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