

BACKGROUND

No. 2738 | OCTOBER 26, 2012

Time to Allow Uranium Mining in Virginia

Jack Spencer and Katie Tubb

Abstract

On a tract of private land in Virginia, 119 million pounds of uranium ore lie buried—the nation’s largest known uranium deposit. The Virginia General Assembly is currently considering whether to issue regulations that allow this resource to be developed. The debate has been overtaken by misinformation, decades of cultural bias, and manipulation by special interests. A closer analysis, however, reveals that uranium mining is conducted around the world safely and to great economic benefit. Studies show that the net economic benefit of construction and operations will yield almost \$5 billion for Virginians over the life of the mine—around 35 years. With modern technology, efficient regulation, and 21st-century best practices, uranium mining is safe for workers, the environment, and surrounding populations.

This paper, in its entirety, can be found at <http://report.heritage.org/bg2738>

Produced by the Thomas A. Roe Institute for Economic Policy Studies

The Heritage Foundation
214 Massachusetts Avenue, NE
Washington, DC 20002
(202) 546-4400 | heritage.org

Nothing written here is to be construed as necessarily reflecting the views of The Heritage Foundation or as an attempt to aid or hinder the passage of any bill before Congress.

The federal government banned uranium mining on more than 1 million acres of federal land in Arizona.¹ Virginia lawmakers are considering doing the same in their own state. Buried 1,600 feet beneath a cattle farm in southern Virginia on a tract of private land called Coles Hill are 119 million pounds of uranium ore—the nation’s largest known deposit of uranium, and the seventh largest in the world. At current uranium prices, the deposit is valued at approximately \$6 billion and is enough to fuel each of America’s 104 nuclear reactors for two years.

Unlike in Arizona, however, the tract of land holding Virginia uranium is privately owned by a family who has lived and worked there since 1785, and the decision about whether to develop this resource will be made by the Virginia legislature, not by Washington bureaucrats. At issue is whether the Virginia General Assembly will produce regulations that allow uranium mining. Uranium mining would create jobs and wealth in a region that badly needs it, and would provide an important energy source. Those factors are significant, but even more is at stake: the underlying issue over private property rights. May people safely develop their own property as they see fit?

KEY POINTS

- With modern technology, efficient regulation, and 21st-century best practices, uranium mining is safe for workers, the environment, and surrounding populations.
- Uranium mining is safely conducted domestically in states like Colorado and Texas, and internationally in countries like Canada and Australia.
- Uranium mining will create hundreds of much-needed, well-paying jobs directly with the mine, and many indirectly as a result of increased prosperity and economic activity. These are private jobs created by private investment.
- Virginia has ample regulatory experience with mining operations and it has worked closely with federal regulators and industry to ensure safe nuclear operations for decades.
- The Virginia General Assembly’s responsibility is not to ban or promote mining, but to set strong regulations that protect public health and safety and that allow safe resource development.

Of course, as soon as the word “uranium” or “nuclear” is introduced, the debate quickly becomes clouded by misinformation, decades of cultural bias, and manipulation by special interests. The reality is that uranium mining is not that different from other mining, such as for coal and titanium, that is conducted in the U.S. and around the world very safely. There is no reason that the result cannot be the same in Virginia.

Uranium Mining in the Commonwealth

Interest in mining uranium grew in Virginia when the 1973 OPEC oil embargo inspired the creation of the National Uranium Resource Evaluation program under the U.S. Geological Survey to locate sources of American uranium. Though the U.S. had only 40 operating nuclear reactors in 1973, hundreds were in the planning process. The evolving energy landscape seemed to point directly toward an increase in uranium demand for decades to come.

Meanwhile, the Canadian company Marline Uranium Corporation, conducting its own explorations, discovered the Coles Hill site in 1978, the only deposit in Virginia for which recovery is believed to be economically feasible, and purchased leases on the land. In 1982, the Virginia General Assembly prohibited the

issuing of uranium mining permits until a regulatory system could be developed.² It is important to note that the General Assembly did not ban uranium mining: It decided that more investigation, and a strong regulatory regime, was a prerequisite to uranium mining.

By the time the General Assembly started to work on the issue in the mid-1980s,³ the outlook for nuclear power had changed significantly. The combination of cost overruns, regulatory overreach, decreases in energy demand, and other factors⁴ significantly undercut the demand for nuclear power, and the price for uranium began to drop. As uranium prices fell, so did Marline’s interest in the Coles Hill site, as well as any pressure on the Commonwealth of Virginia to write regulations.

Over time, demand for nuclear power and uranium recovered, and by the mid 2000s, the global outlook for nuclear power had begun to rebound.⁵ One of the results was a rise in uranium prices and renewed interest in the Coles Hill deposits. Instead of selling (or transferring control by some other means) to international interests, the Coles family and 31 supportive neighbors decided in 2007 to start their own company—Virginia Uranium, Inc. (VUI)—to develop the deposit. As owners of the property and members of the community, they

were interested not only in developing this resource but also, according to the owners, in protecting the “values of the community and environmental stewardship.”⁶ They believed that they were best positioned to develop the property in a way that respected the long-term needs of the community.

The Opposition Emerges. VUI was granted a permit by the Virginia Department of Mines, Minerals and Energy in 2007 to conduct exploratory drilling, and the 2008 session of the Virginia General Assembly began to discuss the possibility of writing uranium regulations. To that end, the Uranium Subcommittee of the Coal and Energy Commission was created, followed in 2012 by a Uranium Working Group consisting of the Departments of Mines, Minerals and Energy; Environmental Quality; and Health. The Uranium Working Group is currently charged with studying uranium mining in Virginia to ultimately provide the Assembly with a recommendation on whether to lift the moratorium on permits, and a draft regulatory structure for uranium mining in Virginia by December 2012.

The renewed prospect of uranium mining has sharply divided southern Virginia between those hoping to restore economic health to a depressed region of the state and a vocal coalition of “pro-ban”

1. News release, “Secretary Salazar Announces Decision to Withdraw Public Lands Near Grand Canyon From New Mining Claims,” U.S. Department of the Interior, January 9, 2012, <http://www.doi.gov/news/pressreleases/Secretary-Salazar-Announces-Decision-to-Withdraw-Public-Lands-near-Grand-Canyon-from-New-Mining-Claims.cfm>, (accessed October 4, 2012).
2. Code of Virginia § 45.1-283, 1982, <http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+45.1-283> (accessed October 2, 2012).
3. Whittington W. Clement, “Another View of Virginia’s History of Potential Uranium Mining,” *Virginia Lawyer*, Vol. 60 (October 2011), pp. 19-20, http://www.hunton.com/files/Publication/454562a5-abec-41cc-9d30-1dcb0bc714a9/Presentation/PublicationAttachment/3105313e-5b72-4ec9-9eae-291b516912b3/Uranium_Mining_Virginia_Lawyer.pdf (accessed October 3, 2012).
4. Jack Spencer, “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes,” Heritage Foundation *Backgrounder* No. 2086, November 15, 2007, <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>.
5. U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2006*, Table A7. “World Nuclear Energy Consumption by Region, Reference Case, 1990–2030,” p. 90, [http://www.fypower.org/pdf/EIA_IntlEnergyOutlook\(2006\).pdf](http://www.fypower.org/pdf/EIA_IntlEnergyOutlook(2006).pdf) (accessed October 1, 2012).
6. Virginia Uranium, Inc., “History of Virginia Uranium,” <http://www.virginiauranium.com/history-of-vui/> (accessed October 2, 2012).

community and environmental groups. Mine advocates point to the national and international best practices that are able to meet the challenges unique to mining uranium and the hundreds of well-paying jobs it would create in Virginia's most economically depressed region. Opponents argue that the environmental, health, and commercial risks of uranium mining in a wet climate and well-populated area outweigh the benefits of mining.

The National Academy of Sciences Study: Lack of Context.

At the center of the public debate over uranium mining is a study conducted by the National Academy of Sciences (NAS), commissioned by the Virginia Coal and Energy Commission, and funded solely by VUI.⁷ Opposition groups were asked to contribute to the funding, and refused. The NAS study was meant as a companion to a second state-commissioned study on the site-specific socioeconomic impacts of uranium mining.⁸

Commissioned in 2009, the NAS panel of science, environment, and medical specialists was asked to “examine the scientific, technical, environmental, human health and safety, and regulatory aspects of uranium mining, milling, and processing” in Virginia. The goal was to inform the General Assembly’s decision on whether uranium can be mined “in a manner that safeguards the environment, natural and historic resources, agricultural lands, and the health and well-being of its citizens.”⁹

Though the study contains much

good information, a lack of proper context leaves its conclusions open for manipulation. The terms of the study make it necessarily a negative report: The committee was not to study any of the benefits of uranium mining, was not allowed to compare uranium mining in the context of the mining and processing of other resources, and was not permitted to consider any of the site-specific conditions of Coles Hill. It could also make no recommendations for or against uranium mining.

MAY VIRGINIA RESIDENTS SAFELY DEVELOP THEIR OWN PROPERTY AS THEY SEE FIT?

The report was by design, then, a negative analysis that purposely offered no beneficial consequences of uranium mining and was essentially irrelevant to what was specifically being proposed in Virginia. This was made worse by a poorly communicated introduction and nontechnical summary that focused on the potential negatives of uranium mining. Framing it in such a way allowed anti-nuclear, anti-development activists to easily exploit the report to advance their “pro-ban” agenda. Despite the important information contained in the report, the “pro-ban” crowd’s attempts to distort the report’s contents have largely poisoned it as a whole. The reality is that the NAS study could provide lawmakers with important information if it is understood within the proper context.

As the report’s body suggests, creating a regulatory structure and meshing it with current state mining, environmental, and health regulatory structures will be a large task. However, it is far from being a task without guidance. Though the report acknowledges the risks of potential external factors, such as hurricanes, that could affect mining or milling operations, it also provides the lessons learned, international and national best practices and standards, and repeated calls for the necessity of site-specific evaluations for this knowledge to be best applied to Virginia.

A statement in chapter six of the report provides an accurate representation of the report’s actual conclusions regarding the potential environmental effect of mining: “The impact of these activities in Virginia will depend on site-specific conditions, the rigor of the monitoring program established to provide early warning or contaminant migration, and the efforts to mitigate and control potential impacts.”¹⁰ Though not apparent by the nontechnical summary, the report, in its totality, surmises that uranium mining can be safely conducted if Virginia rigorously addresses the unique challenges of uranium mining and processing with the best solutions and standards.

Regulation: Mining, Processing, and Reclamation

Uranium mining is conducted safely around the world and in the United States. While uranium

7. Committee on Uranium Mining in Virginia, Committee on Earth Resources, and the National Research Council, *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia* (Washington, DC: National Academies Press, 2012), http://www.nap.edu/catalog.php?record_id=13266#toc (accessed October 2, 2012).

8. Chmura Economics & Analytics, “The Socioeconomic Impact of Uranium Mining and Milling in the Chatham Labor Shed, Virginia,” November 29, 2011, <http://lis.virginia.gov/111/oth/Uranium.120611.pdf> (accessed October 2, 2012).

9. Committee on Uranium Mining in Virginia et al., *Uranium Mining in Virginia*, p. 22.

10. *Ibid.*, p. 145.

mining's combination of traditional extractive operations with radiation exposure protection presents some unique challenges, so do most industrial activities. And while the anti-nuclear community likes to reference past troubles with uranium mining to suggest future problems,¹¹ the fact is that modern technology, efficient regulation, and 21st-century best practices allow uranium mining to be safe for workers, the environment, and surrounding populations. Indeed, decades of experience in the U.S. and other uranium-mining countries, such as Canada and Australia, provide strong evidence of safe uranium mining.¹²

Some, like Dr. Peter DeFur from the NAS study panel, suggest that mining should not be permitted because neither Virginia nor the United States has extensive and recent mining experience.¹³ This statement ignores the positive and negative examples, both in America and internationally, from which the Virginia Assembly can learn when considering uranium-mining regulations. Further, it does not recognize Virginia's vast business and regulatory experience in both mining operations and industrial sources of radiation. Combined with existing state

regulation, federal regulation, and international best practices, there is ample demonstration that both Virginia and the United States have substantial experience that would allow safe uranium mining.¹⁴

THE FACT IS THAT MODERN TECHNOLOGY, EFFICIENT REGULATION, AND 21ST-CENTURY BEST PRACTICES ALLOW URANIUM MINING TO BE SAFE FOR WORKERS, THE ENVIRONMENT, AND SURROUNDING POPULATIONS.

Mining. The site-specific conditions will likely require VUI to extract the uranium in a conventional underground mine, as opposed to an open pit or "in situ" mining.¹⁵ As is done when mining for other minerals and ores, a shaft is dropped near the deposit to allow workers to create a series of large tunnels. Machinery strips away rock and uranium ore, which is then shipped above ground to the milling unit, which would be onsite. The ore must then be processed into yellow cake. Though uranium mining does present several unique challenges, such as controlling exposure to radioactive

materials, the Commonwealth of Virginia has extensive experience in regulating the mining of other resources, like coal and titanium.

As is the case for any other mining on private lands, the federal government does not directly regulate uranium mining,¹⁶ though operations must meet federal workers' health and safety and environmental protection standards. For example, the Environmental Protection Agency (EPA) regulates a mine's air emissions and water discharges, and the Mine Safety and Health Administration (MSHA) under the Department of Labor sets safety standards for working conditions a mine must meet or exceed. The Nuclear Regulatory Commission (NRC) also regulates worker radiation-exposure levels and requires that employees' exposure levels be regularly monitored.

Virginia, as the sole regulator of uranium mining, needs to develop standards based on successful U.S. examples like Colorado, international ones like Canada, and agency recommendations, like those put forth by the National Institute for Occupational Safety and Health (NIOSH) and the International Atomic Energy Agency (IAEA).

-
11. Keep The Ban, the community-organization group opposing uranium mining, cites four studies as proof that uranium mining causes health problems in populations living in close range of uranium mines. A closer look at the studies shows that Keep The Ban is misinterpreting or misrepresenting these four studies, which range from inconclusive to concluding that uranium exposure does not have significant adverse health impacts. Keep The Ban, "Health Risks," http://keeptheban.org/?page_id=26 (accessed October 2, 2012).
 12. Canadian Nuclear Safety Commission, "Updated Analysis of the Eldorado Uranium Miners' Cohort: Part I of the Saskatchewan Uranium Miners' Cohort Study (RSP-0205)," May 2011, <http://www.nuclearsafety.gc.ca/eng/readingroom/healthstudies/eldorado/#S7> (accessed October 2, 2012).
 13. DeFur was not a spokesman for the NAS panel, but spoke as an individual in opposition to uranium mining. Steve Szkotak, "NAS Uranium Study Leader Following Va. Study," Associated Press, August 3, 2012, <http://hamptonroads.com/2012/08/nas-uranium-study-leader-following-va-study> (accessed October 2, 2012).
 14. Pages 197-201 of *Uranium Mining in Virginia* provide an accessible chart of the most important state and federal regulations governing the different steps of the uranium mining, processing, and site-reclamation process.
 15. In situ mining dissolves uranium from surrounding rock while still in the ground at the mining site before uranium processing continues above ground at a milling facility.
 16. In situ leach mining is regulated by the federal government because it chemically alters the uranium as part of the mining process.

Colorado has been mining uranium for over a hundred years and is a good example for Virginia.¹⁷ Mining opponents point to Cotter Corporation's Cañon City as proof that mining cannot be done safely even in this experienced state. The Colorado site began operations in 1958 and was declared a Superfund site in 1984 as stored tailings contaminated surface soil and water sources.¹⁸ Little was known then about how to best manage radioactive tailings and the primitive methods that the Cotter Corporation used to store tailings would never be permitted under current NRC regulations. Instead of banning uranium mining, Colorado learned from past mistakes. The state rewrote health and environmental regulations to reflect new knowledge to ensure the safety of mining operations, which have consequently become continuously safer over the years.

To date, there are 33 active uranium mining permits in Colorado and 71 prospect notices of intent.¹⁹ Additionally, the private company Energy Fuels Resources Corporation has nearly completed its permitting requirements to build the first conventional mill in America in more than 25 years at Piñon Ridge.²⁰ The

extensive, multiyear permit-approval process involving all levels of government and public participation should prove to be a helpful model for the Virginia Assembly.²¹

Of particular concern to some Virginia residents is the state's wet climate and the challenge it poses to regulate and conduct uranium mining and processing safely. The concern is that Virginia's substantial rainfall and waterways provide a system by which contamination could easily spread, should natural or engineered containment structures fail. Though uranium has most frequently been found in more arid regions, such as Arizona and New Mexico, all sorts of mining have been undertaken in wetter climates. Uranium itself has been mined successfully for decades in the Coastal South region of Texas where 300-mile-long strips of uranium are located between the Colorado and Rio Grande Rivers.²²

One such mine, Kingsville Dome, is located just outside Corpus Christi, which receives an annual rainfall of 32 inches, compared to Virginia's 42 inches. Uranium has also been recovered and processed from phosphate rock mines in Florida and Louisiana where annual average rainfall exceeds Virginia's. Though not the

same process as conventional uranium mining and milling, all of the radioactive decay products of uranium are still present in this process, and have been safely managed.²³

A key piece to the framework that has the ability to strengthen any mining regulation that the Assembly writes, is how it treats liability. At a minimum, the Assembly should require uranium mining companies to acquire liability coverage for any accidents based on the assessments of third-party, private risk assessors. Acquiring such coverage would be a condition of receiving a permit to operate. The Assembly should not determine the level of coverage, nor should a government agency do so. This protects risk-liability determinations from being influenced by special interests attempting to distort the numbers in either direction.

Placing such tangible measures of responsibility on owners and operators applies teeth to any other regulation that the Assembly writes, and positively enforces compliance without overly punishing companies.

Milling and Processing.

Uranium processing is the mechanical and chemical process of separating uranium from rock and purifying it so that it can be shipped and used

17. Colorado Department of Natural Resources, Colorado Geological Survey, "Uranium in Colorado and the World," http://www.coloradomining.org/Content/Release_Pdf/UraniumFlyer.pdf (accessed October 2, 2012).
18. U.S. Environmental Protection Agency, "Superfund Program: Lincoln Park," July 31, 2012, <http://www.epa.gov/region8/superfund/co/lincolnpark/index.html> (accessed October 2, 2012).
19. Colorado Department of Natural Resources, Division of Reclamation, Mining and Safety, "Uranium Mining in Colorado 2012," July 18, 2012, <http://mining.state.co.us/UraniumMininginColorado.pdf> (accessed October 3, 2012).
20. As opposed to a mill that continues the processing of uranium from in situ recovery.
21. The Colorado Department of Public Health and Environment news release and fact sheet on the permit approval of Piñon Ridge provide a broad overview: News release, "Colorado Department of Public Health and Environment Approves Radioactive Materials License for Piñon Ridge Uranium Mill," Colorado Department of Public Health and Environment, January 5, 2011, http://www.coloradomining.org/Content/Release_Pdf/010511.pdf (accessed October 3, 2012). See also Colorado Department of Natural Resources, Division of Reclamation, Mining and Safety, "Uranium Mining in Colorado 2012," July 18, 2012, <http://mining.state.co.us/UraniumMininginColorado.pdf> (accessed October 3, 2012).
22. D. Hoye Eargle and Diana J. Kleiner, "Uranium Mining," Texas State Historical Association *Handbook of Texas Online*, <http://www.tshaonline.org/handbook/online/articles/dku01> (accessed October 3, 2012).
23. World Nuclear Association, "Uranium from Phosphates," June 2012, http://www.world-nuclear.org/info/phosphates_inf124.html (accessed October 3, 2012).

as the raw material for any number of technologies, from medicines to electricity generation. At the mill, the mined ore is crushed into smaller pieces and washed in an acid or alkaline solution that leaches out the uranium from the waste rock, called “tailings.”²⁴ The uranium is then precipitated, purified, dried, and turned into a powder to be packaged in steel barrels for shipment.²⁵

Unlike uranium mining, uranium *processing* falls under federal regulations because the ore and tailings require chemical alteration. The primary regulatory authority is the NRC (through the 1954 Atomic Energy Act, the 1978 Uranium Mill Tailings Radiation Control Act, and, most extensively, Title 10, Part 40 of the Code of Federal Regulations). However, the EPA, MSHA, Occupational Safety and Health Administration (OSHA), and IAEA also have roles in permitting and oversight. The permitting process covers the operation from start to finish, from an environmental impact statement with public hearings to an approved plan for reclamation and long-term monitoring guaranteed by a bond set aside by the mine before the project starts.

Once there is an adequate uranium regulatory program in place, the NRC may turn over regulation to the state as an Agreement State. However, the NRC must still license the mill to operate and continue to review licenses at least every five years.

Site Reclamation. The reclamation process begins even as the uranium deposit is being mined. Tailings are chemically neutralized and thickened in a cement mixture and used as backfill for abandoned mine tunnels. Tailings can also be stored in containment pits meeting NRC standards. Pending state regulations, VUI intends to use both methods.

RADIOACTIVE MATERIALS ARE NOT CREATED IN THE MINING OR MILLING PROCESS—THEY EXIST NATURALLY.

Tailings exist in all mining operations, but in the case of uranium mining, they contain the largest part of radioactive materials, some of which remain radioactive for thousands of years. Most significantly, these include the uranium-decay materials thorium-230 and radium-226, which produce radon gas. It is important to note that these radioactive materials are not created in the mining or milling process—they exist naturally. In fact, tailings contain 15 percent less radioactivity than the naturally occurring ore. Further, managing long-lived naturally occurring heavy metals and radionuclides is not unique to uranium mining. Indeed, many industries produce and safely manage potentially dangerous waste byproducts.²⁶ And, as is the case for other industries, the uranium mining industry has developed safe methods of storing and managing its waste byproduct.

Further, the NRC requires a long-term solution for tailings disposal, rather than what is most economical. Though the highly preferred option is underground disposal, the NRC allows surface containment ponds under certain circumstances. In such a case, the NRC requires that tailings be stored above the floodplain in containment pits with an engineered or water covering. These pits must be designed to withstand the site-specific Probable Maximum Precipitation, which includes hurricane levels, and Probable Maximum Flood, equivalent to a one-in-a-1,000-year flood occurrence.

Nevertheless, questions about uranium processing and site reclamation continue to be raised by state politicians and the general public. Mining opponents say that a natural disaster could thwart the best efforts of individuals and regulations to contain tailings, causing water supply contamination, health problems, and ruin to farmland. Opponents rely on studies like that conducted for the Virginia Beach Department of Utilities, which opposes mining, and claims that a breach in containment pits could contaminate drinking water as far east as Virginia Beach.²⁷ These studies seem to assume that industry and regulators either do not recognize these challenges or choose to ignore them. This is simply not true. Indeed, mining operations around the nation, even those with substantial rainfall, are operating safely precisely because they are held

24. Currently, VUI states that it will use the alkaline solution for its operations.

25. *Powering America*, Heritage Foundation film, 2012, <http://www.heritage.org/poweringamericafilm/>.

26. U.S. Environmental Protection Agency, “Hazardous Waste Listings: A User-Friendly Reference Document,” March 2008, <http://www.epa.gov/osw/hazard/wastetypes/pdfs/listing-ref.pdf> (accessed October 3, 2012).

27. Michael Baker Corporation, “A Preliminary Assessment of Potential Impacts of Uranium Mining in Virginia on Drinking Water Sources,” February 22, 2011, http://www.vbgov.com/government/departments/public-utilities/Documents/04.UraniumMiningReport_Final_Updated20110222_V2.pdf (accessed October 3, 2012).

to the high safety standards established by both industry and state and federal regulators.

The Virginia Beach study concludes that the release of radioactive tailings from a 10-year, 100-year, or 500-year flood occurrence would contaminate the Kerr Reservoir and Lake Gaston pipeline, which supply Virginia Beach and many other communities in southeastern Virginia with amounts of radium and thorium that exceed maximum contaminant levels for safe drinking water.

MINING OPERATIONS AROUND THE NATION, EVEN THOSE WITH SUBSTANTIAL RAINFALL, ARE OPERATING SAFELY PRECISELY BECAUSE THEY ARE HELD TO THE HIGH SAFETY STANDARDS ESTABLISHED BY BOTH INDUSTRY AND STATE AND FEDERAL REGULATORS.

Unfortunately, this argument lacks context, like much of the information used by opponents of uranium mining in Virginia. Another study found the Virginia Beach conclusions to be entirely unrealistic and unreflective of regulatory realities and risk probability.²⁸ As one example of several misjudgments, the Virginia Beach study assumes that VUI would build tailings impoundment dams with outdated designs right on the banks of the Whitehorn Creek, a tributary of the Banister River leading to the Kerr Reservoir.²⁹ However, such a

disposal system would never pass NRC permitting.

The nuclear industry establishes and shares best practices perhaps better than any other industry. While anti-mining groups are quick to point out the deficiencies of the past, they always seem to forget how the industry responded and implemented reforms to ensure that past mistakes are not repeated. As a result of this process, a culture of safety exists today that allows the uranium mining industry to operate at very safe levels.

New Debate—Old Arguments

With the appropriate regulations in place and a culture of safety established from the start, uranium can be mined safely in Virginia. Unfortunately, misinformation and fear tactics are still influencing the debate. Indeed, opponents are using variations of the same discredited arguments that anti-nuclear and anti-development interests have purveyed for decades. Some arguments espoused by opponents include:

- **Uranium mining will not stop at Coles Hill, and will open the entire state to exploitation.**

This argument rests on a potential problem that does not currently exist—assuming that it would be a problem even if it did exist. No one is certain yet if mining at Coles Hill is economically viable. Many hope that it is, but that is something the market will determine once state regulations are written. There is also no evidence

that uranium elsewhere in the state is economical to develop. If there are other uranium deposits in Virginia that could be safely developed, the owners should be allowed to pursue mining if it can be done safely.

- **The entire enterprise is being driven by foreign interests.**

First, VUI is a private company created and run by the Coles family and neighboring Bowen family with investors from Canada and the United States. That said, whether foreign interests are behind the Coles Hill venture or not should have no bearing on the General Assembly's decision to issue regulations. Anyone engaged in uranium mining, from Virginia or elsewhere, must be held to the same standards. Besides, why would Virginia not want foreign investment that resulted in economic growth? There are over 700 international businesses operating in Virginia that employ more than 160,000 Virginians. In the Pittsylvania–Danville region alone, where Coles Hill is located, there are companies from as close as Canada and as far as India, Japan, and Sweden.³⁰

- **Even if nothing bad happens, the stigma alone to southern Virginia will damage tourism, property values, and business.**

The notion that anything associated with the nuclear energy sector creates community stigmas is simply not true. Indeed, census

28. Kleinfelder West, Inc., "Technical Critique of 'A Preliminary Assessment of Potential Impacts of Uranium Mining in Virginia on Drinking Water Sources' by Michael Baker Corp.," May 31, 2011, <http://www.uwg.vi.virginia.gov/pdf/Kleinfelder.Baker%20Critique%205.31.2011.pdf> (accessed October 3, 2012).

29. Kleinfelder West, Inc., "Technical Critique," pp. 5, 8-9.

30. Virginia Economic Development Partnership, "Virginia: Business Without Borders," 2011, http://www.yesvirginia.org/international/foreign_direct_investment/default.aspx (accessed October 3, 2012).

data show that populations generally increase around nuclear power plants.³¹ More specifically, the Center for Regional Analysis (CRA) at George Mason University just released a study that found not only that the prospect of uranium mining has not created a negative stigma for Pittsylvania County, but that there was no evidence of stigma attached to any of the examined uranium mining towns. Indeed, the evidence is that these towns experience very positive economic impacts.³² These findings are not surprising, since increased opportunity, economic prosperity, and high standards of living encourage people to move to a certain area. Economic growth in one area has a ripple effect of spreading economic health and stimulating growth well beyond the immediate jobs and income created, as has been seen recently in states benefitting from hydraulic fracturing, such as North Dakota and Pennsylvania. Even organic farmers should not suffer, as organic farming has safely and profitably been done in the shadow of nuclear reactors for years.³³ Experience also proves that stigma can be overcome and

even embraced when uranium mining is successful. The city of Elliot Lake, Ontario, was born out of a uranium mining community in 1955 as a single industry town. With responsible mining and careful development the town now boasts “a thriving tourism industry” with “pristine” water fronts known across Ontario, a diversified economy, and a world acclaimed retirement community.³⁴ The city even holds an annual Uranium Heritage Days festival.

These anti-mining arguments rely on incomplete or incorrect information and have successfully scared some Virginians. In the end, they do not stand. In fact, assuming that uranium is mined safely under rigorous oversight, the benefits to the surrounding community and the state could be substantial.

The Economy Matters

While safety is most important, the fact is that the economic impact of uranium mining also matters. Mining will create hundreds of much-needed, well-paying jobs directly with the mine, and many indirectly as a result of increased prosperity and economic activity.

These are private jobs created by private investment.

Over 430 commercial nuclear power plants are currently operational in 29 countries, providing nearly 14 percent of the world’s electricity. This power is emissions-free, extremely reliable, and can be very affordable, which is why many countries are pursuing an expansion of nuclear power. In America alone, five reactors are officially under construction and 10 more applications for 16 additional units remain under NRC review.³⁵ If each country seeking nuclear power moves ahead with new reactors, many of which are already under construction, the world could see up to 48 nations with commercial nuclear programs in the coming years.³⁶

Each of these reactors will need fuel. In 2011, American nuclear reactors alone purchased some 27,500 tons of uranium, an 18 percent increase from 2010. Only 9 percent of that uranium was of U.S. origin, the rest came from a mix of countries including Australia, Brazil, Canada, China, Kazakhstan, and Uzbekistan. About half of America’s uranium came from Russia under its Megatons to Megawatts program, which ends in December 2013.³⁷

-
31. Bill Dedman, “Nuclear Neighbors: Population Rises Near US Reactors,” MSNBC, April 14, 2011, http://www.msnbc.msn.com/id/42555888/ns/us_news-life/ (accessed October 2, 2012).
 32. George Mason University Center for Regional Analysis, “Coles Hill Uranium Report,” September 14, 2012, http://cra.gmu.edu/pdfs/Coles_Hill_Uranium_Report.pdf (accessed October 2, 2012).
 33. Organic farmers have raised concerns that a nearby uranium mill could destroy the integrity of their businesses. However, farmers have harvested safe produce near nuclear power plants as several testify in the Heritage Foundation documentary *Powering America*.
 34. The City of Elliot Lake, “History of Elliot Lake,” 2011, <http://www.cityofelliotlake.com/en/cityhall/history.asp> (accessed October 3, 2012).
 35. Nuclear Energy Institute, “New Plants: New Nuclear Plant Status,” May 2012, <http://www.nei.org/resourcesandstats/documentlibrary/newplants/graphicsandcharts/newnuclearplantstatus> (accessed October 3, 2012).
 36. World Nuclear Association, “World Nuclear Power Reactors & Uranium Requirements,” October 2012, <http://www.world-nuclear.org/info/reactors.html> (accessed October 3, 2012).
 37. Canada and Australia accounted for 31 percent; Kazakhstan, Russia, and Uzbekistan for 40 percent; Brazil, China, Malawi, Namibia, Niger, South Africa, and Ukraine for 20 percent. U.S. Energy Information Administration, “2011 Uranium Marketing Annual Report,” May 2012, <http://www.eia.gov/uranium/marketing/pdf/2011umar.pdf> (accessed October 3, 2012).

Unsurprisingly, the World Nuclear Association expects a 33 percent increase in world uranium demand from 2010 to 2020.³⁸ A joint report by the Nuclear Energy Agency and IAEA expects world uranium requirements for nuclear power alone to be 136,000 tons by 2035, compared with the 67,990 tons needed to fuel reactors this year.³⁹

Nuclear energy demands in America and the world over are growing, presenting Virginia with a promising opportunity to attract some of that growth to the Southside region, one of the state's poorest areas. According to state statistics, the Southside region ranks the lowest in the state for high school graduation rates, wages and salaries, and employment growth. Following the same theme, Southside has the highest poverty rates.⁴⁰ In addition to the nationwide recession, Southside has suffered from the steady retreat of industries, like tobacco farming and furniture manufacturing, which once sustained the region.

Uranium mining will not solve these problems. However, it will create opportunity in the region for those willing to pursue it. While the NAS

study examined the potential negative externalities, the state-commissioned socioeconomic study conducted by Chmura Economics & Analytics examined the potential positive consequences of the Coles Hill project.⁴¹ The study projected that Coles Hill mining, milling, and decommissioning will create 323 jobs annually during the construction phase and 1,052 jobs annually during the 35-year operating lifetime of the mine.

The operation will generate \$35 million annually during the three-year construction, \$136.7 million annually during operation, and another \$3.2 million each year in state and local taxes. The net economic benefit yields almost \$5 billion for Virginians over the life of the mine. Only in the very worst case, in widespread contamination and severe environmental impact far exceeding federal regulations along with a reduced price for uranium, would the Coles Hill endeavor be one where costs exceed benefits. Ultimately, the biggest winner in this project will be Pittsylvania County, the Chmura study estimates.

Chmura's projections hardly seem to be a story too good to be true

when considering the benefits that other communities, like Elliot Lake, have reaped for many years thanks to uranium mining. In Australia, uranium mining supports 1,200 jobs and generates \$21.5 million in royalties and \$44 million in taxes each year.⁴² In Saskatchewan, the provincial government decided to phase out uranium mining in the early 1990s. However a joint study by the Canadian and Saskatchewan governments on the health, environment, safety, and socioeconomic issues related to mining reversed the policy, as the study concluded that environmental impact could be well controlled, and jobs created by mining would be very hard to replace.⁴³

As long as Virginia establishes strong regulations and follows them diligently, uranium mining should be a great source of economic health for one of its poorest regions—a development that is sure to benefit the entire state.⁴⁴

Time for Uranium Mining in Virginia

Banning uranium mining is not the best way to mitigate the risks associated with the practice. As

38. World Nuclear Association, "World Nuclear Power Reactors & Uranium Requirements."

39. News release, "Global Uranium Supply Ensured for Long Term, New Report Shows," International Atomic Energy Agency, July 26, 2012, <http://www.iaea.org/newscenter/pressreleases/2012/prn201219.html> (accessed October 3, 2012).

40. Twenty-six percent of Southside residents ages 25 and older never earned a high school diploma. Council on Virginia's Future, "Virginia Performs: Workforce Quality," January 12, 2012, <http://vaperforms.virginia.gov/indicators/economy/workforceQuality.php> (accessed October 3, 2012). Including the effects of the nationwide recession, Southside has experienced negative employment growth because of a significant decrease in manufacturing jobs. Average Southside wages and salaries amounted to \$31,520 (the state average is \$50,957). Council on Virginia's Future, "Virginia Performs: Employment Growth," May 2, 2012, <http://vaperforms.virginia.gov/indicators/economy/employmentGrowth.php> (accessed October 3, 2012). Poverty levels are the highest in the state at 19.9 percent. Council on Virginia's Future, "Virginia Performs: Poverty," January 12, 2012, <http://vaperforms.virginia.gov/indicators/economy/poverty.php> (accessed October 3, 2012).

41. Chmura Economics & Analytics, "The Socioeconomic Impact of Uranium Mining and Milling in the Chatham Labor Shed, Virginia."

42. World Nuclear Association, "Australia's Uranium," October 2012, <http://www.world-nuclear.org/info/inf48.html> (accessed October 3, 2012).

43. World Nuclear Association, "Uranium in Canada," August 2012, <http://www.world-nuclear.org/info/default.aspx?id=318&terms=Canada's%20uranium> (accessed October 3, 2012).

44. The benefits are not limited to Canada and Australia. A 2011 study by the University of North Texas found that the uranium mining industry directly created \$311 million and 1,160 jobs per year, which benefitted the entire state but especially rural areas of Texas. Business Wire, "Uranium Industry Study: Significant Economic Impact in Texas," May 11, 2011, <http://www.businesswire.com/news/home/20110511006988/en/Uranium-Industry-Study-Significant-Economic-Impact-Texas> (accessed October 3, 2012).

countries around the world have demonstrated for decades, uranium can be mined safely. Defeatist thinking will deny southern Virginia critical economic activity, and the nation an important energy source. Instead of banning uranium mining, the Virginia General Assembly should:

- **Review the entirety of the studies produced to inform the debate.** A significant amount of information has been produced to help the Virginia Assembly make an informed decision. Many of the studies have been manipulated either in their production or presentation. Therefore, it is critical that each Virginia policymaker take the time to review each study in its entirety and not rely on the interpretation of any special interests to inform his or her decision making.
- **Implement strong liability requirements.** Perhaps the most important responsibility of Virginia lawmakers will be to establish fair liability requirements as part of the regulatory process. A good liability regime will promote safety, encourage rational economic behavior, and ensure that adequate funds are available to cover the costs of any accidents. A poor liability regime, however, can either create unfair barriers to legitimate business or artificially mitigate risks in ways that ultimately undermine safety.

- **Recognize Virginia's vast experience in mining and managing industrial radiation risks.**

Uranium mining has two specific challenges—those associated with any mining operation and protecting workers and the public from radiation exposure. Virginia has vast experience in safely and effectively regulating both. As a mining regulator, Virginia has worked closely with federal regulators and industry to ensure safe mining operations for decades. Virginia regulators and businesses also have a long history of protecting the public and workers from potential radiation risks associated with industrial activities. It has two nuclear power plants, major commercial nuclear companies such as AREVA and Babcock & Wilcox have a significant presence in Virginia, and the state hosts nuclear submarines at Newport News. That experience should give both the Assembly and the public confidence that uranium mining can also be conducted safely.

- **Develop regulations to allow uranium mining.** The job of the Assembly should not be to ban or promote mining, but rather to set strong regulations that protect public health and safety. Then, given those regulations, private investors can determine whether the mining is worth pursuing. Doing so is not an endorsement of

uranium mining. It is an endorsement of private property rights, free economic activity, and government responsibility to protect public health and safety. If developed and applied correctly, regulations will help to ensure that uranium is mined safely and that public health is protected. And it will do more than that. It will allow private property owners to steward their property as they see fit, and to use their resources to promote economic activity that will surely benefit them, but will also benefit the region, even the country.

By mandate of the federal government, the state of Arizona must control the challenges of uranium mining by not mining at all and thus also forfeit the benefits of doing so. Free of that federal yoke, the Virginia General Assembly should construct a regulatory system that not only allows citizens to steward their own property, but also protects public safety with a standard of excellence worthy of emulation.

—**Jack Spencer** is Senior Research Fellow in Nuclear Energy, and **Katie Tubb** is a Research Assistant, in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.