



Policy Report

Uranium Mining in the Roanoke River Basin

Background: In the late 1970's, the Marline Uranium Corporation estimated it had discovered 30 million pounds of uranium in Pittsylvania County, VA potentially worth more than \$1 billion. However, by 1982, the price of processed uranium oxide (yellowcake) had declined to roughly half of its 1978 price, and interest in mining the deposits waned. Three Mile Island and a number of uranium mining mishaps had made the public aware of the potential health and environmental hazards of nuclear power and uranium mining. In 1983, the Virginia General Assembly enacted a statewide moratorium on uranium mining, which remains in effect today.

Until recently, there were no efforts to lift the moratorium because the price for uranium yellowcake remained low. However, both the estimate of available ore in Pittsylvania County, and the price of yellowcake have increased dramatically. The uranium deposits in Pittsylvania County may be worth seven to ten billion dollars. Virginia Uranium, Inc. is conducting a public relations campaign and lobbying the General Assembly to lift the moratorium on uranium mining so that up to 100 million pounds of uranium can be mined from a location known as Cole's Hill.

During the 2008 General Assembly, SB525 was introduced to establish the Virginia Uranium Mining Commission. The Commission's purpose was to advise the Governor and General Assembly as to whether uranium mining in Virginia could be undertaken in a manner that would protect the Commonwealth's citizens, environment, and natural resources. Opponents claimed that the legislation failed to mandate an impartial scientific analysis, did not provide adequate public input, and suggested a foregone conclusion. The legislation was modified to address these concerns, but it was tabled by the House committee.

On November 6, 2008, the Virginia Coal and Energy Commission (VCEC) passed a motion asking the Virginia Center for Coal and Energy Research (VCCER) to contract with the National Academy of Sciences, or other comparable scientific or academic institution, to conduct a study of the impact of uranium mining on the Commonwealth. The VCEC established a subcommittee to oversee the study¹. The VCEC motion did not identify or provide a funding source.

Considerations: A uranium mine and mill is a combination of an open pit mine², a milling operation in which uranium ore/rock is pulverized, and a chemical plant which extracts small

¹ The VCCER is a university research center established at VPI&SU. Its advisory board consists mostly of representatives of the coal, energy and transportation industries, but no environmental resource agencies. The VCEC subcommittee does not include any representation from the Roanoke River Basin.

² Open-pit mining is the process most likely to be proposed for uranium mining in Pittsylvania County. There are other processes but local conditions do not appear to favor or be consistent with the requirements of these other processes.

amounts of uranium from large amounts of ore. Huge volumes of highly mobile, radioactive, sand and clay-like sediments known as mill tailings are a byproduct of the operation. They are stored as slurries and sludge in ponds, and then ultimately as dewatered tailings piles, where they retain 85% of their original radioactivity for hundreds of thousands of years. Non-radioactive earth and overburden in combination with clay and synthetic liners are used to construct dams and caps, the purpose of which is to confine and immobilize these radioactive mill tailings.

A number of tailings pile/dam failures have occurred in the United States, Canada, and worldwide, resulting in the release of radioactive particles and sediments to downstream surface waters. Historically, many tailings piles were not properly confined (or confined at all), and in many instances abandoned when the price of uranium declined. This resulted in radioactive contamination of ground and surface waters, and in some cases, a legacy of environmental and human tragedy. In the United States, the federal government had to step in to remediate these environmental disasters. After three decades and billions of dollars, that work is still underway.

All of the open-pit uranium mines in the United States (and most in the world) are located in areas with low rainfall and high evaporation – important factors for dewatering radioactive slurries, and minimizing erosion and flooding. Virginia's climate is the opposite – high rainfall and low evaporation. Virginia is subject to frequent tropical storms, hurricanes, and nor'easters, some of which are devastating. A single storm in Virginia can produce more rainfall in a few hours than the total annual precipitation of the arid states where the nation's uranium mines are located. Virginia's climate has the capacity to cause massive erosion and structural damage to tailings piles, dams, and caps while simultaneously providing long-distance, transport and dispersal of the radioactive sediments throughout the downstream watershed.

Virginia Beach and Chesapeake own a raw water intake and pump station at Lake Gaston, in Brunswick County, VA. Lake Gaston water is pumped to Norfolk's water reservoirs in Isle of Wight and Suffolk. Subject to a contract, Norfolk delivers an equivalent amount of treated water from the Moores Bridges Water Treatment Plant to Virginia Beach. Due to the interconnections among the water utilities, Lake Gaston water is intermixed in all three city water supplies. During the 2007-08 drought, the Gaston project provided about one-third of the total municipal water demand in Southside Hampton Roads.

The primary concern to Virginia Beach and Southside Hampton Roads is contamination of Lake Gaston if a storm similar to that which hit Nelson County, VA in 1969 (Hurricane Camille) or Madison County, VA in 1995³ were to fragment confinement cells and transport the radioactive tailings downstream to Kerr Reservoir and Lake Gaston (see figure). The mining of the Cole's Hill deposits alone would result in a dozen or more tailings confinement cells, each about twice the footprint of Mount Trashmore (but lower in height depending upon how much could be placed below grade)⁴. Each cell would contain roughly 2.5 million cubic yards (4 million tons) of radioactive sediments. If all 100 million pounds of uranium were mined, the combined tailings would equal 50 million tons, or about one-fifth of the current total national inventory.

The City's contract with Norfolk states that Virginia Beach must deliver water to Norfolk that is treatable by Norfolk's existing water treatment plants. Norfolk's water treatment plants were not

³ These two storms produced 81% and 86% of the maximum probable precipitation, respectively.

⁴ This estimate is based upon representations that about 100 million pounds of yellowcake would be produced at a rate of three to four million pounds per year from raw ore containing 0.1% uranium oxide.

designed to remove radioactive substances, although they might remove some. Therefore, if Kerr and Gaston were contaminated, depending upon the level of that contamination, the pipeline might have to be shut down for an indefinite period of time. This is an unlikely event, but it is not inconceivable and the consequences would be severe. A worst case scenario would include abandonment of the Gaston project, termination of the water services contract (requiring the payment of stranded capital costs), and the construction of a seawater desalination plant to replace the abandoned water supply. The direct costs to Virginia Beach alone would be substantially more than \$500 million.

Representatives of Virginia Uranium do not dispute the environmental consequences of past uranium mining practices. Instead, they indicate that uranium mining is now regulated by the Nuclear Regulatory Commission (NRC) whose primary mission is to protect the public health, as opposed to the Atomic Energy Commission (AEC), whose primary mission was to produce uranium. They believe that this fact combined with modern methods of constructing uranium tailings confinement cells will prevent any significant release of radioactive substances downstream. There is some merit to this view – the AEC’s historical stewardship of radioactive tailings was abysmal and existing NRC regulations are a significant improvement.

Staff has not been able to identify examples of these new confinement cells located in areas that have climate similar to Virginia’s, or any that have ever been subject to the storm intensities that occur in Virginia. Furthermore, NRC regulations may not be sufficient for Virginia’s climate. For example, with respect to radioactive tailings, NRC regulations require only that the mine operator provide *“reasonable assurance of control of radiological hazards to . . . be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years.”* 10 CFR Part 40, Appendix A, emphasis added. However, Hurricane Camille caused the equivalent of 2,000 years of erosion in a single night, and the historical record is replete with instances of mankind overestimating its ability to tame nature.

Alternatives: The alternatives are to 1) take no action, 2) support a study of uranium mining impacts, 3) oppose a study, 4) oppose uranium mining and the lifting of the moratorium on uranium mining altogether, or 5) some combination, thereof.

Taking no action would be tantamount to stating that the City does not oppose uranium mining upstream of its primary water supply. This is not recommended due to the potentially catastrophic impacts to Virginia Beach, Southside Hampton Roads, and the Roanoke Basin.

With respect to a study, the VCEC has appointed a steering subcommittee that has no representation from the Roanoke River Basin, and has asked the VCCER, a university research center with an advisory board made up mostly of representatives of the coal, energy and transportation industries, to procure the study. No environmental, public health, or water supply agencies have been included in the process, and no funding has been identified. In the early 1980’s, the VCEC had formed a Uranium Subcommittee and Uranium Administrative Group (US/UAG) to study the issue in response to the Marline proposals. In 1985, the US/UAG overwhelmingly recommended moving forward with uranium mining in Virginia.

There is no disputing that historically, the uranium industry and its regulators had considerable deficiencies which resulted in serious harm to people and the environment. These problems occurred from the 1950’s through the early 1980’s when the industry literally shut down, and the federal government had to step in to clean up the mess. Many of these environmental disasters

were related to the inability to properly manage water and water pollution. This is significant because these failures occurred in arid states where water management is far less problematic than in Virginia. It is this context in which the US/UAG advocated the precedent of establishing uranium mining in a meteorologically wet state like Virginia. However, the General Assembly did not agree. Neither did the Virginia Beach City Council, which passed two resolutions in 1985 calling first for an “indefinite moratorium” on uranium mining and second for a “permanent ban.”

Although uranium mining upstream of its water supply will never be in the City’s best interest, it is inappropriate for the City to oppose proceedings that would expand knowledge of the issue. Therefore, the City should not oppose a study of the impacts of uranium mining. If a study is to proceed, the following criteria should be met: 1) Every facet of the study process must be open to public scrutiny, 2) the study must be conducted by experts who are independent, impartial, and qualified, 3) these experts must be provided adequate time and resources to accomplish the study, 4) in conducting the study, these experts must be charged with placing the health, welfare and safety of the public above all other considerations, and 5) a peer review group that is independent of the VCEC and the VCCER and includes adequate representation from environmental, public health, water supply and water resource agencies, including the Army Corps of Engineers⁵ must be established to monitor and critique the study.

Recommendations: It is recommended that City Council adopt a resolution opposing uranium mining in Virginia, opposing the lifting of the moratorium on uranium mining, and opposing any attempt to develop a regulatory framework for uranium mining until it can be demonstrated to the City’s satisfaction that there will be no significant release of radioactive sediments downstream.

The City should not oppose a study of the impacts of uranium mining, as long as the criteria described above are followed. If the Commonwealth does undertake or commission a study, Virginia Beach should actively participate in the process with the goal of ensuring that the process is thorough, accurate, impartial, transparent, and protective of the interests of Virginia Beach, Southside Hampton Roads, and the Roanoke River Basin.

This policy report has been reviewed by the Water Task Force.

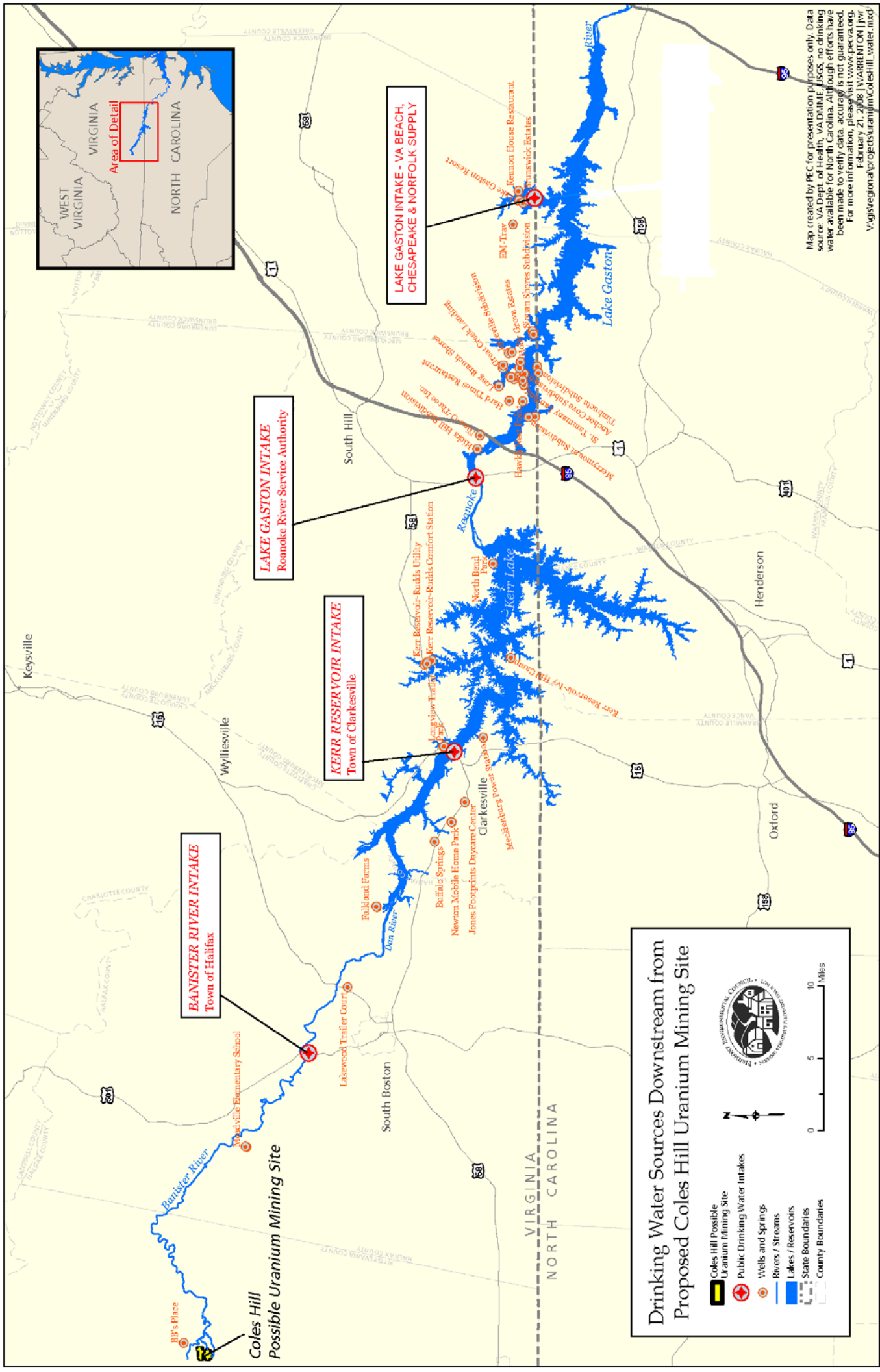
Prepared By: _____
Director of Public Utilities Date

Reviewed By: _____
City Attorney Date

Deputy City Manager Date

Approved By: _____
City Manager Date

⁵ The Army Corps of Engineers is the federal water resource agency. It owns and operates Kerr Reservoir which is downstream of the proposed uranium mining operation. Kerr Reservoir provides 93% of Lake Gaston’s average inflow.



BANISTER RIVER INTAKE
Town of Halifax

KERR RESERVOIR INTAKE
Town of Clarkesville

LAKE GASTON INTAKE
Roanoke River Service Authority

LAKE GASTON INTAKE - VA BEACH, CHESAPEAKE & NORFOLK SUPPLY

Drinking Water Sources Downstream from Proposed Coles Hill Uranium Mining Site

Legend:

- Coles Hill Possible Uranium Mining Site
- Public Drinking Water Intakes
- Wells and Springs
- Rivers / Streams
- Lakes / Reservoirs
- State Boundaries
- County Boundaries

Scale: 0 to 10 Miles

North Arrow

RESERVE ENVIRONMENTAL COUNCIL • SAN FRANCISCO

Map created by PEC for presentation purposes only. Data source: VA Dept. of Health, VADHME, USGS. No drinking water available for North Carolina. Although efforts have been made to verify data, accuracy is not guaranteed. For more information, please visit www.pecva.org.
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