



**Tufts**  
UNIVERSITY

School of Medicine

Department of Public Health  
and Family Medicine

November 25, 2008

The Honorable R. Lee Ware, Jr.  
P.O. Box 689  
Powhatan, VA 23139

Re: Possible Virginia Uranium Mining Study

Dear Delegate Ware:

I am writing to you on behalf of the Piedmont Environmental Council who asked for my opinion of The Virginia Coal and Energy Commission's request for a wide-ranging study of the impact of uranium mining on the Commonwealth of Virginia including the environmental and public health issues that could affect the nearby communities, the region, and the Commonwealth. In order to achieve this objective it is my opinion that new studies are needed of the practices of uranium mines and mills operated under conditions (geology, hydrogeology, weather, and population patterns and proximity) similar to those found in Virginia. The vast bulk of what we know about the impact of uranium mining on health in the US is from the experience of mining in the Southwest, where conditions are substantially different.

As I noted to the U.S. House of Representatives, Committee on Oversight and Government Reform on October 23, 2007, uranium ore is a toxic brew of hazardous materials. Uranium, itself highly toxic, gives rise to a series of other radioactive decay elements such as radium, thorium and radon that are found in ore and, to a lesser extent yellowcake and a greater extent in tailing wastes. Significant among these are radium and thorium, both of which are highly radioactive. When radium decays it produces radon gas, a potent carcinogen. Because radon is a gas that becomes airborne, when it decays it transforms into a series of highly radioactive "radon daughters" that can lodge in the lungs.

At least in the Southwest the primary heavy metal toxicants in addition to itself are arsenic, as well as vanadium and manganese. There is a need to define these contaminants in the proposed mining area in Virginia. During the first phase of processing uranium, most of the uranium is removed, leaving behind mill tailings which retain most of the other toxic contaminants from the ore. The milling of uranium is an industrial process that involves crushing and grinding of the rock and the addition of acids and organic solvents to facilitate concentration and removal of the uranium. Hence, uranium mill tailings and mill tailings effluent are not only highly radioactive, but also contain common industrial chemicals.

Although there is a body of scientific literature on the health effects caused by the constituents in uranium ore, the knowledge base is continuing to expand and recent studies suggest previously unknown concerns, including DNA mutations, estrogenic effects and kidney disease caused by environmental exposure from mining and milling. For this reason, I consider there to be an inadequate base of

scientific research on environmental and public health issues associated with uranium mining affecting the nearby communities and regions.

Consider, for example, The Church Rock tailings dam failure in 1979, only months after the Three Mile Island release. In this incident, a dam holding back a tailings lagoon maintained by United Nuclear Corporation failed, sending 94 million gallons of radioactive and acidic wastewater and 1,100 tons of toxic and radioactive mill waste into the Puerco River. This release, which was substantially larger than the release at TMI, flowed into a low-income, largely Native American community. The spill remains the largest industrial release of radioactive wastes in the history of the United States yet this incident has been virtually ignored in the press and scientific literature, except for my recent article in the American Journal of Public Health. Recent studies have only begun to explore how this dramatic release and the on-going chronic releases in this area have affected the local population.

To me this is why new studies on uranium mines operated under conditions comparable to Virginia's are a necessary first step in this process.

Sincerely,

A handwritten signature in black ink that reads "Doug Brugge". The signature is written in a cursive, slightly slanted style.

Doug Brugge, PhD, MS

Associate Professor

Tufts University School of Medicine

Co-editor, *The Navajo People and Uranium Mining* (UNM Press, 2006)

cc:Virginia Coal and Energy Commission