

Blue Ridge Environmental Defense League

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STATEMENT TO THE URANIUM WORKING GROUP

In Richmond, Virginia

November 27, 2012

TO: Governor Bob McDonnell; Karen Remley, State Health Commissioner; Conrad T. Spangler, III, Director, Dept. Mines, Minerals and Energy; David K. Paylor, Director, Va. Dept. of Environmental Quality; and the UWG staff: Rick Weeks (DEQ), Maureen Dempsey (VDH), and Cathie France (DMME)

FROM: the Blue Ridge Environmental Defense League, Julius Kerr and Louis Zeller

RE: Uranium Working Group Worker Health and Safety, Unified Emergency Preparedness and Response Plan, Summary of findings and presentation of draft statutory changes and conceptual regulation, summary of findings and recommendations regarding financial impacts

On behalf of the Blue Ridge Environmental Defense League and its members and chapters in the Commonwealth of Virginia and nearby states, we submit this statement for the record of the Uranium Working Group.

General Comments

The environmental and public health impacts of uranium mining and milling are severe, life-threatening and long-lasting. They include massive amounts of radioactive and toxic rock and sand, or tailings, surface and groundwater contaminated with radioactive and toxic pollutants, and airborne releases of conventional, toxic and radioactive pollution. Many places where uranium mining has been done have adopted bans on new uranium mines.

Uranium is different from all other minerals extracted from the earth, in a number of ways. Together with its byproducts (such as plutonium) and its end products (many kinds of radioactive waste) uranium is a health hazard: not only for those who work in the industry, but for all the inhabitants of this planet and for all future generations.¹

Radiation in nature is called the background level. But radiation from any source is harmful. Even if radiation from human activity is below the background level, it is still harmful. There are three main types of radiation: alpha, beta and gamma. Alpha radiation is a tiny particle with high energy. It has a large mass it is stopped by just a few inches of air or a piece of paper, but if inhaled it can be deadly. Beta is a very tiny particle, a fast moving electron able to penetrate through several feet of air, several millimeters of plastic or even very light metals. Gamma radiation is not particles, it is photons similar

¹ *Mined U: Financing of New Uranium Mines*, by Nuclear Information and Resource Service/World Information Service on Energy, <http://www.nirs.org/mononline/minedureport.pdf> with Profundo Onderzoek & Advies economic research at www.profundo.nl, March 2008. Page 9

to visible light, but of much higher energy; depending on their energy, they can be stopped by a thin piece of aluminum foil, or they can penetrate several inches of lead.

The inevitable negative consequences of uranium mining are mining waste, radioactive gas, contamination of air, soil and water, and public health impacts. These negative factors make it unsuitable for Virginia and, in fact, other states in the US and other nations around the world:

1. Tailings waste

Most deposits contain less than 1% uranium. So huge amounts of ore have to be processed to get useful quantities of the uranium. The leftover 'waste' rock is called tailings. In the course of processing it is crushed to a fine powder, which is almost as radioactive as the uranium itself. It is hazardous for more than 250,000 years, which might as well be forever. These tailings need to be isolated from the environment to prevent a cancer epidemic, and there are - according to the most accurate figures possible - 230 million tonnes of uranium tailings already waiting for a solution.

2. Radon Gas

As uranium emits radiation, it transforms itself into a new element, which in turn emits radiation and decays, and so on through 14 steps until it eventually - after hundreds of thousands of years - becomes a stable form of non-radioactive lead. One of the elements along the way is radon, a radioactive gas which can travel for hundreds of kilometres before decaying. Mine workers and others who breathe in this gas risk developing lung cancer and other forms of lung disease.

3. Environmental Contamination

Uranium mining contaminates the air, water and earth with radioactive chemicals and heavy metals which can never be properly cleaned up. In addition to the radiation hazard, mining is also associated with poisonous process chemicals, heavy metals and the use of huge quantities of water. In the short term, uranium mine sites wreck the ecology of the local region; in the long term, they pose a risk to a much broader area.

4. Health risks

The health risks of uranium mining are by now quite well known, although still aggressively disputed by the mining industry. Collectively, uranium miners suffer the highest radiation doses of all workers in the nuclear fuel chain (apart from accident cleanup crews). The main problems are inhalation of dust and radon gas, which leave alpha radiation emitters lodged in the body where they can do most harm. As the contamination from the mines spread away from the mine site, local people are also exposed to contamination. While uranium mining is most commonly associated with cancer, low level radiation is also implicated in birth defects,² high infant mortality and chronic lung, eye, skin and reproductive illnesses.²

² *Id.*

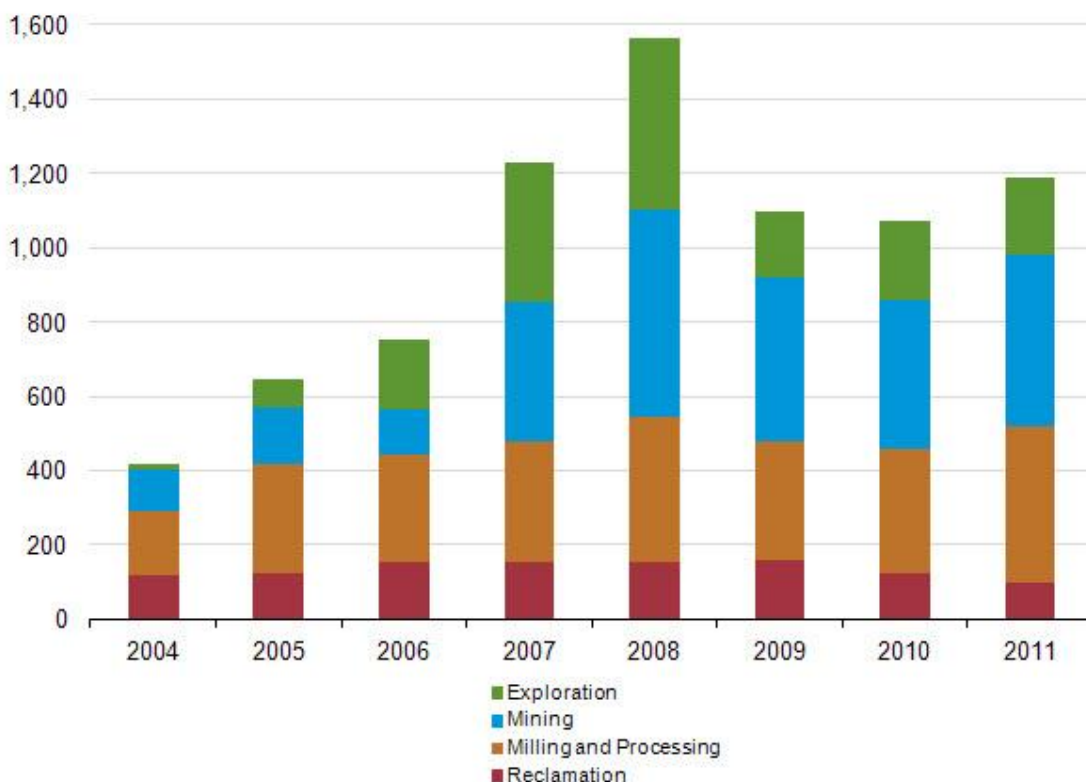
The Governor of Virginia has directed the creation of the Uranium Working Group to examine the environmental, human health and worker safety issues raised by the possibility of uranium mining and milling in Virginia. The Uranium Working Group is comprised of staff from the Departments of Environmental Quality (DEQ), Health (VDH), and Mines, Minerals and Energy (DMME) and is charged with analyzing whether and how these issues might be addressed by regulation, should the General Assembly decide to lift the moratorium. But many are convinced it is a stalking horse for the uranium mining industry.

Pollution, Worker Health and Safety

In 2011 the total employment in the U.S. uranium production industry was 1,191 person-years, centered mostly in Utah, Nebraska, Texas and Wyoming.³ Like other extractive and energy industries, employment fluctuates with supply, demand and price. The graph below compares the last eight years.

Figure 3. Employment in the U.S. uranium production industry by category, 2004-2011

person-years



Source: U.S. Energy Information Administration: Form EIA-851A, "Domestic Uranium Production Report" (2004-2011).

International studies indicate that the incidence of lung cancer in uranium mine workers

³ U.S. Energy Information Administration, <http://www.eia.gov/uranium/production/annual/>

is two to five times higher than in the general population.⁴ The pollution which causes this negative impact also affects those who live near uranium mining and milling operations; pollution is transported via air, soil and water and indirectly via the food chain. Contamination of water supplies near uranium mines and processing plants has been documented in Brazil, Colorado, Texas, Australia, Namibia and many other sites.⁵

The World Nuclear Association, a pro-nuclear group, details the risk to uranium mine workers:

Although uranium itself is barely radioactive, the ore which is mined must be regarded as potentially hazardous due to uranium's decay products, especially if it is high-grade ore. The gamma radiation comes principally from isotopes of bismuth and lead in the uranium decay series. The radiation hazards involved are similar to those in many mineral sands mining and treatment operations.

Radon gas emanates from the rock (or tailings) as radium decays. It then decays itself to (solid) radon daughters, which are energetic alpha-emitters. Radon occurs in most rocks and traces of it are in the air we all breathe. However, at high concentrations it is a health hazard since its short half-life means that disintegrations giving off alpha particles are occurring relatively frequently. Alpha particles discharged in the lung can later give rise to lung cancer.⁶

Presently, Canada is the world leader in uranium mining, with 75% coming from open pit operations and the balance from underground mines. In 2003 Canada had 213 million tonnes of uranium tailings at 24 sites requiring perpetual care. Exposed to the elements the wind carries from these sites radionuclides, radon gas, heavy metals and toxic dust. And this radon gas contamination can continue for 1,600 years. The milling operations themselves release large amounts of the pollutants common to fossil fuel power plants including nitrogen oxides, sulfur dioxide, volatile organic compounds, PM-10 and carbon dioxide. Water pollution includes contaminated leachate from the tailings. The mines and mills release uranium, heavy metals, and other industrial contaminants to ground and surface water. For example, arsenic in groundwater near a uranium mine was found to be 66 times above the background level. Nickel, cobalt and cadmium have been found at similar levels. In fact, the effluent from uranium mining and milling operations is considered a toxic substance under Canada's Environmental Protection Act.⁷

AREVA in Africa

The French nuclear industry giant, AREVA, operates around the world, including the

⁴ "Uranium Mining: Nuclear Power's Dirty Secret," Fact Sheet No. 2, May 2007, The Pembina Institute, www.pembina.org

⁵ "Extracting a Disaster," David Thorpe, *The Guardian*, December 5, 2008, <http://www.guardian.co.uk/commentisfree/2008/dec/05/nuclear-greenpolitics>

⁶ "Occupational Safety in Uranium Mining," World Nuclear Association, July 2012, <http://www.world-nuclear.org/info/inf24.html>

⁷ "Uranium Mining: Nuclear Power's Dirty Secret," Fact Sheet No. 2, May 2007, The Pembina Institute, www.pembina.org

United States.⁸ The company has an unenviable track record in the countries where it has operated, leaving a toll of illness, shortened lives and devastated communities. For example, its uranium mining operations in the west African nation of Niger have poisoned the people for decades.

Niger is one of the poorest countries in the World. COMINAK and SOMAÏR, two subsidiaries of AREVA, have extracted uranium in Niger since the beginning of the 1970's and already produced 100,000 tons of uranium. When residents of the desert town of Arlit, Niger's uranium mining settlement in the far north of the country, started getting increasingly sick, they questioned whether this had to do with their overexposure to radioactivity and called in French research institute CRIIRAD to investigate. The town of Arlit and nearby Akokan where the second mine is located, were constructed solely to accommodate mine workers. Even though most of their scientific equipment was confiscated by the authorities when landing at Niamey airport, the team made a preliminary study and demonstrated that the AREVA subsidiaries were not complying with international radioprotection standards nor properly protecting people's health and the environment.⁹

French investigators found radioactively contaminated metal scrap, water and waste in open areas exposed to desert winds and affecting the local people. Yet company officials deny the allegations. If the company which bills itself as "the world leader in nuclear power and the only company to cover all industrial activities in this field," with total assets of \$25.9 billion, flouts international standards, what confidence can we have that they will treat the residents of South Carolina, or Virginia if they are permitted, any better? And if the putative world leader can go that far wrong, how can we trust the other banking and mining industry giants to do better?

Financial Consequences of Uranium Mining

In 2008 the World Information Service on Energy commissioned a study of international financial institutions and the financing of uranium mining industry.¹⁰ WISE studied the world's largest uranium mining companies accounting for over 90% of world uranium production. They found that the financial institutions which seem to be most strongly involved in the uranium mining sector are Royal Bank of Canada and Citigroup, BMO Financial (Bank of Montreal), HSBC (Headquartered in London, HSBC also operates in Canada and the US), JPMorgan Chase, UBS (Switzerland) and AREVA (France).

⁸ AREVA is part of the consortium which is building a factory to manufacture plutonium fuel for commercial nuclear power plants at the US Department of Energy's Savannah River Site near Aiken, South Carolina.

⁹ *Mined U: Financing of New Uranium Mines*, by Nuclear Information and Resource Service/World Information Service on Energy, <http://www.nirs.org/mononline/minedureport.pdf> with Profundo Onderzoek & Advies economic research at www.profundo.nl, March 2008. Page 15

¹⁰ *Mined U: Financing of New Uranium Mines*, by Nuclear Information and Resource Service/World Information Service on Energy, <http://www.nirs.org/mononline/minedureport.pdf> with Profundo Onderzoek & Advies economic research at www.profundo.nl, March 2008.

New Mexico

In New Mexico financial analyses are required to determine the capacity of uranium mining companies to meet their financial obligations as required by state radiation protection standards; specifically, NMRPR Part 3-315 E.2 through 9. The purpose of the financial requirements is to ensure that uranium site maintenance and reclamation is carried out properly. This is done by requiring uranium companies to self-insure or provide a surety bond for site reclamation. New Mexico regularly evaluates financial compliance and specifies three tests which must be met by self-insuring companies. These involve the relationship of the dollar amount of the stabilization requirement to: 1) working capital, 2) cash flow and 3) stockholders' equity (net worth).¹¹

An economic study done for the New Mexico Environmental Law Center found:

Important environmental and social costs must be considered when evaluating the commercial economic benefits of renewed uranium mining. Uranium mining has most of the same near-permanent environmental costs that metal mining in general has and, because of its radioactive character, uranium poses some additional public health concerns. Substantial natural resources, such as groundwater, have been irreparably contaminated by uranium mining and therefore cannot be considered as a resource to support future economic growth in the area.¹²

Mine and mill waste are a major problem. "At 0.1% average ore grade, the industry will only extract 2 pounds of uranium for each ton of ore mined at conventional mines. At 2 pounds per ton, 157.35 million tons of tailings would be created in order to produce 315 million pounds of uranium. New Mexico already has about 100 million tons of waste at its existing sites."¹³ The Navajo Nation has banned uranium mining and milling.

The promise of jobs is a chimera. If one assumes that almost all of New Mexico's economically feasible uranium reserves will be extracted during the next 30 years (which is unlikely), approximately 1,575 uranium mining and processing jobs would be created. This would equal only 0.14% of New Mexico's total employment. "Since 2000 the New Mexico economy has created this number of jobs every 4 weeks."¹⁴ The job multiplier effect would be small and potential state tax revenues from uranium mining would be just six-tenths of one percent of the state general fund budget. The study concludes:

In sum, the economic impacts of a renewed uranium boom would be quite modest at best. At the state level the impact would be almost imperceptible. At

¹¹ "Financial Analysis of Selected Uranium Mining and Bonding Companies in New Mexico," submitted to New Mexico Environmental Improvement Division (FOIA/PA 2010-0247) <http://pbadupws.nrc.gov/docs/ML1022/ML102230503.pdf>

¹² *An Economic Evaluation of a Renewed Uranium Mining Boom in New Mexico*, A report prepared for the New Mexico Environmental Law Center by Thomas Michael Power, Research Professor and Professor Emeritus, Economics Department, The University of Montana, October 2008, www.nmenvironlaw.org, page 2.

¹³ *Id.*

¹⁴ *Id.* Page 3

the local level it would make a difference, boosting both county revenues and county costs to deal with the impacts of renewed mining, but would not in any sense transform the local economies. In both cases the impact would be temporary, until uranium mining retrenched or shut down again.¹⁵

During the last few decades, New Mexico—the Land of Enchantment—has moved away from resource extraction and mining and instead capitalized on its natural and cultural assets for expanding economic growth, resources not subject to the boom-and-bust cycles which left behind ghost towns and a hundred million tons of radioactive waste. The social costs of the uranium mining industry have left a significant negative aftereffect on public health and the environment.

Conclusion

Our overall recommendation to the Uranium Working Group and the Virginia General Assembly is that, based on these findings and previously submitted information, the Commonwealth of Virginia should keep the current uranium mining ban in place. The half-life of Uranium-235 is over 700 million years. The ban has not decayed appreciably in three decades and should be considered to have a similar expiration date.

Thank you for the opportunity to present these remarks

¹⁵ *Id.*, Page 4