

Report on the Health Impacts of Proposed Uranium Mining and Milling Operations at Coles Hill in Pittsylvania County, VA

I. OVERVIEW

With this report, the Southern Environmental Law Center (“SELC”) provides a brief assessment of the potential public health impacts of uranium mining and milling operations at Coles Hill in Pittsylvania County, Virginia.

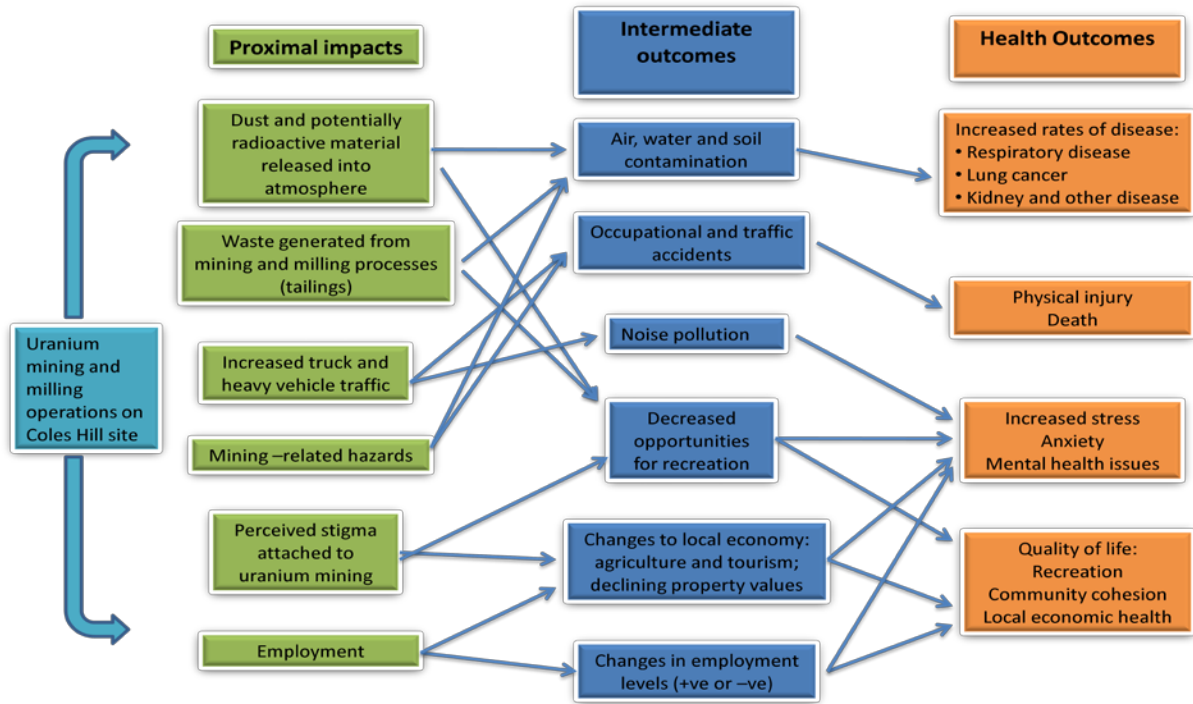
Development of uranium mining and milling operations in Pittsylvania County, and in Virginia more broadly, will have significant environmental, social, and economic consequences. They will also have significant impacts on the health of those in the surrounding communities. This report analyzes existing data from peer-reviewed epidemiological and public health literature, federal government and agency reports, and various stakeholders to assess the extent of these health impacts.

This report has been developed using a Health Impact Assessment (“HIA”) framework. HIA is a method for evaluating projects or policies in terms of their potential effects on the health of a population and the distribution of those effects within the population. HIA is based on a broad model of population health as determined by a range of economic, social, political, environmental, and psychological factors.

II. PRINCIPAL FINDING

The health of residents living proximal to the Coles Hill site may be impacted both *directly*, by increased environmental and occupational exposure to uranium and other toxic substances through the air, soil, or groundwater, and accidents resulting from mining operations, and *indirectly*, through stress and other health effects related to community changes, including potential loss of recreation sites, declining property values, changes to the local economy, and the perceived stigma of uranium mining.

Figure 1, below, shows the pathways through which mining operations can affect health outcomes:



III. LOCAL CONTEXT

Pittsylvania County, VA has a population of 63,506, with 1,338 people living in Chatham, VA, the town closest to the Coles Hill site. Data from the US Census Bureau indicates that Pittsylvania County is generally poorer and more sparsely populated than the state of Virginia on average. The economy of the county is driven by a strong agricultural/agribusiness sector, with agriculture being the county's primary revenue generator. The area has a relatively low cost of living. Although current unemployment is high at 8.2%, this is below the national rate of 9.1%. The local economy of Chatham is supported in part by the presence of two exclusive private schools, Chatham Hall and Hargrave Military Academy. In addition, the area's rivers, lakes and streams support hunting, fishing and watersports as both popular recreational activities and revenue generators from visitors to the area. The Roanoke River is particularly well known for its world-class striped bass fishery and as a resource for boaters and birdwatchers.

A uranium mining development could be expected to threaten these important elements of the local economy, with potential pollution affecting both agriculture and recreation, and the general stigma of uranium mining undermining the attractiveness of the area – e.g., for parents considering sending their children to local schools or consumers purchasing agricultural products.

IV. DIRECT HEALTH IMPACTS OF URANIUM MINING

1. *Greater Exposure.*

Peer-reviewed research and government reports confirm that populations living near uranium mines or mills may be exposed to higher levels of uranium in drinking water and locally grown foods due to contaminated soil, water and air:

- Mean airborne uranium concentrations of 200 times normal background concentrations have been detected at locations within 2km of a Canadian uranium refinery; in Australia, elevated levels of uranium and thorium were measured up to 8 miles from an active uranium mine.
- A study investigating cattle raised near uranium mining and milling plants in New Mexico found that the **uranium concentration in the vegetation was 75 times greater in the exposed area than in control sites**. Uranium concentrations in the exposed cattle were 4 times greater for the liver and kidney and 13 times greater for the femur.
- Daily intake of uranium in food and water varies from ~1 to ~5 µg U/d daily in uncontaminated areas. In uranium mining areas, however, intake varies from 13-18 µg U/d or more. The EPA has measured the highest concentrations of uranium in potatoes, onions, parsley and beef products; other measures show that milk products, cereals, fresh fruits and vegetables comprise the majority of daily uranium intake.

Animal studies show that uranium toxicity may affect bone growth and development and have negative reproductive and developmental effects. **Higher incidence rates of childhood leukemia, respiratory disease and kidney disease have also been recorded in areas proximal to uranium mine sites.**

Current evidence from animal studies suggests that the toxicity of uranium is mainly due to its chemical damage to kidney tubular cells. An extensive animal database for intermediate duration exposure via inhalation or ingestion suggests that renal toxicity is a concern for humans similarly exposed.

2. *Water-related Impacts.*

Communities that depend on waterways proximal to the Coles Hill site for their water supplies are vulnerable to exposure following either acute or chronic failures of waste (tailings) containment facilities. Uranium levels in drinking water have been associated with damage to kidney function that may increase the risk of kidney disease.

Water-related hazards from uranium mining, milling, and tailings management include leachate from tailings containments. Potential causes of containment failure—resulting in the release of hazardous or toxic contaminants— include earthquake-induced instability, erosion from heavy rain or adjacent waterways, and collapse caused by heavy overflow of slurry after a severe rainfall.

The Coles Hill site sits on the Banister River, which flows into the Dan and Roanoke Rivers, both of which feed reservoirs that provide drinking water for downstream communities, including the cities of Norfolk and Virginia Beach, which have a combined population of over half a million. Since Virginia has higher levels of rainfall than other areas in which open-pit or underground uranium mining has been conducted in the US (the more arid Western states), potential tailings failure is a significant concern.

Preliminary modeling of a catastrophic failure of a mill tailings containment cell at the proposed Coles Hill site suggests that the impact of such a failure would be significant for water supplies in the region. **Released or leaked tailings would move through the river system to the reservoirs downstream, potentially leading to radioactivity concentrations in the river/reservoir system 10-20 times greater than what is allowed by the Safe Water Drinking Act,** and could remain for an extended period of time.

3. *Air-related Impacts.*

The waste generated by uranium mining and milling contains many hazardous and toxic substances, including radon, selenium, molybdenum, uranium and thorium. Radon gas can be diffused from the tailings and inhaled, increasing the risk of developing lung cancer for those exposed. Increased exposure to these hazardous substances during the mining and milling process and from the storage of wastes can have a range of adverse health impacts:

- Radon released from mining and milling wastes and in the mines themselves poses a risk of lung cancer to both mine workers and surrounding communities.
- Uranium miners have higher mortality rates from non-malignant respiratory diseases, such as emphysema, due to high levels of mining dust, radon decay products, and diesel exhaust.
- Noise and air pollution associated with increased heavy vehicle use at mine sites can aggravate existing levels of respiratory disease and cause increased stress, high blood pressure, and sleep disruption in surrounding communities.

4. *Ongoing research.*

Research on the adverse human health effects of uranium exposure is ongoing. Studies being conducted by the Agency for Toxic Substances and Disease Registry (“ATSDR”) and in the Navajo Nation are particularly focused on kidney toxicity, reproductive health effects, and genotoxicity. This research agenda highlights the elevated levels of concern regarding the effects of uranium on human health.

V. INDIRECT HEALTH IMPACTS OF URANIUM MINING

Outdoor recreation is a central feature of life in Pittsylvania County, with fishing, hiking, hunting, and boating being popular and renowned activities. High levels of participation in these activities has a positive impact on both individual and community health.

Research has shown that contact with nature positively impacts blood pressure, cholesterol, outlook on life and stress-reduction, and increased physical activity can help to reduce poor health associated with overweight and obesity. Individuals and communities benefit from the strengthened social networks created by shared participation in these activities and from public investment in recreational areas.

Development of the uranium mining industry in Pittsylvania County threatens the health of the surrounding environment, particularly waterways. Local community members have expressed concern that uranium mining will have a negative impact on the way in which residents and visitors interact with the natural environment. Loss of recreational opportunities could lead to increased levels of stress, anxiety, and other mental health issues in the community, and decreased levels of physical activity, social interaction, and social support.

Degradation of environmental and ecological resources through non-sustainable development can have devastating consequences for quality of life, health and well-being within a community.

VI. COSTS AND BENEFITS

The uranium mining industry argues that mining developments will bring significant benefits to local communities. Any potential benefits, however, must be weighed against the many potential costs, including loss of other local industries, environmental damage, damage to public health, and the financial costs of cleanup following the suspension of mining activities.

But weighing costs and benefits is not simply an economic task; it is also an *ethical* one. In many cases of development, the people who benefit from the project are different from the people who bear the costs. From an ethical point of view, it is important not only whether the benefits outweigh the costs but how those benefits and costs are distributed throughout the population.

The history of uranium mining in the United States is not encouraging in this regard. Major mining operations conducted in the Colorado Plateau region imposed a significant health burden on a vulnerable population in Navajo territories, and the costs of cleanup have often been borne by local communities. The Navajo Nation alone has spent more than \$23 million on safety and reclamation at nearly 1000 abandoned uranium mines. This lopsided distribution of benefits and burdens is considered by many to be both unfair and unjust.

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