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An illustration of a uranium mine. *Artwork credit: Elise Auger*

STATE OF PLAY: The Legacy of Uranium Mining on U.S. Tribal Lands

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From 1950 to 1980, the U.S. was one of the largest producers of uranium globally, and the majority of that uranium was sourced in the western U.S, on or near tribal lands. According to studies conducted by the U.S. Department of Energy Office of Legacy Management, 96% of all U.S. defense-related uranium mines were located in the Navajo Nation. The remainder of U.S. defense-related uranium mines were located on lands of the Pueblo of Laguna, the Pueblo of Zuni, the Hualapai Tribe, the Tohono O'odham Nation, the Spokane Tribe of Indians, and the Ute Indian Tribe. Uranium was also mined from deposits in a few eastern states.

Seeking to reduce dependence on foreign uranium, from World War II to the 1970s, the U.S. government served as a guaranteed buyer for domestic uranium, which it valued for national security and weapons production. Despite evidence in Europe, from as early as 1932, that uranium mining posed occupational risks, health and safety protections for U.S. uranium miners were minimal until 1962, after U.S. Public Health Service studies concluded a correlation between radon levels in uranium mines and rates of cancer. Before federal radon limits were established in 1967 by the Department of Labor, state regulators and private industry set their own safety standards, which left uranium mine workers exposed to radon levels well above modern-day federal safety limits.

When the uranium market price plummeted after the Chernobyl accident in 1986, U.S. uranium mining corporations stopped operations and frequently abandoned their former claims. From 1944 to 1986, mining companies extracted 30 million tons of uranium ore from the Navajo Nation to produce nuclear weapons and fuel nuclear reactors. Today, there are at least 523 abandoned uranium mines and four abandoned uranium mills on or near the Navajo Nation. The Havasupai Tribe lives near one of the few active uranium mines left in the Southwestern region, the Pinyon Plain Mine (formerly known as the Canyon Mine) located on the Grand Canyon's South Rim. The mine is located near the Havasupai's traditional spiritual site, Red Butte, and uses aquifers that flow into the tribe's sole water source in Havasu Canyon. The Lakota tribal territory hosts over 3,200 uranium mines, many of which await cleanup. Many of the mines in Lakota territory are located in the Black Hills, an area considered sacred to the Lakota, Cheyenne, Kiowa, and Arapaho tribes. The Lakota tribal nations have been fighting against mining in the Black Hills since gold was discovered there in the 1870s.

Community contamination from legacy uranium mines exacerbates existing inequities in under-resourced communities that lack access to reliable income, food, and medical care. Studies have shown that historically uranium miners suffered from asthma, lung cancer, and kidney damage. The Navajo Nation continues to suffer from the impacts of legacy uranium mining. Approximately 30% of Navajo households do not have piped water in their homes, leading to the use of water from unregulated wells, which can be contaminated with uranium. Some

Navajo people built their homes with uranium mine waste that emits radon gas. Livestock can ingest uranium-contaminated water and vegetation, continuing the cycle of radiation exposure when consumed. Cancer rates in the Navajo Nation doubled from the 1970s to the 1990s, coinciding with the uranium boom.

Across tribal lands, contamination from historic uranium mining continues to exacerbate inequities and pollute natural resources. For example, on the Pine Ridge Lakota reservation in South Dakota, studies revealed that abandoned uranium mine runoff caused elevated levels of uranium in local water reservoirs and the Cheyenne River, which crosses through two nearby Lakota reservations. Residents on the Pine Ridge Reservation depend on these bodies of water, as a third of homes lack access to piped water or sewer systems. This lack of infrastructure, coupled with a lack of access to grocery stores with bottled water, leads to widespread community use of uranium-contaminated water from local waterways. Lack of access to healthcare compounds the issues of uranium contamination and infrastructure inequity. Due to these compounding factors, the Pine Ridge Reservation currently has the lowest life expectancy in the U.S. While modern uranium mining can be performed safely and sustainably, communities across the U.S. share the long-lasting harmful effects of historic uranium mining conducted with few environmental safeguards.

Many uranium miners and their families have felt the impacts of radioactive contamination from abandoned uranium mines and mills in their communities for decades. As uranium miners were getting sick from long-term radon inhalation in the early 1980s, miners filed state workers' compensation claims but were largely unsuccessful because many states did not recognize radon illness as a qualifying condition. The lasting health impacts from U.S. uranium mining and the lack of state-level compensation led Congress to pass the Radiation Exposure Compensation Act (RECA) in 1990 to help uranium miners suffering from work-related illnesses. RECA compensates miners for qualifying illnesses and diseases related to radiation exposure from atomic weapons testing and uranium mining that occurred from 1941 to 1971 when the government was the sole buyer of U.S. uranium. But the law does not compensate other people living near abandoned uranium mines and mills who have developed radiation exposure-related illnesses. In 2021, a bipartisan group of lawmakers introduced legislation that would expand benefits eligibility to those individuals and extend the exposure deadlines past 1971, but the legislation has not moved forward.

The U.S. uranium industry has declined significantly since the late 1980s due to a global uranium price drop. A few uranium mines currently operate in Wyoming, Utah, New Mexico, Arizona, Nebraska, and Texas. As a result of the Russian invasion of Ukraine in February 2022 and potential sanctions on Russian uranium, commodities traders expect the global price of uranium will continue to rise over the next several years. U.S. policymakers have considered several bills to incent new uranium mining to help close the market gap. Tribal leadership is concerned that new U.S. uranium mines could further impact community health, natural resources, and spiritual sites. There is also concern among tribal leadership that new uranium mines could scatter government focus on remedying legacy uranium mine pollution, which has been impacting some communities for almost 80 years. On the other hand, some communities are enthused about the prospect of new jobs that uranium mine cleanup projects could spur.

As many tribes continue to suffer from radioactive contamination with a slow government response and lack of funding, many communities are focused on building infrastructure to mitigate harm. Some tribes have been working with nonprofits to help deliver clean drinking water to households, including the DigDeep Navajo Water Project and the Running Strong Project on the Pine Ridge Lakota Reservation. However, Congress and the federal government should take additional steps to address historic uranium mine contamination on tribal lands and ensure future mining operations do not leave behind a harmful legacy.

Recommendations for a more just future for tribal mining communities:

- Federal agencies should prioritize the cleanup of thousands of abandoned uranium mines, mills, and contaminated waterways — on tribal lands and elsewhere.
- The Radiation Exposure Compensation Act should be expanded to remedy the harm suffered by Indigenous uranium mining and milling communities dealing with legacy pollution.
- Future uranium mining or milling operations should be conducted with Indigenous communities' free, prior, and informed consent and provide adequate compensation.
- Future uranium mine operators should monitor and safeguard water quality and the surrounding environment to prevent contamination. ◆