

Uranium renaissance will be different for miners

The drive for clean energy is driving uranium prices back up and leading mines to reopen — with new safety practices. Opponents remain skeptical.

Story by ANASTASIA HUFHAM, photos by TRENT NELSON

In southwestern Colorado, 85-year-old Jim Fisher copes with the lung illness that's a legacy of his years underground, mining uranium in Utah.

He's a member of the generation of workers who mined, milled or transported the radioactive rock during the Cold War to meet demand from a U.S. government intent on developing nuclear weapons to keep up with Russia. Along with an apology for the cancers and lung diseases they later developed, the U.S. has paid more than \$2.6 billion in compensation to them and others exposed to radiation from nuclear weapons testing.

Today, uranium mining is undergoing a renaissance on the Colorado Plateau. And Fisher's son, Race, descends hundreds of feet beneath the La Sal Mountains to work in the same mine his father managed in the 1960s.

This time, the industry promises and the Fishers believe, it will be different.

The Biden administration set a goal to have the country's electricity fully provided by clean power by 2035. Targets like this one are driving a renewed focus on developing nuclear energy domestically, and are driving higher prices for uranium, the metal most widely used as fuel for nuclear fission.

Since the mines now reopening in Utah and across the Southwest shuttered, researchers, politicians, local communities and environmentalists have come to more deeply understand the impacts of burning fossil fuels. Combusting oil, coal and gas traps heat in the atmosphere, warming the earth, causing stronger storms, longer droughts and sea level rise.

Advocates of nuclear power see it as a vital alternative. And scientists, the industry and regulators say that they now know how to mine uranium with far less harm to people and the environment.

Mines monitor groundwater for radiation. Regulators require extensive ventilation systems that push clean air into mines and pull hazardous gases out. In higher-grade uranium mines, workers routinely wear personal dosimeters that measure their exposure to radiation.

"From when my dad started mining until now," Race Fisher said, "it's a night-and-day difference."

The industry can be pressed to continue to improve safety and reduce its impacts, but rejecting domestic uranium mining or nuclear energy altogether isn't smart, said Isabel Barton, associate professor at the University of Arizona Department of Mining and Geological Engineering.

"If we shut down our mines here because of understandable concerns about the legacy from the last time around," Barton said, "that demand [for energy] isn't going to go away."

"People aren't going to say, 'All right, in order to minimize the demand for this type of energy that I oppose, I'm going to shut off the electricity to my house for one month a year,'" she said. "We're going to keep wanting the electricity."

Still, many environmentalists say that it's unnecessary to mine uranium on the Colorado Plateau, one of the world's most sensitive, and landscapes, when the U.S. can continue to import higher-grade uranium from allies like Australia and Canada.

And the region's tribes largely oppose uranium development — not convinced that these changes should ally their fears that history is repeating itself.

WHAT'S CHANGED FOR MINERS?

Beneath the La Sal Mountains and a sagebrush plain, the uranium mine where Race Fisher works unfurls underground like an art form. The extraction here is called "gopher hole" mining — the basics of which haven't changed much since his father's time.

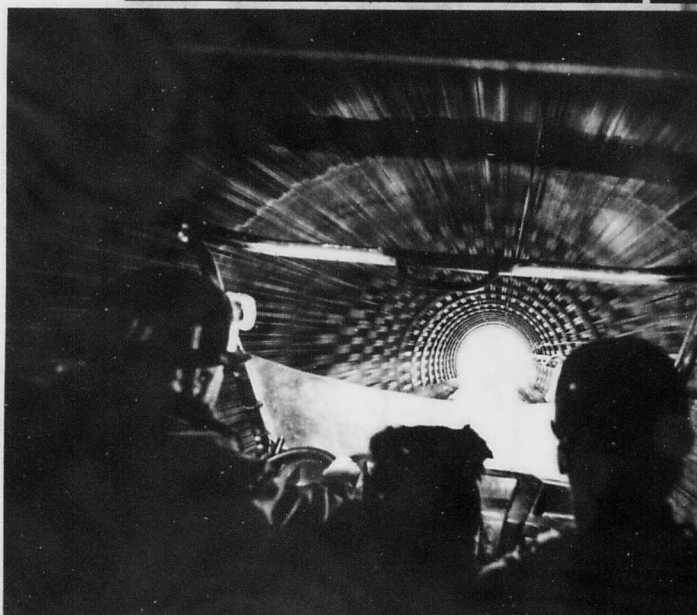
Miners still go deep underground, using drills and Geiger counters to identify pockets of uranium ore. They then detonate explosives to break up the rock and trucks haul ore up to the surface.

The mines in La Sal — owned by Energy Fuels Resources Inc., headquartered in Denver — follow uranium deposits along ancient riverbeds, which run like ribbons under the ground.

Hunting them down, Race Fisher said, "is real thrilling. We're chasing the leads and the colors ... [the ore] will pinch down pretty thin and then it will balloon back up, pinch down, balloon up. You just got to follow it."

Miners' headlamps illuminate those colors

Right » La Sal miner Race Fisher points out increased protections put in place since his father — now coping with lung illness — worked in the same mine.
Far right » A vein of ore is exposed inside the La Sal uranium mine.



Above » This timed exposure appears to put miners in hyperdrive as they drive inside the tunnel to the surface of the La Sal mine. **Above right** » Mined ore. Miners harvest ore the same way they did decades ago, using drills and Geiger counters to find

underground. Suspended yellow tubes snake across the rock overhead, delivering clean air from the world above and sucking out stale air. Miners wear hearing protection to muffle the deafening drone of that ventilation, which wasn't required or as sophisticated decades ago.

Uranium miners risk breathing in radioactive gases, like radon, which naturally forms as uranium breaks down, as well as dust and diesel exhaust — all known to cause cancer. In past decades, drilled holes would allow oxygen into the mines, but there was no system to pull dangerous gases out.

"This is something that was only partly understood in the mid-20th century," Barton said. Effective ventilation neutralizes the main hazards to Colorado Plateau miners, she said, who are extracting lower-grade and less radioactive uranium.

As for the region's uranium ore itself, Barton said, "a bunch of my uranium samples are sitting right over there in my office and have been for a couple of years now. It really is mostly just a rock."

Moore said that all of Energy Fuels' employees who work closely with uranium wear dosimeters. Due to the less radioactive ore in the La Sal mine, Race Fisher and his coworkers weren't wearing them on a recent workday, and he said they generally don't. "Concentrations in the mine are so low that they wouldn't be picking up on that," he said.

Uranium miners in Jim Fisher's time often smoked cigarettes at work, exacerbating their risk of lung cancer when they inhaled radon and uranium dust. Today, Energy Fuels does not permit miners to smoke in their mines.

"Most of our workers receive radiation doses that are actually 75% below occupational limits, and far below any levels where adverse health impacts could be observed by scientists," said Curtis Moore, the company's senior vice president of marketing and corporate development.

"While radon gas poses a concern no matter where it's found, we actively monitor and mitigate exposure," Moore said, "making our mine sites safer than some rooms in many Utahns' homes."

Radon densities are typically measured in becquerels per cubic meter — which counts how many radon particles decay per second. The median home in Utah has a concentration of 100 becquerels per cubic meter — double the national average — based on tests tracked by the Utah Department of Health. The World Health Organization recommends reducing radon in a home over the 100 becquerel mark, while the U.S. Environmental Protection Agency recommends taking action at 148.

Underground mines are required to develop ventilation plans that are evaluated on an annual basis by the Mine Safety and Health Administration, under the U.S. Department of Labor.

Uranium mining still carries a risk, as miners are still exposed to radioactive gases and carcinogens.

"Regulations are not perfect at preventing potential harm," said Amber Reimondo, energy director for the environmental nonprofit Grand Canyon Trust. "We have to be careful about assuming that because a regulation is there or that it exists that there's nothing to worry about."

Congress has been divided over whether to continue to pay for the poor health of past uranium workers. The Radiation Exposure Compensation Act, passed in 1990 and expanded in 2000, offers miners and others in the industry between 1942 and 1971 a one-time payment of \$100,000 if they have a qualifying illness. But that law was set to expire Friday.

WHAT'S CHANGED FOR THE ENVIRONMENT?

As former miners continue to face cancers and other illnesses, there also are lingering environmental impacts from uranium mining, such as groundwater contamination and depletion on the parched Colorado Plateau. Uranium decays into radium, a radioactive chloride that cannot be destroyed or degraded. Removing radionuclides from groundwater is costly and difficult.

The Environmental Protection Agency reports that over 500 abandoned uranium mine claims from the 1940s to 1980s remain on the Navajo Nation today. Federal and tribal agencies in 2008 found 29 unregulated water sources on the Navajo Nation that exceeded the EPA's drinking water standards for uranium and other radionuclides, a result of past uranium activity.

The industry asserts that this is another past hazard that can be mitigated with new protections.

Today, mining companies are required to test groundwater for contamination using monitoring wells. The EPA and the U.S. Nuclear Regulatory Commission set and enforce water protection standards for uranium

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