Environmental Degradation

Nuclear energy mines uranium in order to function

EPA 25, March 5, 2025 - “Nuclear Power Plants” [Nuclear Power Plants | US EPA] Accessed 3/31/25 SAK

Nuclear reactors generate about 20% of all of the electricity used in the United States. Uranium is the fuel most widely used in nuclear reactors at power plants. Nuclear energy is created when uranium atoms are split in a process called fission. Fission releases a tremendous amount of energy in the form of heat. This heat creates steam that is used to turn a steam turbine. The turbine is connected to an electric generator, which generates electricity. Radioactive materials found at nuclear power plants include enriched uranium fuel, low-level waste, and spent nuclear fuel. Enriched uranium is the fuel for nuclear power plants. One pellet of enriched uranium is approximately 1-inch long and can generate about the same amount of electricity as one ton of coal. Low-level radioactive waste includes items used at the power plant that become contaminated with radioactive material during energy production. This may include items such as shoe covers and clothing, wiping rags, mops, filters, reactor water, and tools. Low-level waste is stored at the nuclear power plant temporarily. After some time, wastes may be sent to a low-level waste disposal site. Or, when items are no longer radioactive they may be disposed of as ordinary trash. High-level radioactive waste includes spent (used) reactor fuel and wastes remaining after the spent fuel is reprocessed. Spent nuclear fuel is highly radioactive and stored in specially designed pools or containers. There are no high-level waste sites designed for permanent, long-term storage in the United States. High-level radioactive waste must be stored on-site at each individual nuclear power plant, currently in units called dry cask storage units.

Affirming means more uranium is mined, which means more radioactive waste.

EPA 25., United States Government Agency (2025, Jan., 29). “Radioactive Waste from Uranium Mining and Milling” Accessed March 16, 2025 from [https://world-nuclear.org/nuclear-essentials/how-is-uranium-made-into-nuclear-fuel#:~:text=Uranium%20is%20the%20main%20fuel,loaded%20into%20a%20nuclear%20 reactory.] // Shyam

Uranium is a naturally-occurring radioactive element that has been mined and used for its chemical properties for more than a thousand years. It is now primarily used as fuel for nuclear reactors that make electricity. Uranium can be recovered in two ways: by conventional mining of the rock (ore), or by using strong chemicals to dissolve uranium from the rock that is still in the ground and pumping it to the surface. **Industries in the United States recover uranium from the Earth through mining** or chemical extraction. Mining: When uranium is near the surface, miners dig the rock out of open pits. Open pit mining strips away the topsoil and rock that lie above the uranium ore. When uranium is found deep underground, miners must dig underground mines to reach it. The rock is then removed through underground tunnels. In situ leaching: “In situ” is Latin for “in place.” In situ leaching ISL), or in situ recovery (ISR), is the process of pumping chemicals into groundwater to dissolve uranium in porous rocks (typically sandstones. When uranium is located in an area saturated by groundwater, at relatively greater depths and generally lower concentrations than for conventional mines, in situ leaching may be used. After the chemicals are put into the ground, the liquid containing uranium is pumped to the surface through a network of wells and then processed to recover the uranium. This has become the most commonly used uranium extraction method in the United States in recent decades, especially in Texas and Wyoming. Once the uranium ore is extracted from the Earth, it must be processed to get the uranium from the ore. There are a few processes that can be used to recover uranium: Uranium Ore (Carnotite). Milling: This process takes place at a mill after the ore containing uranium is removed from the Earth through open pit or underground mining. The ore is brought to a mill, crushed, and ground up before chemicals are added to dissolve the uranium. The uranium is then separated from the chemical solution, solidified, dried and packaged. Heap leaching: This process uses a liquid to dissolve metals found in rocks (ores). Similar to the way pouring hot water over crushed coffee beans leaves coffee grounds (waste) and liquid coffee, spraying chemicals over piles of uranium-containing crushed rock leaves the leftover rock and a liquid containing uranium. The liquid then needs further processing to recover the uranium. This processing method is not currently used in the United States for uranium, but it is used for gold. **Regardless of how uranium is extracted** from rock, **the**

processes leave behind radioactive waste. These processes separate uranium from its decay products which are also radioactive and actually contain most (80-90%) of the radioactivity in the rock (ore). The solid radioactive wastes that are left over from the milling processes are called tailings and the liquid wastes are called raffinates. Mill tailings and raffinates are stored in specially designed ponds called impoundments. The tailings remain radioactive and contain hazardous chemicals from the recovery process. Image of a warning sign on forest access road near a uranium mining area in Mesa County, Colorado. **Uranium eventually decays to radium. Radium decays to release a radioactive gas called radon**. Open pit uranium milling and in situ mining sites do not pose a significant radon risk to the public or to miners; the radon disperses into the atmosphere. In the past, the waste rock produced by underground and open pit mining was piled up outside the mine. This practice has caused problems, including on Navajo lands where more than half of the small, abandoned uranium mines from the middle of the 20th century and their wastes remain. **Wind can blow radioactive dust from the wastes into populated areas and the wastes can contaminate surface water used for drinking. Some sites also have considerable groundwater contamination. Underground mines can present a radiation hazard to miners. Without proper air ventilation, radon can collect in the mineshafts, where it is inhaled by miners.** The operators of uranium mines must take special precautions to protect miners, such as pumping radon gas out of the mine and replacing it with fresh air. To protect the public near uranium mines, vented radon gas must not exceed certain limits. Sometimes miners are required to wear respirators that protect their lungs from radon gas. Learn more about the health effects of radon at Radon in Homes, Schools and Buildings. Previously, waste rock and mill tailings were used in some Western mining areas as building materials for homes, schools, roads and other construction. Structures built with waste rock and mill tailings were radon and radiation hazards to anyone spending time in them. People traveling on roads made with waste rock were in danger of breathing radioactive dust. In response to these issues, the 1978 Uranium Mill Tailings Radiation Control Act (UMTRCA) stopped the use of mill tailings in building and construction projects.

Uranium poses numerous environmental and health hazards.

Radzyminski 21, Rochelle Radzyminski, March 27, 2021, “Environmental and Health Consequences of Uranium Mining” [Environmental and Health Consequences of Uranium Mining] Accessed 4/1/25 SAK

With the continued threat of climate change and its irreversible consequences imminent, clean and sustainable energy is a goal shared by much of the world. While nuclear energy remains a polarizing topic, it is appealing due to its high energy density. U-235 has an energy density of 2.36×10^4 MWh/kg which is equivalent to 8.48×10^7 MJ/kg. [1] A kilogram of uranium metal from the ground, which is .72% fissile U-235, therefore has energy content of 6.11×10^5 MJ. In comparison, bituminous coal has an energy density of 26.9 MJ/kg. [2] Dividing the two numbers, one finds that 22,700 kg - or 22.7 tons - of coal are required to produce the same energy as 1 kg of uranium metal out of the ground. As a result of this high energy content, most modern countries, including the U.S. and France, rely on nuclear energy to fulfill military and civil demands. [3] The widespread use of nuclear energy can be seen in Table 1, which shows its share of electricity production in various countries. The usage and demand for nuclear energy necessitates large-scale uranium production via uranium mining, a process that poses significant environmental, social, and health hazards. Whether the benefits of nuclear energy offset these consequences needs to be carefully examined when assessing the future of nuclear energy.
The impact is two-fold:

The impacts cannot be ignored

Russel 23, Steve Russell - November 28, 2023, “Unearthing the Environmental Consequences of Uranium Mining” [Unearthing the Environmental Consequences of Uranium Mining - Environment Co] Accessed 4/1/25 SAK

Open-pit mining can result in massive land disturbances, including removing topsoil and vegetation, which disrupt local ecosystems. Underground mining, while less visibly destructive on the surface, can still lead to habitat disruption and groundwater contamination. Water Contamination Uranium mining can contaminate surface and groundwater with heavy metals, radioactive materials and toxic chemicals used in the extraction process. These pollutants threaten aquatic ecosystems and can migrate beyond the mining site, affecting nearby communities. Air Pollution Dust and radon gas emissions are common byproducts of uranium mining, posing health risks to workers and nearby residents. Radon is a radioactive gas that can accumulate in poorly ventilated spaces, increasing the risk of lung cancer. Tailings Management Tailings are the waste materials left behind after extracting uranium from ore. Managing these tailings poses a significant environmental challenge. If not properly contained and treated, radioactive tailings can leach into the surrounding environment, contaminating soil and water. Radioactive Waste. The entire uranium mining process generates radioactive waste, from mining residues to contaminated equipment and infrastructure. This waste disposal and long-term management require stringent controls to prevent environmental contamination.

The numbers speak for themselves.

Keyanna, Teracita Keyanna, Rebecca Neal, Carmela Roybal, Ph.D - ND, "The Health Impacts of Uranium Mining in Native American Communities" [The Health Impacts of Uranium Mining in Native American Communities] Accessed 4/6/25 CP

Since 1879, uranium mining has been linked to workers' lung disease and lung cancer, with early studies showing that up to 75% of deaths in uranium miners were caused by these respiratory illnesses. By 1932, Germany and Czechoslovakia had designated lung cancer as a "compensable" disease for uranium miners—a simple tertiary measure the United States did not enact until almost 60 years later with RECA in 1990. In the interim, the U.S. Public Health Service (USPHS) conducted a study of health risks to uranium miners but excluded Native Americans from the study.2 Moreover, when USPHS research unequivocally established associations between a number of illnesses and uranium mining, Native American miners were not informed of the findings, and many times researchers were banned from disclosing health risks to impacted communities by federal officials, who participated in an expensive campaign of misinformation and deception in the name of "national security."14, 8 Because some of the richest uranium deposits in the world are located on the Colorado Plateau within the Four Corners Region of the United States, the Navajo, Hopi, Ute, Pueblos, and other tribes that call this area home have been particularly impacted by the uranium industry. During the peak years of Colorado Plateau uranium mining until 1969, there were no established or enforced standards in the United States to protect miners from radiation.15 As the uranium demand declined with the end of the Cold War, mine companies closed, sold, went out of business, and abandoned more than 4,000 mines. Some 520 of those abandoned uranium mines are on the Navajo Nation, accounting for nearly 12% of the abandoned uranium mines in the United States. With the inclusion of uranium mills and waste sites as well, well over 1,600 former uranium mining-related sites remain abandoned on the Navajo Nation, contaminating land, water, and communities.16, 10

Ancestral Grounds

The US structurally set up Nuclear Waste to be on Native Land

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This is especially important when it comes to the nuclear industry. Years of nuclear testing and development on tribal land (as well as several resulting accidents) have led to major radioactive exposure and few consequences for its perpetrators. Becoming Sites for Nuclear Waste Disposal The federal government has intentionally singled out and targeted Native American reservations as potential repositories for high-level nuclear waste. After years of struggling to dispose of the United States' rapidly-accumulating radioactive waste, Congress passed the Nuclear Waste Policy Act in 1982. This law authorized the creation of Monitored Retrievable Storage (MRS) facilities to store the nation's nuclear waste – and Native American reservations were targeted as ideal sites for MRS facilities. A 1991 Public Citizen and the Nuclear Information & Resource Service report explains that Native land was targeted partly because the nuclear industry could "hide from environmental regulation and widespread public opposition behind the shield of tribal sovereignty." Several Native American tribes have sought to store nuclear waste on their land, pointing to the economic benefits of MRS facilities. The Office of the Nuclear Waste Negotiator, a short-lived federal agency tasked with finding communities willing to host MRS facilities, offered tribes thousands of dollars in grants just to consider the idea and promised million-dollar payments if tribes would go through with it. Many tribes, including the Mescalero Apache and Skull Valley Goshute, applied to the program, focusing on the financial advantages instead of the environmental risks caused by radioactive waste. Some government officials claimed it would be preferable for Native American tribes, and not other communities, to store the nation's nuclear waste. For example, David Leroy, the Nuclear Waste Negotiator from 1990–1993, argued (to much backlash), "Because of the Indians' great care and regard for Nature's resources, Indians are the logical people to care for the nuclear waste." Others claimed that allowing tribes to choose to apply to nuclear waste storage programs demonstrated respect for and deference to tribal sovereignty. But anti-nuclear advocates characterized this view as ignorant of the coercive history and inherent power disparities between tribes and the federal government. Nuclear dumping on Native land can be seen as a continuation of the United States' long history of exploiting and dispossessing Native people. The government's strategy (later adopted by private corporations) was widely criticized for capitalizing on and exploiting economically disadvantaged Native American communities, with the highest poverty rate out of all racial and ethnic groups in the United States. Financial incentives for nuclear waste storage on Native land have been described as "a form of economic racism akin to bribery." In addition, establishing temporary or permanent nuclear waste repositories on Native land could make it more difficult to sue nuclear waste manufacturers for damage caused by these facilities because of the regulatory conflicts mentioned above. Perhaps the best-known example of nuclear encroachment on Native land in recent decades is the Yucca Mountain Nuclear Waste Repository, a proposed permanent storage facility on Western Shoshone land in Nevada. The Western Shoshone people have a long history of exposure to radioactive material. For years, the US government conducted nuclear tests at the Nevada Test Site, releasing hundreds of tons of radioactive fallout onto Native land. When Yucca Mountain was chosen as a site for the nation's principal repository of nuclear waste, the Western Shoshone were never consulted, asked for consent, or acknowledged as the original owners of the land. Since then, the project has progressed considerably but faced numerous roadblocks, including litigation, resistance from Native activists, and opposition from the state of Nevada. Opposition to the repository has been driven by concerns about the potential health and ecological impacts — including groundwater pollution, radiation exposure caused by possible earthquakes, and severe health risks such as cancer and respiratory illness. Resisting Nuclear Dumping on Native Land As of 2022, the Biden administration is opposed to continuing development on Yucca Mountain, but until Congress amends the Nuclear Waste Policy Act, Yucca Mountain will continue to be the proposed site for the nation's primary nuclear waste storage facility. Although the Yucca Mountain project has not yet come to fruition, many examples of environmental contamination caused by nuclear waste on Native land exist. Radioactive material and other hazardous chemicals were dumped into Washington's Columbia River for decades, contaminating the Chinook salmon, which the Yakama Nation tribe has historically relied on as a primary food source. In the Navajo Nation, radioactive material was used to build homes and schools. The land of the Ute Mountain Ute tribe, next to the only functioning uranium mill in the United States, has been found to have groundwater contaminated with high acidity levels and dangerous chemicals such as chloroform. Nuclear dumping on Native land has been met with intense resistance for as long as it has been occurring. There are several ways in which Native leaders have attempted to fight back and achieve justice. For example, they have advocated for expanding and renewing the Radiation Exposure Compensation Act, a federal law providing compensation to workers harmed by nuclear exposure. Tribes, sometimes supported by states, have also pursued litigation against government and private companies for the environmental and health risks caused by nuclear waste. These lawsuits have faced many procedural barriers and some have been dismissed. In contrast, others have resulted in favorable settlements, although no amount of money can thoroughly remedy the harm inflicted by nuclear waste. Other advocacy efforts include pressuring the government to clean up nuclear waste sites and urging more research on the health impacts of nuclear waste. Advocates have described nuclear waste on Native American reservations as a textbook example of environmental injustice: the disproportionate exposure of marginalized communities to environmental harm. Nuclear dumping on Native land can be seen as a continuation of the United States' long history of exploiting and dispossessing Native people. Addressing it will require a comprehensive approach that centers the voices and experiences of Native communities.

And, investment means more building reactors near low income people

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For nuclear power to make a positive difference in the world, we will need to address the challenges of handling waste and securing systems to protect everyone — not just the rich and powerful. This begins with understanding how nuclear waste has harmed marginalized communities in the past. From the devastation wrought by nuclear bombs to the accidents that have driven marginalized people from their homes, the impact of nuclear waste cannot be ignored. But first, it's important to understand why this power source has been sought out by governments and corporations across the world. The Power of Nuclear Nuclear power has incredible potential. With zero-carbon methods of producing electricity for massive populations, exploring this energy alternative can offer clean and reliable solutions. Since one of the biggest drawbacks of other renewables is their questionable reliability, nuclear makes sense. Already, this carbon-free source of energy powers homes and businesses. In 2020 alone, 790 billion kilowatt-hours of electricity were produced in the US, providing around 20% of the nation's electricity all without any impact on carbon emissions. These nuclear plants operated at full capacity 92% of the time, which makes them at least 1.5 times more reliable than natural gas and up to 3.5 times more reliable than wind and solar plants. It goes without saying that with such benefits come financial interests. The nuclear industry in the US contributes an estimated $60 billion to gross domestic product and, in turn, creates around 700 jobs per power plant. Additionally, capital costs for building nuclear power plants tend to be lower than wind and solar plants.That said, the poverty cycles that lead to rich people getting richer while the poor stay poor are inherent in striving for nuclear power. With wealthy **investors pouring money into** these power plants to harvest financial gain, safety is at risk of being forgotten over a bottom line. Without proper safeguards and considerations, nuclear power has proven unsafe for marginalized communities. The Unfortunate Consequences for Marginalized Communities **Nuclear power** can be immensely beneficial. At the same time—if improperly handled—nuclear energy and the waste it creates can be a ticking time bomb for disaster. And like we saw with the COVID-19 pandemic, poor management will mean that marginalized communities face the worst of the effects. Three unfortunate circumstances faced by societies all over the world **make** this so. These are: the lack of power marginalized communities have in making their voices heard, the tendency of **nuclear power plants to be built in low-income areas,** and existing protections designed around an adult white male base. Here's how these factors play out to the detriment of marginalized communities: Marginalized Voices are Ignored in Favor of Nuclear Development All over the world, nuclear power plants are planned and developed within communities that do not want them and question their safety. Yet, corporations press on with their plans. One prominent example occurred in the aftermath of the Fukushima nuclear disaster, in which an estimated 32 million people were affected. Then, plans in South Africa to develop a nuclear reactor set off political activism in the nation. Social equality groups pressed for reconsideration, stating that any fallout would only further widen the gaps generated by apartheid. But were they listened to? South Africa has moved ahead time and time again with plans to develop more nuclear reactors. Nuclear Power is Built in Low-Income Communities As a direct consequence of their being ignored, marginalized communities like those below the poverty level or with higher populations of minority groups tend to live closer to nuclear power plants. According to Stanford University research, a larger percentage of African Americans lived within 50 miles of nuclear power plants than their white peers. Infamously, Chernobyl represents exactly what happens to marginalized communities when a nuclear disaster occurs. The city's many subsistence farmers found themselves suddenly without the means to make a living when the disaster occurred. As a result, they were forced to rely on government subsistence to make ends meet, and many have either returned or stayed in the region where housing is cheaper. Because the risks associated with nuclear power lower property values, **lower-income families** both already **live in planned sites** for nuclear development **or come to live there after they're built.** This means when a disaster occurs, it is the poor who face more of the devastation. Protections Aren't for Everyone The leaks at the Savannah River nuclear site in the American South showcased just how racially and financially disparate the effects tend to be when dealing with dangerous nuclear waste. From the evidence that emerged that black workers were frequently sent into high-radiation areas without the proper protection to the lack of job mobility experienced by the same, historically marginalized workers and the larger black community in Savannah River took a disproportionate amount of the fallout. There were at least 30 cases of cancer and ailments associated with the Savannah River site in its earlier days, but the leaks of nuclear containments continue to give the community health concerns, especially when it comes to the availability of safe drinking water. Poor water quality can lead to illness and even death. When polluted with radiation, the effects of contaminated drinking water can be even worse. But Stanford research shows that ionizing **radiation** standards are designed more to protect adult males. For nuclear facility workers, even these **standards can be waived, allowing facility owners to expose workers to as much as 50 times more radiation** than is allowed for the common citizen. Often, these workers don't even receive hazard pay. Minority and low-income communities are at higher risk of the radiation pumped via nuclear waste into their communities because of their proximity. At the same, these communities have statistically higher levels of women and children. These risk factors, much like the reasons nuclear power plants are built in these areas in the first place, perpetuate racist and classist outcomes.

And, investment does not make reactors safer

Jack **Spencer**, Jack Spencer is a Senior Research Fellow for Energy and Environmental Policy at The Heritage Foundation."Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes", The Heritage Foundation, November 15th, **2007**, Accessed March

31 2025 [https://www.heritage.org/environment/report/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes?] RaChEl

However, establishing economically viable commercial recycling in the U.S. will not be easy. Carter's unilateral ban had a chilling effect on the domestic nuclear industry, forcing domestic nuclear suppliers to discontinue their activities at the cost of hundreds of millions of dollars. One industry group invested approximately $500 million in a project that never became operational.[22] Another major company spent $64 million on a facility that never opened.[23] This technology has since been transferred overseas and is being used safely by other countries, such as France and Japan. With over regulation driving up the cost of nuclear power and the government unilaterally banning critical commercial technologies, the U.S. nuclear industry all but died. From the early 1950s through 1974, 231 nuclear power plants were ordered. Another 15 were ordered by 1977.[24] However, no new orders have been placed since 1977, although some of plants ordered by 1977 have since become operational. Not only did orders stop, but previously ordered plants were cancelled. Of the 246 plants ordered in the U.S., only 104 operate today. Some were never built, others were shut down early, and construction was stopped on many after substantial investments had been made. The result was billions of dollars in losses. For example, the Cherokee plant in South Carolina was cancelled in 1982 after over $600 million had been invested. In 1983, a group of three utilities cancelled the Zimmer plant in Ohio after investing $1.8 billion.[25] In total, $30 billion was spent on nuclear plants that were never completed,[26] which is more than the value of most of the companies that are considering new plant orders.

Therefore, millions will die and reservations will be violated

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Since the development of nuclear energy in the mid-20th century, Native American reservations have been subjected to thousands of tons of toxic nuclear waste, with dangerous consequences for health, the environment, and tribal sovereignty. The disproportionate concentration of nuclear waste on Native lands is not a coincidence. Instead, it reflects a targeted effort by the US government to saddle Indigenous communities with "the most hazardous material ever created by humanity or nature." For example, over 500 abandoned uranium mines on the Navajo Nation have poisoned residents' drinking water and caused elevated rates of kidney failure and lung disease for generations. Members of the Yakama Nation in southeastern Washington, home to the Hanford Nuclear Site, experience high amounts of thyroid cancer and congenital disabilities. And the Western Shoshone tribe, which has been exposed to significant nuclear fallout from decades of nuclear testing on its land (known as "the most bombed nation on earth"), suffers disproportionate leukemia and heart disease rates. These are just a few examples of the devastating health impacts caused by what activists and scholars have aptly described as "radioactive colonialism."