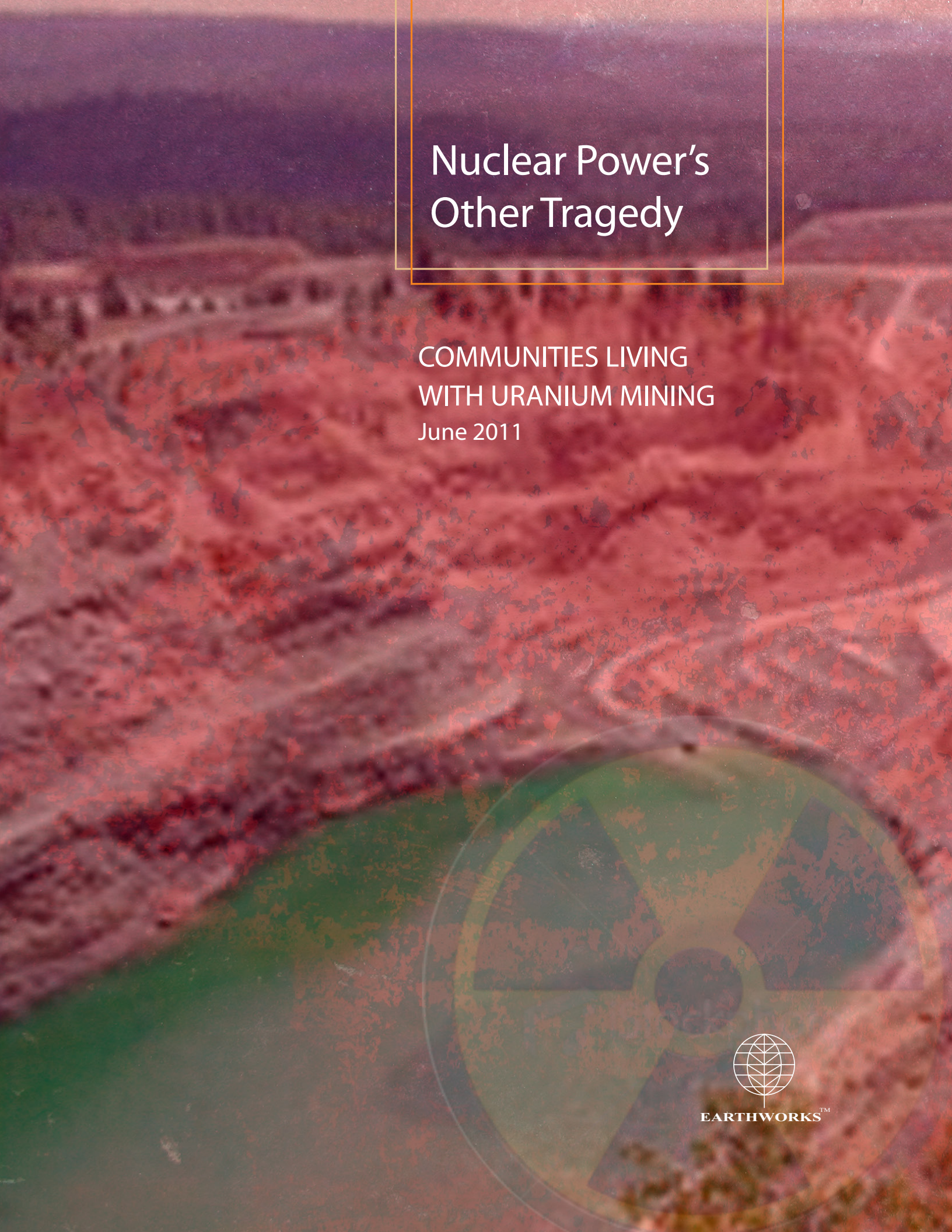


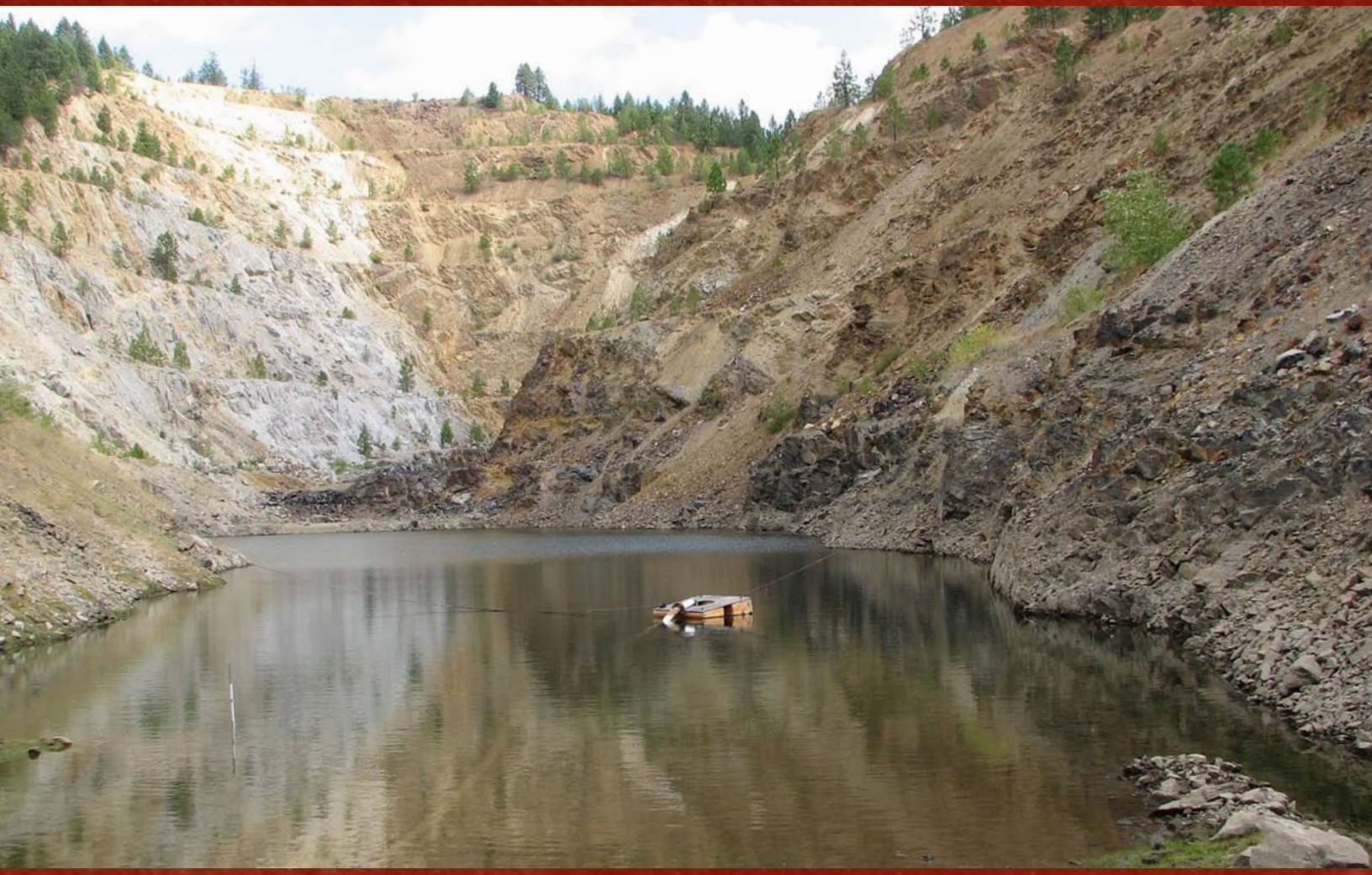
Nuclear Power's Other Tragedy

COMMUNITIES LIVING WITH URANIUM MINING

June 2011

EARTHWORKS™

Midnite Mine located on the Spokane Indian Reservation, Washington. Photo: Jessa Lewis



This report was written by Erika Kamptner, with contribution from Julia Nania. Reviewed by Lauren Pagel, Cathy Carlson, and Bill Walker. Thank you to Wilma Tope, Nadine Padilla, Linda Evers, Deb Abrahamson.

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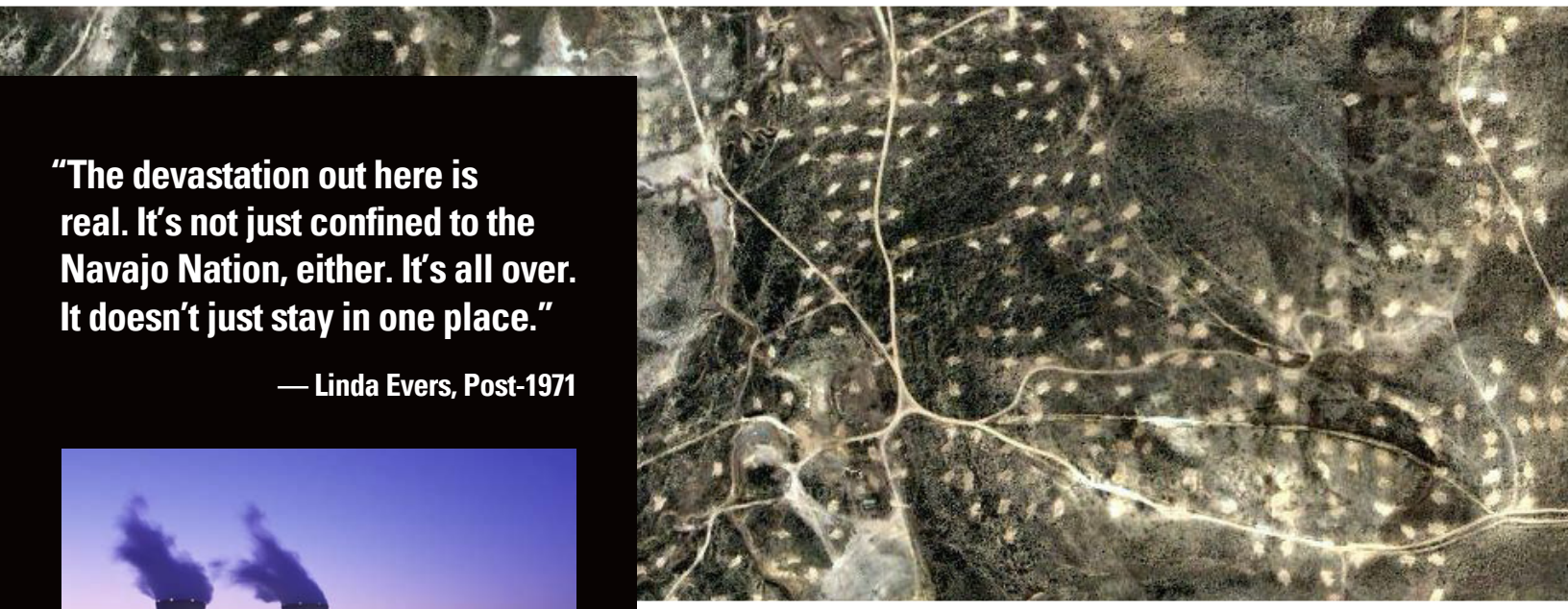
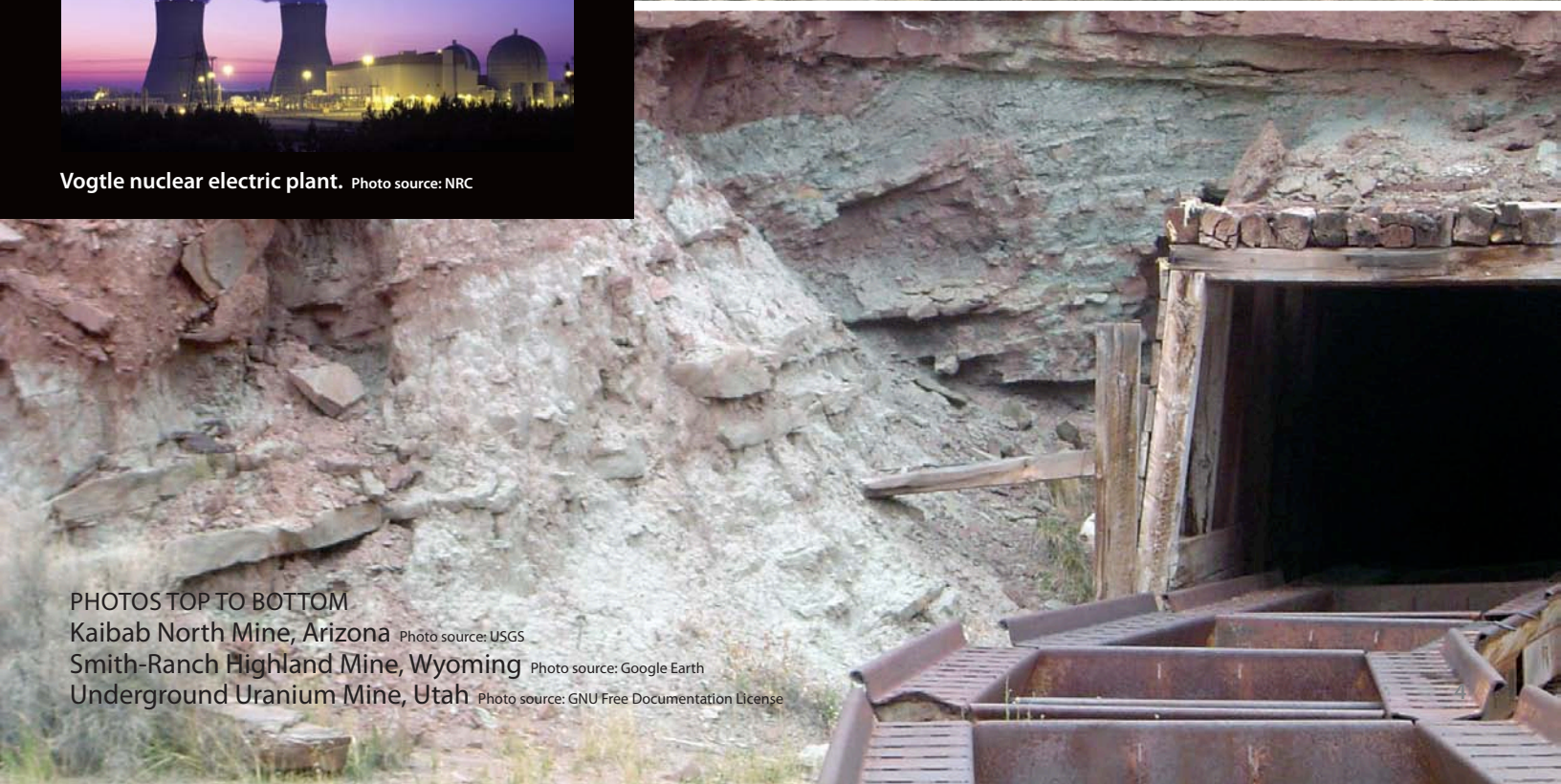


"The devastation out here is real. It's not just confined to the Navajo Nation, either. It's all over. It doesn't just stay in one place."

— Linda Evers, Post-1971

Vogtle nuclear electric plant. Photo source: NRC



PHOTOS TOP TO BOTTOM
Kaibab North Mine, Arizona Photo source: USGS
Smith-Ranch Highland Mine, Wyoming Photo source: Google Earth
Underground Uranium Mine, Utah Photo source: GNU Free Documentation License

Introduction

INTRODUCTION

Uranium was first mined in the United States in 1871, but industrial-scale uranium mining boomed at the end of World War II and the dawn of the Atomic Age.[1] The industry's history of contaminating streams, rivers, lakes and groundwater with radioactive or toxic wastes is just as long, and it persists as abandoned open-pit mines from the Cold War era continue to leach pollutants into waterways, mostly on public or tribal lands, in 14 Western states. By 2009, 14 uranium mines were in operation in the U.S., and four were *in situ* operations that involve injecting chemical-laced solutions into the ground to dissolve uranium from ore and then pumping out the uranium-containing fluids. But as we will see, modern-day uranium exploration and mining are far from being as safe as they claim to be. The legacy and the future of uranium mining are threatening communities who, under the lax provisions of the 1872 Mining Law, have little recourse against the reach of large multinational mining companies. The new 21st century push for nuclear power in the U.S. and worldwide significantly increases the risk of future uranium development leading to more tragic contamination stories like those outlined in this report.

This report tells only some of the stories of communities impacted by uranium mining. We highlight the more serious cases of contamination from past and present mining. We spotlight the special places threatened by the devastating and lasting impacts of exploration and drilling. And we recommend policy changes that are urgently needed to protect the public from an industry whose byproducts too often include environmental degradation and health hazards. It is long past time that regulation of uranium mining is brought into the 21st Century.

Modern-day uranium exploration and mining are far from being as safe as they claim to be.

Community members rally against new uranium projects in New Mexico. Photo: Nadine Padilla

Arizona 1 Mine operated by Denison located near the Grand Canyon in Arizona. Currently, this is the onlyoperational underground uranium mine in the United States.

Photo source: USGS

How it Works

Uranium Mining 101

URANIUM MINING 101

Mining not only exposes uranium to the atmosphere, where it becomes reactive, but releases other radioactive elements such as thorium and radium and toxic heavy metals including arsenic, selenium, mercury and cadmium.[2] Exposure to these radioactive elements can cause lung cancer, skin cancer, bone cancer, leukemia, kidney damage and birth defects. [3]

Historically, uranium has been used primarily for nuclear weapons and electric power generation, although it has also been used in various other products such as copper and nickel alloy production.[4] In the early 1980s, following the Three Mile Island and Chernobyl reactor accidents, the price of uranium fell due to the *de facto* moratorium on nuclear power in the United States.[5] As a result, many mining and milling operations shut down their facilities. Today – even following the nuclear disaster at the Fukushima reactors in Japan – increased interest in nuclear power has led to a new boom in uranium exploration and development. Many mining companies are renewing licenses to reopen old mines or undertake new projects. In 2009, 14 underground mines and four *in situ* projects produced ore containing uranium.[6] One uranium mill (Denison's White Mesa) processed uranium ore into concentrate. [7]

In the uranium mining industry, the regulatory framework depends on the extraction method. Conventional mining is regulated by the Office of Surface Mining, the U.S. Department of the Interior and the individual states where the mine is located. The Nuclear Regulatory Commission regulates any facility where uranium ore is chemically altered, such as *in situ* leaching facilities and mills.

Conventional Mining

Conventional uranium mining can refer either to open-pit or underground mining. Open-pit mining is extremely destructive and involves stripping away or excavating the topsoil and rock to reach the underlying uranium ore.[8] Currently there are no active open-pit uranium mines in the United States, but three underground mines continue to operate intermittently—White Canyon Uranium in Utah, Denison's Uravan Colorado mines, and Denison's Arizona 1 mine.[9] Although less invasive on the surface environment, underground mines run the risk of contaminating surface water and groundwater. Abandoned and decommissioned underground mines constitute most of the contamination cases on federal and tribal lands.

TOP: The Sherwood mine in 1979, Washington. The mine was operational until 1985 and has been reclaimed since. Photo source: EPA

BELOW: Orphan Mine, now closed, in Grand Canyon National Park.
Photo: © Copyright Alan Levine and licensed for reuse under Creative Commons License

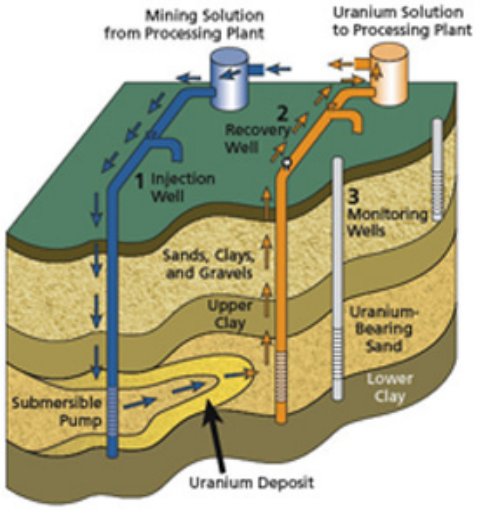
INSET: Open pit uranium mine in Australia's Kakadu National Park.
Photo source: www.telegraph.co.uk

In Situ Leaching

Over the last 40 years, new technologies have allowed the uranium mining industry to explore vast areas once previously inaccessible by older mining methods. The *in situ* recovery method was developed in the 1970s as a new way to extract uranium. Today in the United States, *in situ* leaching accounts for most uranium production. According to the Nuclear Regulatory Commission, there are currently 26 proposals to start, expand or restart *in situ* projects in the states regulated by the commission (Wyoming, Nebraska, South Dakota, New Mexico). Of these, nine will be new operations.[10]

During *in situ* mining, chemicals called "lixivants" are injected into a uranium-containing body of ore. Under natural conditions, these ore bodies are localized and the radiation and heavy metals associated with them remain confined in small portions of a groundwater aquifer. When the lixivant is injected into the aquifer, a chemical reaction occurs. The lixivant dissolves the uranium, making it mobile, and is then pumped out of the aquifer through a series of wells at the site. This system causes little surface disturbance (only several well heads) and produces no tailings or waste rock.[11]

Although this uranium and toxin-laced fluid is pumped out, groundwater contamination is inevitable and persists for decades.[12] The U.S. Nuclear Regulatory Commission (NRC), which regulates *in situ* operations in several states, including Wyoming, New Mexico, and Nebraska, acknowledges that although *in situ* mine permits call for complete restoration of groundwater conditions after mining operations, most of these baseline parameters have proved impossible to achieve.[13] Any *in situ* operation risks spreading uranium and its hazardous byproducts outside the mine, potentially contaminating nearby aquifers and drinking water sources. This has been a major problem with almost all *in situ* projects in the U.S.



The *In Situ* Uranium Recovery Process Injection wells (1) pump a chemical solution—typically sodium bicarbonate, hydrogen peroxide, and oxygen—into the layer of earth containing uranium ore. The solution dissolves the uranium from the deposit in the ground and is then pumped back to the surface through recovery wells (2) and sent to the processing plant to be converted into uranium yellowcake. Monitoring wells (3) are checked regularly to ensure the uranium and chemicals are not escaping from the drilling area. Source: www.nrc.gov.

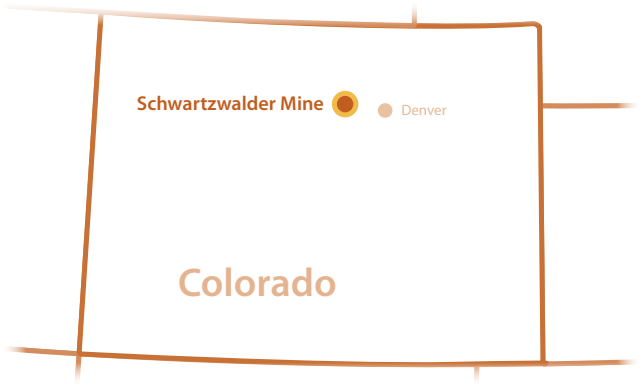
ISL operation at the Smith Ranch-Highland Mine, Wyoming. Photo source: Google Earth

Case Studies: **Violations**

CASE STUDIES: Violations

Since the beginning of uranium mining in the United States, conventional mines, *in situ* leaching facilities, and even the mills that process the uranium ore, have had serious problems. Here are just some of the facilities that are facing issues today.

VIOLATIONS: CONVENTIONAL MINING **Schwartzwalder Mine, Colorado**



The Schwartzwalder Mine, once one of the nation's largest underground uranium mines, is located in Jefferson County, Colorado, northwest of Denver. The uranium deposit was discovered in the 1940s and was developed as a multi-level, hard rock underground uranium mine.[14] Cotter Corporation acquired the Schwartzwalder Mine in 1965 and it was operational until 2000. As a result of the drop in uranium prices in the past decade, Cotter shut down the Schwartzwalder Mine and started reclamation efforts. Since its closure, Cotter has been in dispute with the state of Colorado as to the best plan for cleanup.

Today, groundwater near the Schwartzwalder Mine contains uranium levels that are 1,000 times higher than human health standards. According to EPA records, the mine has been in environmental non-compliance for each of the past 12 quarters. Water concentration violations at the facility include uranium, boron, chromium, copper, cyanide, fluoride, zinc, thallium and radium-226.[15] In 2010, Cotter faced state orders to pump and treat the toxic water that is filling the mine and allegedly contaminating nearby reservoirs. Ralston Creek, which flows into Denver Water's Ralston Reservoir, contains uranium levels of 310 parts per billion; this is 10 times higher than the safety standard.[16]

Contaminated water in the mining shaft still poses a threat to water resources at Cotter's Schwartzwalder Mine.

In August 2010, Cotter agreed to remove tainted water from its mine, but had chosen to pump and clean only surface ponds and not the water inside the mineshafts. Despite high uranium concentrations in nearby water resources, Cotter defied state orders to clean up the site and refused to pay state fines of $55,000 for failing to do so. As the legal battle continues between the state and Cotter, contaminated water in the mining shaft still poses a threat to water resources.[17]

Operational until 2000, the Schwartzwalder Mine was one of the largest underground uranium mines in the United States.

Photo source: Googlemaps, USDA Farm Service Agency

VIOLATIONS:
IN SITU LEACHING
Willow Creek, Wyoming

While the industry insists that *in situ* mining is environmentally safe, the record of frequent violations and fines associated with the practice tells a different story. Spills and groundwater contamination have threatened the drinking water sources for communities in Colorado, Texas and Wyoming.

The Nuclear Regulatory Commission regulates the Willow Creek, facilities , formerly known as Christensen Ranch and Irigaray. These two sites have had numerous spills, violations and wells placed on excursion status.

Excursions are very frequent at *in situ* leaching facilities. *In situ* mines affect groundwater quality near the well fields and lixivants often travel beyond the production zone and field boundaries. In a well field, the area of uranium production, monitoring wells are designed to detect any lixivant that moves outside of the production zone (mining area). A monitoring well is placed on excursion status when two or more excursion indicators exceed their upper control limits.

The Willow Creek facilities are an *in situ* site in Johnson and Campbell counties in north central Wyoming. Originally acquired and operated by Wyoming Mineral Corporation in 1978, the Willow Creek facilities have gone through a long line of ownership, and today are operated by Uranium One, Inc; a new subsidiary of Russian-owned firm Atomredmetzoloto. The Willow Creek facility consists of two distinct sites. Both sites contain approximately 15,000 acres of land. Half is privately owned and half is jointly owned by the Bureau of Land Management and the State of Wyoming.[19]

From 1993 to 2010, when the sites were mined by COGEMA Mining Inc., there were numerous spills, leaks and excursions. Lixivant excursions in the well-field have been a huge issue at *in situ* facilities. It has been made clear by many facilities, including the Willow Creek, that restoring the water quality at these monitoring wells is difficult and can take many years. From 1987 to 1998, 49 wells were placed on excursion status at the Willow Creek facilities.[20]

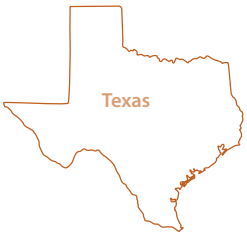
According to COGEMA's quarterly status report in 2000, seven monitor wells at the Irigaray site remained on excursion status. Many of these wells have been on excursion status for more than four years. One well had been on excursion status for as long as 11 years.[21]

There have been 260 reported spills at these two sites from 1987 to 2004.[22] Most spills ranged from 1,000 to 8,000 gallons of uranium-laced spill fluids. In April 1997 one site had a spill of 59,400 gallons of spill solution with a uranium concentration of 237.7 milligrams per liter[23] – nearly 8,000 times the EPA Maximum Contamination Level for drinking water.[24]

In early 2010, the ownership of the Willow Creek facilities was transferred to Uranium One. By April, Uranium One was issued a violation from the Wyoming Department of Environmental Quality. Of 66 monitoring wells requiring routine sampling, sampling had been missed at least once at 24 wells, with a total of 82 missed sampling events. Uranium One was fined $25,000 for violating permit rules for regular sampling of wells.[25]

One site had a spill of 59,400 gallons of solution with a uranium concentration of 237.7 milligrams per liter – nearly 8,000 times the EPA Maximum Contamination Level for drinking water.

VIOLATIONS:
IN SITU LEACHING
Southeast Texas



Unlike other *in situ* uranium extraction projects in the United States, the Nuclear Regulatory Commission does not regulate uranium production in Texas. The regulation of uranium mining is divided between the Texas Commission of Environmental Quality (TCEQ) and the Texas Railroad Commission. The Environmental Quality Commission has oversight over wells constructed for uranium production, while the Railroad Commission has authority over exploration mining.

Unlike many states, Texas regulates the underground injection of fluids for *in situ* mining and also follows the federal Safe Drinking Water Act, which says no injection well permit may be issued that causes contamination of an underground source of drinking water. Unfortunately, there are several loopholes that allow mining companies to inject toxic chemicals into underground aquifers. Companies often request an aquifer exemption, which would allow mining in a portion of the aquifer that is not officially designated a drinking water source. This aquifer exemption is permitted by the TCEQ and the EPA under the Underground Injection Control Program. This program regulates the underground injection of fluids for *in situ* mining and implements the federal rules and Safe Drinking Water Act, which states that no injection well permit may be issued that causes contamination of an underground source of drinking water.

In Texas it has become all too easy for mining companies to bend the rules when it comes to clean water. The process of exempting aquifers from groundwater contamination is very common. These exempt portions of aquifers are declared unsuitable for human consumption. Permitting this exemption has left many groundwater sources deeply contaminated after mining projects have ended. One of these exempt aquifers sits on the banks of Lake Corpus Christi in Live Oak County, and provides drinking water to nearby residents. The Burns/Moser mining facilities, located approximately ten miles southwest of George West, Texas, operated from 1979 to 1999. Since restoration began, approximately 1.633 billion gallons of aquifer water have been removed from one production area alone.[26] When mining operations concluded in 1999, the TCEQ allowed the mining company to leave behind groundwater with 10 times the amount of uranium specified in the original permit.[27]

State legislation allows uranium companies to promise to clean up groundwater to a certain level when applying for mining permits, but to then lower the level of required cleanup after mining operations are completed. According to the Texas Commission on Environmental Quality, from 1988 to 2008, 51 of 80 requests to make cleanup levels higher after the fact have been approved.[28] Therefore, in most cases, water conditions are worse than before mining operations started due to lax environmental standards.

Kingsville Dome *In Situ* Leaching Facility in Texas. The Kingsville Dome facility was operational until 2007. Today, it is looking to restart operations. Photo source: New Mexico Mines and Minerals Division

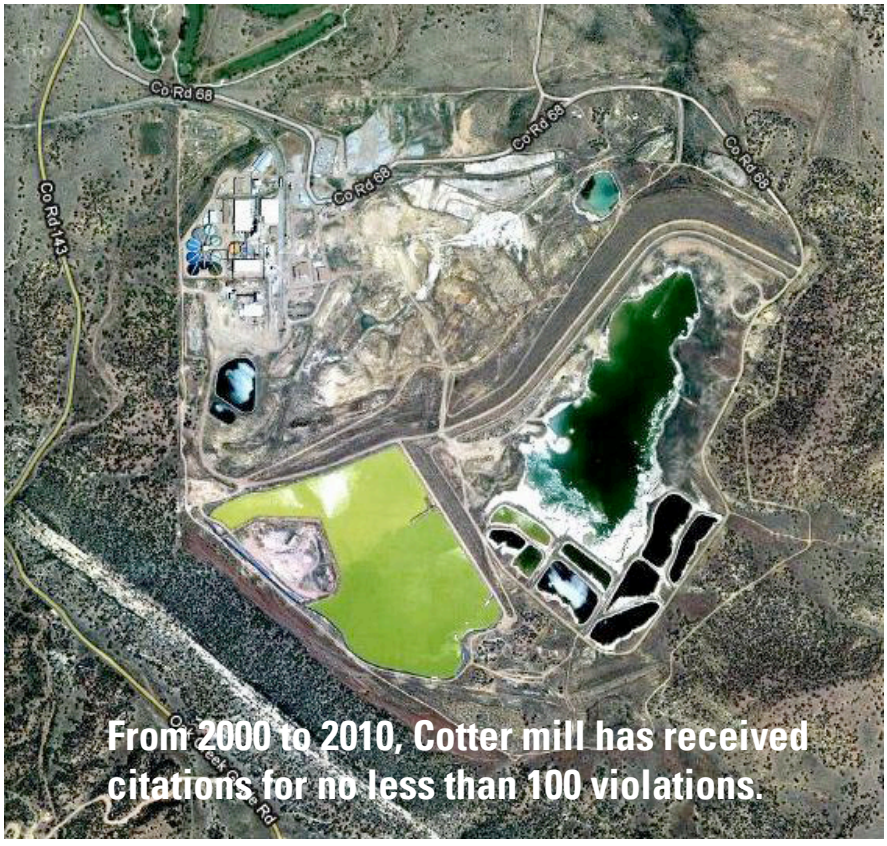
VIOLATIONS:
MILLING
Cañon City, Colorado

The Cañon City Mill site located just outside of Cañon City, Colorado, is owned and operated by Cotter Corporation of Denver. The mill operated continuously from 1958 until 1979, and has operated intermittently since that time. Before 1980, Cotter disposed of tailings and other wastes from uranium processing into unlined bonds. Contaminants such as molybdenum, uranium, and uranium decay products leached into the groundwater and migrated to Lincoln Park and nearby local wells.[29]

As a result of high contamination levels, in 1984 the EPA placed the Cañon City Mill on the Superfund National Priorities List. Since decommissioning and reclamation efforts at the mill began, Cotter has been cited for numerous labor and environmental violations and has continuously shown negligence of EPA standards and requirements. From 2000 to 2010, Cotter has received citations for 100 violations and 55 concerns or potential deficiencies. Cotter has paid three Colorado Department of Public Health and Environment fines totaling $59,175 for radiation and air emissions violations. In March 2008 Cotter pleaded guilty for its role in the poisoning deaths of migratory birds at the mill. Approximately 40 geese and ducks landed on a spill of 4,500 gallons of solvent that ran from inside a building to a pond and took several days to clean up. The U.S. Department of Justice Fish and Wildlife Division fined Cotter $30,000.

Cotter at first said the mill would reopen, but in September 2010 told regulators it would discontinue testing radon emissions on the site because it is no longer an active facility subject to regulation.[30] The battle continues, as many watchdogs question Cotter's commitment to environmental protection. A citizens' group filed a lawsuit in September 2010 accusing Colorado regulators of failing to require Cotter Corporation to set aside enough money to clean up its uranium mill in Cañon City. The department estimated costs of at least $43 million, while Cotter has set aside only $20.2 million.[31]

In 1984 the EPA placed the Cañon City Cotter mill on the Superfund National Priorities List.



Cañon City Cotter Mill in Lincoln Park, Colorado.
Photo source: Google Maps

Case Studies: **Community and Individual Impacts**

CASE STUDIES: Community and Individual Impacts

IMPACTS: Mount Taylor, New Mexico

With the recent boom in the price of uranium, mining companies are scavenging the United States for areas with the greatest resources of uranium. Under the 1872 Mining Law, the Bureau of Land Management and the Forest Service cannot stop a uranium mine from going forward because of environmental or cultural resource conflicts. Today, mining companies have staked claims in culturally sensitive areas, including the Grand Canyon and Mount Taylor.

Mount Taylor sits on top of the Grants Mineral Belt, one of the most uranium-rich formations in the U.S. Mined sporadically throughout the 1950s and 1970s, today hundreds of mining proposals for the area have flooded the New Mexico Mining and Minerals Division.[32] It is estimated the Mount Taylor mine contains over 100 million pounds of uranium.[33]

For many American Indian tribes – the Navajo, the Hopi, the Zuni, and the nearby Laguna and Acoma Pueblos – Mount Taylor, located in the southwestern corner of New Mexico in the Cibola National Forest, is a sacred place.[34] For centuries the mountain has served as a sacred site for pilgrimages, prayers, and offerings as well as for collecting herbs and medicines. The mountain is referenced often in native song and ceremony.[35] Today it is threatened by potential uranium mining.

Mount Taylor, New Mexico. Photo: © Copyright Anna Dalmaterra and licensed for reuse under Creative Commons License

Nadine Padilla, who is of Navajo and Pueblo descent, is one of the many people working to help save Mount Taylor from uranium development. She works for Multicultural Alliance for a Safe Environment (MASE), a coalition of grassroots organizations working to address the uranium mining legacy which continues to have devastating impacts on many communities.

Nadine Padilla. Organizer for the Multicultural Alliance for a Safe Environment (MASE).

"Mt. Taylor is at the very foundation of our cultural identity and livelihoods," said Padilla. "It is our duty to protect Mt. Taylor and other sacred places to maintain our balance in the world and to benefit our communities and future generations."

In 2008, five tribes asked the state to consider protection for Mount Taylor. The nomination recognized that the mountain has a cultural significance which extends from time immemorial to the present,[36] and that the mountain was "important to collective and individual understanding of history."[37] In June 2009, the New Mexico Cultural Properties Review Committee voted unanimously to protect the cultural resources of Mount Taylor. The property includes not only the mountain itself but many of the mesas and valleys around it. The title doesn't give the tribes any veto power over mining proposals but it does allow

more input on development decisions that come before the federal and state agencies.[38]

One proposed mine on the Mount Taylor site is an open-pit mine owned by Roca Honda Resources. Under the 1872 Mining Law, Roca Honda has the right to develop the portion of the proposed mine located on U.S. Forest Service lands. Today, MASE is working to fight against the development of the Roca Honda mine, the first application on Mt. Taylor to get this far in the past 30 years. [39]

IMPACTS:
The Navajo Nation

The Navajo Nation encompasses 27,000 square miles in the Four Corners area of the Southwest.[40] For over 60 years, the Navajo people have been struggling with the health impacts of uranium mining. Intensive uranium mining on Navajo lands began during World War II and the Navajo people began working the mines that sprang up near their family homes. From 1944 to 1986, nearly four million tons of uranium ore were extracted from Navajo Nation mines. Over 500 abandoned uranium mines still scar the land.[41]

One of these mines is the United Nuclear Corporation Northeast Church Rock Mine and Mill site, near Gallup, New Mexico, site of one of the worst – but little-known – nuclear accidents in U.S. history. On July 16, 1979, a six meter-wide earthen tailings wall from the Church Rock uranium mill site collapsed, sending approximately 1,100 tons of waste and 95 million gallons of waste-tained fluids down the north fork of the Rio Puerco River. Within days, the contaminated water had traveled 80 miles downstream near Navajo, Arizona.[42]

The Northeast Church Rock mine, closed in 1982, is the highest priority abandoned mine cleanup in the Navajo Nation. EPA has detected widespread radium contamination in 14 areas on and off site,[43] Although all public water systems on the Navajo Reservation meet health standards, almost a third of Navajos haul water from unregulated sources such as livestock wells, springs, or private wells. These sources are not routinely monitored, and therefore are a possible threat to public health.[44] In the late 1990s, the EPA and Army Corps of Engineers conducted a water sampling survey of unregulated water sources and found that of the 226 unregulated water sources, 38, or 17 percent, showed elevated radionuclides.[45]

Groundwater contamination isn't the only problem remaining from the Church Rock Mine. Many homes and other buildings were constructed from contaminated materials.[46] A program has been created by the EPA and the Navajo Nation to tear down and rebuild uninhabitable homes.

Poor safety regulations during Cold War era mining have left many Navajos sick.

Of the estimated 10,000 people who worked in uranium mining in the United States from the late 1940s to the 1980s, about a quarter of them were Navajo, although this number has been disputed. [47,48] A 2000 study found that from 1969 to 1993, 94 Navajos died of lung cancer. Of these 94 tested, 63 were former uranium miners.[49] Social and environmental harms caused by these mining and milling projects exist today, long after production stopped. Miners began dying from radiation-related illnesses including lung cancer and kidney disease.

Protective safeguards were not implemented until 1971, nearly two decades after the harmful effects of radon exposure from uranium mining were known. Today, under the Radiation Exposure Compensation Act (RECA), people who worked in uranium mines before 1971 qualify for compensation. The act offers an apology and monetary compensation to individuals who must live with the harmful affects of radiation

Churchrock, New Mexico. Site of large radioactive spill. Source: EPA

exposure.[50] Although additional safeguards were implemented in 1971, post-1971 workers continue to feel the effects of uranium mining today.

One of those post-1971 workers is Linda Evers. Linda Evers is a mother, grandmother, and 4H community volunteer from Grants, New Mexico, a town surrounded by uranium mining and milling projects just outside of the Navajo Nation in northwest New Mexico. Just after graduating high school, Evers began working at the Kerr-McGee Mill. The job paid more than twice the minimum wage, and at 18, it was an opportunity she couldn't say no to.

She began as a laborer and soon took on various roles working at the crusher, acid plant, and yellowcake facilities. The health hazards of working with uranium ore were never fully addressed during her time at the Kerr-McGee mill.

Linda Evers. Vice President of Post 1971.
Photo: Barry Moss

"We had some safety meetings," she said. "But most discussed burns, first aid, CPR, things like that. " Evers and her coworkers were regularly assured that due to increased safety standards and technology set forth in 1971, there would be no need to worry about radiation overexposure.

"They said we were safe now," recalled Evers.

By 1978, Evers left her position at Kerr-McGee to have her first child, who was born with birth defects. In 1979, she went back into the uranium industry, this time at the United Nuclear Homestake facilities. She worked as a laborer and then at the crusher department, where she was regularly exposed to radiation with few safety precautions. In 1981 she left again to have her second child, born without hip bones.

Sixteen years after her intense exposure to radiation, Evers began to feel ill. She was eventually diagnosed with degenerative bone disease — a case her doctor said could only be caused by age, genetics, and radiation exposure. It wasn't until then that she realized her intense overexposure to radiation at such a young age could be the cause of her joint pain and children's birth defects.

"I have suffered degenerative bone disease because of the mining," Evers said. "I have had two children and both of them were born with birth defects. The devastation out here is real. It's not just confined to the Navajo Nation, either. It's all over. It doesn't just stay in one place."

Today, Evers is working toward amending the RECA bill to include post-1971 uranium workers.

She is the vice president of Post-1971, a group dedicated to the reimbursement of all workers under amendments to the Radiation Exposure Compensation Act. Today RECA only allows compensation to individuals that worked in mine and mills sites prior to 1971, before "safety" measures were put into place.

IMPACTS:
Spokane Indian Reservation, Washington

From 1956 to 1982, the Dawn Mining Co., majority owned by Newmont Mining Corporation of Denver, operated the Midnite Mine, an open-pit uranium mine located on the Spokane Indian Reservation in eastern Washington state. Today two open pits, backfilled pits, and a number of waste rock piles leach radioactive and toxic heavy metals from over 2.4 million tons of ore that remain on the site.[51] Three streams flow into a single channel near the southern end of the basin which discharges to Blue Creek, 3.5 miles downstream from Franklin D. Roosevelt Lake.

In 1978, a yellowish-white solid appeared in the waterways, identified as aluminum salts and gypsum with 3 to 6 percent uranium oxide. A dam was constructed to keep the contaminant out of Blue Creek and FDR Lake, but water continued to seep from the waste areas until 1985.[52] In 2009, the Agency for Toxic Substances and Disease Registry (ATSDR) recommended that people avoid using water from drainages of the site and from Blue Creek due to toxic contamination levels.[53]

The Spokane Indian tribe is relatively small with just under 2,700 members, but has been significantly affected by the uranium mining industry. Years of

mining have had tremendous environmental and cultural impacts on the community. Deb Abrahamson, a member of the tribe, grew up near the Midnite Mine. She, her father and three brothers have worked at the mine and mill sites.

"The [Spokane] tribe is literally surrounded by the contamination from the mine," said Abrahamson. "The Spokane River, Columbia River and Tschimikan Creek define three of the tribe's reservation borders. All three rivers are contaminated with waste from the mine."

The decades of radioactive contamination have not only contributed to water and soil contamination and widespread illness on the reservation, but have also disrupted cultural practices that have been maintained for generations. Every spring, the Spokane tribe sets out to harvest the season's white camas root, a rich source of carbohydrates, and other roots. It is a ritual harvest takes place near Harrington, Washington, distant from the hazards of the mine. Once harvested, the roots are peeled and air-dried for winter consumption. These starchy roots are one of the traditional roots of the Spokane tribe diet. But due to contamination issues in the Blue Creek drainage, the Spokane tribe is unable to use this land for harvesting food.[54]

Not only are people afraid to harvest from lands near the reservation, but wild game is also a concern. Before the building of a fence around the mine site in 2009, moose, elk and deer roamed freely around it. The salts that would form in the river beds from the mine drainage would attract animals to the site.[55]

Abrahamson noted that the tribe's cultural practices have been disrupted because the wildlife and plants in and around the site are at a risk for radioactive contamination. "Traditionally tribal members would gather roots and berries from the area surrounding the mine," said Abrahamson. "Now we no longer gather chokecherries because of concerns about poisons. People are afraid to eat, afraid to harvest."

Deb Abrahamson, Director of SHAWL (Sovereignty, Health, Air, Water, Land) Society. Photo: Barry Moses

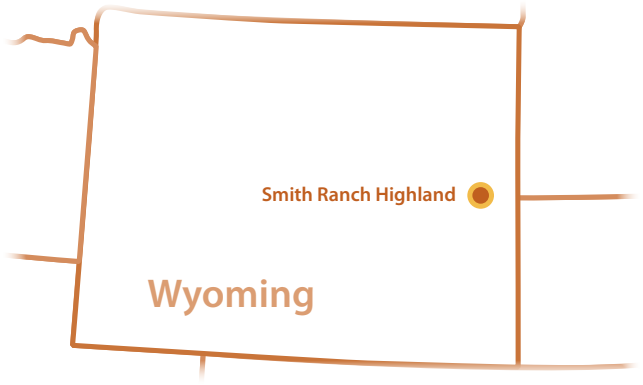
"The tribe is literally surrounded by the contamination from the mine."

Abrahamson is the founder of the SHAWL (Sovereignty, Health, Air, Water, Land) Society, which addresses the impacts of radiation exposure from the mine. A lot of her work is focused on educating her community about the health impacts of the Midnite Mine. The SHAWL group is currently working with the Gonzaga University law school to help attorneys assist former uranium workers to get compensation through the Radiation Exposure Compensation Act (RECA) and the Energy Employees Occupational Illness Compensation Programs (EEOICP).

What the public will pay to remedy this fiasco is yet to be determined. In 1997, the federal government began negotiations with Dawn and Newmont over the decontamination and cleanup of the site, which is now a federal Superfund site. These negotiations were ultimately unsuccessful and in 2005 the federal government filed a claim against Newmont and Dawn Mining for reclamation costs incurred at the site.[56] In 2008, Judge Justin Quackenbush ruled that Newmont was partially liable for cleanup of the site. Previous rulings also made Dawn Mining and the federal government liable. It is estimated that complete cleanup of the site will cost $152 million.[57]

Midnite Mine located on the Spokane Indian Reservation, Washington.
Photo: Deb Abrahamson

IMPACTS:
Converse County, Wyoming



Power Resources Corporation, a subsidiary of Cameco, of Saskatchewan, Canada, owns and operates the Smith Ranch-Highland *in situ* recovery facilities in Converse County, Wyoming. Together, the sites form the largest uranium production facility in the United States. In 2006, Cameco received certification under a program of the International Organization for Standardization, one of the most recognized international standards for environmental management. The certificate was awarded to Cameco for its excellence in environmental protection and implementation of "best practice" environmental management system at its Smith Ranch-Highland facilities.[58] Just over a year later, the Wyoming Department of Environmental Quality cited Smith Ranch-Highland with a notice of violation detailing environmental, reclamation, and staffing concerns at the site. Today, the operation has one of the worst environmental records in the uranium mining industry.

Today, the Smith Ranch-Highland *in situ* operation has one of the worst environmental records in the uranium mining industry.

Smith Ranch-Highland facility. Photo source: NRC

Once celebrated as Wyoming's model uranium mine, the Smith Ranch-Highland mine has had more reported spills and environmental violations than any other *in situ* mine now operating. According to a report by the Land Quality Division, since the start of operations in 1988 there have been "some 80" spills, in addition to numerous pond leaks, well casing failures and excursions.[59] Of the 202,247 gallons of mining fluids spilled in June 2007, only 3,500 gallons were recovered.[60] Other violations included delayed restoration of groundwater, so-called routine spills, and a cleanup bond that was inadequate to cover restoration costs. Power Resources routinely violated Wyoming Department of Environmental Quality regulations that required underground water cleanup to take place at the same time as production.[61]

A 2007 Wyoming Department of Environmental Quality Report said: "A realistic reclamation cost estimate for this site would likely be on the order of $150 million, compared to Power Resources, Inc.'s current calculation of $38,772,800."[62] Despite what the Department on Environmental Quality considers grossly inadequate bonding for the mine, the mine has continued with operations.

In a 2008 state investigation, it was reported that Power Resources was blatantly violating permits: "It is readily apparent that groundwater restoration is not a high priority for PRI," the state reported. "Reclamation is not contemporaneous with mining. A total of 12 wellfields are now in production and restoration is proceeding (slowly) in only 2 wellfields. Only 2 wellfields have been restored in 20 years of operation."[63] In July 2008, Cameco agreed to pay a total of $1.4 million in fees to the state for the violations.[64]

Environmental concerns raised by the Smith Ranch-Highland site have rallied Wyoming citizens against other uranium mining proposals. In August 2006, Wilma Tope arrived home to Crook County only to find a hefty white envelope containing a lease agreement for her land accompanied by a check from a uranium mining company. The lease agreement was for Powertech's new Aladdin project, a 17,850 acre *in situ* project near the Wyoming/South Dakota border. She was told that her neighbors had signed the lease agreement, but Wilma and her husband Jay refused to sign.

Aware of the environmental spills and violations at the Smith Ranch-Highland project, Tope felt threatened by the prospect of *in situ* leaching on her ranch. The lease agreement offered a 6 per cent royalty on per pound of uranium produced, on top of the $5 fee per surface acre and $5 fee per mineral acre leased. The total land in question was 163 acres of her ranch.[65] Concerned about the prospect of uranium mining in

Wyoming, Wilma formed Ranchers & Neighbors Protecting Our Water – a group dedicated to protecting the quality and quantity of the groundwater surrounding their homes. Today, the group is working to inform their community on the impacts of *in situ* operations and the dire consequences that could occur during production or decommissioning.

"We're all concerned about the quantity of water, the quality of water, and our way of life," said Tope. "We've seen what has happened at Smith Highlands, and we know that has been a disaster. (Power Resources) cannot return water to the

"We're all concerned about the quantity of water and quality of water, and our way of life."

— Wilma Tope, Ranchers & Neighbors Protecting our Water

baseline (quality), and they admit that."

Wilma recalled a statistic in the the Christensen Ranch's 1999 permit: "For the successful restoration of the ground water quality within the mined-out areas of the Wasatch Formation, a wastewater disposal capacity of 300 to 500 gallons per minute will be required over the next 18 years."[66]

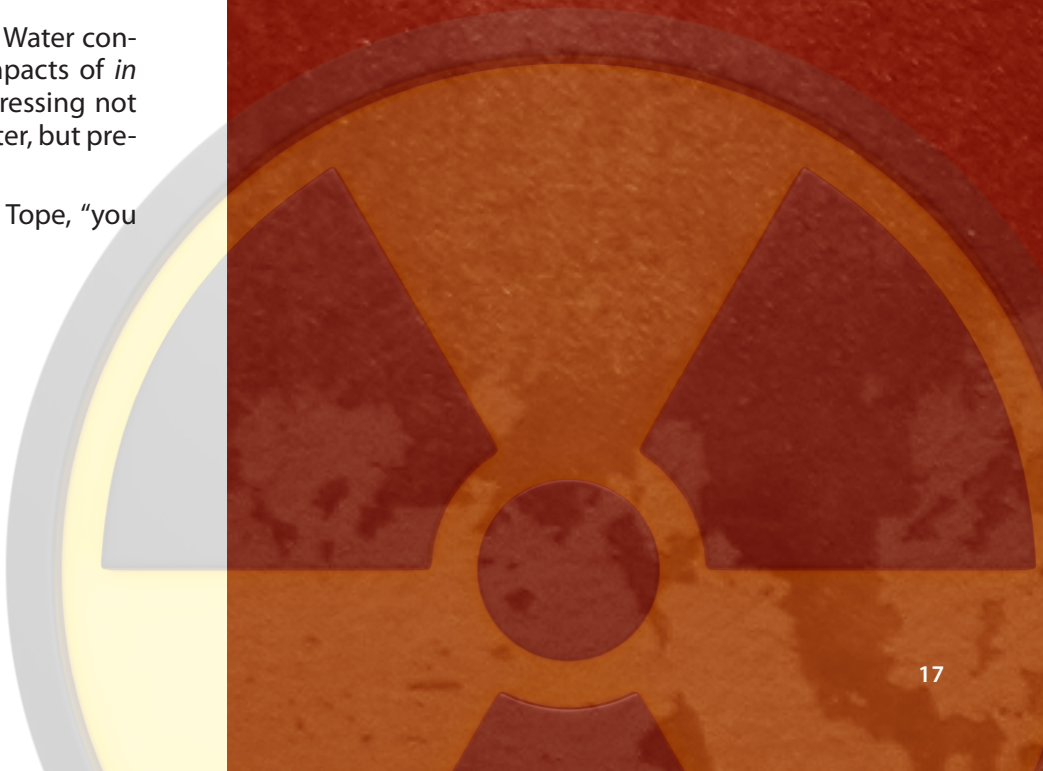
"The numbers are mind-boggling," she said. "How much water is this really going to use?"

Ranchers & Neighbors Protecting our Water continue to inform the public on the impacts of *in situ* on water quality and quantity, stressing not only the importance of preserving water, but preventing future contamination.

"If you don't have good water," said Tope, "you have nothing."

"For the successful restoration of the ground water quality within the mined-out areas of the Wasatch Formation, a wastewater disposal capacity of 300 to 500 gallons per minute will be required over the next 18 years."

— Wilma Tope, Ranchers & Neighbors Protecting our Water



The Law: **The Way Forward**

THE WAY FORWARD

The legacy of past uranium mining still haunts the West, and current regulations are ill-equipped to deal with the resource conflicts and pollution issues that of the new uranium boom. A major overhaul of the laws and regulations that govern uranium mining is needed to fully protect public health, ground and surface water.

The Uranium Resources Stewardship Act (URSA)

The 1872 Mining Law – passed before women could vote and long before the advent of our national environmental laws – still governs hardrock mining, including uranium mining, on public lands today. This antiquated law allows uranium mining companies, who are often foreign multinationals, to take minerals from public lands for free while polluting our country's precious resources. Because the law contains no environmental provisions or reclamation standards for hardrock mining that occurs on public lands, taxpayers have been burdened with billions of dollars in clean up costs.[67]

Historically, the Mining Law has been interpreted to trump all other potential uses of public lands. If you hold a mining claim, that claim is treated as a right to mine by the federal government. All other types of mine proposals (such as coal) on public lands must be weighed against other potential land uses before being permitted. But in the modern era, federal land management agencies have consistently argued that they cannot deny hardrock mining proposals because of the 1872 Mining Law, and federal land managers insist that, in the eyes of the Mining Law, mining is the highest and best use of public lands.

In Congress, Reps. Martin Heinrich (D-NM) and Ben Ray Lujan (D-NM) have introduced a bill to shift the regulation of uranium mining from the antiquated 1872 Mining Law to the Mineral Leasing Act. This change would allow uranium mining on federal lands to be managed through a competitive leasing program, as opposed to an industry-initiated claim and patent system.

The Uranium Resources Stewardship Act (HR 1452) is the first step towards comprehensive federal regulation and oversight of uranium mining to protect both uranium-impacted communities and the environment. Extraction of all other fuel minerals – coal, oil and gas – is governed by leasing systems, which allows public land managers to develop energy sources in a manner consistent with protecting air, land and water for future generations, and better balance the public's economic interests.

URSA would impose a 12.5 percent royalty on the uranium mining industry, compensating the taxpayer for the uranium that is being taken from public lands. Perhaps most importantly, URSA would also end the presumed right to mine afforded by the 1872 Mining Law. It would allow public land managers most discretion to decide where uranium mining is and is not appropriate.

URSA will allow the U.S. to balance the demand for minerals with the importance of protecting crucial drinking water supplies and other natural resources, outstanding natural lands, taxpayers, fish and wildlife habitat, and the health and well-being of our communities. It will end the giveaway, make the mining industry pay their fair share and create thousands of badly needed jobs in western communities by establishing a fund to clean up the thousands of abandoned uranium mines that litter the West. It is long past time that regulation of uranium mining is brought into the 21st Century.

Endnotes

ENDNOTES

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