

# Uranium Mining for Belgian nuclear power stations: Environmental and human rights impacts

## Executive summary

### Nuclear power: a dead end

The threat of global warming has allowed the nuclear power industry to position itself as a low carbon-emission source of energy. In fact, although the splitting of uranium inside a nuclear reactor does not produce greenhouse gas, every other step in the “nuclear chain” including the mining, milling and enrichment of uranium, the construction of nuclear power plants, and the treatment and storage of nuclear waste are incredibly energy intensive- and much of this energy is supplied by fossil fuels. In comparison to wind energy, nuclear power releases 3-4 times more CO<sub>2</sub> per unit of energy produced taking account of the whole fuel cycle. The fact that nuclear power can only meet demands for electricity supply (and not the proportion of energy required for transport, or industry), coupled with the long lead time needed to construct nuclear power plants, means that we must search elsewhere for solutions to climate change.

It is not only the greenhouse gas emissions, the ever present risk of nuclear accidents and the huge quantities of radioactive waste that make nuclear power an environmental disaster: the mining and milling of uranium for nuclear power production have caused widespread environmental and human rights problems on every continent. These are impacts that have been felt most strongly by indigenous people.

### Uranium mining

Uranium mining is currently experiencing a global boom, and the prices are at their highest point since the 1970s (\$72/lb U<sub>3</sub>O<sub>8</sub>). This has led to exploration of as-yet unexploited uranium reserves, and a return to lower grade ore deposits that were abandoned due to the collapse in uranium prices in the 1980s.

Extraction of uranium only makes sense in deposits containing concentrations of at least 1000 g/t (0.1%). Except for a few high-grade deposits in Saskatchewan, Canada, ore grades are below 0.5 percent, and large amounts of ore have to be mined to get at the uranium. In the mines, workers are exposed to dust and radioactive radon gas, presenting a lung cancer hazard.

During mining operation, large volumes of contaminated water are pumped out of the mine and released to rivers and lakes, spreading into the environment.

Ventilation of the mines, while lowering the health hazard for the miners, releases radioactive dust and radon gas, increasing the lung cancer risk of residents living nearby.

Piles of so-called waste rock often contain elevated concentrations of radionuclides when compared to normal rock. These piles continue to threaten people and the environment after shutdown of the mine due to their release of radon gas and seepage water containing radioactive and toxic materials.

Ore mined conventionally in open-pit or underground mines is first crushed and leached in a **uranium mill**. The major hazard resulting from the milling process is from dust emissions. When closing down a uranium mill, large amounts of radioactively contaminated scrap have to be disposed of in a safe manner.

In the early years, however, tailings were in some cases simply released into the environment without any control

Seepage from tailings piles is another major hazard. Seepage poses a risk of contamination to ground and surface water. Residents are also threatened by uranium and other hazardous substances, like arsenic, in their drinking water supplies and in fish from the area. Due to the long half-lives of the radioactive constituents involved, safety of the tailings deposits has to be maintained for very long periods of time.

### **Global Uranium Supply**

Based on current levels of use, this would give us enough uranium for about 50 years (WISE, 2003; NEA-IAEA, 2004; WNA, 2004c). Even if we were only to double world usage of nuclear energy, the life span of uranium reserves would be just 25 years. If we would decide to replace all electricity generated by burning fossil fuel with electricity from nuclear power today, there would be enough economically viable uranium to fuel the reactors for between 3 and 4 years.

Of course, the total amount of uranium is much greater than this; NEA and IAEA estimate the total of all conventional reserves to be in the order of 14,4 million tonnes. At the moment, these reserves are too expensive to mine, as the cost of uranium is not high enough to meet the costs of extracting the ore. As the cost of uranium increases, these reserves may become economically viable. However at a certain point, the amount of energy needed to extract and enrich uranium from very low-grade ore will be higher than that which could be produced from the uranium.

### **Environmental racism**

While a relatively small number of people in the West and local elites in developing countries have benefited from the development of nuclear technology, it is clear that not all members of society have had to carry an equal share of the burden caused by uranium mining. The nuclear industry has practiced a form of “environmental racism”, as the groups that are hit the hardest by the impacts of nuclearism (environmental degradation, sickness, negative impacts on social structures), are already victims of racism or economic disadvantage.

In places where mines have been exhausted or abandoned due to falling uranium prices, there has often been no effective clean-up of the radioactive contamination caused by the mining activity. This "ecological debt" is not included in the cost of the uranium. The fact that the community has had to bare this radioactive legacy, as well as the unemployment caused by the collapse of local industry, compounds the exclusion and marginalization.

In many cases, there has not been an open and honest communication between the local, often indigenous population, and the governments and industry responsible for the uranium mining.

## Violations Against Indigenous Peoples

The link between uranium mining for the purpose of nuclear power and racism is intrinsic and undeniable. Those who are affected most by uranium mining tend to be indigenous peoples commonly victimized and subjugated by the present government. These peoples historically are victims of racial and economic prejudice, with uranium mining being the most current form of such victimization. Ironic for indigenous peoples is that while they are often the members of the society most affected by uranium mining they are also the ones to benefit the least from the development of nuclear technology. Indigenous peoples worldwide have come to bear the burden of uranium mining, due much to their position as minorities within each respective country. Belgium, as an importer of uranium from Australia, Canada, Kazakhstan, the USA, China, and South Africa, has a part to play in furthering the victimization of the environment and spirit of indigenous peoples. The following cases of social exclusion, restriction of land rights and sovereignty, and environmental destruction suffered by indigenous peoples should be looked to as reasons why the prospects for future use of nuclear power should be reassessed.

### Case 1: Australia

Australia is the second largest uranium exporter in the world and operates three large mines: the Beverley mine, the Ranger mine, and the Roxby Downs mine. The country contains 30-40% of the world's known conventional uranium reserves, thus prompting the government to consider increasing their nuclear capacities by enlarging the number of uranium mines, introducing nuclear power to Australia, creating a nuclear waste dump in its Northern territories, and establishing uranium enrichment facilities. In many ways the financial attractiveness of increased uranium production has outweighed the resulting environmental and social costs, and, as according to a 2003 report by a federal Senate References and Legislation Committee, "short-term considerations have been given greater weight than the potential for permanent damage to the environment."

Each mine has a history of exploiting the traditional owners of the land on which the mining takes place, as well as its surrounding environment. The Roxby Downs mine operates on portions of the Arabunna people's traditional land, polluting it with its poorly managed 70-80 million tonnes of annual dumped tailings, as well as the mine's daily extraction of 30 million liters of water from the Great Artesian Basin, a fragile ecosystem.

The Ranger mine, operating on the Mirarr people's traditional land, threatens the health of its inhabitants as well as the extensive Kakuda wetlands on which it is located. The mine's history of environmental destruction is extensive, with documented accounts of 120 leaks, spills and license breaches of its generated tailings waste since the mine opened, which easily seeps into the waterways of the wetlands and contaminates what is still used as a traditional food source.

The Beverley mine, located on the traditional land of the Adnyamathanha people, established itself against the will of the local community and practices dumping its liquid radioactive waste directly into groundwater, adversely affecting the health of the environment and local inhabitants. These mines have many tactics used to exploit the Aboriginal communities such as ignoring the concerns of traditional owners insofar as the legal and political circumstances permit, divide-and-rule tactics, bribery, exerting consistent unwanted pressure, providing Traditional Owners with false or misleading information, and threats. The Aboriginal peoples are thus victimized again and again as the traditional land on which they live becomes polluted and poisoned.

The prospect for further profits from increased international demand for uranium is encouraging the Australian mining companies to continue such exploitative practices. There are plans to enlarge the mines, prolong their existence by mining lower grade uranium, and tap new deposits.

It is necessary to question, how much social and environmental costs are worth being incurred for an increased profit. In the words of Yvonne Margarula, a Mirarr Senior Traditional Owner, "Uranium mining has completely upturned our lives... None of the promises last but the problems always do."

## **Case 2: Canada**

Canada is a huge contributor to the world's uranium production and supply. It produces one third of the world's uranium mine output, is the largest exporter of uranium in the world, and itself generates 15% of its electricity from nuclear power. Within Canada there are 1.3 million Aboriginal peoples, as defined by the Canadian government, and numerous others who are not accounted for within the system.

Many Uranium mining companies have overlooked aboriginal rights in the past and present, and take advantage of outstanding land claims to settle themselves on lands traditionally inhabited by Indigenous peoples. Development of uranium mines and the introduction of nuclear technology, for instance, has been undertaken primarily by the Federal government, with little input and involvement from the affected indigenous communities.

The majority of uranium mining takes place in the northern Saskatchewan region of Canada, in mines such as the McArthur River mine, Key Lake, and Rabbit Lake, which also happens to be an area where Indigenous peoples make up the largest percentage of the population. A significant issue arising out of uranium mining and nuclear power is the fact that Indigenous peoples are often victims of exclusionary tactics used by the mining companies which prevent them from benefiting in any way from the mines. Though such native peoples tend to be those most affected by uranium activity as a result of environmental degradation, contamination of traditional food sources, radioactive exposure, and racism, they are restricted from gaining socially and financially from the technology and development of nuclear science.

Aboriginals are limited to participating in labor intensive and dangerous jobs of mining and milling, with little to no chance of becoming involved in energy production, or in the long/short term storage of fuel waste. The racism and bias incurred by the Aboriginal peoples of Canada has been enormous; their past and present has been filled with the loss of human life and the destruction of their lands, and yet while all of this happens, they have never been compensated for the environmental or social costs either by the government or by mining companies.

## **Case 3: China/Tibet**

Detailed facts on Uranium mining within Tibet is limited due to the secretive nature of the Chinese government occupying the country. There are nine known uranium mines on the Tibetan plateau, which are used to fuel China's nuclear weapons program and development of nuclear power. Due to China's rapidly growing economy and status as an emerging world power, such nuclear technologies, facilities, and plants are expected to increase in the coming years. Chinese uranium is also one of the country's exports, for example between 1990 and 2005 it made up 8% of Belgium's total uranium consumption.

Little to no regulations are in place to oversee the disposal of radioactive waste, and those hit hardest by such disregard for human and environmental health are local Tibetans. They are excluded from governmental decisions on where and how mining is conducted, are often displaced and forced to resettle, and are not given access to information on the significant health risks associated with exposure to mining waste. China's largest uranium mine, No. 792, is reported to dump its untreated irradiated water straight into the Bailong River, a tributary of the Yangtze.

#### **Case 4: South Africa**

The history of uranium mining in South Africa is long, beginning in the 1950's, and was often used to supplement gold mining. After a lull in the industry, plans are now in place to enlarge the South African mining facilities. AngloGold Ashanti, the only company currently producing uranium, plans to increase their uranium outputs in the following years.

The company srx Uranium One Inc. plans to develop one of the largest untapped uranium deposits within South Africa, in fact one of the largest deposits in the world. Many other projects in the regions of Buffelsfontein in the North West province, and near Johannesburg in the Gauteng province are also being developed. These enlargements will further the environmental destruction and health problems plaguing the area since mining began. The inhalation of radon gas and radioactive ore dust within mines exposes workers to dangerous radiation, which in many South African mines was found by the CNS (Center for Nonproliferation Studies) to be well above the dose limits internationally recommended for occupational exposure.

The general public is exposed to airborne and waterborne radioactive contaminants; water sources are seriously polluted by run-off water from mining dumps, seepages from tailings dams, and discharge of untreated water; streams around Johannesburg townships have been found to contain uranium, sulfates, cyanide and arsenic; and pollution can render land sterile and too contaminated to farm.

The people most affected by uranium mining and its pollution are poor black communities who are discriminated against in this environmental way. Mines and plants are often situated near their communities, and failure of the mines to maintain proper health and safety standards result in their exposure to radioactive contamination that takes away their water, land, and lives.

#### **Case 5: United States**

Within the United States, nearly all Indian nations sit on land threatened by ruinous environmental hazards such as toxic waste, strip mining, oil drilling, and nuclear contamination. Native Americans are some of the poorest and most discriminated against peoples within the United States, making them easily targeted and exploited by mining companies. Mining companies offer sums of money in exchange for their land, often misleading them and giving them misinformation on the prospects and safety of uranium mining. The environmental destruction that Native Americans face from mines extends far into the future.

Between 1968 and 1982 millions of tonnes of mine and mill wastes were generated at just four mining and milling sites, and an estimated 30 billion gallons of untreated or poorly treated mine water was discharged into local arroyos and streams. This resulted in contaminated livestock, high rates of diabetes, high blood pressure and kidney disease, and many cases of lung cancer in the neighboring area. Newly developing mines threaten to repeat these environmental atrocities.

Present mining now takes place in Colorado, Nebraska, Texas, Utah and Wyoming, and new projects are coming into being in these states as well as in Arizona and New Mexico. Near the indigenous community of Crownpoint in north-western New Mexico, the Nuclear Regulatory Commission (NRC) has granted permission for Hydro Resources Inc. (HRI) to mine uranium, which threatens to contaminate the source of drinking water for the community. The NRC has been known to violate the federal Safe Drinking Water Act and Atomic Energy Act for amounts of uranium per liter in water and has allowed HRI in the past to overlook necessary water safety precautions.

The Navajo population rejects the idea of developing uranium mines on their lands and created a Native American tribal law banning uranium mining and milling. Regardless, mining companies continue to exploit poor native peoples by taking their land and implementing less than sufficient safety measures. As stated by Dr. John Fogarty M.D. the Chief of Staff of the Indian Health Service

Hospital, “Would this happen in Santa Fe, would this happen in Manhattan, would this happen in San Francisco? No. I think this is a case of environmental racism.”

### **Case 6: Russia**

Russia is the fourth largest supplier of uranium worldwide, with four-fifths of its domestic supply and exports coming from stockpile uranium, and one-fifth of the amount coming from mining. The largest mine in Russia is the Streltsovsk mine, where milling and processing of its uranium is carried out in the nearby Krasnokamensk mill. The mine water discharge site Bambakai has leaked contaminated water into stream beds for the duration of the mill's existence, there are reports that indicate seepage from its tailing ponds has leaked through holes in the liner, and the regional water table has unnaturally risen due to an excess of water produced from mine dewatering, tailings liquids, and infiltration from local reservoirs. Indoor radon levels within the region's housing is dangerously high, and mine workers, being accommodated only kilometers from the main pit, are those peoples most exposed to radioactivity.

Plans for future expansion of uranium mining are underway, with an expected increase of annual uranium production by a factor of six by 2020. Such growth in uranium mining would result in yet more environmental pollution and health risks. One such new mine, the Khiagdinskii mine, began production without first laying out plans for restoring the site and its surrounding groundwater once mining is completed. This poses the question of whether the mine will in the future take responsibility for its environmental pollution. As of now, the Khiagdinskii mine does not have fixed monitoring of radiation levels in place at wells, the process plant, in living quarters, or in the cafeteria. There is no way to measure workers' exposure to radiation. There seems to be misconstrued ideas of the environmental and personal dangers of uranium mining, thus putting the Russian people and land at risk as time and mining projects progress.

### **Case 7: Kazakhstan**

Kazakhstan suffered the consequences of nuclear power and weaponry under the Soviet Union for decades. Between 1949 and 1991 approximately 500 nuclear tests with 2500 times the explosive force of the Hiroshima bomb were carried out in the region of Semipalatinsk. The environmental and health damage has effected a documented 1.3 million people, and still 260,000 people are not legally recognized as candidates for governmental compensation.

The new danger for the Kazakhstan people is uranium mining, used to fuel their growing desire for nuclear power. Already wells are contaminated, and millions of tons of radioactive sediments have been dumped into the Koshkar-Ata Lake, which is now drying up and exposing people to radioactive dust. Nuclear power is being presented as a means to solve Kazakhstan's energy deficit, and plans for building nuclear power plants are in the works, thus inevitably leading to more mining and dangerous pollution.

### **Plans for Europe**

Due to increasing uranium prices, European and international companies are becoming interested in the prospect of mining within Europe. Recently there has been developing interest in Finland and Slovakia. Companies proposing uranium mining have encountered strong opposition which has stopped, for the most part, such developments in their tracks. The cited reasons for opposition have been: fear of polluting water sources, dangerous health effects, destruction of nature, environmental pollution, and the fact that such operations take so much away from communities and offer little in compensation, such as employment.

It is clear through the vocal opposition in Finland and Slovakia that uranium mining is not something that any community desires. Yet, in areas such as Australia and the Mid-West where indigenous peoples are not allowed to have a voice of opposition, such mining continues.