



URANIUM

MINING IN NAMIBIA



Rössing Uranium Mine



Radioactive uranium ore

Mining rights and licenses

In Namibia, any right in relation to the reconnaissance, prospecting, mining, sale/disposal and exercise of control over uranium is regulated by the Minerals (Prospecting and Mining) Act, 1992 (Act No. 33 of 1992). Any person interested in mining uranium must apply to the Ministry of Mines, Energy and Industry for a mineral license. A mineral license under the Act includes a reconnaissance license, an exclusive prospecting license (EPL), a mining license and a mineral deposit retention license. A mining license entitles mining companies to mine for uranium for a period of 25 years depending on the deposit size and the scale of production. Currently uranium is mined at Rössing, Husab, Langer Heinrich and Trekkopje, all located in Erongo Region.

Environment

Mining is a listed activity in terms of the Environmental Management Act, 2007 (Act No. 7 of 2007). A mining license will not be granted unless the Environmental Commissioner issues an environmental clearance certificate (ECC), and an ECC will not be issued unless an environmental impact assessment (EIA) has been conducted. An EIA entails a process of identifying and assessing the impacts of a planned activity on the environment (i.e. physical, social and economic). The EIA also serves to enable the miner to mitigate (reduce the severity of) potentially negative impacts of the mining operation and maximise the potential positive impacts.

Radiation protection and waste disposal

Uranium is a radioactive metal. Article 95(1) of the Namibian Constitution states that the Government must provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian territory. The Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005) and its regulations make provision for the protection from radioactive sources and the disposal of waste generated by activities involving radioactive material at medical, industrial and research facilities where radioactive materials and sources of ionising radiation are produced, used or handled. Radioactive waste generated as a result of mining activities are normally disposed of at tailings facilities on mine sites.

Certain actions, such as possessing and exporting any radiation source or nuclear material, are prohibited unless the company/individual is in possession of the license prescribed by the Atomic Energy and Radiation Protection Act. The Act also requires each license holder to appoint a radiation safety officer, who must be a technically competent person with the appropriate independence and authority to implement the provisions of the Act and its regulations.

How does uranium impact the environment?

Natural uranium occurs in three forms, called isotopes: uranium-234; uranium-235; and uranium-238. Ninety-nine percent of natural uranium occurring in rock is uranium-238. Uranium-235 accounts for just 0.72% of natural uranium in rock, but it is more radioactive than uranium-238. Uranium-234 is the least-abundant uranium isotope in rock. Uranium is not a stable element. As it decays, it releases radiation and forms decay products. Its half-life¹ is about 4.5 billion years for uranium-238, 710 million years for uranium-235 and 250,000 years for uranium-234. ►

¹ The "half-life" is the time it takes for a quantity to reduce to half of its initial value.



Because of the slow rate of decay, the total amount of natural uranium in the earth remains almost the same, but radionuclides (radioactive forms of an element) can move from place to place through natural processes or human activities. For example, rain can wash soil containing uranium into rivers and lakes, and mining and milling release uranium into the environment.

How are people exposed to uranium?

Uranium ore contains all of the daughter elements of uranium-238 and uranium-235, but during uranium processing, all three isotopes (238, 234 and 235) are extracted and chemically separated. The concentrated uranium product that is generated at a uranium mine's mill-tailing² sites and uranium-processing facilities is a potential source of exposure for people and the environment, and is a primary concern for the clean-up of these sites. Exposure at these sites may be from different pathways, but due to the mobility of uranium, the groundwater pathway is of particular concern.

² Mill tailings are the residue that remains from extracting uranium from uranium ore. The tailings are radioactive and might contain other metals or hazardous substances.

How does uranium enter the body?

Uranium enters the body when inhaled or swallowed, or through cuts in the skin. About 99% of the uranium ingested through food or water will leave a person's body in the faeces, and the remainder will enter the bloodstream. Most of this uranium will be removed by the kidneys and excreted in the urine within a few days. A small amount of the uranium in the bloodstream will be deposited in the person's bones, where it will remain for several years.

What are the health risks?

In addition to the risk of cancer posed by uranium and all other radionuclides, uranium is associated with non-cancer effects, and the major target organ of uranium's chemical toxicity in humans is the kidney. Radioactivity is a health risk because the energy that radioactive materials emit can damage or kill cells. The level of risk is dependent on the level of uranium concentration.

What are the dose limits for the public and workers to protect human health?

In terms of the Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005), the minimum dose to which the public may be exposed is 1 mSv³ in a single year, which may, subject to approval, be increased up to 5 mSv in a single year, provided that the average dose over five consecutive years does not exceed 1 mSv per year. The minimum dose limit for workers is 20 mSv per year averaged over five consecutive years.

³ 20 millisieverts (20mSv) = 100mg

Is there a regulatory body in Namibia?

The Atomic Energy Board (AEB), established in 2009 in terms of the Atomic Energy and Radiation Protection Act, 2005, is an advisory body reporting to the Minister of Health and Social Services. The National Radiation Protection Authority (NRPA) is its technical arm and is responsible for administering the Act. The AEB has to ensure that the use of radiation and nuclear energy in Namibia does not cause unacceptable impacts on the health of workers, the public and the environment.

