The environmental impacts associated with uranium mining include solid waste management, water management and chemicals and emissions from milling. Special management practices and preventative measures need to be in place in relation to the radioactivity associated with the uranium ore and to ensure the safety of workers.

**Environmental Approvals**

In Australia, an Environment Protection and Biodiversity Conservation Act approval is required before a uranium mine can be established and projects must comply with all environmental, safety and occupational health conditions applicable. Environmental studies of the site are undertaken, focusing on any issues of potential concern to the proposal. Following this, an environmental impact statement is published and public comment is invited. Approval for the project may occur after a period of consultation with a range of state and federal authorities.

**International Certification**

The world’s most recognized Environmental Management System (EMS) framework is ISO 14001, which was developed by the International Organisation for Standardisation in Geneva. Two of Australia’s three currently operating uranium mines have achieved ISO 14001 classification. The purpose of this framework is to assist companies in minimising harmful effects of uranium mining on the environment.

**Wastes from Mining and Milling**

The uranium ore in the ground contains only a fraction of the metal that is sought by the mining operation, therefore, the mining of uranium ore produces large amounts of bulk waste materials, some of which is radioactive. Environment regulations and guidelines need to be followed to minimise releases of radioactive decay products such as radium and radon. Companies are subject to strict government regulation and inspection of all mining methods and practices around rehabilitation. Mining operations must also adhere to the relevant national health and radiation protection codes of practice.

**Tailings and Radon**

Waste tailings are those materials that are extracted in the mining process but which contain little or none of the mineral being sought. The waste management objective is to control and limit the release of potential harmful substances to the environment. Safety measures need to be taken to minimise the emission of radon gas, which is one of the products of radium’s natural radioactive decay. Material in the tailings dam for example is often covered by water to reduce surface radioactivity and radon emission. On completion of mining, the tailings dam is covered with meters of clay and topsoil.

**Water**

In Australia, stringent requirements have been placed on water management at uranium mines to avoid pollution of groundwater. Run-off from the mine stockpiles and waste liquors from the milling operation are collected in sealed retention ponds. Process water discharged from the mill, which contains traces of radium and other metals, is evaporated and the metals are retained in tailings dams.

**Rehabilitation**

At the conclusion of mining, any solid wastes, including equipment no longer needed, is buried with the tailings. These are covered permanently with clay and soil to reduce radiation levels and radon emanation rates. A vegetation cover is then established.

**Health of Workers**

In Australia, uranium mining and milling operations are regulated by the Code of Practice and Safety Guide: Radiation Protection and Radiation Waste Management in Mining and Mineral Processing, which sets strict health standards for radiation and radon gas exposure for both workers and members of the public.

Precautions which need to be in place to protect the health of workers include:
- Good forced ventilation systems in underground mines
- Efficient dust control
- Limiting the radiation exposure of workers
- The use of radiation detection equipment in all mines and plants
- Imposition of strict personal hygiene standards for workers handling uranium oxide concentrate
- Routine monitoring of workers for alpha radiation contamination
- Routine monitoring of air, dust and surface for radiation contamination.

The World Nuclear Association is acknowledged as a significant source for this information.