Government of **Western Australia**
Department of **Mines and Petroleum**
Radiological Council

Transporting Uranium Oxide in WA

– your questions answered

1. How am I protected from radiation risks from transporting uranium oxide?
2. What are the risks of a spill?
3. Where can I find more information?

Australia has been shipping uranium oxide out of its ports for over 30 years without a major transport incident or radiological damage to people or the environment.

In 2012, a total of 473 containers on 36 separate shipments, departed Australia without incident.

In Western Australia regulation of uranium mining by the Department of Mines and Petroleum (DMP) and the transport of radioactive material by the Radiological Council ensures the risks of public exposure to radiation as a result of uranium mining are negligible.

The Radiation Safety (Transport of Radioactive Substances) Regulations 2002 cover the transport of uranium oxide and are based on international and national standards for radiation management.

How is uranium oxide packaged, loaded and secured for safe transportation?

Uranium oxide is sealed in 200-litre steel drums, the drums are washed and checked prior to being loaded into shipping containers. The drums are secured inside the containers to international standards using a strapping system designed to withstand the forces expected during road, rail and sea transport. This strapping system minimises the likelihood of uranium oxide spilling as a result of an accident.

International and national guidelines for the transport of radioactive material have requirements regarding the control of contamination on external surfaces of packages. These controls are easily achieved by washing and checking of containers before they leave the minesite.

The packaging, loading and transport of uranium oxide has been designed to minimise the risk of radiation exposure to the workers, the public and the environment through engineering and administrative controls. These stringent controls ensure public safety with no measurable dose during transport. Current proposals involve transportation by truck in convoys from Western Australia to Adelaide via Kalgoorlie.

What is the radiation risk to communities along the transport route?

The low levels of radiation of uranium oxide and the strict packaging requirements mean that any radiation exposure to the public from a passing truck carrying uranium oxide is negligible.

Secure packaging of uranium oxide for transport
Photo: ERA

Personnel work near drums of uranium oxide during packing, loading and transport
Photo: ERA

Legislation in Western Australia stipulates that members of the community are not exposed as a result of mining and transport activities to more than 1 milliSievert (mSv) per year on top of natural background levels. Data collected from people living close to existing uranium mine sites in Australia shows that mining origin radiation doses are only 1–2 per cent of the annual dose limit set for members of the public[1].

How will radiation levels be monitored along the transport route?

Monitoring the drivers' radiation doses is the best indicator of radiation exposure along the route. Evidence from existing uranium mines shows that truck drivers are likely to receive an annual radiation dose of just two per cent (0.4 milliSieverts) of the annual occupational limit. Exposure to members of the public would be significantly less than this because of the transient nature of trucks on the road.

Roadside radiation monitors are not practical due to the fluctuations of natural background radiation. The low level of radioactivity of uranium oxide and the strict packaging requirements mean that a truck passing a stationary monitor once or twice a week will not cause any change to the background radiation already present.

Source or mode	Typical dose (mSv)
Annual dose from natural background	2.4
10 hour aeroplane flight	0.03
Chest x-ray	0.05
CT scan	10
Annual dose to nuclear worker	1
Annual cosmic radiation at sea level	0.4
Annual cosmic radiation Mexico City (2,300m)	0.8
Chernobyl recovery workers in 1986	150

Sources of radiation exposure[2]

What are the risks of a spill?

If there is a traffic accident, any release of material is very unlikely due to the way that uranium oxide is packed (see previous section).

If there is a spill, any environmental or health risks from radiation are low because the properties of uranium oxide are such that it is:

- effectively insoluble and does not pose a fire or explosion hazard.
- a dense, heavy material. This reduces the spread of material into the wider environment and also minimises the likelihood of inhalation or ingestion.
- unable to penetrate our skin and there is no evidence of negative health effects from skin contact.

In the unlikely event that material escapes from both the drums and the container, spilt uranium oxide is collected and returned to the drums by trained personnel. Following clean up, monitoring of radiation levels is conducted around the area to ensure there are no adverse impacts to people or the environment.

What happens if there is a spill?

A spill of uranium oxide is treated the same as an incident involving any other dangerous good. In Western Australia, it will be managed by the Department of Fire and Emergency Services through the Western Australian Hazardous Materials Emergency Management Plan.

Companies are also required to have an Emergency Response Plan approved by the Radiological Council. This plan outlines the procedures in place for dealing with foreseeable accidents. This may include providing appropriate driver training and a requirement to carry a response kit to immediately contain any spill of uranium oxide.

Where can I find more information?

- Radiological Council
  Telephone: **9388 4999**
  Email: **radiation.health@health.wa.gov.au**
  www.radiologicalcouncil.wa.gov.au
- Western Australian Department of Mines and Petroleum
  Telephone: **9222 3734**
  Email: **uranium@dmp.wa.gov.au**
  www.dmp.wa.gov.au/uranium

Department of Mines and Petroleum
Mineral House, 100 Plain Street, East Perth WA 6004
Tel: +61 8 9222 3333, Fax: +61 8 9222 3862
www.dmp.wa.gov.au/uranium

[1] Radiation Workers Handbook

[2] United Nations Scientific Committee on the Effects of Atomic Radiation (2011) *Answers to Frequently Asked Questions*