



1. What is uranium?

1.1 What is uranium and how is it mined?

Uranium is the world's heaviest, naturally occurring element and is found in soil, rocks, human tissue, food, water and the ocean.

Uranium can be mined in three different ways, open-cut, underground and in situ leaching. Once the ore is mined it is finely ground and the uranium is extracted through conventional processes involving mineral separation with acid or alkali, and then the ore is concentrated into uranium oxide called yellow cake.

2. Uranium mining in WA

2.1 When will WA's first uranium mine be operating?

Uranium proponents need to meet stringent State and Federal health, safety, security and environmental requirements before mining can begin.

The three main companies planning to mine uranium in Western Australia are Mega Uranium, Toro Energy and BHP. Once they meet all the strict requirements it is estimated that:

- Mega Uranium will have the State's first uranium mine in operation by early 2012 at its Lake Maitland project;
- Toro Energy will begin operations at its Lake Way project in 2012/13; and
- BHP's Yeelirrie project, the biggest project, is expected to be in production in 2014.

2.2 Where are the uranium deposits in WA – how close to developed areas are they?

Western Australia's uranium deposits are all located in remote areas well away from populated areas. The first three of the current proposed uranium mines are about 80 - 100km from Wiluna.

2.3 How much will uranium mining be worth to WA and how does that compare to other mineral export income for the State?

Like any resource operation, the State Government would receive royalties and the local government would receive shire rates. The royalty is expected to be five per cent of sale value.

It is expected that uranium mining in WA will be on a small scale initially, but could bring \$34 million dollars to the State by 2014 (based on uranium exports of \$675 million – 5000 tonnes per annum and the current spot price of AU\$135,000 per tonne).

Uranium would initially be towards the bottom of the resources league. Iron Ore and Petroleum are the two most dominant export resources in WA.

In 2008, total iron ore sales were \$31.30 billion; crude oil and condensate was \$13.25 billion and LNG was \$7.18 billion.

Uranium mining is also expected to bring economic and employment benefits to local indigenous communities.

Many uranium companies have already started to negotiate employment and training opportunities with indigenous communities.

It will also be a valuable employment opportunity for science graduates because Radiation Safety Officers, who monitor radiation at mine sites, must have a Bachelor of Science degree.

2.4 How long will some of the State's uranium resources last?

Individual projects will have a varying life expectancy based on the resource and quality of the grade. Lake Maitland could have a life span of 10–12 years; Yeelirrie up to 40 years.

2.5 Where would WA most likely export to and what will the uranium be used for?

Australian mining companies currently supply uranium under long-term contracts to electricity utilities in the United States of America, Japan, the European Union (United Kingdom, France, Germany, Spain, Sweden, Belgium and Finland), South Korea and Canada.

Under the Nuclear Non-Proliferation Treaty, Australia has obligations to ensure that uranium oxide will only be sold for peaceful purposes – such as electricity generation – to countries which have signed the Treaty and with which Australia has bilateral safeguard agreements. Regulation 9 of Customs (Prohibited Exports) Regulations under the *Commonwealth Customs Act 1901* will ensure this.



3. Uranium Safety

3.1 Can uranium mines be operated safely?

Yes, for the following reasons:

- Health, safety and environmental standards have improved considerably since the early days of uranium mining in Australia and are now of an international standard.
- Radiation workers are continually monitored for radiation exposure.
- The workers wear high-grade personal protective equipment which includes dust monitors and radiation badges.
- Stringent State and Commonwealth legislation and regulations apply to the mining, milling, operation and transportation of radioactive materials.
- Mine sites are monitored for radiation levels, the yellowcake is securely stored, and the environment is continually monitored.
- Inspectors from the Department of Mines and Petroleum's Resources Safety Division regularly assess data collected from onsite Radiation Safety Officers as well as making their own onsite inspections.
- Radiation Safety Officers, who must have a science degree, are employed on site to monitor workers' radiation exposure as well as regularly testing the monitoring equipment.
- Representatives from the Australian Safeguards and Non-Proliferation Office can also inspect the site with virtually no notice given to assess security arrangements and audit uranium accounting methods.

4. Transporting Uranium

4.1 How will the uranium be transported?

The processed uranium (yellowcake) will be sealed in metal drums and stored and braced in shipping containers in compliance with the *Safety Guide for the Safe Transport of Radioactive Material*.

It will most likely be transported by truck/rail to South Australia or the Northern Territory. Because yellowcake is containerised, it is never loaded using conveyor belts as other minerals such as iron ore are.

Radioactive materials, such as mineral sands, have been

transported in bulk on WA roads for more than 40 years without a major radiation incident or health effect.

In the unlikely event of a spill of drummed and containerised yellowcake, a spill can be safely cleaned up by a person using a shovel and wearing standard Personal Protection Equipment (PPE).

4.2 How much uranium is the State expecting to transport?

The projects will vary, but BHP has predicted that its Yeelirrie mine, which will be the State's largest uranium mine, will produce about five shipping containers of uranium oxide a week.

4.3 Is there going to be any security at the mine sites or accompanying the transportation of uranium?

Once produced, yellowcake must be stored in a secure area as required by the Australian Safeguard and Non-proliferation Office (ASNO).

The Commonwealth has specific security requirements due to its international nuclear non-proliferation obligations.

Every producer or transporter of uranium oxide concentrate must prepare a Transport Plan that specifically focuses on the numerous activities and responsibilities of all parties and individuals involved in the transportation of uranium oxide concentrate containers from the mine site to the export shipping port or terminal.

4.4 Will there be any stockpiling of either uranium ore or processed yellow cake allowed? If so, how will that be managed and what sort of locations would be considered?

Uranium ore will be processed at the mine site into yellowcake which will be stored in drums and containers awaiting transport. The Mines Safety and Inspection Regulations require storage of yellowcake only in defined areas while ASNO's requires the area to be secure.

Current safety and environmental regulations require stockpiling of uranium ores and waste products in an appropriate manner to minimise dust generation and water contamination.

The yellow cake will be stored in registered, secure radiation storage areas prior to transport. Again, the Commonwealth has specific security requirements due to its international nuclear non-proliferation obligations.



5. Environment and Uranium

5.1 Will uranium mining affect the environment?

Development of uranium mines have similar environmental impacts to other non-radioactive mining operations.

For example, the development of mines may result in the clearing of native vegetation, noise generation, changes to the landscape, water extraction and/or adverse impacts on fauna habitats.

Where radioactive ores are involved in the mining process, they are highly regulated under both State and Commonwealth approval processes and rigorous inspection schedules to ensure minimal radiation impacts on receiving environments, such as air, soil and water.

5.2 Can the land be restored after uranium mining?

Yes, as part of the environmental approval processes by the Environmental Protection Authority, the Department of Environment and Conservation and the Department of Mines and Petroleum (DMP), there is a requirement for mining companies to remediate and rehabilitate all mining disturbances to the approved standards which are to promote a safe, stable, non-polluting environment and support a native ecosystem.

Mining operations that have involved the extraction of radioactive ores can be satisfactorily rehabilitated. DMP requires demonstration that the rehabilitation is:

- Safe – for the public and wildlife
- Stable – landforms do not erode or collapse
- Non-polluting – the air and water quality around the site is not impacted
- Self-sustaining ecosystem – the ecosystem is able to re-establish

The design or waste rock dumps and tailings storage facilities can occur to ensure that any residual radioactive material is adequately contained. This includes capping of areas.

As part of the approval of mining proposals, DMP will require mining companies to lodge environmental bonds to cover the full cost of rehabilitation.

DMP requires that pre-mining radiation monitoring be undertaken at uranium mining sites so that the success of closure can be demonstrated (eg. radiation emissions not being different after the mine is closed).

5.3 Does Western Australia have a good history in rehabilitating mine sites?

Feedback from national and international mining rehabilitation consultants, indicates that mining rehabilitation in WA has been of a high standard and with a high success rate.

Mining companies are required to lodge environmental bonds and to adequately rehabilitate mining sites after completion of their operations.

The rehabilitation failure rate, based on the environmental bonds that have been called up is about 0.5 per cent.

DMP requires the lodgement of a financial security, an Environmental Bond, as part of the assessment of the Mining Proposal under the *Mining Act 1978*.

The bond will only be discharged after the company has met all its environmental rehabilitation obligations. Otherwise the bond will be called up by the Minister and the money will be used by the State to undertake rehabilitation.

5.4 How much radioactive waste does uranium mining produce?

The volume and proportion of radioactive waste will depend upon the size of the operation, the nature of the ore, and the processing methods used at the mine site.

The management of the waste at mine sites is highly regulated by the DMP and DEC on advice and direction from the Radiological Council.

6. Uranium and the Community

6.1 How can the State Government reassure people that the communities exposed to the transport of uranium and yellowcake will be safe?

The transport of radioactive materials is covered by the Commonwealth's *Nuclear Non-proliferation (Safeguards) Act 1987*. The export of concentrates would be regulated under the *Customs Act 1901*.

The yellowcake will be sealed in metal drums and stored and braced in shipping containers in compliance with the *Safety Guide for the Safe Transport of Radioactive Material*. The transport companies will be licensed with the Radiological Council and drivers will have attended Radiation Safety training.



It will most likely be transported by truck/rail to SA or NT. As yellowcake is containerised, it is never loaded on ships using conveyor belts as the lead in Esperance was.

Radioactive materials have been transported in bulk on WA roads for more than 40 years without a major radiation incident or health effect.

In the unlikely event of a spill of the containerised yellowcake, a spill can safely be cleaned up by a person using a shovel and wearing standard Personal Protection Equipment (PPE). Yellowcake is not a dangerous radiation hazard and it is low in radioactivity.

7. Uranium and the State Government

7.1 **The State Government says it does not support the construction of a nuclear power station in WA, what is in place to give the community confidence that will not change?**

WA has abundant supplies of affordable energy resources such as gas. In the short to medium term, it is uneconomic to build a nuclear power facility in WA.

Also the *Nuclear Waste Storage and Transportation Prohibition Act 1999*, prohibits the construction or operation of a nuclear waste storage facility in WA.

It makes it illegal to store, dispose or transport any nuclear waste in Western Australia.

How can the WA community be confident the Government will not just change its mind on accepting radioactive waste and spent nuclear fuel?

The storage of nuclear waste in Western Australia is prohibited through the *Nuclear Waste Storage and Transportation (Prohibition) Act 1999*. That Act prohibits the construction or operation of a nuclear waste storage facility and makes it illegal to store, dispose or transport any nuclear waste in this State.