



Australian Government
Department of Industry,
Innovation and Science

National Radioactive Waste Management Facility

JULY 2018



Facility concept design

Concept design of the National Radioactive Waste Management Facility

The National Radioactive Waste Management Facility will be the permanent disposal site for Australian low level radioactive waste and where Australian intermediate level waste is temporarily stored for a few decades, until a separate permanent facility is constructed at another location.

The site design will be finalised once a preferred site is selected so it will suit the chosen location's conditions, taking account of geology, hydrology, seismicity, rainfall, bushfire risk and local flora and fauna. Community expectations will also be considered in

the design process, including aesthetics preferences, and community and tourist facility needs.

While the final Facility design will be developed in close consultation with a host community, there are some essential elements that will be included in the design regardless of which site is selected.

The initial concept design features the visitor and administration centres, a waste reception and management area flanked by low level disposal vaults on the left and the temporary intermediate waste stores on the right. The operational footprint is about 40 hectares set within an overall 100 hectare zone.



This document is part of a series of factsheets providing information on the process to site the National Radioactive Waste Management Facility.

For more information

Call
13 28 46

Email
radioactivewaste@industry.gov.au

Facebook
[@radioactivewasteproject](https://www.facebook.com/radioactivewasteproject)

Visit
www.radioactivewaste.gov.au

General principles of the Facility design

The National Radioactive Waste Management Facility will be built in line with world's best practice, consistent with the extensive regulations. More information on the regulations that will apply to the Facility can be found in the *Regulatory frameworks* factsheet available at www.radioactivewaste.gov.au.

The building and design will be engineered to the point that there is no credible scenario that could result in a risk to people or the environment.



▲ Facility concept design site shown from above

Visitor and administration centres

The visitor centre is expected to be one of the most recognisable buildings at the Facility – welcoming visitors and staff. Its location, design and layout will be tailored to the site that is selected, and activities will be decided in consultation with the community.

It is expected to have a similar role and purpose to the Discovery Centre at ANSTO's Lucas Heights campus, and other similar facilities around the world. The visitor centre would be able to cater for at least 48 people (around a bus load) at a time.

The form of the centre will represent the final form of the covered low level waste vaults, and includes two 'pilot vaults' (that will not contain any radioactive material) to evaluate capping materials during the operational life of the Facility.

Buffer zone

The Facility footprint will be approximately 40 hectares, surrounded by a 60 hectare buffer zone.

The use of the buffer zone will be determined in consultation with the community and key stakeholders.

The buffer zone could, for example, include agricultural research and development, or other scientific uses, within the required parameters, regulations and guidelines.

▼ Artist's impression of visitor and administration centres



Waste reception

The waste reception area is where radioactive waste will be received. Here all packages will be inspected and documents reviewed to ensure compliance with Waste Acceptance Criteria.

In waste reception, operators will verify documentation, packages will be visually inspected, surveyed, and the unloading point for each type of waste will be determined. Depending on the material and its packaging, actions could include:

- quality assurance checks and scans;
- quarantine of waste that may not meet Waste Acceptance Criteria, for further investigation;
- limited conditioning, where additional grout may be applied to final outer packages for low level

waste prior to disposal (noting that at no time will the waste be open to the environment or workers); or

- buffer storage pending movement to the low level vaults or intermediate level storage facility.

Once these actions are finalised, low level waste that meets the Waste Acceptance Criteria will be moved to the above-ground disposal vaults, and intermediate level waste that meets the Waste Acceptance Criteria will move to intermediate level waste storage buildings.

As with other parts of the Facility that are accessible to people, the material will be shielded to ensure safe access for workers, scientific visitors and regulators who attend the Facility.

Low level waste disposal

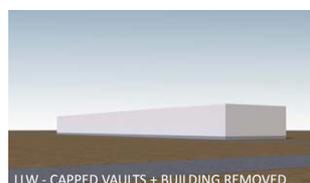
The low level waste disposal facility will be operational for 100 years, and then will be monitored for a further 200-300 years.

To be disposed of in the disposal cells, waste will need to be conditioned and packaged to meet appropriate Waste Acceptance Criteria. The disposal cells themselves will be rows of above-ground reinforced concrete vaults, which meet the specifications of the site and the operating licence. The concept design internal vault dimensions are 12.5 metres square by 6.8 metres high.

Each vault will have a temporary roof over it while it is being filled, to protect the materials as well as overhead cranes and equipment from the weather. As waste is accepted, each vault will be progressively filled.

Once filled, each vault will be capped and sealed, its temporary roof will be removed and the long-term engineered cover of earthworks will be placed over the top.

Once the Facility has entered the post-closure phase, there will be ongoing environmental monitoring, to provide ongoing assurances of safety.



◀ Artist's impression of low level waste disposal stages

Intermediate level waste storage

Intermediate level waste will be temporarily stored at the Facility for several decades, while a final disposal path is developed, for a different type of facility in a different location. The design of the intermediate level waste storage facility will be appropriate for this timeframe.

All intermediate level waste will be appropriately conditioned and packaged in accordance with Waste Acceptance Criteria before being received at the Facility. The intermediate level waste will be stored

in purpose-built storage facilities that retain access, so that it can be moved to its final disposal site in the future.

Intermediate level waste storage will be kept in a variety of appropriate formats, including shielded flasks (such as the TN-81 cask), flasks with additional facility shielding, or in above-ground storage racking.

All waste will be fully immobilised inside a glass, concrete or synroc matrix and then placed within multiple layers of protection to ensure safety for workers, visitors and the surrounding community.



▲ Artist's impression of intermediate level waste storage facility during operations

Ensuring a safe operating environment

This concept design is in line with Australian regulations, codes and standards, as well as considering international best practice, as demonstrated overseas at facilities such as El Cabril in Spain and ANDRA in France.

Alongside the concept design, the Department has prepared a preliminary safety and waste acceptance report, which is essentially a preliminary assessment of risk, based on the concept engineering designs and the experience of experts such as ANSTO in managing these kinds of radioactive wastes safely.

The preliminary safety and waste acceptance report considers the activities to be carried out during the operational phase of the Facility, when waste is being received and moved into storage, over about 100 years, and finds that the risk associated with those activities is 'Low' or 'Very Low'.

For the post-closure phase of the Facility, the low level waste disposal was assessed taking into account the engineered and natural barriers (waste packages, engineered vaults with capping and site

geohydrology) that all contribute to ensuring long-term safety for people and the environment. The development of the safety assessment will look at the natural and man-made intrusion scenarios.

This analysis also indicates that the proposed concept design of the Facility, coupled with a strong safety culture, and the comprehensive safety management systems that will be implemented, will ensure safety during operation and post-closure.

A more detailed, site-specific safety case, which includes a detailed risk assessment and accident scenario planning, will be produced once a site is selected and the detailed facility design has been developed. This is a requirement of the multiple licensing and regulatory processes involved in siting, designing, constructing and operating the Facility.

The safety analysis is never truly "final" and will be regularly reviewed and updated as events, technologies and our understanding of issues evolve.