Australian Government

ANSTO
Science. Ingenuity. Sustainability.

ANSTO Synroc® technology overview

Safe, secure and sustainable radioactive waste treatment

The ANSTO Synroc® demonstration plant has been operating since 2017.

ANSTO Synroc® technology is regarded as global best practice in the safe treatment of complex nuclear waste, minimising environmental impact, reducing disposal volume, and lowering full lifecycle costs.

This technology is designed for the treatment of challenging nuclear waste, including actinide bearing materials, radioiodine and molten salts from spent fuels. The technology is part of the global, 'new nuclear build paradigm', and is highly regarded by the international nuclear community.

Key ANSTO Synroc® technology benefits include:

- A cost-effective, low-risk, disposal-ready solution for intermediate and high-level radioactive waste to meet international requirements.
- Lifecycle management of radioactive materials that minimise disposal volumes and environmental risk, which can be built into nuclear supply chains anywhere in the world.
- Tailored products and services for the treatment of nuclear waste, to meet client requirements.

ANSTO Synroc® wasteform product is tailored to suit the waste characteristics to reduce environmental risk, disposal volumes and lifecycle costs.

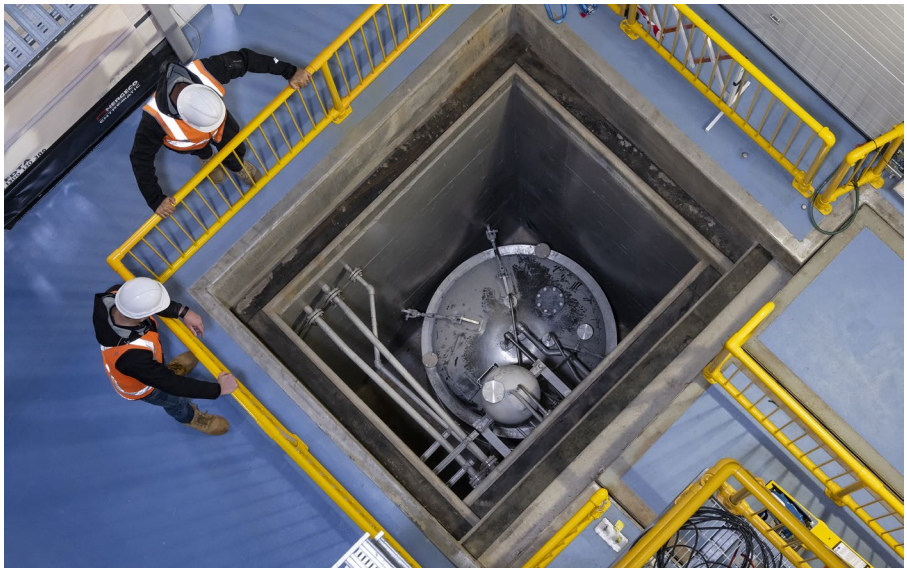
ANSTO Synroc® Technology Maturation

Anchored in research, nuclear engineering, and proven process design and demonstration testing, the ANSTO Synroc® waste treatment plant, located at Lucas Heights in Sydney, Australia, is currently moving to cold commissioning of the process plant. This fully remotely operated facility will treat the liquid by-product of Molybdenum-99 (Mo-99) nuclear medicine production.

About ANSTO Synroc®

The team at ANSTO Synroc® has built a global reputation as a trusted and innovative technology solution provider for the safe and cost-efficient treatment of challenging nuclear waste. Our scientists, engineers, and highly skilled technologists, working with quality and safety specialists, have successfully delivered projects in the US, Canada, UK, and South Africa, demonstrating the efficacy of this technology.

ANSTO has radioactive waste management expertise across the technology maturation pipeline. Synroc technology, developed by ANSTO, is an advanced, robust solution for the treatment of intermediate and high-level radioactive waste.



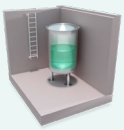
Waste transfer bunker which houses the liquid waste tank in the new ANSTO Synroc® treatment plant.

Key features of the ANSTO Synroc® facility

- High performance state-of-the-art facility
- Integrated and seamless waste treatment
- Hot isostatic pressing system
- Safe and secure operations
- Full remote automation

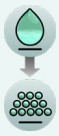
Process overview for the treatment of liquid waste from Mo-99 production

1



Capturing waste from Mo-99 production
The liquid waste is captured, stored and characterised in tanks prior to transfer to the final waste treatment facility.

2



Conversion of liquid to powder
The liquid waste is processed within a hot cell by introducing the tailored Synroc formulation. The tailored liquid additive undergoes mixing before it is converted into a granulated powder via a drying process.

3

Preparing the canister
When the waste mixture is in powder form, it is dispensed to a specially designed canister.

4

Hot Isostatic Pressing
The canister is sealed and placed into a hot isostatic press where heat and pressure are applied.

5

Durable, compact waste form
The final solid product is now volume-reduced, durable and a disposal-ready wasteform.

Find out more

To learn more about our technology, team, facilities, and expert consulting services:

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