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Nuclear-based science benefiting all Australians

Australian Nuclear Science and Technology Organisation

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ANSTO showcases expertise in Washington

In Washington this week, ANSTO launched a new initiative to treat difficult nuclear wastes. This initiative reflects the importance of securing all nuclear materials, including nuclear wastes, with practical technology solutions.

The keynote Austrade event was held at the Embassy of Australia in Washington DC and was hosted by the Ambassador the Hon. Kim Beazley in the margins of the Nuclear Security Summit.

At the launch, ANSTO CEO, Dr Adi Paterson, indicated that the US Department of Energy's (DoE) recent Record of Decision (RoD) selecting Hot-isostatic Pressing (HIP) technology to treat the radioactive wastes known as the 'Idaho Calcines' is a game-changer for ANSTO.

"The suite of technologies known as Synroc, developed at ANSTO, is key to immobilising the most challenging nuclear wastes," Dr Paterson said. "The DoE announcement is a turning point that will lead to widespread acceptance of the technology for legacy clean-up campaigns, not only in the United States, but around the world."

As the global leader in HIP technology to treat wastes, ANSTO is planning to build a plant at its Lucas Heights site to process its waste from medical radioisotope production. In response to the growing global demand for this technology, ANSTO also announced the establishment of a dedicated business group to pursue these opportunities.

Interest has already been expressed by two European countries in specialised applications using this technology. Similarly, other producers of radioisotopes have indicated interest in early construction of plants to deal with their waste.

"The multi-mission capability in the treatment of difficult radioactive waste makes the technology platform unique and attractive for a range of clients," said Dr Paterson.

The distinctive advantages of the approach include volume reduction – the holy grail of modern nuclear waste management - which is achieved by high waste loading in conjunction with HIP technology.

Secondly, enhanced durability delivering greater proliferation resistance and, thirdly, the modular plant construction which allows the technology to be applied on a wide range of challenging wastes.

ANSTO has two-and-a-half decades of Synroc engineering development which provides the unique platform to deliver tailored plants and associated technology packages together with local and global partners.

"The interest generated at the Austrade event is the main reason to showcase Australian innovation – practical expression of interest and the proper recognition of Aussie creativity," said Alison McGuigan-Lewis the Austrade Senior Trade Commissioner.

Synroc background information

Synroc (synthetic rock) is a substance that safely locks up radioactive waste in a way that mimics natural rocks that have existed in the environment for millions of years. It was pioneered in 1978 by a team led by Dr Ted Ringwood at the Australian National University, with further research undertaken in collaboration with ANSTO.

Over that time, the original Synroc, designed for the immobilisation of high-level waste (HLW) from the reprocessing of spent nuclear fuel, has evolved into a broad family of formulations and associated process technologies.

ANSTO has more than 25 years of experience in the development of Synroc-type ceramic and glass-ceramic wasteforms and associated process technologies for the immobilisation and safe disposal of nuclear wastes. *SynrocANSTO*[®] has utilised this knowledge and experience to develop innovative Synroc waste-forms tailored for individual nuclear waste streams, including some which have no current disposal route.

The combination of ANSTO's waste-form design and processing technology also offers potential cost savings of billions of dollars to international nuclear waste cleanup programs.

Tailored nuclear waste forms

The expertise of the *SynrocANSTO*[®] team lies in tailoring the chemistry of the wasteform and the associated process technology to suit the unique characteristics of the particular waste stream.

Tailored Synroc designs can offer significantly improved durability. This enables the waste package to effectively retain the radioactive isotopes as they decay over tens to hundreds of thousands of years, significantly reducing the long-term environmental risk.

The wasteform formulation is the key component of the immobilisation process. It determines the type of nuclear waste that can be immobilised, the durability of the waste package and the waste loadings achievable.

Advantages

The integration of wasteform design with *SynrocANSTO*[®] Hot-Isostatic Pressing (HIP) technology achieves maximum benefits by minimising the waste volume via high waste loadings, reduced environmental risk via optimal chemical durability, and increased process flexibility. In addition, using HIP technology significantly reduces radioactive volatility during high temperature processing compared to competing process technologies.

By using *SynrocANSTO*[®] technology to reduce the waste volume, potential savings of billions of dollars could be realised.

ANSTO utilises the services of ANSTO Inc., a wholly-owned US subsidiary, to pursue commercial opportunities for the technology in the USA.

Ends

For more information please contact ANSTO Public Affairs Manager, Andrew Humpherson (+61) 419 241587.