

WM2017 Conference Panel Report

Panel Session 14: Featured Country: Japan - Perspectives on Decommissioning NPP in Japan

Co-Chair: **Kazuhiro Suzuki**, *TEPCO/NDF, (Japan)*
John Tappert, *USNRC*

Panel Reporter: **Eric Knox**, *AECOM*

Panelists:

1. **Kazuhiro Suzuki**, *Senior Managing Director, TEPCO/MDF (Japan)*
2. **Masanao Moriwaki**, *General Manager Hitachi-GE Nuclear Energy (Japan)*
3. **Masamichi Obata**, *Chief Specialist, Toshiba Co. (Japan)*
4. **Tim Carraway**, *Director, International Projects, AECOM*
5. **Colin Austin**, *Senior Vice President, EnergySolutions*

A panel of experts focused on the decommissioning of the older Japanese Nuclear Power and the ongoing collaborations with overseas partners and companies. TEPCO's **Kazuhiro Suzuki** provided a detailed overview of the current status of the 55 reactors in Japan breaking down the number of reactors currently in commercial operation (3), in the process for amendment of the reactor establishment license (16), reactors under consideration for restart (16), Provisional disposition order for prohibition of operation (2), amendment to the reactor establishment license approved (5), permanent shutdown (6), Decommissioning (4), and handling the accident at Fukushima (6).

Other experts provided unique experiences of leading Japanese companies including what work they have done in country and what they are doing collaboratively to gain experience and qualifications. For example, Toshiba is extending their capabilities and developing technologies, and technical capabilities through an alliance with AECOM, IHI and Westinghouse working with those companies in the USA and Europe. Areas of emphasis include risk management, surveillance technology, segmentation and packaging technology and characterization technology.

Decommissioning experts **Tim Carraway** and **Colin Austin** provided comparative case studies on nuclear decommissioning projects in the USA illustrating how similar projects provided significantly different cost and schedule profiles. The sometimes painful lessons learned from those projects in the USA can and should provide opportunities for significant efficiencies as Japan plans their decommissioning projects.

One significant challenge Japan will have to also address will be waste disposal and was a topic raised by the audience in Q&A. **Tim Carraway** recounted the US experience of beginning decommissioning projects without complete disposition solutions and stated that while disposal solutions are helpful and provide multiple savings and benefits, they are not required to begin and be successful.

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Summary of Presentations:

Kazuhiro Suzuki Decommissioning situation of Nuclear a power Plant in Japan

Provided a comprehensive overview of the commercial nuclear status in Japan with a complete breakdown of operating reactors, shutdown reactors, reactors currently undergoing decommissioning, and reactors under consideration for restart. He additionally provided a status on decommissioning in Japan and an overview of the Institution for decommissioning allowance. Because true cost is significant there is a delay in the timing that required the electric generating period.

The sequence for decommissioning will be Shutdown, de-fueling, system decontamination, safe store, dismantle equipment, water treatment, waste management and disposal.

One of the most important issues is how to handle the radioactive waste. The key elements are segregation, treatment and disposal. Depending on the activity level monitoring of waste will vary from 50 years for very low level waste to 300 years for relatively high level waste.

Masanao Moriwaki Decommissioning technologies in Hitachi-GE Nuclear energy supporting Japanese Nuclear Power Plants

HGNE has provided a wide range of technologies and services on NPP from front end to back end including, manufacturing, design, spent fuel storage and continuous construction experience for about 50 years.

Currently 9 reactors are under decommissioning with 3 under dismantlement and 6 under licensing for decommissioning. Japan has considered three decommissioning strategies: 1) Immediate Dismantlement 2) Deferred Dismantlement and 3) Entombment and is currently in process of Deferred Dismantlement.

Currently 4 technologies are being used for decommissioning:

-Intelligent 3D Model DB which can help estimate, map, simulate and assist in schedule and work planning

- dismantlement and segmentation technology
- Decontamination technology for chemical decontamination to reduce dose for both existing plant services and decommissioning. Decontamination of dismantling equipment is also planned to help reduce waste.
- The necessity of chemical decontamination will be planned and utilized based on each plant condition.
- stabilization of Rad-Waste

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Masamichi Obata Activities of Toshiba for Decommissioning Nuclear Facilities in Japan

Activities and experience of Toshiba in Japan and how they extend their capabilities to aid in reactor dismantlement in Japan.

Toshiba has considerable experience in Japan. Their experiences include planning and decommissioning of their Toshiba Training Reactor. Toshiba has also done the whole package of

DAD TTR: Planning, Defueling and Storage/Transport, system decontamination, dismantlement, and waste management. Demolition of the building is deferred and is currently in a safe storage phase.

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Tim Carraway Sharing our D&D Lessons Learned with Japan

After reviewing overall AECOM experience, Carraway focused on Yankee Rowe, Maine Yankee and Connecticut Yankee decommissioning projects as case studies. The lessons learned in the results of those three projects is that understand your end state, choose your management team wisely and allow them to perform over the life of the project. A complete Comprehensive characterization for the entire site as part of phase 1 (Decommissioning planning) activities is critical. Surgical Removal of contaminated components is critical to allowing for open air removal of containment structures.

Colin Austin Application of Past Experiences for Nuclear Power Plant D&D Success

EnergySolutions experience covers everything needed after the reactor has been switched off. Zion, LaCrosse and Songs (with AECOM) are key *EnergySolutions* D&D projects. At Zion, *EnergySolutions* are on schedule to complete the project in 7.5 years which is 12-14 years ahead of their customer's expected schedule.

Decommissioning plants represent waste. At the point decommissioning begins, the project is no longer a power plant or an engineered component with an engineered operating purpose, it is now a waste redistribution project with various form of waste to be destructed and re-distributed. The cost driver in decommissioning is inexperience.

In decommissioning safety and compliance are non-negotiable. Failure to work safely and compliantly will spell delay and also drive up costs. Strategic priorities are schedule and waste management.

Experiences are transferable to Japan. Collaborative study, baseline development and planning along with worker exchanges will facilitate transferring knowledge and experiences.