

Going long term: US nuclear power plants could extend operating life to 80 years

By May Fawaz-Huber



Surry Power Station was the first plant to notify the US Nuclear Regulatory Commission of plans to submit an application for subsequent licence renewal.

(Photo: NEI)

“If a subsequent renewal is granted and plants are allowed to operate for 80 years, NRC could see increased interest by other utilities.”

— Allen Hiser, Senior Technical Advisor for Licencing Renewal Ageing Management, NRC

The last couple of decades have witnessed increased interest in the extension of the operating life of nuclear power plants. Extending the life of a plant is more economical than building a new one, and where it makes business sense, many plant operators in the United States are seeking licence renewals. This helps avoid supply shortages and support the country in reducing carbon emissions.

“It is very important for us as a world community to care how electricity is produced,” said Maria Korsnick, President and Chief Executive Officer of the Nuclear Energy Institute. “You can produce electricity of an intermittent nature, like wind and solar, but you are going to also need 24/7 baseload energy supply that is kind to the environment, and nuclear is just that.”

The US Nuclear Regulatory Commission (NRC) issues licences for nuclear power plants to operate for up to 40 years and allows licences to be renewed for up to 20 years with every renewal application, as long as operators prove that the effects of ageing on certain plant structures and components will be adequately managed.

About 90 percent of US plants have already renewed their licences once, extending their

operation to 60 years. But most of these will soon reach the end of their 60-year term. If they cease to operate or are not replaced by new plants, the percentage of energy generated from nuclear will drop. A subsequent renewal extends a plant’s operation from 60 to 80 years.

Nuclear provides 20 percent of the United States’ electricity supply and more than 60 percent of the country’s CO₂ emissions-free generation. Electricity demand is expected to rise by more than 30 percent by 2035.

To obtain licence renewal, a plant must provide the NRC with an assessment of the technical aspects of plant ageing and show how any issues will be managed safely. This includes review of system metals, welds and piping, concrete, electrical cables and reactor pressure vessels. It must also evaluate potential impact on the environment, assuming the plant will operate for another 20 years. The NRC verifies evaluations through inspection and audits, and its reviews of licence renewal applications can last anywhere between 22 and 30 months.

“In the very beginning, an NRC review took years to complete,” Korsnick said. “Now that the process is better understood, we are just under two years. For subsequent licence

renewal, we will probably get the process down to 18 months.”

While there have not been any subsequent licence renewals yet, three plants have already expressed their intent to submit an application for such renewal.

“If a subsequent renewal is granted and plants are allowed to operate for 80 years, NRC could see increased interest by other utilities,” said Allen Hiser, Senior Technical Advisor for Licencing Renewal Ageing Management at NRC. “NRC experienced a similar trend when the original licence renewals were granted back in 2000.”

Coping with government and market challenges

Most US Government policies favour renewables over nuclear, and according to Korsnick the market does not value all of the attributes that the nuclear plants bring. Three plants in the past six years have already shut down even before their original licence expired because they could not make sufficient money in the current market place. Korsnick maintains that the markets must be improved so that they value the products that nuclear is bringing — products that include clean air, constant 24/7 power and continuous operation for at least 18 months before needing to refuel. Full recognition of these benefits would prevent additional plants from shutting down prematurely.

“Fundamentally we want an electricity grid that boasts a diversity of generating

WOMEN IN NUCLEAR

Maria Korsnick

President and Chief Executive Officer, Nuclear Energy Institute (NEI)



Drawing on her engineering background, hands-on experience in reactor operations and a deep knowledge of energy policy and regulatory issues, Ms. Korsnick aims to increase understanding of nuclear energy’s economic and environmental benefits among policymakers and the public. Before joining NEI, she was Senior Vice President of Northeast Operations for

Exelon and had served as chief nuclear officer and acting chief executive officer at Constellation Energy Nuclear Group. She began her career at Constellation in 1986 and held positions of increasing responsibility, including engineer, operator, manager, site vice president, corporate vice president and CNO.

“I am proud to have been a member of Women in Nuclear for more than a decade — an organization with more than 25,000 members from 107 countries. Women in Nuclear members come from all areas of the nuclear industry — major power utilities, reactor design firms, universities, laboratories and government agencies — and draw on their passion for this industry to advocate for nuclear science and technology.”

technologies and that appropriately values the core attributes of each technology and the benefits they deliver to society,” Korsnick said.

The IAEA and long-term operation

The IAEA has benefited from NRC support in its long-term operation (LTO) activities. The NRC was an early funder and active participant in the IAEA International Generic Ageing Lessons Learned (IGALL) programme, which used technical information from the NRC’s Generic Ageing Lessons Learned report as its starting point. Other IAEA Member States added data for their plants to that US information, including information for pressurized heavy water reactor designs.

The USA has been an active participant in other IAEA activities related to LTO, including the development of safety guides on ageing management and LTO and presenting LTO workshops for international regulators and plants. The US also continues to provide expertise during IAEA Safety Aspects of Long-Term Operation (SALTO) missions to countries in Europe, Asia, North and South America.