



Fueling nuclear's future

COG's Tony Tenev is overseeing the Fuel Channel Life Management program into its next phase to support CANDU operational excellence.

Less than a year into his CANDU Owners Group (COG) journey, Tony Tenev is using every tool in his toolkit to increase industry understanding of fuel channel material properties and validate predictive models used in the evaluation of fuel channel fitness-for-service.

Throughout his 13-year career in nuclear, Tenev has worked in many areas from fuel handling instrumentation and control engineering to marketing, business development, project delivery and plant equipment supply management. He has called on those diverse experiences while managing the 60+ projects he oversees in his role as COG Fuel Channel Life Management (FCLM) program manager.

Tenev joined COG in August 2019, from SNC-Lavalin's Candu Energy division, where he most recently served as power plant equipment supply portfolio manager. Tenev spent seven years at SNC, managing joint venture projects and major project proposals, with a focus on MCR. He earned his bachelor of engineering at Ryerson University and is both a certified project management professional and chartered professional accountant. In joining COG, Tenev was eager to transition into a role and be part of an organization where he could engage with industry in new and collaborative ways.

"I've been fortunate in my career to touch all facets of the business, from working on the NRU at Chalk River to leading bids for hundreds of millions of dollars in MCR projects," says Tenev.

"Joining COG has allowed me to put those experiences to good use and focus on common solutions for our members in an area that benefits the entire industry."

FCLM: A profile in excellence through collaboration

The CANDU industry's work on fuel channel development is an incredible success story built on collaboration. FCLM research has improved confidence in the fitness-for-service of CANDU pressure tubes and led to improvements in industry standards used worldwide to confirm pressure tube integrity. The work includes accelerated aging and subsequent testing of actual CANDU reactor components that were removed to evaluate late-life material properties.

The Ontario electricity sector is a prime example of the exponential value received from FCLM and Spacer Life Management project efforts. The province's three nuclear plants have all benefitted from demonstrating fitness-for-service through the results of this work. The plants earned relicensing for operating beyond initial design-based estimates and, as a result, gained thousands of additional hours of generation.

For Ontarians, the result has been billions of dollars of additional revenue from the publicly-owned assets and a continued supply of low-carbon electricity even as refurbishment projects are underway.

The next phase

Tenev is overseeing FCLM at an interesting point in the program's development. He says it has matured and is now entering a "validation," phase where COG supports CANDU utilities with model development, CSA standard updates, data and test results about the "expected behaviour of CANDU fuel channels."

"These next stages of the FCLM program will provide our members and the regulator with greater certainty that predictive models are validated and reactors operate within safety margin," says Tenev. "Through hydriding,

burst testing and other experimental validations, we can simulate radiation effects on fuel channel materials and test annulus spacers at various stages of their lives."

One such experiment uses the High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory to prematurely age spacers. This is followed by an examination to see how the spacers perform, conducted by Canadian Nuclear Laboratories. The experiment is an example of how FCLM allows COG members to anticipate material behaviour and change, over time, under simulated operating conditions.

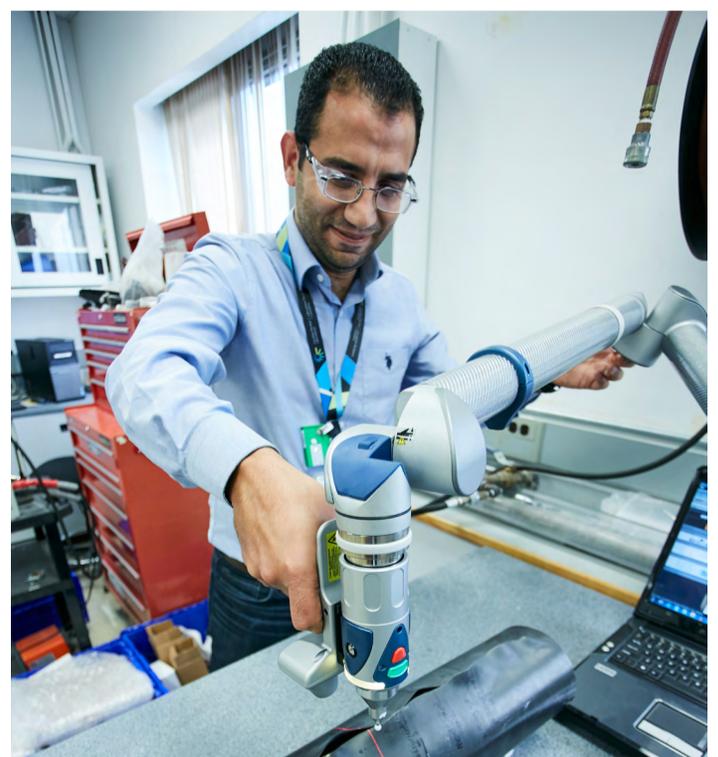
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"Industry collaboration to understand annulus spacer and load expectations is critical for our members, particularly, as a pre-requisite for re-licensing and as CANDU utilities perform refurbishments," says Tenev. "The results of our work can be used to improve component design as well as reduce operating and surveillance costs. FCLM has a lot to give to the future of CANDU plant safety and operations."

The value of the project extends beyond the existing fuel channels, Tenev adds.

"There's also a benefit for future new build stations and post-refurbishment life. These predictive models could be applied to support cost reductions in future reactor maintenance, operations and surveillance procedures," he says.

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A CNL employee analyzes a sample of a bursted pressure tube as part of fuel channel research work for COG. The research has contributed to continued operation at Pickering and allowed for effective synchronization of the Darlington Refurbishment and Bruce Power MCR projects. Photo courtesy of CNL.

This story is one of an on-going series about COG employees; a diverse group in expertise, gender, age and nationality. Our team reflects the diversity and strengths of our Members and the COG community. Their skills help create the best in collaboration for nuclear innovation. Through COG, our Members and the nuclear community worldwide achieve results that contribute to the highest standard of safety, efficiency and environmental performance. Together we create Excellence Through Collaboration.