

# CANDU OWNERS GROUP: *Top 10 of 2017*

*It was a busy year for CANDU Owners Group, CANDU operators and supplier participants. As we ring in the New Year, here are 10 things from 2017 to look back on that we achieved together:*



## 1 Fuel channel life management: 40 is the new 30

COG's Fuel Channel Life Management program continued to make significant contributions to life extension for Ontario's CANDU plants, by extending life of this critical reactor component. The result for consumers is more electricity from the plants for the same up-front capital cost thanks to several additional years of operation. For Ontario Power Generation (OPG) and Bruce Power, it has meant flexibility to stagger unit refurbishments while continuing to produce safe, reliable electricity for the province. Watch for this research to be applied elsewhere in other CANDU plants.

### *The technical details*

Now in Phase 3 of 4, the FCLM project has already delivered predictive models for fracture toughness to assess pressure tube fitness-for-service; provided sufficient evidence to confirm the integrity of the spacers that are used to maintain a gap between pressure tubes and calandria tubes; and improved knowledge of associated aging mechanisms improving the understanding of life management techniques. The combination of the FCLM deliverables, condition assessments, and extensive engineering analysis has helped confirm fitness for service and extended licensing of OPG and Bruce Power plants.

Where pressure tubes were once expected to provide up to 30 years of service, today with improved knowledge of aging, in-service inspection and confirmation of safety margin, some units may serve for up to 40 years before a mid-life replacement.

## 2 COG Collaboration Week

About 250 international participants converged in Toronto for a week of workshops, networking, sponsored dinners and events at the first annual COG Collaboration Week (CCW). An opening plenary of industry leaders and an R&D Expo, featuring current research in COG's six R&D program areas, kicked off the week. As well, there were several peer group workshops and opportunities for cross-function networking before the week concluded with COG's Annual General Meeting. Participants returned home with new knowledge, contacts, performance improvement plans and next steps for industry collaboration through COG. The second annual CCW will be held in fall, 2018 in Niagara Falls, Ontario.



**Read more here:** <http://www.candu.org/COGNews/CCW.pdf>



### 3 COG's supplier participant program on the grow

In 2017, COG's supplier participant program grew by six new participants, pushing the total number of supplier participants to more than 20. The new suppliers include two international suppliers whose participation will assist in further opportunities to strengthen the supply chain for both Canadian and international COG operators. COG continues to build new aspects of its supplier program to improve knowledge, job readiness and security throughout the CANDU supply chain. Watch for more collaboration between COG and the Organization of Canadian Nuclear Industries (OCNI) on supplier initiatives in 2018.

### 4 Record participation for COG/IAEA biennial technical meeting

A record number of participants attended the international COG/IAEA 14th Technical Committee Meeting on the Exchange of Experience of Pressurized Heavy Water Reactors (PHWR) hosted by Nucleoeléctrica in Cordoba, Argentina, this fall. Fifty-six presentations were made on a range of topics including refurbishment, asset management, equipment reliability, obsolescence, research, safety and life extension. Presenters from Canada, Romania, Austria, Argentina, China, Korea, Pakistan and India shared technical experience.



*Read more here:* <http://www.candu.org/Pages/TCM2017.aspx>



## 5 More ways to interact with COG

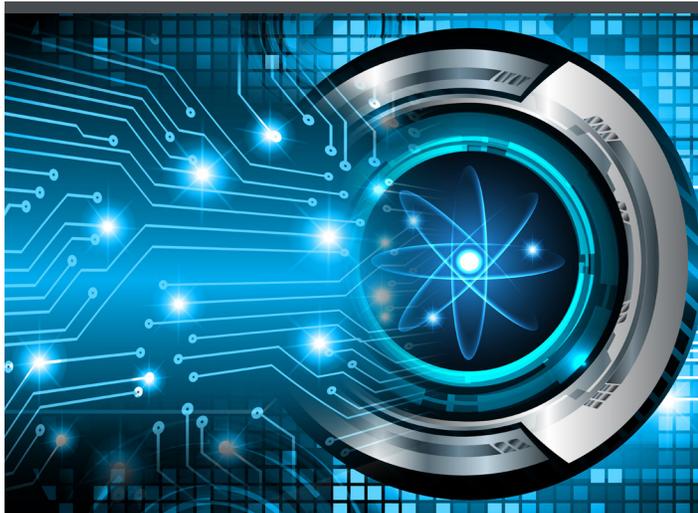
In 2017, COG launched several new or updated platforms to further broaden the reach of operating experience, industry news, trends and ways to collaborate. Its new COGonline member website and collaboration space was launched in December with an upgraded user experience and security. This followed the launch of a fully revamped public website, earlier in the year. In addition to many other upgrades, each of the new websites feature an online version of COG's own industry magazine, COGnizant. Readers can now see news and trends as they happen. COG also joined Twitter sharing updates and participating in conversations about industry news and innovations within the CANDU community. A new event management / registration tool was piloted in 2017 and will be further rolled out in the New Year.

## 6 New forums and groups on trending nuclear topics

COG established new forums and peer groups for member collaboration on work areas gaining interest within the industry. New groups in 2017 included:

- Small and Medium-Sized Reactor Technology Forum
- Radioactive Waste Leadership Forum
- Decommissioning Waste Management Peer Group
- Emergency Preparedness and Response Peer Group





## 7 Strategic R&D: Preparing for future innovation

COG's Strategic R&D program provides operators the opportunity to share knowledge and pool resources to identify and meet industry needs. Strategic planning ensures research today will help the industry remain safe, reliable and economically competitive well into the future.

In 2017, achievements in the strategic program included:

- An outage reduction roadmap, rolled out in November and featured at COG's December General Business Meeting;
- Draft roadmaps for fuel channels and other CANDU specific materials and components;
- Enhanced computer codes: Work on assessment and recommendations for the next system thermal hydraulic code and integrated Industry Standard Toolset platform is near completion with a final report tentatively scheduled for presentation at a mid-January workshop;
- More than 50 experts on diverse subject matter areas attended a decommissioning and long-term waste management workshop. Outcomes from the workshop will help inform a report to be issued in early 2018.

## 8 Industry contribution to Canadian and International standards

COG, working with its members, regularly reviews and provides input to standards of the Canadian Nuclear Safety Commission (CNSC), Canadian Standards Association (CSA) and International Atomic Energy Agency (IAEA).

A sample of undertakings this past year includes:

- Development of the Principles and Guidance to support a Common Approach to Human Performance and Human Factors in the Canadian Nuclear Industry;
- Formation of a task team on Fitness for Duty REGDOC 2.2.4;
- A successful two-day safety and licensing / Industry Standard Toolset (IST) workshop with the Canadian Nuclear Safety Commission where industry work was presented;
- Progress on fuel channel research to address questions related to CSA N285.8 (technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors) including a pilot study on probabilistic evaluations;
- Facilitated industry input to CSA N288 series of standards on environmental management of nuclear facilities and piloted a self-study training package. N288.8 *Establishing and implementing action levels for releases to the environment from nuclear facilities* was published in March 2017. The new CSA N288.9-18 *Guidance for design of fish impingement and entertainment programs at Class 1 nuclear facilities* is scheduled for publication in April 2018;
- Initiation of two projects to assist COG members in implementing new CSA environmental standards; and
- Reviewed and provided comments to several IAEA nuclear safety standards under revision.



## Achieving the CANDU promise

As CANDU operators create their own version of the US industry's Nuclear Professional Development Seminars (NPDS), they are finding innovative ways to improve efficiency and safety through collaboration and the use of technology. In the quest for greater efficiency and safety, some are using virtual reality to simulate operations. **By Leah Hootman**

Ontario Power Generation (OPG) and the Canadian Nuclear Association (CNA) have teamed up to create a virtual reality (VR) training program for CANDU operators. The program, called the CANDU Virtual Reality Training Program, is a collaboration between OPG and the CNA. It is designed to help operators understand the CANDU reactor system and its components. The program is available in both English and French. It is a valuable resource for operators and is available to all CANDU operators. The program is available to all CANDU operators. The program is available to all CANDU operators.



## 10 COG information and training sessions to build industry knowledge

COG facilitated learning and training of its members and supplier participants through more than 100 workshops, events, training activities and resources in 2017. These ranged from leadership training in the Nuclear Professional Development Seminars (NPDS) to technical training on specific topics such as codes on MAAP4 – CANDU, ELESTRES, ELOCA and TUBRUPT. COG's General Business Meetings featured industry leaders including OPG and Bruce Power presidents Jeff Lyash and Mike Rencheck, Ontario Deputy Minister of Energy Serge Imbrogno as well as representatives from INPO, EPRI and industry researchers to share industry insights. With the University Network of Excellence in Nuclear Engineering (UNENE), COG released The Essentials of CANDU textbook, an online resource for CANDU operators.

## 9 COG in the community

In 2017, COG increased outreach to members, partner organizations, government and other stakeholders through a variety of outreach activities both on specific program areas as well as general education programs. In some cases, the goal was to help members gain increased understanding of the opportunities available to them through COG programs and services. In others, the aim was to help stakeholders better understand nuclear industry accomplishments achieved through COG contributing to safer, cleaner, more affordable low carbon electricity generation. Among the outreach efforts were a presentation to a parliamentary committee, a new COG engagement manager at the IAEA in key areas of member interest; and an international government side event at the IAEA general conference featuring Kim Rudd, Canada's Parliamentary Secretary to the Minister of Natural Resources. COG also presented several information sessions at our members' sites to better orient staff to the opportunities available through COG. As well, COG contributed to publications, including Nuclear Engineering International magazine and published COG's own magazine, COGnizant.

