

Neil WILMSHURST

**NUCLEAR SECTOR AT THE ELECTRIC POWER RESEARCH INSTITUTE (EPRI)
VICE PRESIDENT AND CHIEF NUCLEAR OFFICER**

Neil Wilmshurst is Vice President of the Nuclear Sector at the Electric Power Research Institute (EPRI). He has overall management and technical responsibility for the more than \$130 million in annual research activities conducted by EPRI with its global nuclear membership.

Wilmshurst joined EPRI in 2003 as a Senior Project Manager within the Plant Support Engineering (PSE) program. In 2007, he became Director of the Plant Technology department, which encompasses equipment reliability, instrumentation and controls, and risk and safety management. The Plant Technology department develops and supports the use of technology to ensure the safe, reliable and economic operation of nuclear power plant assets today and well into the future.

Before joining EPRI, Wilmshurst worked in a variety of nuclear utility engineering and maintenance roles with AmerGen at Three Mile Island Unit 1 and British Energy at the Sizewell B plant. Prior to joining the civil nuclear program Wilmshurst served for 13 years in the Royal Navy as a Nuclear Submarine Engineer Officer.

Mr. Wilmshurst received a Bachelor of Science degree in electrical, mechanical and control engineering from the Royal Naval Engineering College, Manadon, UK, a Post Graduate Diploma in nuclear reactor technology from the Royal Naval College, Greenwich, UK and a Masters degree in defense administration from Cranfield Institute of Technology, Shrivenham, UK, he was also certified as a Naval Nuclear Plant Operator. Wilmshurst is registered as a Chartered Mechanical Engineer in the UK.



ENTREVISTA **MATILDE PELEGRI**
FOTOS EPRI

THE ORGANIZATION

Who is EPRI and who are the members worldwide?

EPRI performs research in electricity generation, delivery and use in collaboration with the electricity sector, its stakeholders and others for the benefit of the public good. Our global R&D includes nuclear, generation (from sources other than nuclear), energy and environment, and power delivery and utilization.

EPRI's Nuclear Sector works with owners or operators of 350 reactors at more than 40 utilities in more than a dozen countries across the globe – and that number is growing – to perform research that informs decisions related to the safe, efficient, reliable operation of nuclear plants.

What are EPRI main goals and activities?

The Nuclear Sector's main goal is to develop cost-effective innovative technologies, technical guidance, and knowledge transfer tools that help

maximize the value of existing nuclear assets and inform the deployment of new nuclear technology while maintaining or improving safety.

We have research programs that cover 18 areas in plant performance, fuel and chemistry, materials management and strategic initiatives.

We're doing some exciting work right now in several areas:

- Plant Modernization: Modernization can equip nuclear plants with updated technologies and improved processes to deliver greater economic efficiency and reliability – helping the future of carbon-free energy generation. EPRI is leading and coordinating a global industry effort for implementing new processes and value-added technologies in plants. At this stage, our initiative is combining a business case analytic model, developed as the standard for cost-benefit optimization analysis in nuclear plants, with industry peer developed and reviewed Modernization Quick Guides of standard

designs and demonstrations. The ultimate deliverable to EPRI members will be a Plant Modernization Handbook which will be a living analytical database of potential plant improvements in 2020, with case studies added in 2021.

- Accident tolerant fuel: ATF designs may provide more resilient performance during hypothetical accident scenarios and could potentially support more efficient normal operations, including the capability for better plant integration with renewable generation sources. Our Fuels team is collaborating with governmental, regulatory, and commercial stakeholders to provide key safety, economic, and operational technical analyses to support strategic decision-making for ATF implementation.
- Training: We are working diligently to optimize the use of training for technology transfer through "EPRI|U" – our curriculum of courses and technical training to equip technical



A cart of instruments for EPRI's Smart Chemistry demonstration, one of many projects part of EPRI's Nuclear Plant Modernization efforts. Much of plant chemistry work is still done manually, with technicians bringing separate water samples back to the laboratory for analysis and recording. The intervals between samples can range from hours to days to weeks, limiting the accuracy of trend analysis. EPRI has undertaken a comprehensive demonstration of water chemistry automation, providing continuous data so assumptions about what happened between intervals will be a thing of the past.

and management staff. The Nuclear Sector has 154 courses available, including 107 in on-demand formats – 79 of which were added in 2019. The sector's Standardized Task Evaluation training program has saved the industry an estimated \$6.3 million since its beginnings in 2016.

- Hydrogen generation: There is a growing interest in the nuclear industry to use excess power for another "product" that could provide value to nuclear plants. EPRI

is collaborating with the U.S. Idaho National Lab and the U.S. Department of Energy, and "early-mover" utilities in the U.S. on Technical and Economic Assessments for Integrated Energy Systems, and demonstration projects, that will explore options for hydrogen generation, storage and utilization.

EPRI AND SPANISH FIELD

Who are EPRI Spanish members?

EPRI has a longstanding relationship with all of the nuclear operating com-

panies in Spain. Through FORO, all of the nuclear plants are engaged in the full breadth of EPRI's research. EPRI's Nuclear Sector has been supporting the Spanish nuclear utilities, vendors and collaborative organizations for over 15 years, in the areas of plant materials, chemistry, fuels, nuclear waste, flexible operations, long term operations, safety valves, Nondestructive Evaluation (NDE) and decommissioning.

EPRI's materials science research – has been aided significantly by working with material harvested from decommissioned plants. The Jose Cabrera Nuclear Power Station has been an invaluable source of irradiated materials. Zorita baffle plate material tests are now being run to improve understanding of the irradiation effects on tensile strength, fracture toughness, and crack initiation and growth. Zorita core barrel weld materials are being tested to understand the embrittlement of stainless-steel welds.

EPRI has also been working with Spanish utilities for several years on research to support a centralized storage facility for used fuel in Spain. Our team has provided background and historical information based on U.S. experience, and reviewed the proposed used fuel storage design. This support continues as all parties involved work to find the safest and most effective technical solution.

EPRI has supported WiN Spain/NEA mentoring workshops to promote the STEM education to girls. What are EPRI policies to increase the role of female professionals in the organization?

Members of EPRI's nuclear team supported the NEA mentoring program this year. Our Senior Regional Manager of Southern Europe & Latin America Maria Martin was a mentor of students from different parts of the world at the WiN Global Meeting held in Madrid in 2019 and also presented to more than 200 women at the meeting about the role of innovation, specifically for long term operations of nuclear power plants. We are also a proud sponsor of that conference, which contributes to funds that assist women from across the globe to attend the meetings.

EPRI is engaged with the Spanish Nuclear Society as well. Through participation in the annual meeting, we have shared results of our work in areas like plant modernization and long term operation, and kept informed on the latest challenges and successes within the Spanish nuclear industry.



ForumNeilKeynote – Mr. Wilmschurst giving the keynote speech at the "Innovation for the Future of Nuclear Energy – A Global Forum" held in South Korea in June 2019.



Mr. Wilmshurst participated in the Global Forum panel titled, "Innovation in the Nuclear Sector," led by Chairperson Fiona Rayment, Executive Director, Nuclear Innovation and Research Office (UK). Yunho Kim, Vice President, Head of Central Research Institute (CRI), Korea Hydro & Nuclear Power (KHNP); William D. Magwood IV, Director General, Nuclear Energy Agency (NEA); Jeffrey Merrifield, Partner, Pillsbury Winthrop Shaw Pittman LLP; Patrick Morilhat, Programme Director R&D, Nuclear Performance, Électricité de France (EDF); Neil Wilmshurst, Vice President and Chief Nuclear Officer, Electric Power Research Institute (EPRI) participated in the panel.

NUCLEAR PRESENT AND FUTURE

What are the nuclear role dealing with climate change?

Current global conversation highlights that one way to address climate change is to increase the amount of energy transferred to electricity and then address how to produce that electricity cleanly. Remember, nuclear power is a clean energy source and must be seen as a key option to support these efforts. The challenge for the nuclear industry is that it is currently about 11% of global electricity production, so how do we enable nuclear to stay at 11% or more in a world where electricity generation is significantly higher. Nuclear suddenly being on a declining path is not the right trajectory. We have the opportunity to grasp the momentum, show the key role of nuclear and build a strong future for our successors in this industry.

What are the nuclear challenges worldwide?

The nuclear industry is faced with a need to change, but needs clear objectives, better communication, and a better culture to determine and foster which innovative technical options and processes to accelerate deployment of, specifically if we're going to bridge the gap from the current existing fleet to the next generation of nuclear plants.

What we're finding is that utilities face cost pressures, and they are looking to deploy technology but they have to spend money to deploy. There is a huge potential for innovative technologies and processes to reduce costs and if utilities can spend the capital upfront, it is paying back as reduced O&M costs year after year after year. The evidence is there – it's really a good business decision to invest in technology for repeat, year-after-year savings. And utilities are investing in technology, provided they have the certainty that it will be accepted by regulators and it will be successful. It's a very interesting global trend we're seeing in the industry now where the status quo is being disrupted by those who are embracing technology and deploying it.

What is the role of innovation of nuclear?

In June, EPRI co-organized with the International Atomic Energy Agency (IAEA), the United Kingdom's National Nuclear Laboratory (NNL), the OECD's Nuclear Energy Agency (OECD/NEA) and Korea Hydro and Nuclear Power (KHNP) a conference in South Korea called "Innovation for the Future of Nuclear Energy – A Global Forum" specifically to get to work on how innovation in the nuclear industry can be used to address the critical challenges. More than

250 nuclear leaders, including industry stakeholders, regulators, researchers, government representatives and technology providers, participated in this first-of-its-kind global forum. Attendees developed an action plan for accelerating the deployment of new technical and process solutions to reduce operating costs and enhance nuclear safety for support of global decarbonization with zero-emitting nuclear power generation. One big picture take-away from the Global Forum was that there are tremendous opportunities to learn from outside industries that have successfully deployed these technologies, which can potentially mitigate risks of deployment in nuclear plants.

The forum also brought to light perhaps the most critical need for the industry – to create a culture of innovation where communication flows top to bottom, across utilities, suppliers, researchers and regulators alike. We are all in this together.

If you would like to learn more about the 2019 Global Forum, how you can get involved in the conversation and learn about the 2020 Global Forum to be in London, UK in October, read the Summary and Highlights report at https://assets.ctfassets.net/ucu418cgcnau/451GwXcejwKky0ljTfD-NXx/fa94ddfb60cea23a07e34cc3ee-717ae2/2019GlobalForumInsights_Digital.pdf ■