

## Editorial

Alice Caponiti (GIF Vice Chair for Regulatory Issues)



I hope everyone is staying safe. Despite our transition to virtual meetings in response to COVID-19, 2020 has been a productive year for GIF with publication of several system safety assessment reports in collaboration between the Risk and Safety Working Group (RSWG) and various System Steering Committees. These reports, along with the other previously completed Gen-IV system white papers, are available under the RSWG public web page [https://www.gen-4.org/gif/jcms/c\\_9366/risk-safety](https://www.gen-4.org/gif/jcms/c_9366/risk-safety).

Following the publication of two reports on the Sodium Fast Reactor (SFR) system by the Safety Design Criteria Task Force (available under [https://www.gen-4.org/gif/jcms/c\\_93020/safety-design-criteria](https://www.gen-4.org/gif/jcms/c_93020/safety-design-criteria)), the last SFR Safety Design Guidelines report is currently undergoing a review by the International Atomic Energy Agency (IAEA) and OECD/NEA's Working Group on Safety of Advanced Reactors (WGSAR). Moving forward, development of the safety design criteria and guidelines for the other five GIF systems is expected to be the new collaborative endeavor between RSWG and the respective system steering committees.

The GIF Basic Safety Approach report is in process of being updated to reflect the experience gained from application of the Integrated Safety Assessment Methodology (ISAM) for specific Gen-IV design tracks, the lessons learned from the Fukushima accidents as articulated in the new requirements issued by various international organizations, clarifications for alignment of plant states with the defense-in-depth levels, and improved understanding of practically eliminated accidents. Finally, another initiative of regulatory significance is the ongoing development of a new risk-informed approach for selection of licensing basis events and safety system classification in collaboration with WGSAR. More on that in the next article. Thank you for your continued support as we work to establish and harmonize the regulatory frameworks needed for the commercialization of Gen-IV reactor systems.



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### IAEA, GIF call for faster deployment of next generation reactors

20 July 2020

The International Atomic Energy Agency (IAEA) and the Generation IV International Forum (GIF) have called for greater efforts to support the early deployment of innovative nuclear reactor systems to address climate change. The appeal came during the 14th GIF-IAEA Interface Meeting held last week.



The BN-800 fast reactor in Russia (Image: Rosenergoatom)

## IAEA, GIF call for faster deployment of next generation reactors

Researched and written by World Nuclear News

Participants in the 14th GIF-IAEA Interface Meeting, held virtually amid the global COVID-19 pandemic, reviewed progress on the research, design and development of innovative nuclear reactor systems, including in areas such as nuclear safety, proliferation resistance, economics, education and training.

"Participants called for stepping up action to support faster deployment of these innovative technologies, which can provide significant help as the world transitions to low-carbon energy systems," said Stefano Monti, head of the IAEA's Nuclear Power Technology Development Section, and co-chair of the 8 July meeting.

The IAEA and GIF agreed to follow up on recommendations made at the meeting, including by focusing research and development on using innovative reactors to produce hydrogen and other activities such as the integration of innovative nuclear systems with other low carbon energy sources.

"This longstanding and ongoing dialogue serves an important purpose: to connect the Agency's activities in support of R&D and innovation in nuclear power with a key international forum in which leading nuclear technology nations collaborate on R&D and discuss

major deployment issues," said Mikhail Chudakov, the IAEA's deputy director general and the head of its Department of Nuclear Energy. GIF - an initiative involving 13 countries - was set up in 2000 to carry out the R&D needed to establish the feasibility, safety and performance capabilities of next generation reactor systems, which incorporate major changes in design approaches, fuel, materials or systems configuration in comparison with existing technologies. The OECD Nuclear Energy Agency serves as the GIF technical secretariat. GIF has selected six reactor technologies for further R&D work, including the gas cooled fast reactor, lead cooled fast reactor, molten salt reactor, supercritical water-cooled reactor, sodium cooled fast reactor and very-high-temperature reactor.

China is completing the construction of an advanced modular high-temperature gas-cooled reactor and Russia already operates two sodium cooled fast reactors, the BN-600 and BN-800 at Beloyarsk. Compared with typical reactors, fast reactors produce up to 70 times more energy from their fuel by using 'fast' neutrons not slowed by a moderator, greatly enhancing the sustainability of nuclear energy. They can also significantly reduce the volume, toxicity and lifespan of final radioactive waste.

<https://www.world-nuclear-news.org/Articles/IAEA-GIF-call-for-faster-deployment-of-next-genera>

## Development of a Risk-Informed Approach

Jim Kinsey (GIF RSWG Member)

A technology-inclusive risk-informed process for selection of licensing basis events, safety classification of structures, systems, and components, and determination of defense-in-depth adequacy for Generation IV reactors is being developed by the GIF Risk and Safety Working Group (RSWG) in collaboration with OECD/NEA's Working Group on Safety of Advanced Reactors (WGSAR). The process is intended to complement the GIF Basic Safety Approach by maintaining alignment of the Gen-IV designs with the multiple levels of defense currently reflected in various international standards while allowing flexibility to take advantage of their passive and inherent safety attributes. The approach combines both deterministic and probabilistic insights into the decision-making process in a complementary manner to provide responses to questions such as:

- What are the plant initiating events and event sequences that are associated with the design and site?
- How does the proposed design and its structures, systems, and components respond to initiating events and event sequences?
- What are the safety margins for prevention and mitigation of radiological releases within prescribed limits?
- Is the philosophy of defense-in-depth adequately reflected in the design and operation of the facility?

The report outlining the process is currently undergoing internal reviews by the RSWG members. When completed, it will be shared with WGSAR members to capture their regulatory perspectives into the process. The final report is intended to be a joint RSWG and WGSAR product that can be used by the designers and regulators to establish a structured but flexible risk-informed approach that can be implemented within each country's existing regulatory framework.



## New Chairman of Sodium-cooled-Fast Reactor System Steering Committee

Frédéric Serre, (New) Chair of the SFR-SSC

From mid-2018 to mid-2020, Dr. Hill chaired the SFR-SSC and, in particular, has the difficult task to chair the last SFR SSC meeting on May 15, 2020, held by video-conference due to the Covid lock-down. It required a heavy preparation, since the time was limited due to the large jet lag between members' countries. Dr. Okajima, Technical Secretary, supported this preparation. Since the term of Dr. Hill's mandate was ending on June 30, 2020, it was necessary to elect a new chair for the next 2-years period. JAEA, CEA and DOE are holding alternatively the chair. In 2020, it is the CEA turn. The SFR-SSC members elected me as chair, Dr. Hill (DOE) and Dr. Chikazawa (JAEA) becoming co-chairs. I have been involved for more than 20 years in SFR R&D, by managing experiments in Cabri reactor, operation of Masurca reactor, and managing Severe Accident R&D for ASTRID SFR project.

## Major events — Please save the date !

- ◆ Next GIF Webinar: September 22nd, see the picture on the right
- ◆ International Conference on Fast Reactors and Related Fuel Cycles (FR21) - 10–13 May 2021, Beijing, China — Deadline for the Submission of Abstracts is 9th September, 2020  
<https://www.iaea.org/events/fr21>



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Dr. Shannon Bragg-Sitton, Integrated Energy Systems  
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Tue, September 22, 2020 8:30 a.m. (EDT) (UTC-4)