RSWG: Risk and Safety Working Group

The Risk and Safety Working Group (RSWG) was established in 2005 to provide a harmonized approach and consistent methods for risk and safety assessments of six Gen-IV systems. Since its inception, the RSWG proposed a set of broad safety principles, objectives, and attributes based on GIF safety and reliability goals, as input to R&D plans for specific Gen-IV design tracks (see 2008 report on Basis for Safety Approach):

- developed a technology-neutral Integrated Safety Assessment Methodology (ISAM) to ensure a consistent process to address risk and safety;
- supported the implementation of ISAM for specific Gen-IV design tracks as a toolkit for the entire design cycle from concept development to basic design and licensing;
- established technical interfaces with the International Atomic Energy Agency (IAEA), OECD/NEA's Committee on Nuclear Regulatory Activities (CNRA) Working Group on Safety of Advanced Reactors (WGSAR), and other national regulatory stakeholders and designers.

The RSWG membership currently includes representatives from Canada, China, France, Japan, South Africa, Russia, United Kingdom, and United States as a mixture of designers and regulators forum. The group holds biannual meetings. It proceeded to:

- an update of 2008 version of GIF Basic Safety Approach to reflect the lessons learnt from the Fukushima Daiichi accident;
- interface with GIF PR&PP and ETTF working groups; and
- organize a new joint initiative with WGSAR on development of a technology-inclusive risk-informed approach for selection of licensing basis events and safety classification of systems, structures and components common to Gen-IV systems.

The ongoing RSWG collaborations with the SSCs include:

- development of white papers on pilot application of ISAM to assess its usefulness for self-assessment of select Gen-IV design tracks;
- preparation of system safety assessment reports as summaries of the current state of high-level safety design attributes/challenges and overview of remaining R&D needs after the first decade of system development under GIF; and
- contributions to development of safety design criteria for each system.

By the end of 2019, all but one of the white papers are completed and only MSR white paper pending MSR pSSC revision based on RSWG feedback. The system safety assessment reports for SFR, VHTR, SCWR systems are also completed while the LFR and GFR reports are both pending SSC update based on RSWG feedback. The completed white papers and system safety assessments reports are published and can be accessed through the GIF RSWG public web page. Other than the SFR system (as completed by the SDC-TF), the process for development of safety design criteria is in various stages of preparation for other Gen-IV systems.

The ongoing GIF Basic Safety Approach report update aims to capture the needed revisions more than a decade after its first issuance, mainly focusing on integrating post-Fukushima recommendations and requirements to ensure a level of safety compatible with the expectations of the safety authorities. The update also expands the RSWG efforts to harmonize GIF members' safety approach to:

- converge on a common vision;
- provides common definitions for the plant states considered in a design and their alignment with the levels of defence-in-depth;
- reinforce the independence of prevention/mitigation features in different defence-in-depth levels; and
- clarifies the definition of, and the selection process for, the practically eliminated accidents.

Two separate reports are being prepared:

(1) "Basis for the Safety Approach Update for Design & Assessment of Generation IV Nuclear Systems" as a substantial revision of 2008 version but with a similar outline;

(2) a compendium report on "Impact of Fukushima Accident and Recent Regulations on the Safety Approach for Generation IV Nuclear Systems" as an extension of the focus on post-Fukushima Daiichi recommendations and requirements issued by regulators and international organizations since 2011 to provide insights into their applicability in design and safety assessments of Gen-IV systems.

The GIF-WGSAR joint initiative focuses on development of risk-informed approach for selection of licensing basis events and safety classification of systems, structures and components. This technology-inclusive approach is intended to reinforce common understanding of plant states corresponding to different defence-in-depth levels with emphasis on inherent and passive safety features, and to offer a structured approach for incorporating risk insights in safety assessments and regulatory decisions to supplement deterministic approach for increased confidence and improved safety margins.

As a GIF/CNRA joint initiative, it aims to facilitate a structured dialogue among international designers and regulators. Expected outcome is a report on key considerations for applying the risk-informed approach in a way that:

(a) it is inclusive of all six Gen-IV systems with a flexible implementation recognizing unique and varying sovereign regulatory structures;

(b) it builds on existing GIF safety approaches and methodologies (e.g. Basic Safety Approach and ISAM);

(c) it describes the key constituent parts of the risk-informed approach and provides a process description for its implementation. The two-year project is envisioned for completion of the report with co-ordinated input from GIF System Steering Committees and Safety Design Criteria Task Force before it is presented to WGSAR for their subsequent review and feedback.

The RSWG continues to advice the GIF Policy and Experts Groups on interactions with the nuclear safety regulatory community, international organizations and stakeholders relevant to Gen-IV nuclear systems. In 2019, the RSWG also provided a weeklong ISAM training, sponsored and hosted by China, and presented a Gen-IV risk and safety webinar hosted the GIF Education and Training Task Force.

Tanju Sofu

Chair of the RSWG
and all Contributors