



GIF Risk and Safety Working Group Update

Yasushi OKANO, Japan Atomic Energy Agency
GIF Risk & Safety Working Group Co-chair

GIF-IAEA Interface Meeting
IAEA, Wien
18-19 March, 2019

Goal of RSWG [Risk and Safety Working Group]

- Promote a consistent approach on safety, risk, and regulatory issues between Generation IV systems
- Propose safety principles, objectives, and attributes based on Gen-IV safety goals to inform R&D plans
- Support implementation of technology-neutral Integrated Safety Assessment Methodology (ISAM)
- Collaborate with System Steering Committees, consult with other methodology working groups and task forces
- Interface with IAEA (INPRO, Safety), OECD/NEA (WGSAR) and other regulatory stakeholders

Membership

- Representatives from Canada, China, E.U., France, Japan, S. Africa, S. Korea, Russia, and U.S.
 - GIF member + National Regulatory bodies (S. Korea, S.Africa) + International Organization (IAEA Safety Division)
 - Technical Secretary support from OECD/NEA
 - Switzerland and U.K. representatives are currently inactive
- Three co-chairs, each focusing on two Gen-IV systems to coordinating the collaborations with respective SSCs
- Semiyearly meetings from 2005;
 - Recent meetings
 - Beijing, China (October 2017) — VHTR topical focus
 - Paris, France (April 2018) — LFR topical focus
 - Paris, France (October 18-19, 2018) — GFR topical focus
 - ANL, USA (April 11-12, 2019) —MSR topical focus

Ongoing RSWG activities

- RSWG collaborations with the GIF System Steering Committees (GFR, LFR, MSR, ScWR, SFR, VHTR)
- GIF Basic Safety Approach report update
- Training seminar of ISAM (Integrated Safety Assessment Methodology for Gen-IV reactor systems)
- GIF Webinar on RSWG activities
- Other

RSWG collaborations with GIF System Steering Committees

- “White papers” on pilot application of ISAM
 - Demonstrate applicability of ISAM for self-assessment of Gen-IV design tracks
- System Safety Assessment Reports
 - Summary for current state of high-level safety design attributes & challenges
 - Overview of remaining R&D needs, after decade of system development under GIF
- Contributions to development of safety design criteria (and guidelines)

Status of RSWG collaboration with Sys-SC*

	White Paper on ISAM Implementation	System Safety Assessment	Safety Design Criteria / Safety Design Guidelines
SFR	Completed	Completed	SDC –Completed Safety Approach SDG –Completed Struc./Sys./Comp. SDG - Ongoing
VHTR	Completed	Completed	IAEA-CRP for HTGR SDC as starting point
LFR	Completed	Being proceeded to EG approval process	SDC pending Sys-SC update
SCWR	Completed	Completed	SDC (Fast reactor) development being considered
GFR	Completed	Pending Sys-SC update per RSWG review	SDC pending Sys-SC update per RSWG review
MSR	Pending Sys-SC update	Planned by Sys-SC	Pending proposal to develop “MSR safety approach”

Sys-SC: System Steering Committee

*GIF RSWG documents on https://www.gen-4.org/gif/jcms/c_9366/risk-safety

GIF Basic Safety Approach (BSA) Update

- BSA revisions ten years after its first issuance in 2008
- Focus on integrating post-Fukushima recommendations and requirements to ensure a level of safety compatible with the expectations of the safety authorities
- Efforts to harmonize differing positions of GIF members to converge on a common vision for a safety approach
- Now under development by RSWG

Key Contributions to BSA update (so far)

- France:
 - Safety level of Gen-III and Gen-IV reactors
 - » Post-Fukushima Gen-III safety objectives are sufficiently ambitious
 - Revisions to safety objectives, safety demonstration/robustness
 - Definition and identification of “practically eliminated” cases
 - EURATOM:
 - Compliance with post-Fukushima recommendations and requirements issued by regulators and international organizations
 - » Insights into their applicability in design and safety assessments
 - Assessment of safety architecture and DiD through use of PSA
 - Japan:
 - New regulatory requirements reflecting the lessons-learned from Fukushima accident and their implementation
 - Influence of Fukushima accident on safety regulations
 - New probabilistic assessment approach for external hazards
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Status of BSA Update

- Reflect the lessons learned from Fukushima accidents
 - Reexamination of external hazards
 - Robustness of the electrical systems and ultimate heat sink
 - Increased emphasis on common cause and common mode failures
 - Protection of spent fuel in storage
 - Multi-unit sites and other nuclear/non-nuclear facilities
- Clarifications for practically eliminated accident situations
 - Objectives and principles of practical elimination
 - Definition of a list of situations considered for practical elimination
- Foreseen schedule
 - RSWG-System Steering Committees iterations in 2019
 - GIF approval and open on GIF Web site in following years

GIF Webinar and ISAM training

- GIF Webinar on RSWG activities
 - Webcasted on Feb. 19, 2019
 - Video records on https://www.gen-4.org/gif/jcms/c_82831/webinars
 - Topics:
 - GIF safety goals
 - Risk and Safety Working Group mission and scope
 - Basis of safety approach for Gen IV concepts
 - Integrated Safety Assessment Methodology (ISAM)
 - Summary of ISAM application to Gen-IV systems
- ISAM training for engineers
 - December 11-15, 2017 in Paris (L. Ammirabile, Y. Okano)
 - July 2018 in Beijing (G. L. Fiorini, N. Thambiayah)

Other ongoing RSWG activities

- RSWG Interactions with IAEA
 - HTGR Safety Design Criteria (CRP)
 - Development of EPZ reduction approaches/methodologies
 - RSWG presentation at the 4th GIF symposium (Oct. 2018)
 - ISAM features, Five individual tools and their combination
 - Potential interface with OECD/NEA's WGSAR on establishing a risk-informed approach for event selection and structures/systems/components classification
 - Structured approach for incorporating risk insights to supplement deterministic approach
 - » Less prescriptive approach for LBE selection and SSC classification
 - Common definitions for plant states corresponding to different defense-in-depth levels
 - Interactions with PR&PP WG on safety/security interfaces
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