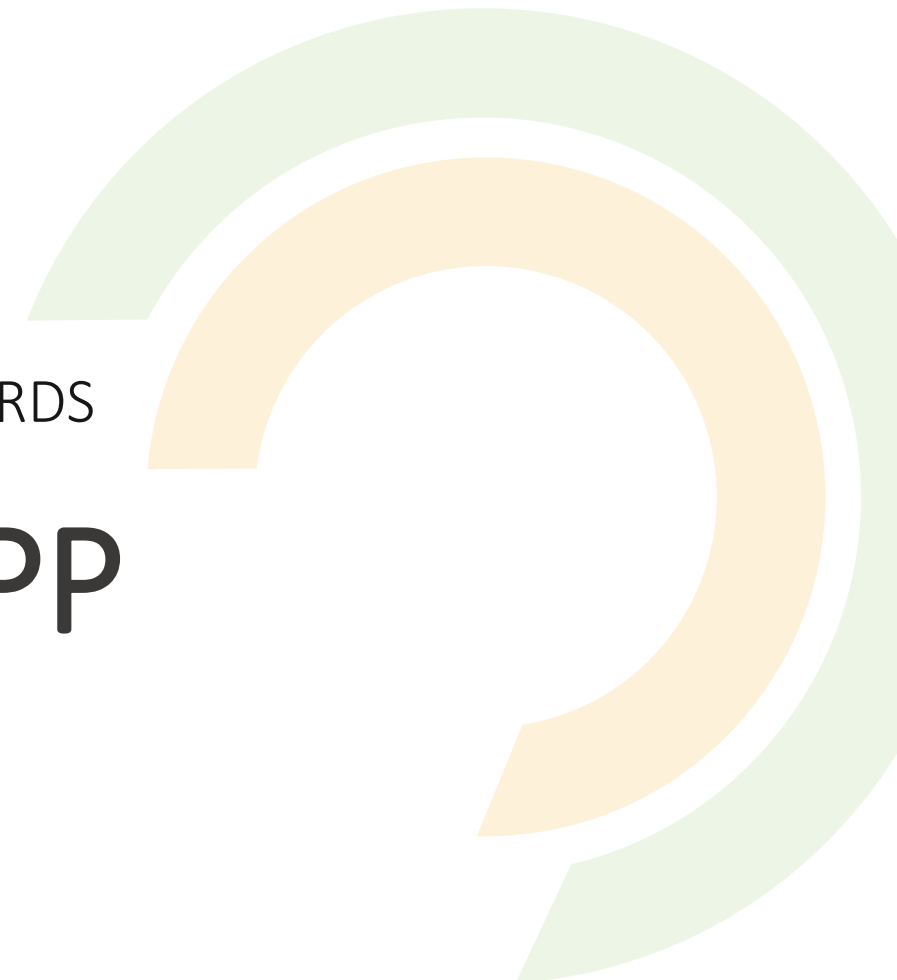




ADVANCED REACTOR SAFEGUARDS

# Gen-IV PR&PP

*International Interfaces*



PRESENTED BY

Lap Y. Cheng

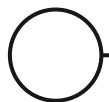
April 18-20, 2023

# GIF PRPP Working Group



GIF is a framework for international co-operation in research and development for the next generation of nuclear energy systems

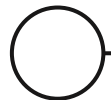
- GIF Proliferation Resistance and Physical Protection (PRPP) Working Group supports GIF technology goal for PR&PP – making GEN IV systems least desirable target for diversion, misuse, theft and sabotage.
- The working group is engaged with IAEA in safety, safeguards, and security (3S).
- It works with Gen-IV reactor designs to explore safeguards and security by design (SSBD)
- It studies emerging PRPP issues when transitioning from design to deployment



# Progress Since Spring 2022



- Published three additional PRPP white papers (SCWR, GFR and VHTR) and a companion report on crosscutting issues.
- GIF Industry Forum - presented insights from the white papers
- IAEA Symposium on International Safeguards – poster on crosscut topics
- Annual meeting hosted by the IAEA – developed work plan and priorities for 2023-2025
- 3S collaboration – interfaces between safety, safeguards and security

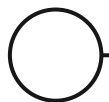


# Feedback from the GIF Industry Forum

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- PR&PP aspects for SMRs and Microreactors
- Explore PR&PP considerations for various siting options (remote, coastal, city, industrial complex, etc.)
- Evaluation PR&PP for floating & transportable reactors (Gen-IV designs)
- Training the next generation (encourage more student, more interactions with university programs, interface with GIF ETWG)
- Collaborative work with EMWG, staffing costs (security and safeguards)

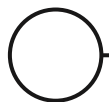


# Key Takeaways from the GIF Industry Forum

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- Reactor vendors in particular resonate with physical protection costs and the need to develop efficient, yet robust designs.
- There is a challenge to maintain work at the UUR level and suggested that vendors work with their national programs/labs to get into more detailed support for physical protection.
- PR&PP by Design continues to need to be promoted to help encourage an efficient design process.
- There is some confusion in the way terms are used: PR vs. Domestic MC&A vs. International Safeguards.

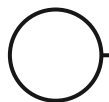


# 3S Collaboration for Gen-IV Reactors

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- Collaboration among PRPPWG, Risk & Safety Working Group (RSWG) and the VHTR SSC
- Goals and timeline
  - Bottom-up approach
  - Focus on 3S interfaces
  - 2 years time frame
- System for the study – PBMR (an SMR of VHTR design)
- Remain cognizant of IAEA initiatives investigating 3S Interfaces and maintain interactions in Novel Advanced Reactors by some PRPPWG members

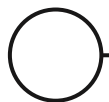


# PRPP Work Plan 2023-2025

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- Follow up interactions with the GIF System Steering Committee (SSC)
  - Consider prevalent or special PR&PP features for SMRs, micro-reactors, transportable cores, and non-electric applications of nuclear energy.
  - Consider various siting options for SMRs (coastal, remote, city, industrial complex) and effects on PR&PP
- Re-examine the PRPP Evaluation Methodology
  - Consider a training workshop to acquaint new members with the methodology
  - Develop guidance for designers, such as a template for reduced scope evaluation
  - Explore economic benefits of SBD
  - Investigate commonalities, synergies and conflicts between safety, safeguards and security (3S)
- Continue collaboration with the IAEA



# Path Forward

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- Direct effort to support industry in transitioning from design to deployment
- Many work plan activities reflect GIF Industry Forum requests:
  - PR&PP features for **SMRs, microreactors, transportable cores, and non-electric applications of nuclear energy.**
  - PR&PP aspects related to **siting options for SMRs (coastal, remote, city, industrial complex)**
- Collaborate with industry (through the VHTR SSC) on the 3S study
- Conduct special PRPP panel at the 2023 INMM/ESARDA Joint Annual Meeting
- Contribute to the Joint IAEA-GIF Workshop on the Safety of Non-Water-Cooled Reactors

