

RIC 2023

U.S. Nuclear Regulatory Commission
35th Annual Regulatory Information Conference



NAVIGATING the NUCLEAR FUTURE

MARCH 14-16, 2023

Bethesda North Marriott Hotel
and Conference Center
Rockville, Maryland

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**Session TH23, 10:30 am–12:00 pm, March 16, 2023,
Thursday**

Constructing Our Energy Future

Opportunities and Challenges for Advanced Reactor Construction



Louise Lund

TH23 Chair

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**TH23—Constructing Our Energy Future: Opportunities and Challenges for Advanced Reactor Construction****Ashley Finan**

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National Reactor
Innovation Center (NRIC)
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TH23—Constructing Our Energy Future

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General Electric Hitachi
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**Bret Tegeler**

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Westinghouse Electric
Company (WEC)

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Principal Project Manager
Electric Power Research
Institute (EPRI)



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Advanced Reactor Construction

- Advanced reactor designs use different nuclear technologies and take different approaches for civil/structural construction.
- The industry and research communities are making strides in developing advanced construction technologies to reduce construction costs and shorten schedules:
 - Modular construction, steel-concrete composite construction, SteelBricks™, seismic base isolation, floating platforms, augmented reality (AR) for construction management, digital twins (DT), artificial intelligence/machine learning (AI/ML), etc.
- The speakers will discuss various activities their organizations are conducting.





Examples of NRC Activities and Challenges

- Developing a technology-inclusive regulatory framework to accommodate different nuclear technologies.
- Staying current with the emerging advanced construction technologies and development of the related codes and standards, and how related NRC guidance may be updated.
- Ensuring that advanced construction technologies to reduce construction cost maintain the appropriate safety and defense in depth.
- Carefully assessing first-of-a-kind new advances for long-term performance and inspection and maintenance protocols.
- Considering how the fast pace in adopting and developing AR/AI/ML/DT in particular requires acquiring new skills quickly and proactively recruiting the next generation of tech-savvy engineers.
- Assessing the implications of building advanced reactors on sites that are normally not considered for large light-water-reactor designs.





Examples of NRC Activities Related to Design and Construction

- Participation in the application of advanced construction methodologies considered by the DOE/NRIC demonstration project.
- Development of risk-informed, performance-based, technology-inclusive regulatory guides on seismic design and seismic base isolation for advanced reactors.
- Continued engagement with standards development organizations, including the annual NRC Standards Forum.
- Future Focused Research program includes projects on DT, AI/ML, and natural language processing.
- University Nuclear Leadership Program grants:
 - Lapped connection for accelerated modularized construction
 - Advanced sensors for structural integrity monitoring
 - Soil-structure interaction framework for small modular reactors
 - Concrete creep and creep fracture
 - Hybrid risk tools for external hazard probabilistic risk assessment



**TH23—Constructing Our Energy Future: Opportunities and Challenges for Advanced Reactor Construction**

Presentations:

Ashley Finan, INL, “National Reactor Innovation Center Advanced Construction Technology Initiative”

Juswald Vedovi, GEH, “Progress and Lessons Learned on Advanced Construction Technologies for New Small Modular Reactor Projects”

Bret Tegeler, WEC, “Design and Construction Considerations in Conceptual Design of Advanced Reactors”

Hasan Charkas, EPRI, “EPRI’s Advanced Construction Research—Enabling the Deployment of Advanced Reactors”



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TH23—Constructing Our Energy Future: Opportunities and Challenges for Advanced Reactor Construction

Panel Discussion

TH23 - Constructing Our Energy Future

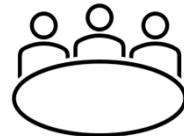
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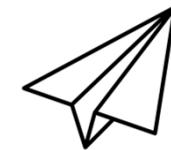
Closing Remarks



Continue
engaging all
stakeholders



Continue
collaborating on
shared research
interests



Continue
enhancing
engineering
communication



**TH23—Constructing Our Energy Future: Opportunities and Challenges for Advanced Reactor Construction**

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