Regulatory Review Process Options: Industry Progress, Initiatives & Concerns

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NRC-DOE Workshop on Advanced Reactors April 25, 2017 • North Bethesda, MD



Advanced Nuclear Industry: Next Generation



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Long-Term Vision for New Plant Commercialization

America's nuclear power plants are operating at worldclass levels of safety and reliability and **by the 2030s are supplying an increasing amount of carbon-free energy** for electricity and industrial uses. **American industry maintains a leadership role** in the development, demonstration and operation of both light-water and non-light water nuclear technologies for energy production and **U.S. reactor designs are recognized as the most innovative available**.

Source: NEI Strategic Plan for Advanced Non-Light Water Reactors



NEI Strategic Plan for Advanced Non-Light Water Reactors: Strategic Goals

- Two or more advanced non-light water reactor designs are commercially available (ready to build) in the U.S. in the 2030-2035 timeframe.
- 2. Demonstrations of one or more advanced non-light water reactors occur in the U.S. by 2025.
- 3. A licensing framework exists to facilitate the efficient and predictable deployment of advanced technologies, provides continued international credibility to U.S. designs, and encourages continued private-sector investment.







NEI Advanced Reactor Activities

- Non-LWR guidance and design criteria
- Standard Design Approval "major portions" guidance
- Licensing Technical Requirements Modernization Project
- Regulatory Engagement Planning guidance
- Codes & Standards coordination
- Standard Review Plan for Research & Test Reactors (NUREG-1537)
- Update NRC criteria for research reactor (examine 1MW liquid fuel limit)
- Issues specific to uranium enrichments between 5% and 20%



Licensing Technical Requirements Southern Company Modernization Project

 Technology-inclusive, Risk-informed, Performance-based



- Propose systematic process for Licensing Basis Event Selection
- Propose an approach to ensuring PRA technical adequacy ("Fit for Purpose") at each stage of design and licensing
 - Provide roadmap for integrating and maturing the PRA and using as additional input to design as the design matures



Regulatory Engagement Planning Guidance

- Pre-application thru chosen regulatory outcome(s)
- "User's guide" reference to current guidance
- Examples of successful approaches/techniques
- Menu-style





NEI Coordination with GAIN TWGs

- High Temperature Gas Reactor TWG
 - Functional containment performance requirements and criteria
 - TRISO fuel qualification
- Molten Salt Reactor TWG
 - Standard Review Plan for Research & Test Reactors (NUREG-1537)
 - Update NRC criteria for research reactor (examine 1MW liquid fuel limit)
- Fast Reactor TWG
 - Issues specific to uranium enrichments between 5% and 20%
 - Modeling & simulation tool use







2019 AND BEYOND

FOUR REACTORS UNDER CONSTRUCTION

The long-term dynamics of rising electricity demand, more stringent clean air requirements, and concerns about U.S. energy security remain drivers for nuclear energy expansion.



MID-2020s AND BEYOND

SMALL MODULAR REACTORS (SMRs) These reactors are light water designs, much the same as the current generation but typically with a generating capacity of fewer than 300 megawatts.





TVA Clinch River Project

2030s AND BEYOND

LIQUID METAL, MOLTEN SALT, AND HIGH TEMPERATURE GAS REACTORS

Almost 60 companies and research institutions are developing advanced reactors for a wide array of capabilities to meet the energy needs of the future.

Terrestrial Energy IMSR



X-energy HTGR



– nuclear. clean air energy

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