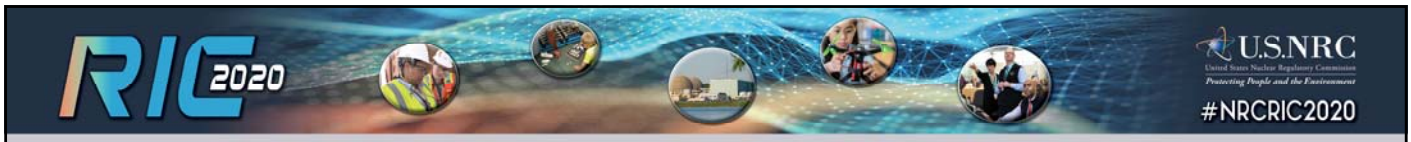

Risk-Informed Approaches to Address External Hazard Risk

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Division of Risk Assessment
Office of Nuclear Reactor Regulation

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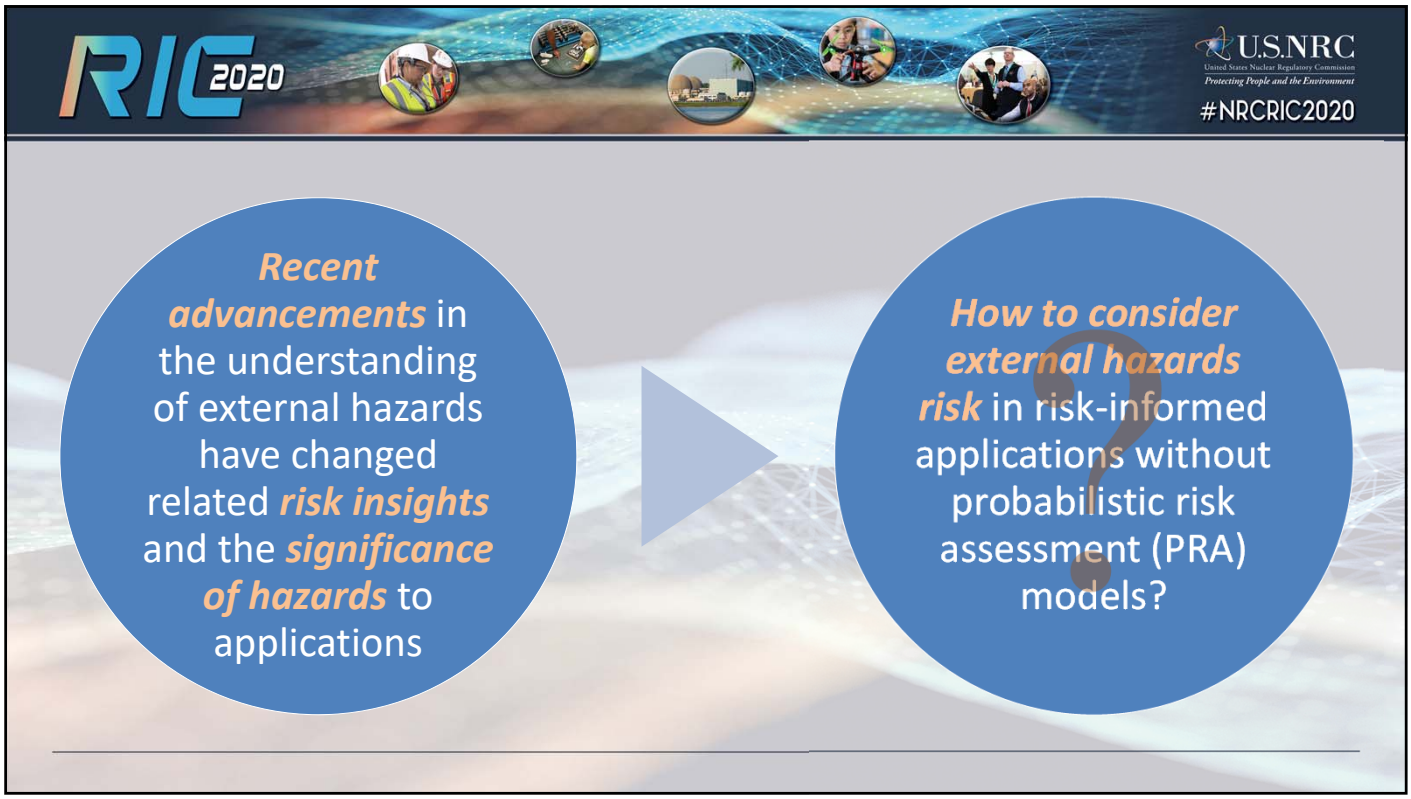
RIC 2020
U.S.NRC
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Protecting People and the Environment
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Recent advancements in the understanding of external hazards have changed related risk insights and the significance of hazards to applications
How to consider external hazards risk in risk-informed applications without probabilistic risk assessment (PRA) models?

2


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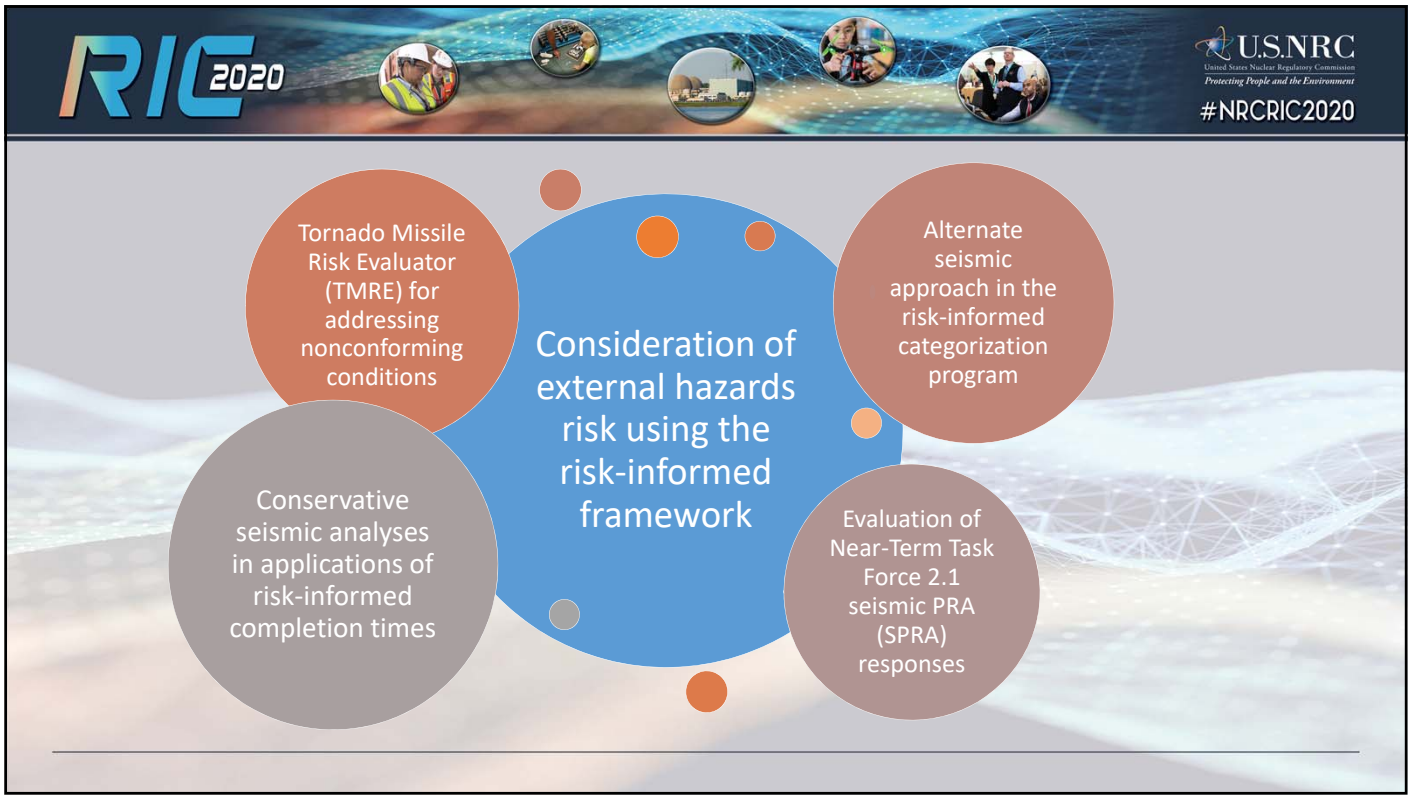
The NRC has applied a risk-informed framework and the Principles of Good Regulation in first-of-a-kind licensing reviews to consider external hazards risk, commensurate with the safety significance of hazards for the intended application.

3


RIC 2020
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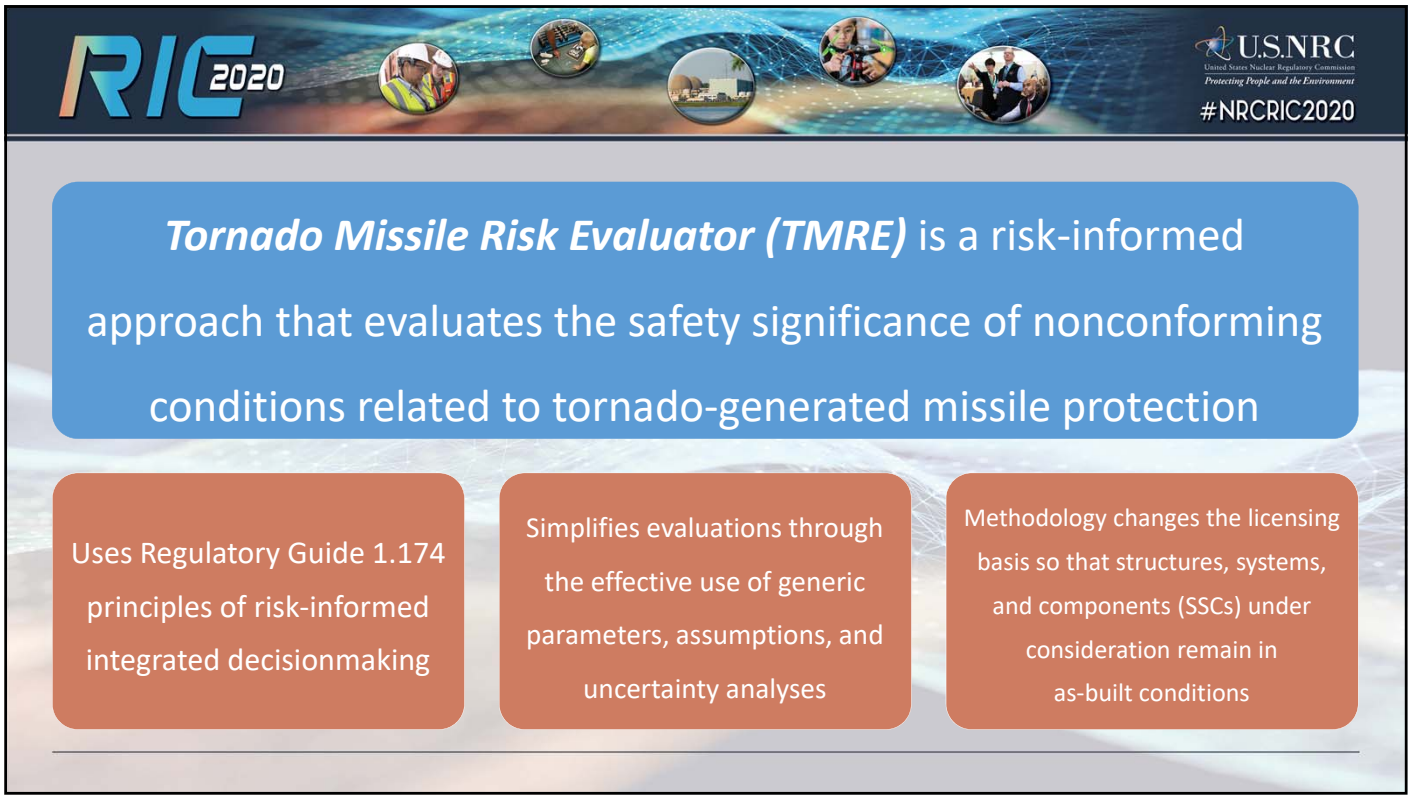
Tornado Missile Risk Evaluator (TMRE) for addressing nonconforming conditions
Alternate seismic approach in the risk-informed categorization program
Consideration of external hazards risk using the risk-informed framework
Conservative seismic analyses in applications of risk-informed completion times
Evaluation of Near-Term Task Force 2.1 seismic PRA (SPRA) responses

4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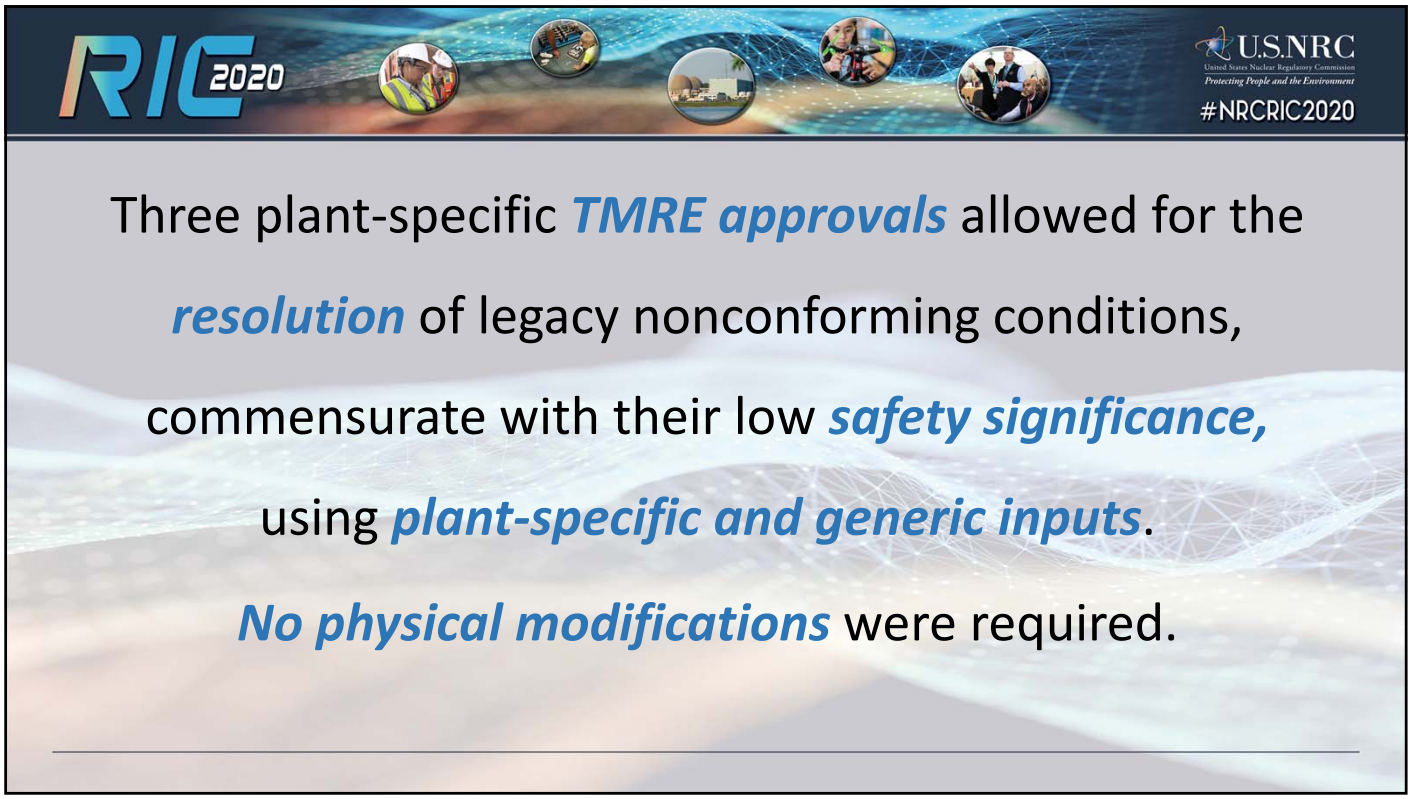
Tornado Missile Risk Evaluator (TMRE) is a risk-informed approach that evaluates the safety significance of nonconforming conditions related to tornado-generated missile protection
Uses Regulatory Guide 1.174 principles of risk-informed integrated decisionmaking
Simplifies evaluations through the effective use of generic parameters, assumptions, and uncertainty analyses
Methodology changes the licensing basis so that structures, systems, and components (SSCs) under consideration remain in as-built conditions

5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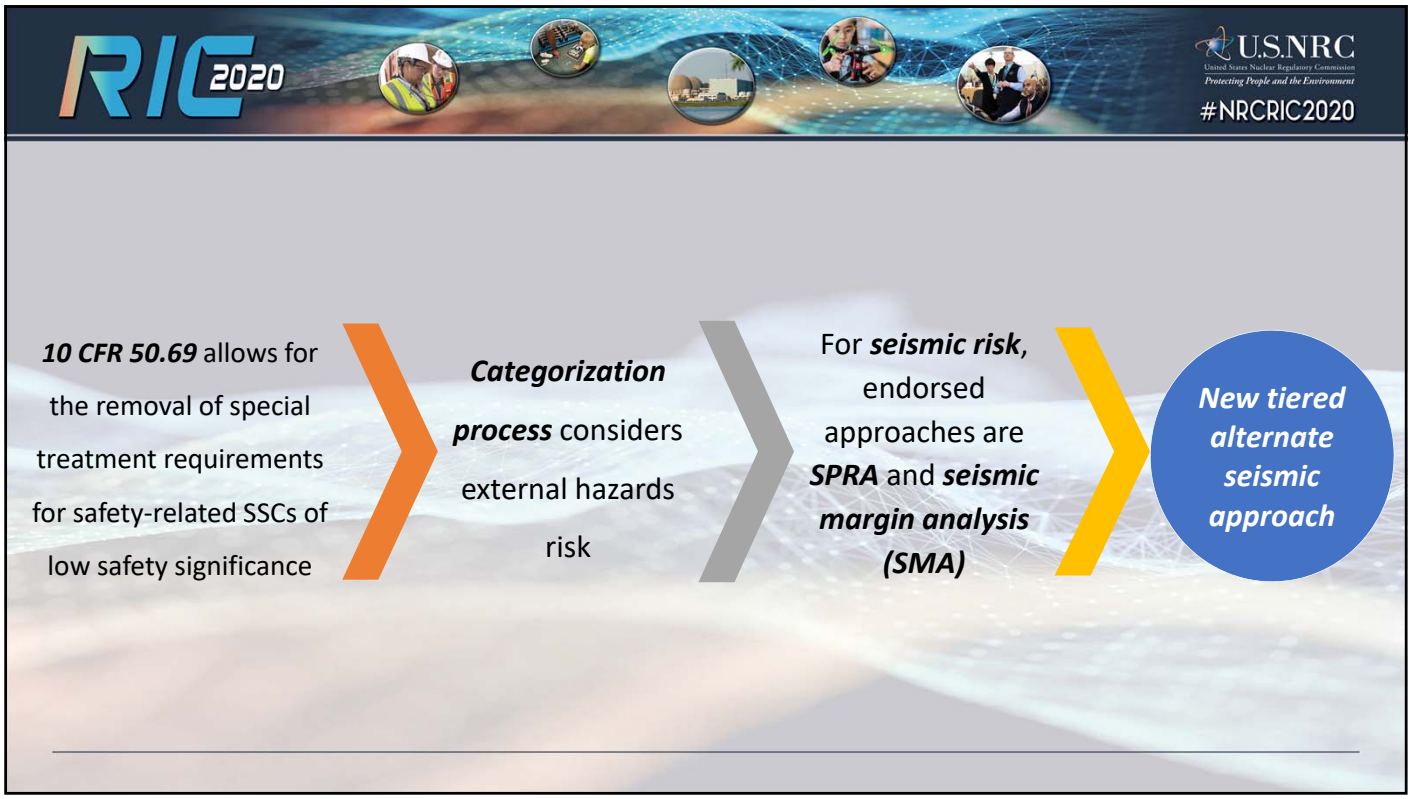
Three plant-specific TMRE approvals allowed for the resolution of legacy nonconforming conditions, commensurate with their low safety significance, using plant-specific and generic inputs.
No physical modifications were required.

6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10 CFR 50.69 allows for the removal of special treatment requirements for safety-related SSCs of low safety significance
Categorization process considers external hazards risk
For seismic risk, endorsed approaches are SPRA and seismic margin analysis (SMA)
New tiered alternate seismic approach

7


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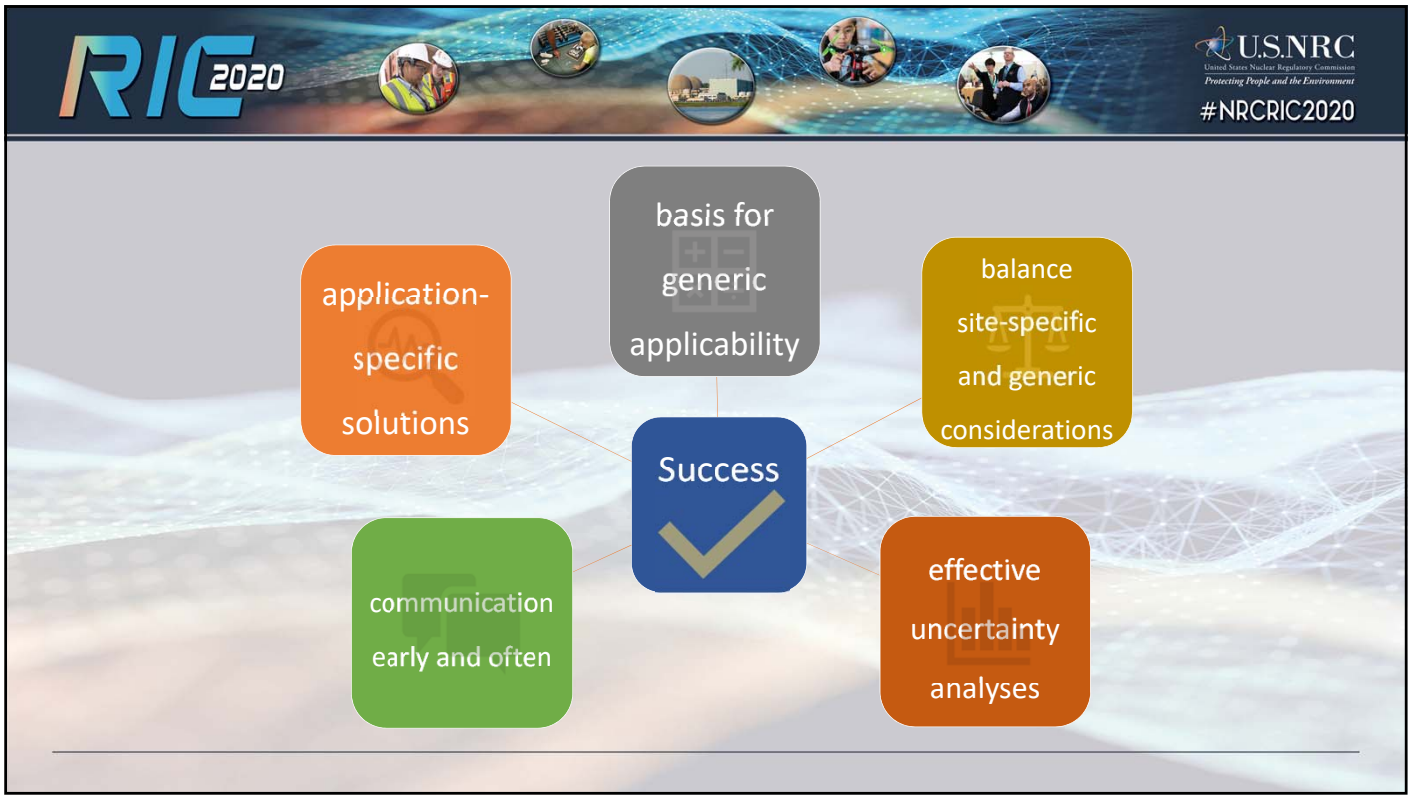
Proposed approach for the consideration of seismic risk for a “low seismic hazard site” in the categorization program (“Tier 1”)
Technical basis used generic risk insights from recent SPRAs
Unique seismic insights generally identified by Internal Events PRA, Fire PRA, and defense in depth
Specific seismic failure modes need to be considered
New SPRA or SMA not needed for the categorization program
Integrated Decisionmaking Panel considers available information
Recent hazard information; design-basis seismic function; relay chatter, seismic interactions, etc.

8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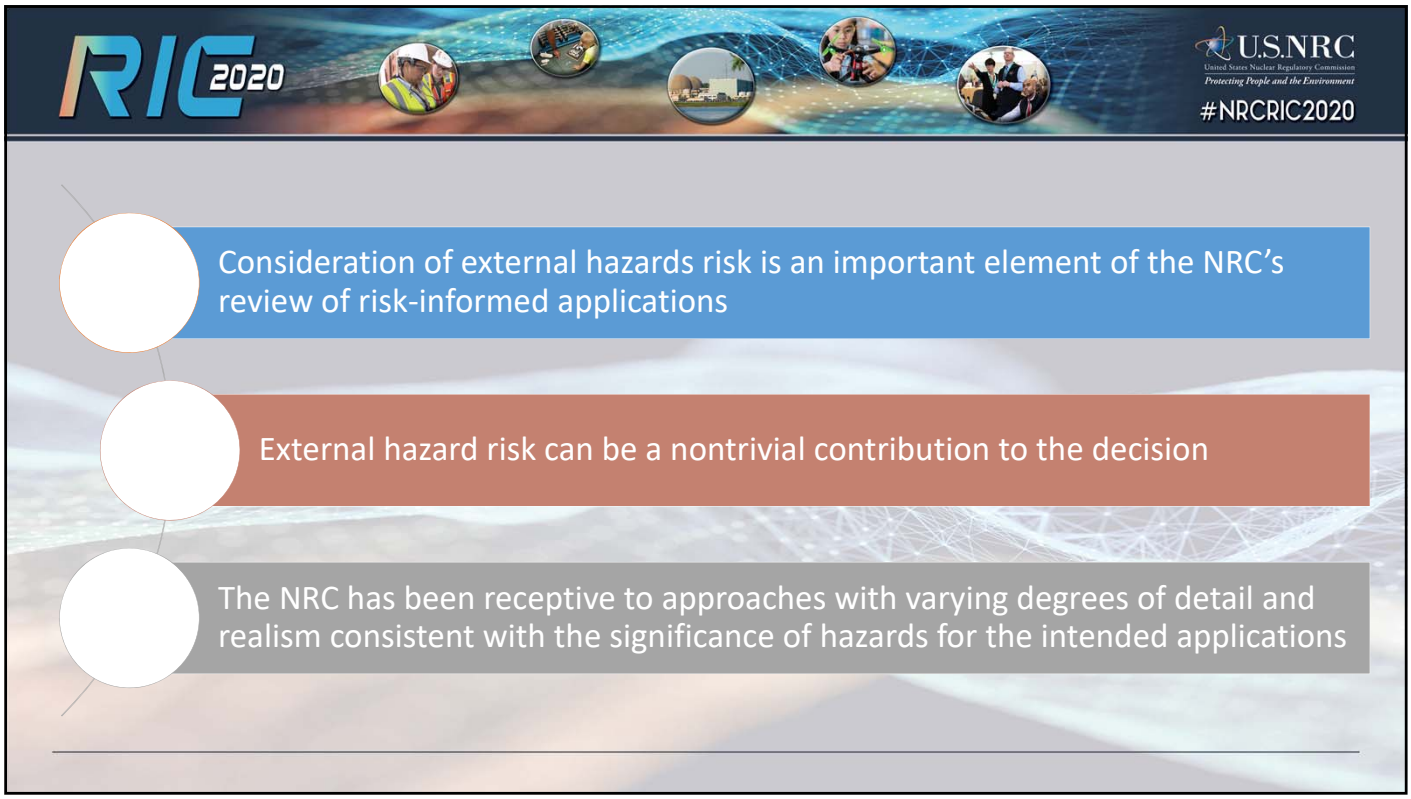
basis for generic applicability
application-specific solutions
balance site-specific and generic considerations
Success
communication early and often
effective uncertainty analyses

9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Consideration of external hazards risk is an important element of the NRC's review of risk-informed applications
External hazard risk can be a nontrivial contribution to the decision
The NRC has been receptive to approaches with varying degrees of detail and realism consistent with the significance of hazards for the intended applications

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