NRC PUBLIC MEETING

ATF Project Plan

NEI Licensing Task Force

September 12, 2018

Key Takeaways

- Appreciate NRC efforts on the Project Plan and agency-wide coordination
- Project Plan represents a comprehensive outline of activities
- Industry has general agreement with the outline in the Project Plan and has a few suggestions for clarification, improvement, and implementation

General Alignment with Project Plan

- NRC accepting industry and DOE test data
- Agree on NRC's acknowledgment that advanced modeling and simulation capabilities can expedite the ATF development timeline
  - The detailed discussions on this topic to be had via direct vendor interactions for design-specific uses
- Recognition that fuel testing can be simultaneous to licensing activities

Industry Suggestions

- Project Plan should provide structure not set requirements
  - Duration and scope of the Phenomena Identification and Ranking Tables (PIRTs)
  - Licensee will determine whether to use license amendment requests (LARs) or 50.59
- Project Plan states that NRC will develop staff and contractors with the critical skills required. The vendors would like to offer support to NRC to develop skill-sets of staff
- Lead Test Assembly (LTA) guidance letter should be finished as soon as possible
- Clarify that advanced modeling and simulation codes may be used for long-term ATF concepts

Industry Suggestions

- Early stakeholder involvement on the concept-specific roadmap development
- Project Plan denotes unnecessarily long durations for activities
  - PIRTs
  - Code Development
  - Rulemaking
- ATF concepts should be licensed for continuous operation to their planned End-of-Life exposures unless LTA / initial batch surveillance results in an adverse finding
  - ATF concepts are expected to be at least as capable as current conventional fuel
- Clarify the expectations regarding updating Probabilistic Risk Assessment (PRA) models as part of fuel licensing activities
  - The development of PRA models for safety benefit implementation is independent of fuel licensing application, as current PRA models bound the use of near-term ATF concepts for licensing

ATF PIRT Process

Key Takeaways

- PIRT Objectives
  - Support NRC review
  - Support vendor fuel qualification plans
- PIRT Proposal and Structure
  - Steering committee responsible for defining scope and expert qualifications
  - Experts responsible for PIRT results
  - Expert reviewers observe the PIRT process and review the report
- Concept specific PIRTs support NRC and industry needs
  - Industry would consider a Pilot PIRT for coated cladding, if necessary
- Coordination can accelerate ATF development and qualification for long-term concepts

Concept Specific Failure Modes PIRT Objectives

- Provide a valuable reference for review of vendor fuel qualification plans[1]
- Provide stakeholders the regulatory insights for developing fuel safety margin testing plans[1]
- Provides regulatory clarity, openness, reliability, and efficiency
  - Identify Concept Specific Degradation Mechanisms
  - Identify Concept Specific Failure Modes
  - Develop Concept Specific Acceptance Criteria

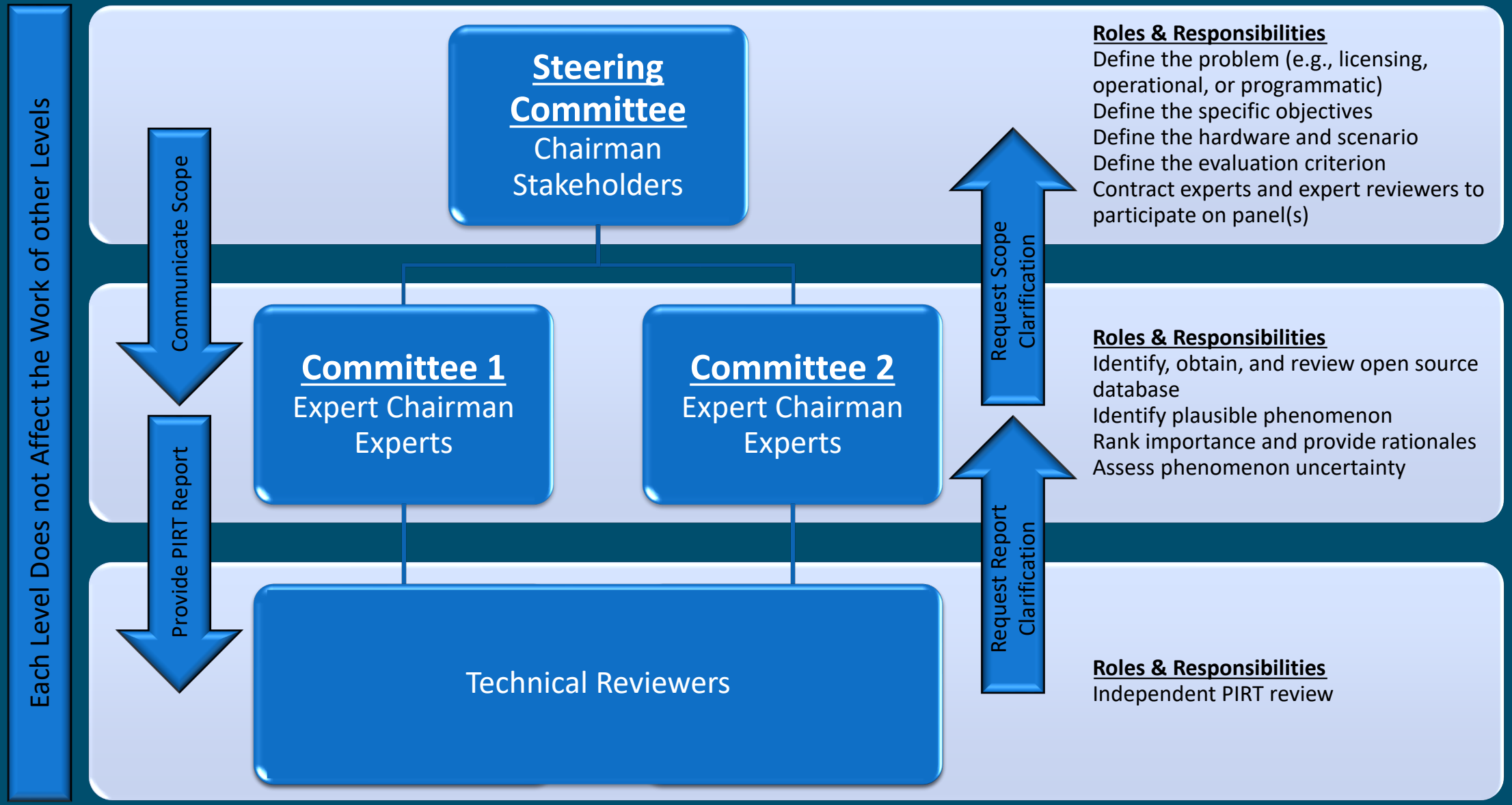
1. U.S. Nuclear Regulatory Commission, "TRISO-Coated Particle Fuel PIRT for Fission Product Transport due to Manufacturing, Operations, and Accidents," NUREG/CR-6844, July 2004

Concept Specific PIRT Proposal[1,2]

- Preparation: Form Steering Committee
  - Define the problem (e.g., licensing, operational, or programmatic)
  - Define the specific objectives
  - Define the hardware and scenario
  - Define the evaluation criterion
  - Contract experts and expert reviewers to participate on panel(s)
- Pre-elicitation: Experts Review State of Knowledge
  - Identify, obtain, and review open source database
  - Identify plausible phenomena
- Elicitation: Expert Ranking Process
  - Rank importance and provide rationales
  - Assess uncertainty for phenomenon (e.g., define gaps)
- Documentation: Document PIRT results
  - Review by independent experts

1. U.S. Nuclear Regulatory Commission, "White Paper: Practical Insights and Lessons Learned on implementing Expert Elicitation," October 13th, 2016
2. U.S. Nuclear Regulatory Commission, "Phenomenon Identification and Ranking Tables for Loss-of-Coolant Accidents in Pressurized and Boiling Water Reactors Containing High Burnup Fuel, NUREG/CR-6744, December 2001

Proposed PIRT Structure



Preparation: Steering Committee

- Steering committee comprised of stakeholders
  - Steering committee selects Chairman
- Steering committee responsible for defining PIRT
  - Schedule and Budget / Funding Sources
  - Roles and Responsibilities
    - Define PIRT goals and objectives
      - Define scope and charter
      - Determine the number of committees
      - Define expert committee member qualifications
      - Determine the number of experts needed per committee
    - Identify experts who meet the qualifications
      - Contracting should be independent of the Steering Committee
    - Communicate scope to PIRT committee facilitators
    - Define evaluation criteria based on safety margin and licensing requirements

Potential Steering Committee Affiliation
NRC
DOE
Vendor(s) Rep(s)
EPRI (if needed)

Concept Specific PIRT Approach

- Initial Focus: Degradation Mechanisms, Failure Modes, and Acceptance Criteria
  - Industry interested in coordinating with stakeholders on proposed PIRT process
  - Steering committee to finalize PIRT scope based on consensus
  - Subsequent PIRTs will use the proposed PIRT process
- Pilot PIRT for Coated Cladding
  - NRC ATF project plan indicates a “pilot PIRT exercise” for coated cladding
  - If NRC desires a coated cladding “pilot” PIRT, the industry would like to use the proposed PIRT process as described

Summary

- Industry is appreciative of the NRC's engagement and involvement on ATF and the development of the project plan

- Industry looks to continue progress through timely dialogue with NRC
  - Roadmaps and Skill-Set Development
  - Project Plan Tasks 1-4
  - Cooperation on the initiation of the pilot PIRT in 2018

Questions?