



***Integration of Expert Elicitation in the
PR&PP Methodology:
Guidelines and Recommendations***

Presented at

**Workshop on
PR&PP Evaluation Methodology
for Gen IV Nuclear Energy Systems**

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Objective

- Provide guidelines and recommendations for the practical and structured application of the PR&PP methodology incorporating formal expert elicitation techniques

A structured beginning...

- First, start by accumulating information about the system
 - System Design → e.g. power, fuel, coolant
 - Operations → e.g. refueling and maintenance
 - Safeguards & Security → e.g. detection, monitoring, C/S
- Augment information through targeted support Expert Elicitations

Best Practice

- Utilize a cross-functional team of Subject Matter Experts (SMEs)
 - Compile the known information
 - Make informed assumptions
 - Organize and record information

Evaluating the system response

- As a cross-functional team of SMEs...
 - Identify the relevant system elements
 - Identify associated targets and pathways
 - Evaluate PR&PP measures for pathway segments

- Assemble the right experts, including:
 - PR&PP Lead
 - System designers
 - Safeguards and Security experts
 - Other Technology experts
 - Operators
 - Expert Elicitation practitioners

Benefits of expert elicitation

- Expert elicitation is a critical part of the evaluation process...
 - Interrogative
 - » Involves practitioners with skill and experience in questioning SMEs to elicit specific responses
 - » Intended to minimize or eliminate bias, capture critical assumptions, and identify inherent uncertainty
 - Iterative
 - » Initial answers may lead to more questions
 - Objective and rigorous

Best Practice

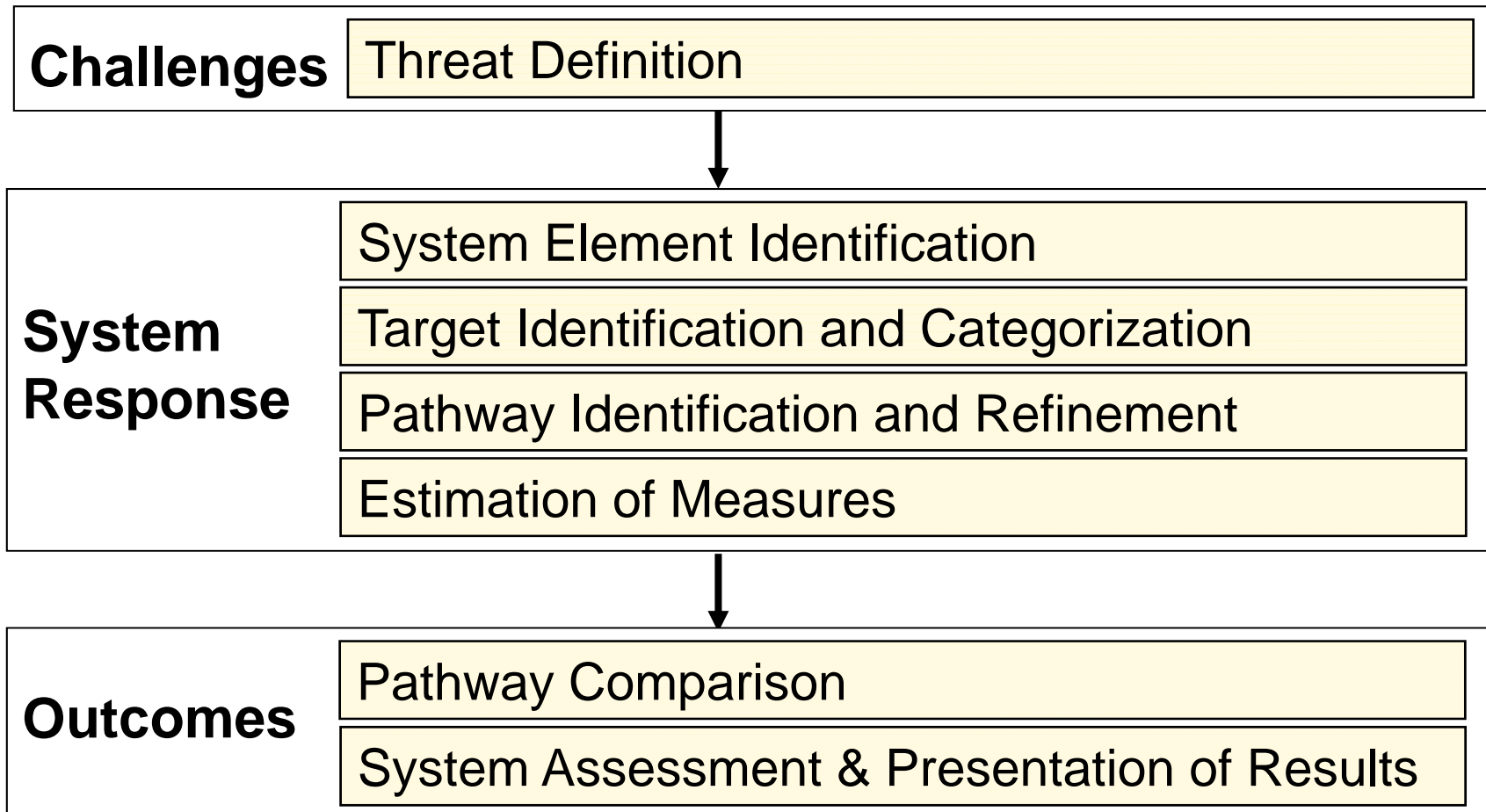
- *A formal* expert elicitation is preferred
- Single project lead from beginning to end
- Continuity in core team SMEs
- Internal and/or external consultants as needed
- Internal critical review panel

Formal expert elicitation process

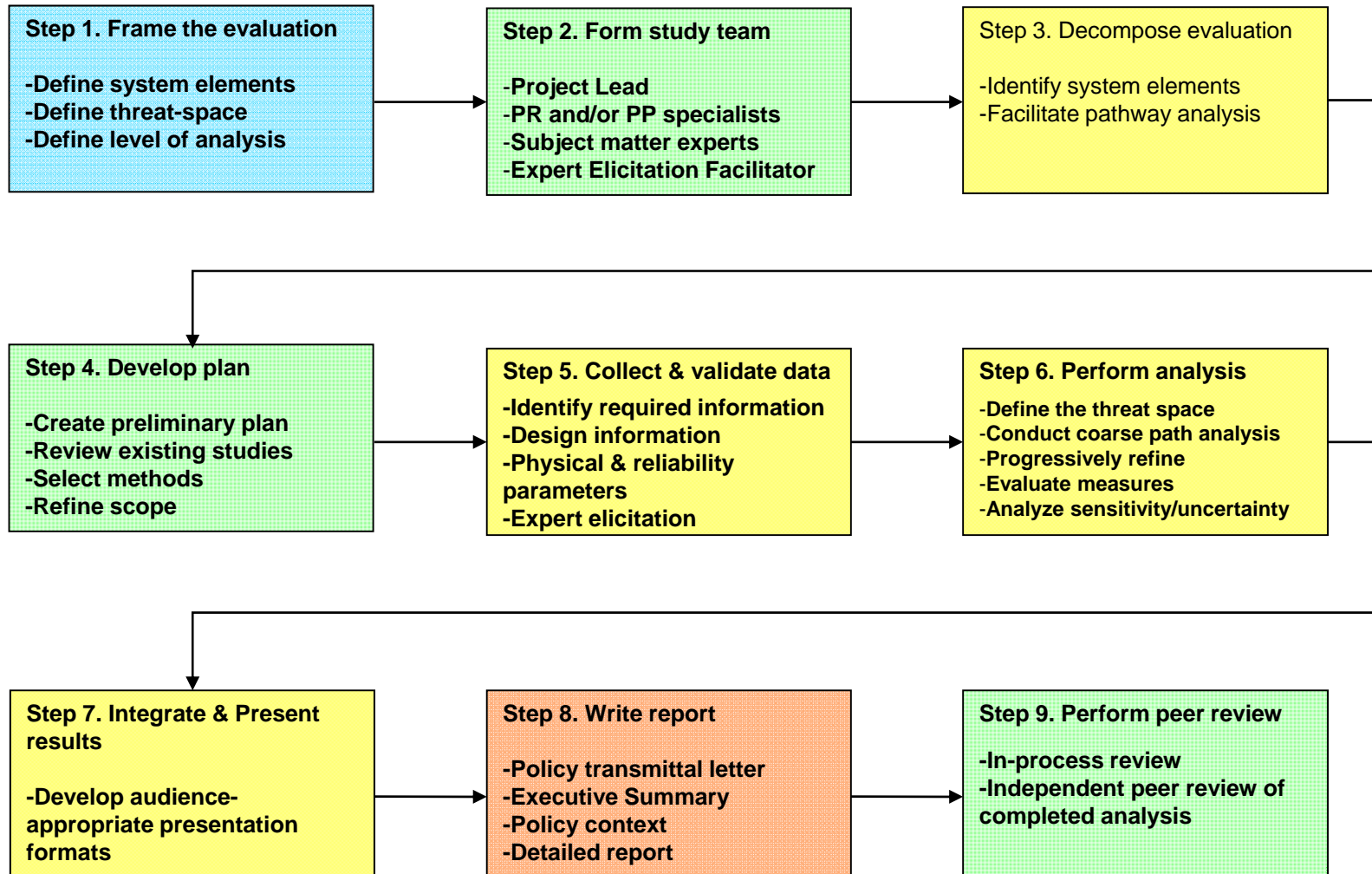
- Identification and selection of issues and scope
- Identification, selection, and training of SMEs
- Development of specific questions and assumptions
- Elicitation of expert judgment
- Analysis, aggregation, and resolution of conflicts between experts
- Documentation and communication of results

Backup Slides

PR&PP Evaluation Framework



Implementation steps in the PR&PP Evaluation Process



PR&PP Framework

<p>Threat Definition</p> <p>System Element Identification</p>		<p>Threat Definition</p> <p>System Element Identification</p> <p>Target Identification and Categorization</p> <p>Pathway Identification and Refinement</p>	<p>Estimation of Measures</p>	<p>Pathway Comparison</p> <p>System Assessment and Presentation of Results</p>	<p>System Assessment and Presentation of Results</p>
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Formal Expert Elicitation Process

<p>Identification and Selection of Issues</p>	<p>Identification, Selection and Training Experts</p>	<p>Development of Specific Questions and Assumptions</p>	<p>Elicitation of Expert Judgment</p>	<p>Analysis, Aggregation and Resolution of Conflicts Between Experts</p>	<p>Documentation and Communication of Results</p>
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PR&PP Implementation Steps

<p>1. Frame the evaluation;</p> <p>2. Form study team;</p> <p>4. Develop plan.</p>	<p>2. Form study team.</p>	<p>3. Decompose evaluation;</p> <p>5. Collect & validate data.</p>	<p>6. Perform analysis;</p> <p>7. Integrate & present results;</p> <p>8. Write report.</p>	<p>7. Integrate & present results;</p> <p>8. Write report.</p>	<p>8. Write report;</p> <p>9. Perform peer review.</p>
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