

NRC Confirmatory Analysis and Advanced non-LWR Code Selection



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Licensing & Confirmatory Analysis

- **Licensing is done through the NRC's Office of New Reactors (NRO). NRO is responsible for organizing the review, developing policy, and working with the applicant to determine schedule.**
 - Early interactions are beneficial to both applicant & NRC
 - Priority generally given to applicants with a customer
 - The applicant owns the Evaluation Model
- **Confirmatory analysis is performed by the Office of Regulatory Research (RES) at the request of NRO to investigate the applicant's calculations and inform regulatory decisions.**



Evaluation Model Review

- **Evaluation Models are approved for a specific design and specific scenarios.**
 - Applicant is expected to submit a “Model & Correlations” document as part of the review.
 - Validation is key to a successful review:

Separate effects data: Are the phenomena simulated accurately?

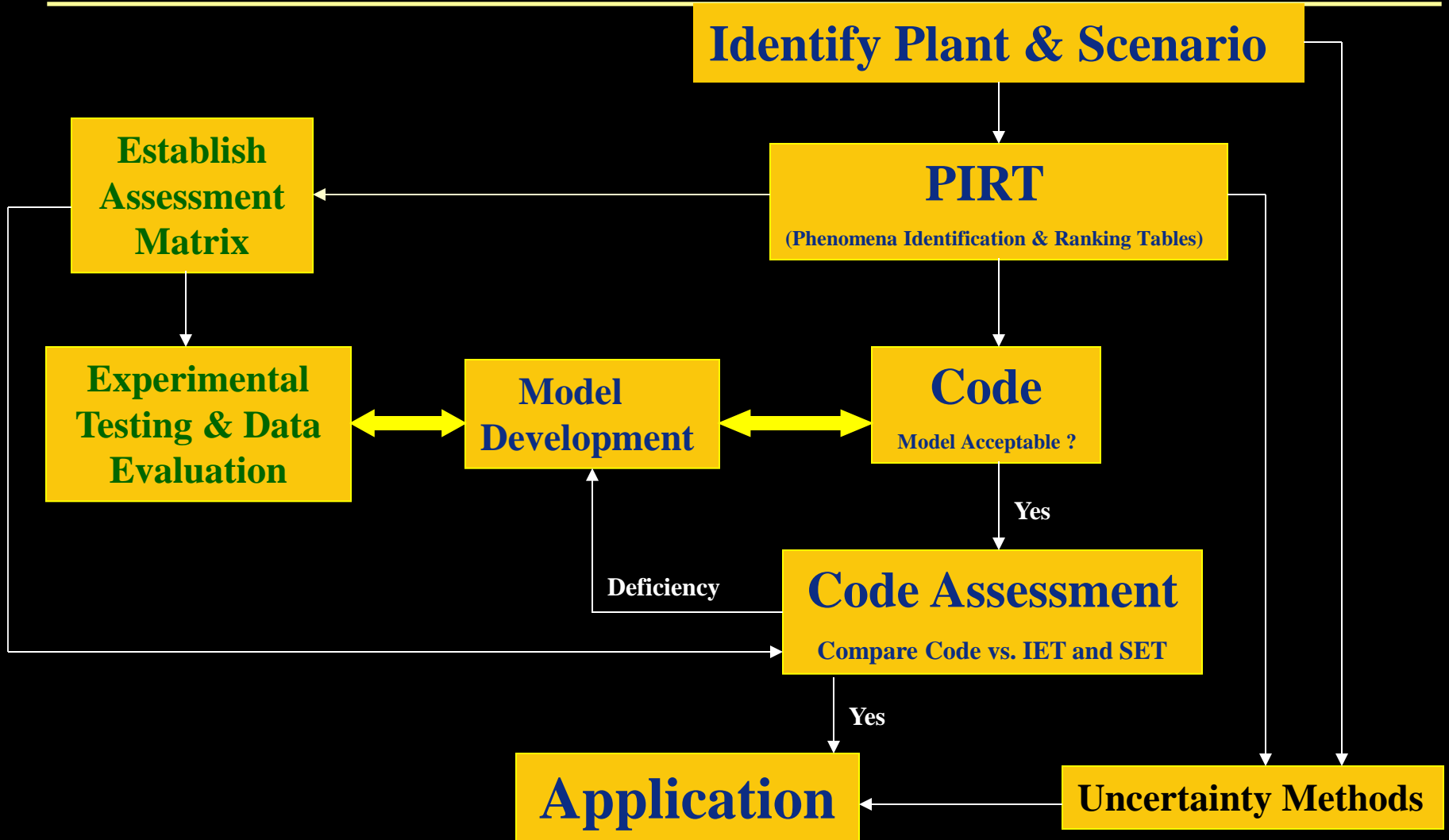
Integral effects data: Do the critical safety systems work?

Scaling: Are the tests scaled to the applicant's design?

Model sophistication: Are there compensating errors in the analysis?



Code Development / Assessment



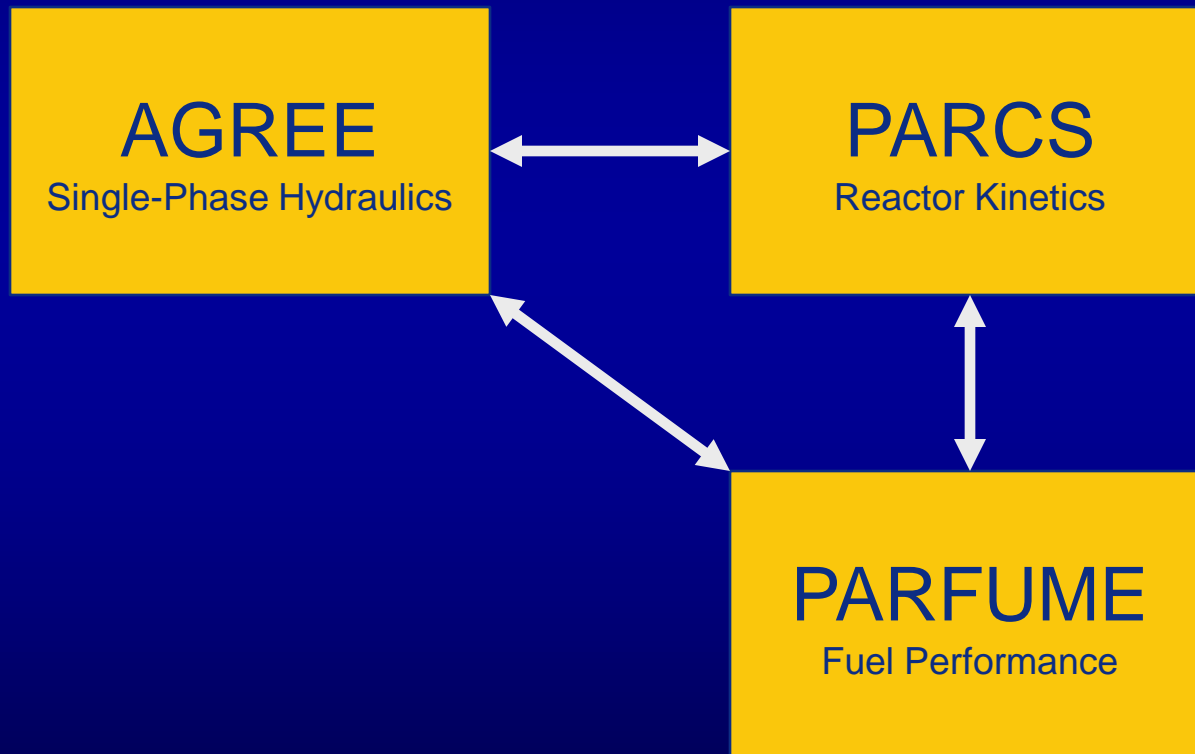


NRC Code Suite Options

- **Good News! Non-LWRs are not expected to have two-phase gas-liquid flows, which is a major source of complexity in LWR analysis.**
- **There are several options that can be considered, and there may be different code systems for various design types.**
- **NRC prefers independence in its confirmatory codes – but is considering the use of existing codes to reduce development costs and speed preparations for reviews.**

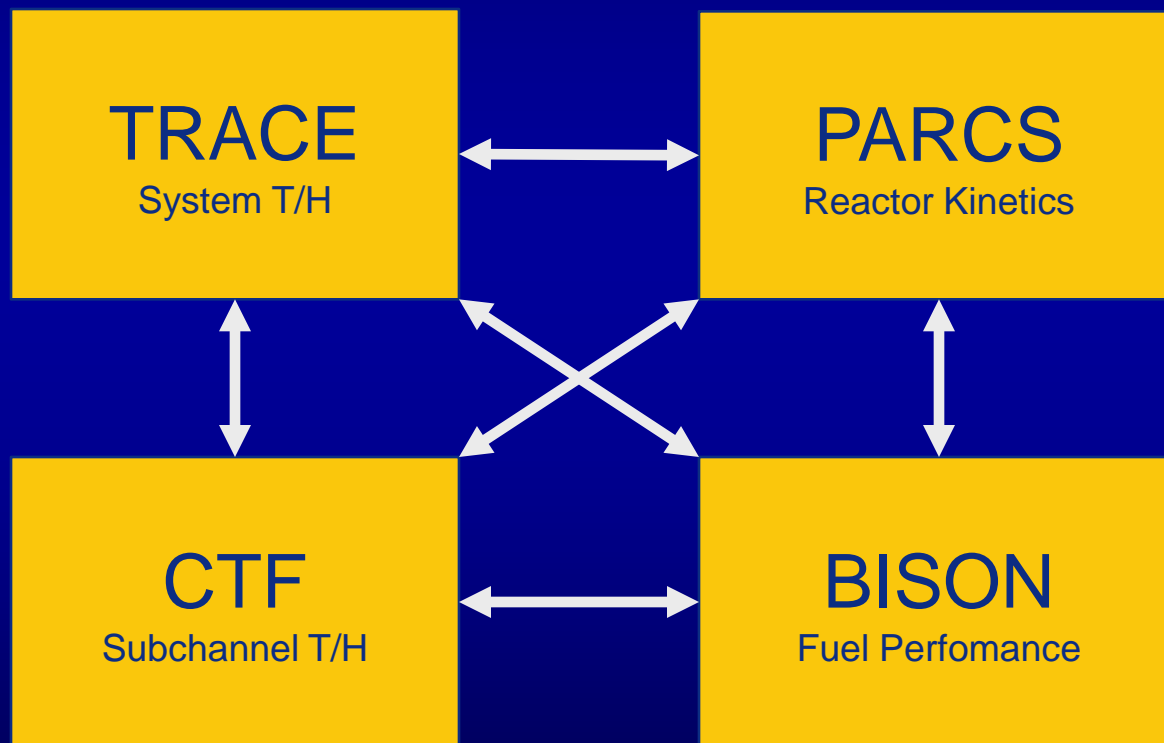


Gas-Cooled Reactors



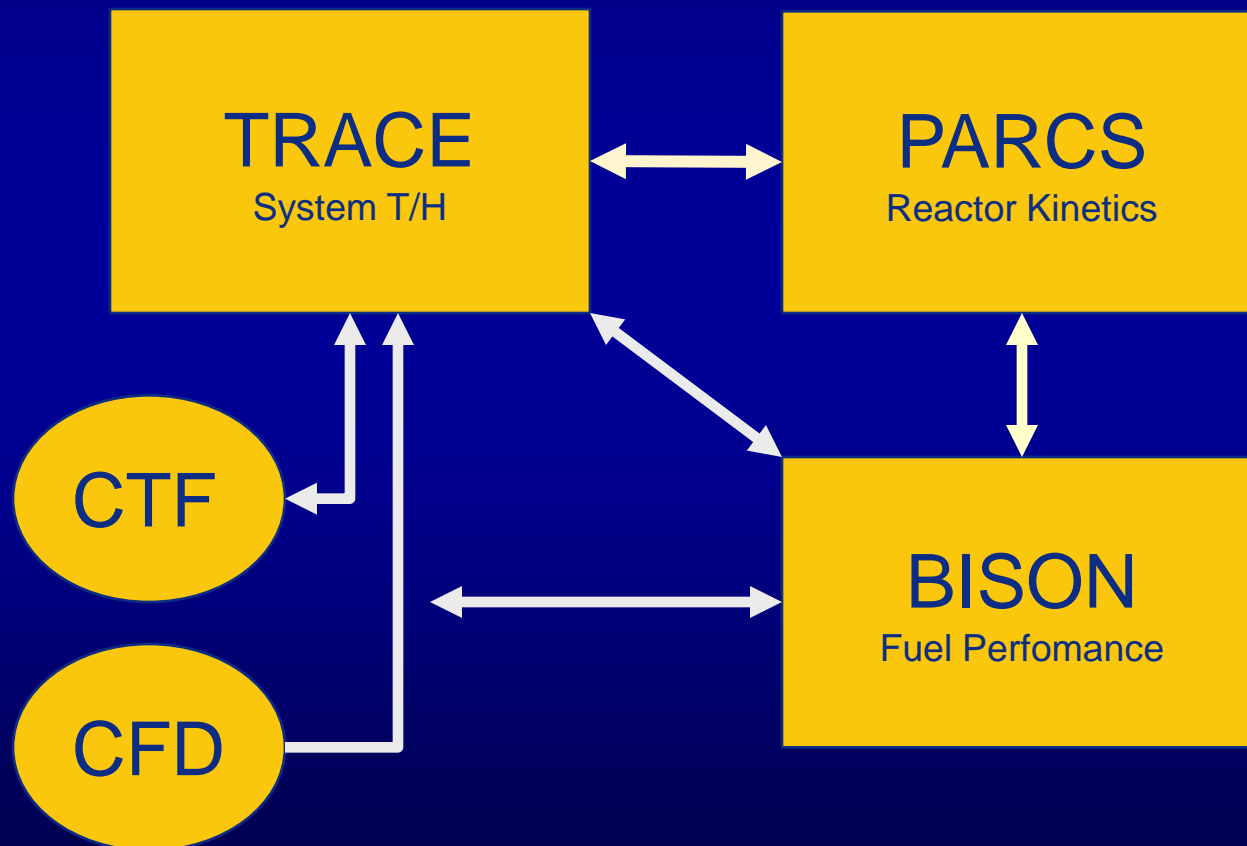


Sodium Fast Reactors (Option 2)



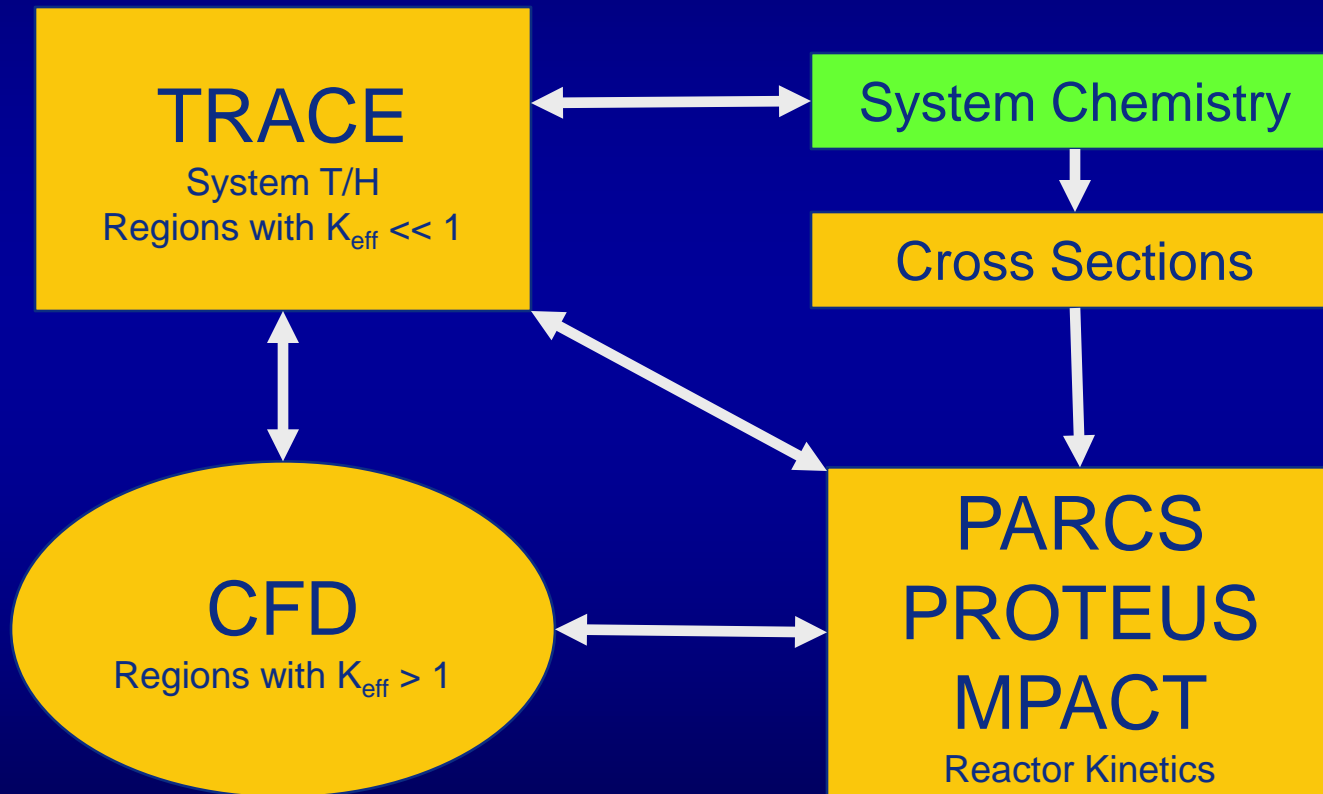


Molten Salt Reactors (fixed fuel)





Molten Salt Reactors *(liquid fuel)*





Summary

- **The NRC has recently developed an “Implementation Action Plan” for development of tools, data and codes for advanced non-LWR confirmatory analysis**
- **We will consider codes that did not originate with the NRC. It may be possible to maintain independence even if the NRC and applicant use the same code(s).**
- **Code assessment remains important. The need for experimental testing may be reduced by high fidelity codes – but not eliminated.**