The Nuclear Energy Knowledge and Validation Center

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Idaho National Laboratory

NEKVAC

Why a Center?

- *A validated code-model is a tool for **users**. An unvalidated code-model is useful for code developers (for understanding, publishing, attracting funds, etc. but not much else).*
- *As nuclear analysis codes have become more sophisticated, so have the measurement and validation methods and the challenges that confront them.*
- *A successful yet cost-effective validation effort requires: 1) expertise possessed only by a few, 2) resources possessed only by the well-capitalized (or a willing collective), and 3) a clear and well-defined objective, i.e. validating a code that is developed to satisfy the need(s) of an actual user.*

Vision

Code owners, users, and developers shall consider the *Nuclear Energy Knowledge and Validation Center* to be a partner and essential resource for acquiring the **best practices** and latest techniques for validating codes, **planning and executing experiments**, gaining access to and **fully exploiting existing data**, and **preserving knowledge** for use by their successors.

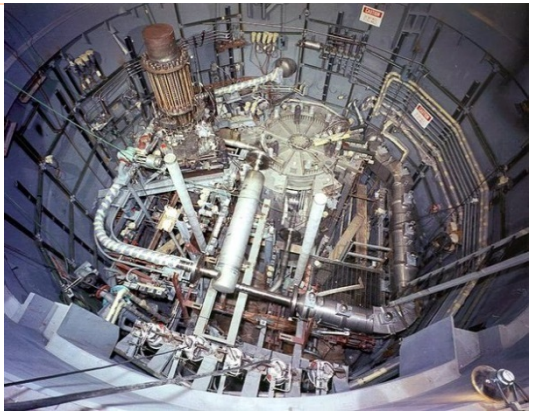
Mission Areas

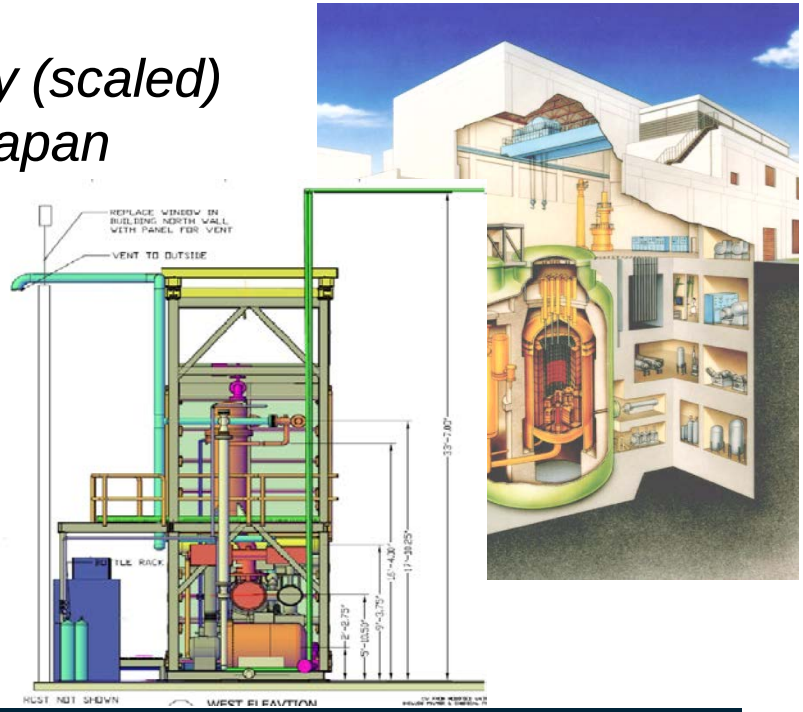
- *Validation Methodology – 'How to validate …'*
  - *Energy & Mass Transfer code , Fuels & Materials codes, etc.*
  - *Multiphysics, Multiscale codes*
- *Standards Development and Benchmark Protocols*
  - *e.g. Zuber's 2-Teired Heirarchy (Reg. Guide 1.203)*
  - *E.g. ICSBEP, IRPhEP*
- *Data Analysis*
  - *Legacy data evaluation and re-use*
  - *Data reduction techniques*
- *Experiment & Code Development*
  - *Facilitate Integrated planning*
- *Knowledge Management*
  - *a la NEKAMS*

NEKVaC will not validate your code

Projects

- *Legacy Data Recovery and Re-use*
  - *Near-term - LOFT, EBR-2, THORS ?*
  - *1-D, Multi-D complementarity*
  - *Others?*
- *Experiment Planning*
  - *Facilitate planning of complementary (scaled) experiments in HTTR/HTTF (USA-Japan Bilateral Agreement CNWG)*
  - *?*
- *Validation Test Facility*
  - *Advanced NPP PCS component and corrosion loop testing*
  - *Flexible, modular, multi-use*





NEKAVC Organization (Rev 1)

Idaho National Laboratory

Directorate

Administers the Program and sets policy. Members: Center Director, Deputy Director, the RSICC Director, and Program Support Personnel

Steering Committee

Recommends projects to pursue. Members from Industry, DOE Programs, Academia, OECD rep

Integration

IRP Development, Negotiate university and industry collaborations, access to Databases/Facilities

Methods and Standards

Defines protocols for data acquisition, storage, and exchange. Evaluates and proposes methods for validation of multiphysics systems . Members: NEA,EPRI, various subject matter experts from labs and academia

Legacy Data

LOFT, EBR2, THORS

Retrieve, Digitize, Evaluate, Qualify, Construct benchmarks in response to user requests (subject to prioritization by Steering Committee)

Education,Knowledge Retention & Application

Develop methods for re-constructing and preserving knowledge (a la NEKAMS) Convene experts to solve specific problems. Educational programs.

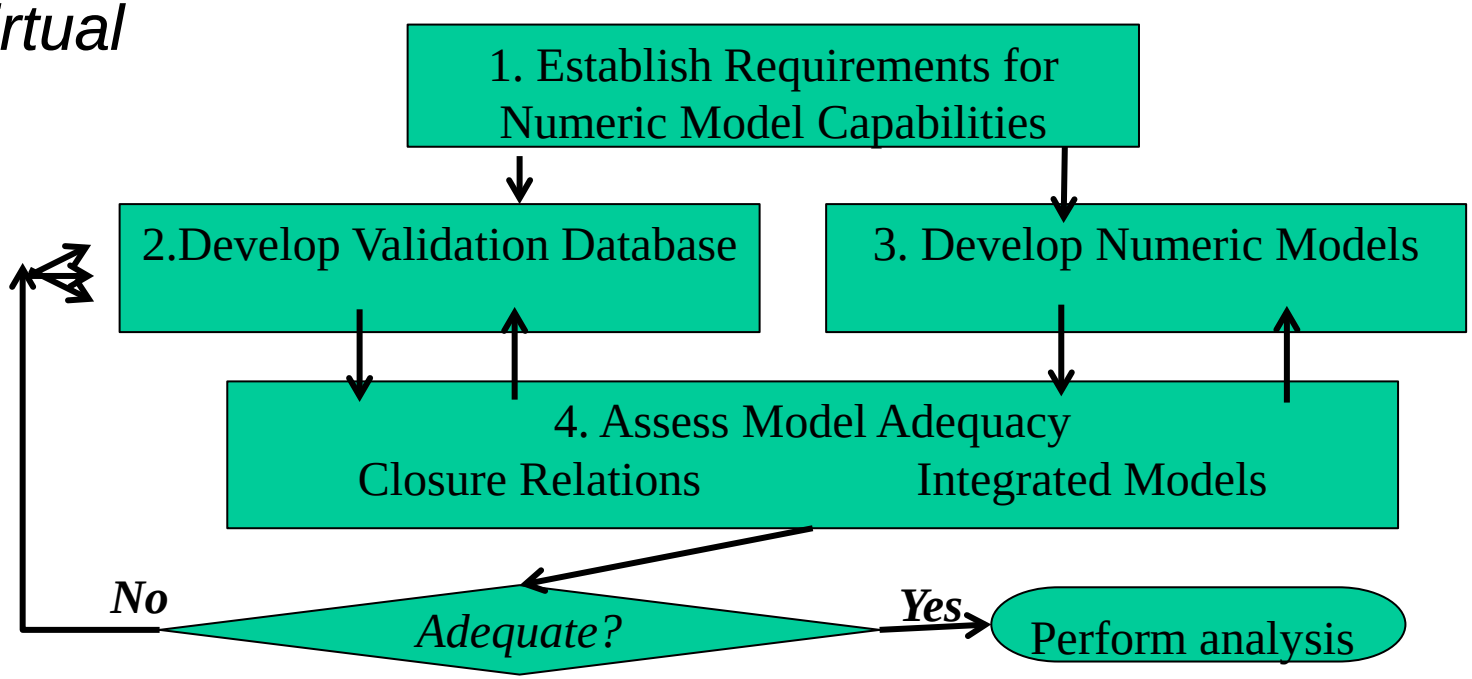
Experiment Planning

HTTR/HTTF, VTF,etc.

Support design and evaluation of experiments in existing or planned facilities for multiphysics, fuels, etc. code validation

Other Attributes

- *Leverages the format and process and international expertise of the NEA Working Groups and Projects (MPEBV)*
- *Considers best and current practices for code validation recognized by regulators and practitioners (e.g. Reg Guide 1.203)*
- *Encourages simultaneous validation of low order integral codes and higher order multiphysics, multi-scale tools.*
- *Virtual*



Path Forward

- *Establish the US Center (Hans)*
  - *Charter, functions, staff*
  - *Interface with OECD/NEA (Phillip)*
  - *Establish relations with stakeholders/identify needs (today)*
- *Form a Steering Committee to Develop and Initiate a Process for Assessing and Prioritizing Legacy and New Experiment Evaluations (Hussein)*
- *Form the Methods/Standards Group Identify best practices/protocols of the reactor physics benchmark projects and adapt/expand them for thermal fluid and multiphysics code validation (Tim)*
- *Initiate identified near-term projects*

Near term/high priority activities

- Populate committees/Charter
- Data
  - Process for submitting/selecting proposals for access to non-US data
  - Legacy data recovery
  - Legacy and nonUS data qualification
  - Database
    - Format
    - Access policy
- University project (IRP/NEUP)
- Specific efforts

Specific Projects

- LOFT/EBR2/THORS
- Portal Construction
  - NRC
  - OECD/NEA
  - Format/Access
  - NEKAMS
- Standard Development for Data Qualification
- Value Proposition
  - Qualification/Benchmark Construction
- Roadmap

We invite your advice and participation

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