Nuclear Facilities Subcommittee of NEAC; 5 June 2014

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Situational Analysis

1. NE has limited resources to expand its program
2. Congressional forecasts indicate that budgets will be flat, at best, for the foreseeable future
3. NE must find mechanisms to increase impact
4. Increased integration of Lab and University activities could provide the opportunity to increase value for funds spent

Mission Imperatives

- NE must pay attention to the current commercial fleet (industry relationships)
- NE must assure that nuclear energy is available in the future to address the US economy (e.g. new and safer designs)
- NE must assure that the future workforce is available (University and Lab relationships)

Mission approach

- The NE Implementation Strategy is:
  - Engineering-driven
  - Solid Scientific foundation
  - Flexible experimental framework
  - Efficiency of experimental activities
  - Focused application of modeling and simulation supported by quality V&V

Committee Observation

1. The ATR-NSUF began as a pilot in 2007
   - Deemed to be a success
   - Expansion of scope is recommended
     - Materials
     - Thermal Hydraulics
     - Code development to include V&V
     - Advanced fuels
     - Fuel cycles
     - Nuclear Engineering in the broadest terms.

Committee Observations

2. The expanded role goes well beyond ATR
   - Proposed revised name “Nuclear Scientific User Facilities” (NSUF)
3. Identify all critical facilities, across the complex, of importance to NE Missions and develop an integrated “User Facility” framework (a virtual set of User Facilities)
   - Hot cells
   - PIE
   - Criticals Experiments
   - Etc.

Committee observations

4. A new model for NSUF should be prominent in the next DOE-NE roadmap

- Encourage Student and faculty use of facilities in NE Science R&D
- Increased Engage industry in cooperative R&D
  - Assure focus on important Industry needs
- Envision next gen. Reactors, fuels, fuel cycles, etc.
- A user organization needs to be emphasized
  - Integration across programs will overcome any double Jeopardy between NSUF and NEUP

Committee observations

5. High Performance Computing is an essential dimension for a successful NE Future
   - The value proposition for CASL needs to be articulated
   - NEAMs must focus on developing insights into performance and safety for both current and new systems: provides guidance for experimentation
   - Experimental facilities must provide validation and verification of new codes

In closing

- The committee recommends leveraging the success of the original NSUF to build a model of multiple new user facilities
- Strong Industry engagement is essential: a closer relationship is deemed necessary
- Strong university engagement is essential: NEUP must become an effective aspect of industry engagement
- INL relationships with both Industry and Universities must be secure and thriving
- The Office of Nuclear Energy plays many roles with the responsibility to ensure that nuclear energy is available as a candidate energy source to the Nation's Economy: the new R&D Roadmap must clearly articulate these multiple roles.