ROLE OF FUSION NUCLEAR TECHNOLOGY IN THE PROGRAM PLAN

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TECHNICAL CONCLUSIONS WITH PROGRAMMATIC IMPLICATIONS

- Fusion Environment for Nuclear Components is
  UNIQUE
- Interactive Effects (n, γ, B, $\dot{B}$, T, V, σ), Multiple Components/Function:
  NEW PHENOMENA
- New Phenomena Result in Critical Issues:
  FEASIBILITY
  ATTRACTIVENESS (Safety, Economics)
- Resolving these Issues Requires:
  NEW KNOWLEDGE
  Experiments, Theory, Models
- Fusion Technology Deserves Enhanced Effort:
  Critical to Fusion
  Important to Science/Technology

TECHNICAL CONCLUSIONS WITH PROGRAMMATIC IMPLICATIONS

- Neutrons Necessary for Many Experiments
- In 1985–1995 : Can/Should Use:
  - Small Scale Test Stands
  - Point Neutron Sources
  - Fission Reactors
- But, After 1995, There is a Critical NEED for a
  - FUSION ENGINEERING RESEARCH FACILITY
- FERF Technology Requirements:

Fusion DT Power:	20 MW
Mode:	Steady State
Test Area:	10 m^2
Fluence:	2–10 MW · y/m^2

- Combined Physics/Technology with $>$ 100 MW:
  - High Risk, High Cost

ISSUES IN ENHANCING FUSION TECHNOLOGY

A. Programmatic : COST

1. US : Suplemental Funding

   Fusion Technology Must Proceed on Its Own Merit because of Importance to Fusion AND Science/Technology

2. International Cooperation : Prime Area

   - User Type Facilities

   - Share Cost/Benefit without Necessarily Agreeing on a Common Path

B. Technical : Credible/Inexpensive FERF?

- Requirement : Low Power (20 MW), High Power Density (2 MW/m^2)

- From Technology : Plasma is Only a Neutron Producer

- New Plasma Mode May Enhance Discoveries

- FERF Goals can Capture the Imagination of the Nation

  - Produce : 20 MW/2 MW/m^2 of Fusion Power

  - Use : Most Intense Neutron Source with Unique Fusion Environment to Gain New Knowledge from Important Engineering Research Experiments