Comments on
US Fusion Program

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Workshop Agenda

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… MEDIA UPDATE …

The following is a statement by President Bush about ITER, a major international fusion project. Energy Secretary Abraham announced the President's decision that the U.S. will participate in the project in remarks today at the Department of Energy's Princeton Plasma Physics Laboratory. Secretary Abraham's prepared remarks are available at **www.energy.gov**

The White House
Office of the Press Secretary

For Immediate Release January 30, 2003

STATEMENT BY THE PRESIDENT

I am pleased to announce that the United States will join ITER, an ambitious international research project to harness the promise of fusion energy. The results of ITER will advance the effort to produce clean, safe, renewable, and commercially-available fusion energy by the middle of this century. Commercialization of fusion has the potential to dramatically improve America's energy security while significantly reducing air pollution and emissions of greenhouse gases.

The United States will be working with the United Kingdom, other European Union nations, Russia, China, Japan and Canada on the creation of ITER. Today, I am directing the Secretary of Energy to represent the United States at the upcoming ITER meetings in St. Petersburg, Russia. We welcome the opportunity to work with our partners to make fusion energy a reality.

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DOE This Month

U.S. DEPARTMENT OF ENERGY

FEBRUARY 2003

Department requests $23.4 billion for Fiscal Year 2004

Administration committed to hydrogen fuel for future

U.S. to join ITER negotiations

Secretary Abraham addresses employees at Princeton Plasma Physics Laboratory

FY 2004 Congressional Budget Request
Comparison to FY 2003 Congressional Budget Request

The President has decided the **U.S. should join negotiations** to build ITER to provide a sustained, burning plasma experiment

ITER **($12M for new direct expenses** related to ITER participation, are redirected within the Science, Enabling R&D, and Facilities Operations subprograms)

Science ($144.7M, $+2.1M) (includes SBIR/STTR)

- Broad consensus that a burning plasma experiment is the next step (FESAC, NRC, SEAB)
- Conduct ITER-specific experiments on DIII-D and C-MOD
- Refocus SciDAC on an integrated simulation project supporting burning plasma physics
- Establish fusion plasma science "Centers of Excellence"
- Curtail international collaborations in order to support ITER
- QPS design efforts continue

Facilities Operations ($87.6M, $+9.1M)

- **Operate 3 national facilities at 84% of full utilization**
- **Increase funding for NCSX MIE project**, as planned, to complete final design and procure long lead items
- Support ITER transitional activities

Technology R&D ($24.9M, $-11.2M)

- **Focus plasma technology on needs of ITER**
- **Curtail longer range technology activities, in particular chamber technologies**, in order to focus on directly supporting preparations for ITER construction and experiments
- **Redirect FIRE** and other advanced design efforts to ITER transitional activities

Fusion Program Elements Addressing ITER Needs

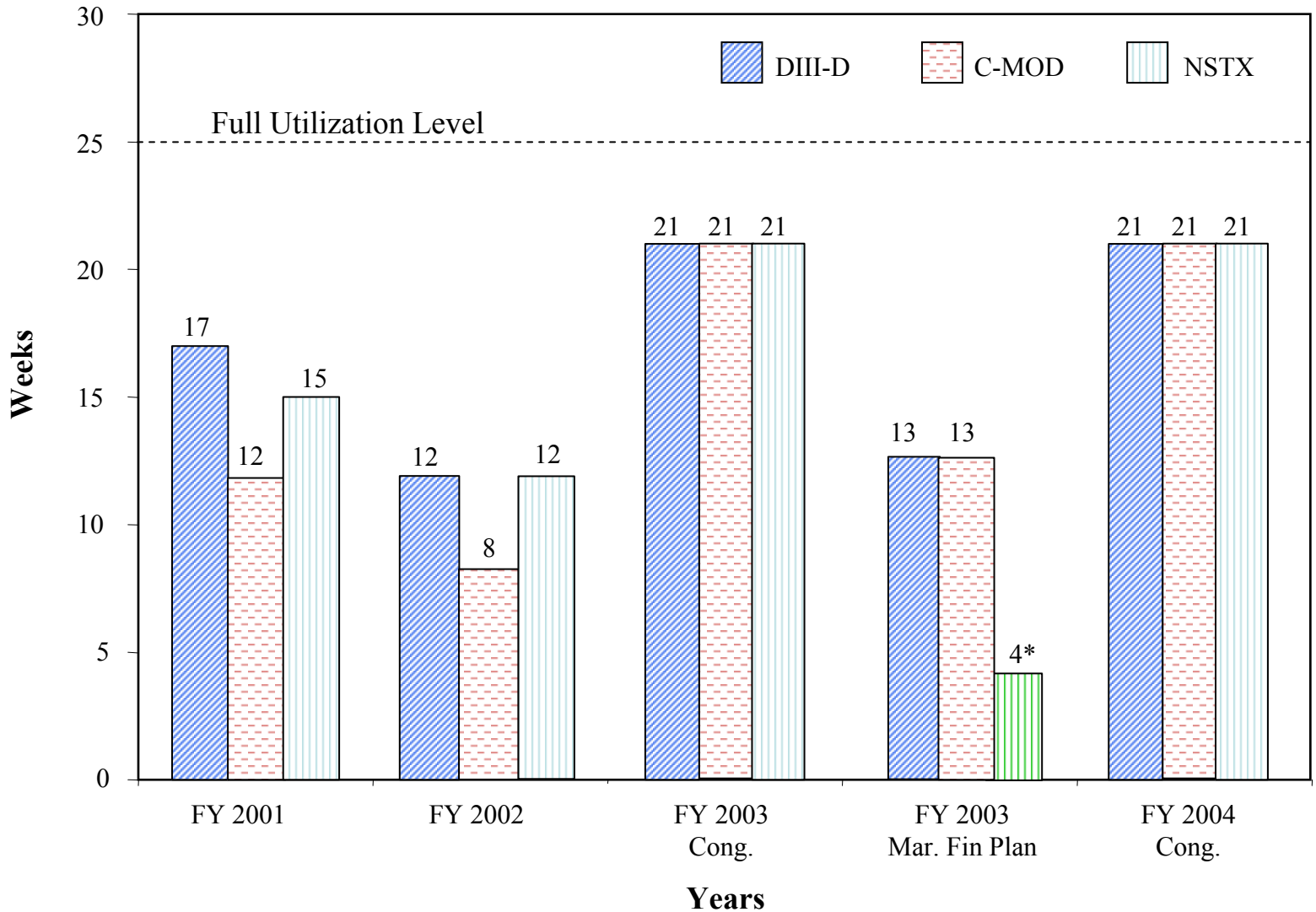
Elements	FY 2004 Resources
DIII-D Experimental Program	$5,000,000
Alcator C-Mod Experimental Program	2,000,000
Fusion Plasma Theory and Computation (SciDAC)	3,000,000
ITER Preparations	2,000,000
Total	*$12,000,000*

FY 2004 Fusion Energy Sciences Congressional Budget Request

	FY 2002	FY 2003 Cong.	FY 2003 Mar. Fin Plan	FY 2004 Cong.
Science	134.3	136.2	137.4	138.1
Facility Operations	70.8	78.6	66.2	87.7
Technology R&D	36.0	36.1	37.1	24.9
SBIR/STTR	0.0	6.4	6.2	6.6
OFES Total	*241.1*	*257.3*	*246.9*	*257.3*
DIII-D	50.9	55.6	52.3	56.7
C-Mod	17.6	22.3	19.2	22.7
NSTX	28.0	33.1	30.4	35.2
NCSX	5.4*	11.8	11.7	16.6

*Operating Only

Major Fusion Facilities Operating Times



*NSTX operating time is reduced due to the failure of one of the magnetic coils in February. The coil will be repaired during the March-September timeframe.

Recent Developments
Related to
Blanket & Materials R&D

- **Reduced budgets** for blanket R&D
- **Shifts in priorities and directions** for blanket R&D
- **Changing views** on prospects for blanket structural materials

Reduced Budgets
for Blanket R&D

- Congress has not yet acted on FY 2004 budget
- President's FY 2004 budget request includes 1/3 overall reduction for technology R&D
  - Plasma technology R&D (plasma facing components, plasma heating, magnets…) to receive **budget increase** and to be refocused toward ITER
  - Fusion technology R&D (blankets, tritium …) that is not needed for ITER is to be **terminated**
  - Design studies to receive budget reduction and to be refocused toward ITER
  - Materials budget to remain at FY 2003 level
- Current planning for FY 2004 is based on President's request, although it is possible that Congress could increase funding for technology R&D

Recent Actions by Congress on FY 2004 Budget

- House Appropriations Committee: "… additional $10,800,000 includes $4,000,00 for burning plasma experiments, including support for ITER and for the domestic FIRE project, $5,200,000 for fusion technology, and $1,600,000 for advanced design and analysis work."

- Senate Appropriations Subcommittee on E&WD: "...Committee recommendation includes $11,000,000 for such fusion technology under the enabling research and development sub-program."

- Senate Appropriations Committee: "The Department's proposed FY 2004 budget proposes to cut severely long-term activities in fusion technology and design that will have significant impact on the ultimate attractiveness of fusion power. The Committee recommends that, within available funds, the Department should make adjustments to redress the imbalance resulting from these cuts."

FY 2004 Budgets for Technology R&D

Shifts in Priorities and Directions for Blanket R&D

- Shift focus of blanket R&D from science of higher risk concepts (advanced, innovative, and revolutionary) to development issues of lower risk concepts (conventional and evolutionary) that will be basis for Test Blanket Modules (TBMs) in early ITER operation

- Maintain some effort on higher risk concepts that might be tested as TBMs in later stages of ITER operation

Changing Views
on Prospects for
Blanket Structural Materials

Recent change in structural materials R&D portfolio balance due to:

- Concerns about prospects for developing insulator coatings to control MHD effects in V/Li blanket
- More positive outlook on prospects of developing advanced (nanocomposited) ferritic steels that can operate at much higher temperatures than present-day steels

Changing Views
on Prospects for
Blanket Structural Materials

Change in Portfolio Allocation

	Past Allocation	**Present Allocation**	**Target Future Allocation**
Structural Material Class Funding Allocation	V alloys: > ½ FS: < ¼ SiC: ¼	V alloys: < 1/2 and declining FS: > 1/4 with AFS research increasing SiC: ¼	About 1/3 for each *if prospects for insulator coatings improves* Reduce V alloys further *if prospects for insulator coatings does not improve*

Summary of Situation for US Fusion Program

Although details of FY 2004 budgets are not yet fully known, the following is clear:

- Technology programs will be greatly affected by ITER
- V/Li concept R&D must focus on solutions to the insulator coating issue
- US must soon re-establish connections with Test Blanket Working Group and make decisions on concepts of interest for early and late TBMs
- Priorities for blanket R&D will be driven by TBM considerations

US Plasma Facing Components Program for FY 2003

- Integrated national team
  - Total of 6.5 $M allocated to SNL (2.4 $M), UCSD (1.8 $M), PPPL (.8 $M), ANL (.7 $M), GA (.3 $M), UI (.2 $M), LLNL (.1 $M), ORNL (.08 $M), UCLA (.05$M)
- Diverse R&D portfolio
  - Advanced concepts (ALPS): 64%
  - Domestic plasma experiment support: 20%
  - International collaborations: 16%
- Increasing level of community governance
  - Newly formed Steering Committee

New
Plasma Facing Component R&D Task under IEA IA on Fusion Nuclear Technology (Annex II)

Workshop Agenda