



U.S. Department of Energy's  
Office of Science

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# Fusion Energy Sciences Program

Burning Plasma Assessment Committee



**Dr. N. Anne Davies**  
Associate Director  
for Fusion Energy Sciences

[www.ofes.fusion.doe.gov](http://www.ofes.fusion.doe.gov)

*May 5, 2003*

# ***FY 2004 Congressional Budget Request***

## ***Comparison to FY 2003 Congressional Appropriation***

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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, \$+1.5M) (includes SBIR/STTR)

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

**Facilities Operations** (\$87.7M, \$+22.3M)

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

**Enabling R&D** (\$24.9M, \$-13.3M)

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

## *Fusion Program Elements Addressing ITER Needs*

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<u>Elements</u>	<u>FY 2004 Resources</u>
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	<u>2,000,000</u>
<i>Total</i>	<i>\$12,000,000</i>

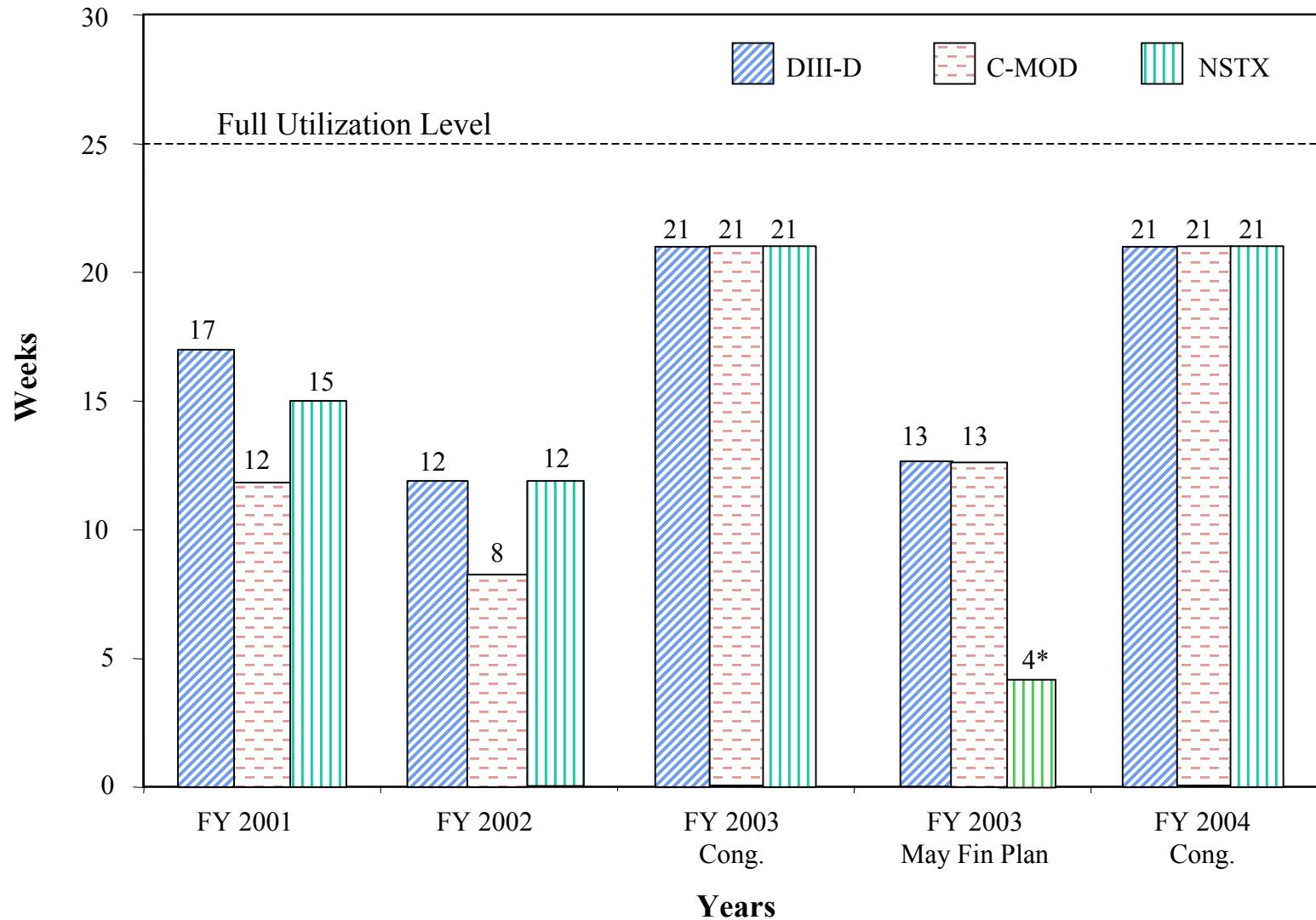
## ***FY 2004 Fusion Energy Sciences Congressional Budget Request***

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	<u>FY 2002</u>	FY 2003 <u>Cong.</u>	FY 2003 <u>May Fin Plan</u>	FY 2004 <u>Cong.</u>
Science	134.3	136.2	137.0	138.1
Facility Operations	70.8	78.6	65.4	87.7
Enabling R&D	36.0	36.1	38.3	24.9
SBIR/STTR	<u>0.0</u>	<u>6.4</u>	<u>6.2</u>	<u>6.6</u>
<i>OFES Total</i>	<i>241.1</i>	<i>257.3</i>	<i>246.9</i>	<i>257.3</i>
DIII-D	50.9	55.6	52.0	56.7
C-Mod	17.6	22.3	18.9	22.7
NSTX	28.0	33.1	30.1	35.2
NCSX	5.4*	11.8	11.6	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.



**NEWS MEDIA CONTACTS:**  
Jeanne Lopatto, 202/586-4940  
Jeff Sherwood, 202/586-5806

**FOR IMMEDIATE RELEASE**  
Thursday, January 30, 2003

**... 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](http://www.energy.gov)

The White House  
Office of the Press Secretary

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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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*ITER Negotiating Meeting in Russia  
now including China and U.S.*

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*U.S. Delegation at ITER Negotiating Meeting in  
Russia (next to Academician Velikhov)*

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## *Status of Negotiations*

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- o Advanced
  - Principally Governmental Issues
    - Intellectual Property Rights
    - Non Proliferation concerns
    - Privileges and Immunities
    - Site assessment –now completed: [www.iter.org/jass](http://www.iter.org/jass)
- o Beginning
  - Principally Programmatic Issues
    - Procurement processes
    - Component allocations
    - Management approaches/tools

## *Results from the St. Petersburg Meeting*

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- o Next Steps
  - Next set of staff-level procedural meetings initially set for April in Toronto, Canada—rescheduled for Garching, Germany in mid-May
    - Many topical working discussions followed by summaries, then on to drafting
    - US will explore in Garching how to do planning for research
    - May 12<sup>th</sup> EU meeting may decide on process to reduce EU site offers from 2 sites to one.
  - Ministerial Meeting in Vienna in mid June—Dr. Raymond Orbach to lead delegation
    - First meeting at "higher/political" level to put "positions" on table
  - Potential meeting of top leaders at the U.N. General Assembly in September
    - Possibly will involve official "encouragement"—"site preference" discussions less likely at that time.

# *Results from the St. Petersburg Meeting*

(Continued)

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- o Issues for the U.S.
  - DOE Developing Management/Financial Risk management positions/papers/Initial preferences
    - Homework for meeting in Garching, Germany in mid May.
  - Preparing Participation in ITER Transitional Arrangements (ITA)
    - Few technical staff on site plus others intermittently in Garching/Naka
    - U.S. participation welcomed, staff as yet undetermined.
  - Fielding participants for all aspects of "negotiations"
    - Vienna ministerial meeting will be the first of "real" negotiations to come
    - Many specialized topics: legal, technical, management, procurement, decommissioning pending at the staff level. Unclear whether they can be resolved at the staff level or must be sent "upstairs" for higher level resolution
  - Site selection
    - U.S. finds all of the sites to be technically acceptable

## *Overview of the April 2003 Meeting in Tokyo*

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- o Preparatory meeting in Tokyo last week (P0)
  - Plan for first substantive negotiations meeting (P1)
    - Date now set for June 19 in Vienna
  - All parties recognize critical next step:
    - **Develop Consensus on Site, Cost Sharing, Personnel**
  - At P1 - first opportunity to address tough issues:
    - **Ask for planned contributions— is sum near 100%?**
    - **Ask for management personnel suggestions**
    - **Ask for expressions of interest in supplying components**
  - Aim for Consensus by October, 2003
    - Can't be earlier- the EU not able to select one EU site
    - CA not able to determine if it has a real role
    - Can't be later- JA, RF, US would find it difficult to stay involved

## *What's Next?*

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- o Negotiators' staff meetings
  - Nine days in Germany in May
  - Press forward on topical issues:

Management	Financial regulations
Procurement	Intellectual property rights (IPR)
Decommissioning	Staffing
  
- o U.S. getting its act together
  - Authorizing Circular 175 to join negotiations
  - State preparing to join negotiations over text issues
    - IPR
    - Privileges and Immunities
    - Nature of International Organization
    - Nature of Agreement
    - Arbitration, etc.

## *What's Happening at Home?*

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- o Domestic fusion program preparing for FY2004 start of work on ITER
- o Papers:
  - Management
  - Risk (trying to convince our partners about this)
  - Procurement approaches
- o Setting Initial component preferences
  - What would we like to do?
- o Scientific involvement
  - **International Tokamak Physics Activity (ITPA)** working groups
  - Fusion Forum (scientific involvement at an early stage)
- o Preparatory organization
- o Budget Preparation
  - FY2004
  - FY2005
  - FY2006



## *Immediate Tasks for Us Now*

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- o Develop Paper on Risk and Cost April 1
- o Develop Papers on Procurement preferences and processes April 1
- o Develop Paper on Management Structure and Staffing April 1
- o Review draft texts (DOE/State) March 21
- o Join ITA\* April 1
  - Formal acceptance of invitation to participate
  - Determination of which tasks US might be able to take on
  - Identification of possible individuals to participate abroad
  - Involvement in focused meetings on organizational/technical topics

\*Subject to availability of personnel and very limited funds in FY03

## *Need to Organize Now*

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- o Two Phased Approach to Organization for ITER in U.S.
  - Phase 1: During ITA, before Construction starts
  - Phase 2: After ITA, during Construction
- o Multi-institutional Team ASAP-Phase 1
  - Immediately: organize around people
  - In near future, revisit to see if more institutionally based organization is necessary
- o For Phase 2, we will develop a Charter for ITER Project Office, consulting with FESAC

## *Immediate Actions*

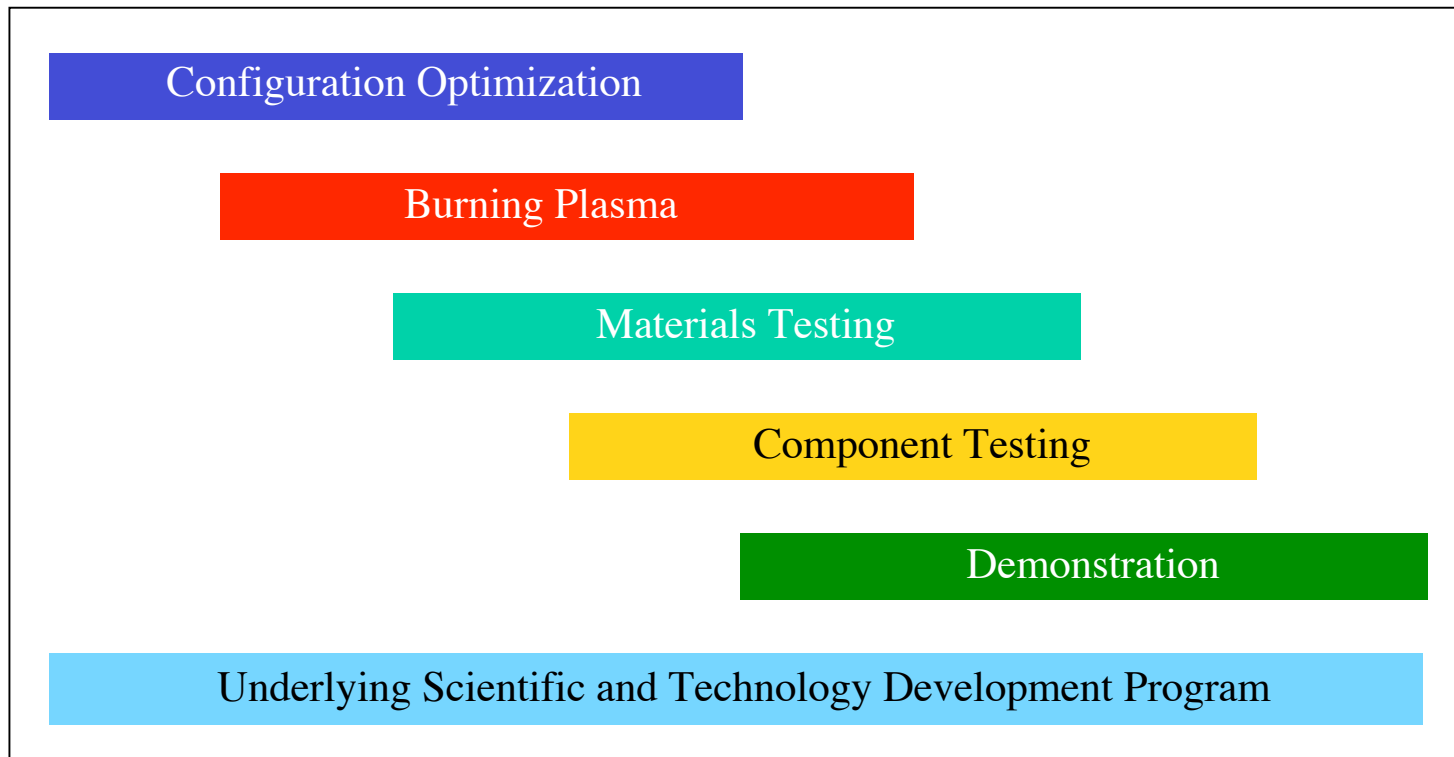
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- o Specifics for the Immediate Effort
  - Ned Sauthoff, with Charles Baker, leading this effort, reporting to Michael Roberts in OFES
  - BP-PAC established by Ned, led by Stewart Prager, with broad participation to engage community in this effort, using FESAC recommendations as guide to the extent possible
  - Assist OFES in both technical and organizational preparations
  - All program participants asked to respond to Ned/Charlie, working with OFES program managers to resolve conflicts, if needed

# *A Plan for the Development of Fusion Energy*

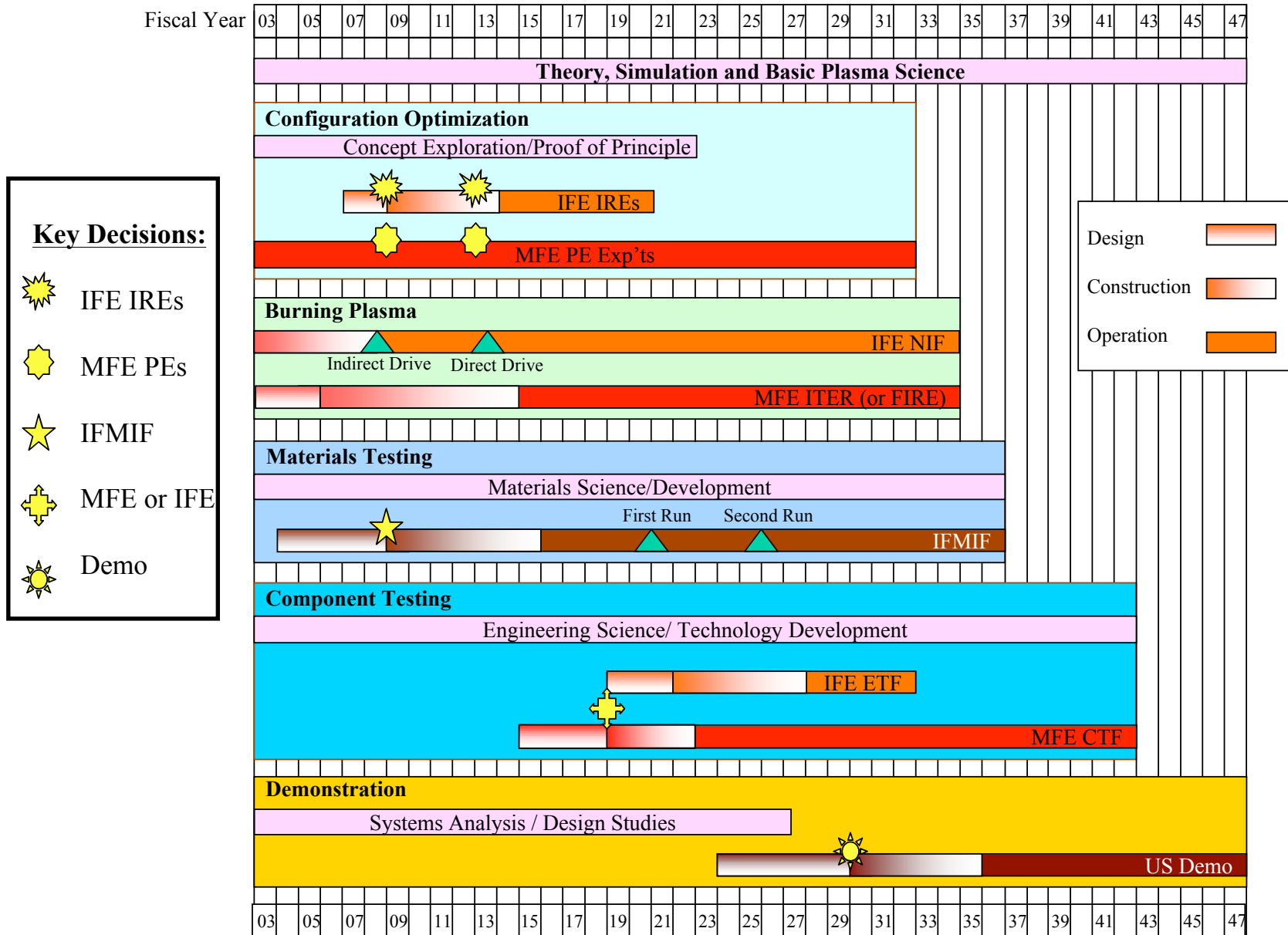
## *FESAC 3/03*

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Overlapping scientific and technological challenges define the sequence of major facilities needed in the fusion development path. Programs in theory and simulation, basic plasma science, concept exploration and proof of principle experimentation, materials development and plasma, fusion chamber and power technologies from the foundation for research on the major facilities.

# The Fusion Energy Sciences Advisory Committee has Developed a Plan for Commercial Fusion by Mid-Century



# *Ongoing NRC Review*

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Looking forward to

final report from

Burning Plasma Assessment Committee