

**ITER TEST PROGRAM:
STATUS, HOMEWORK
AND REQUIRED RESOURCES**

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ITER MEETING
LLNL
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STATUS

- US Addressed Many Issues During FY88
 - Report was issued (UCLA-ENG-88-12)
 - Other Countries Addressed Some Issues
 - Behind in Methodology and Addressing Key Issues
 - Meeting in Garching: July 1988
 - Critical Differences in Approach, Strategy
 - Technical Discussions Among Experts Led to Agreements in Several Areas
 - Definition Phase Report (Sept. 1988)
 - a) Chapter VII on Operations and Test Program
 - b) Homework on Test Program
- *(Handouts available of a and b)

PLANS FOR 1989/1990

- Five Tasks Were Defined
- Schedule for Completing the Tasks was Agreed Upon
- For 1989:

Meetings

- February 1989: Brief Meeting for Review Status (in Garching)
- July 1989: A Working Group From the Four Countries Will Work for One Month to:
 - Review and Discuss Results of Homework
 - Develop Major Features of Test Program and Resolve Major Issues
 - Define Clearly the Remaining Tasks

ITER TEST PROGRAM HOMEWORK TASKS

1. Testing Requirements on ITER Design

- a) Quantify Benefits of Tests as Function of Major Parameters (wall load, fluence, plasma burn/dwell times, availability, continuous operating periods)
- b) Evaluate (in interaction with the Engineering Group) the Test Program Requirements and Effects on CONFIGURATION and MAINTENANCE.

2. Operating Scenario and Schedule

- Estimate Duration of Each Test
- Define the Required Sequence of Test
- Describe the Overall Test Plan
 - number of tests
 - operating time for each test
 - sequence for each series of tests
 - overall ITER Schedule

(assume 2 cases for machine availability during technology phase: 10% and 25%)

HOMEWORK TASKS (CONTINUED)

3. Design, Space and Test Matrix

A) Develop examples of conceptual designs of test modules

- Blanket, HHFC, Tritium Processing, etc.,
- Use ENGINEERING SCALING
(key parameters described in homework;
e.g., temperature, stress, ---)
- Design details should be sufficient to characterize performance parameters, indicate external dimensions and to describe conditions at interfaces with other machine subsystems

B) Ancillary Equipment Requirements

- e.g., Heat rejection system, tritium recovery loop, chemistry control system, auxiliary heating, pumps)

C) Measurements to be Performed

- And how information will be obtained
(e.g., How is velocity profile measured?)

HOMEWORK TASKS (CONT'D)

D) Test Matrix

- Number and Dimensions of all test articles together with duration and sequence of tests

4. Test Program Allocation Among Countries

- Notes:
 - There is not enough space for 4 test programs
 - Test programs presently defined by the four countries are different (even the strategy and approach are different)
- Homework:
 - Develop schemes for effective joint machine utilization
 - Example:
 - Common Base Program
 - Plus 4 Different Programs

HOMEWORK TASKS (CONT'D)

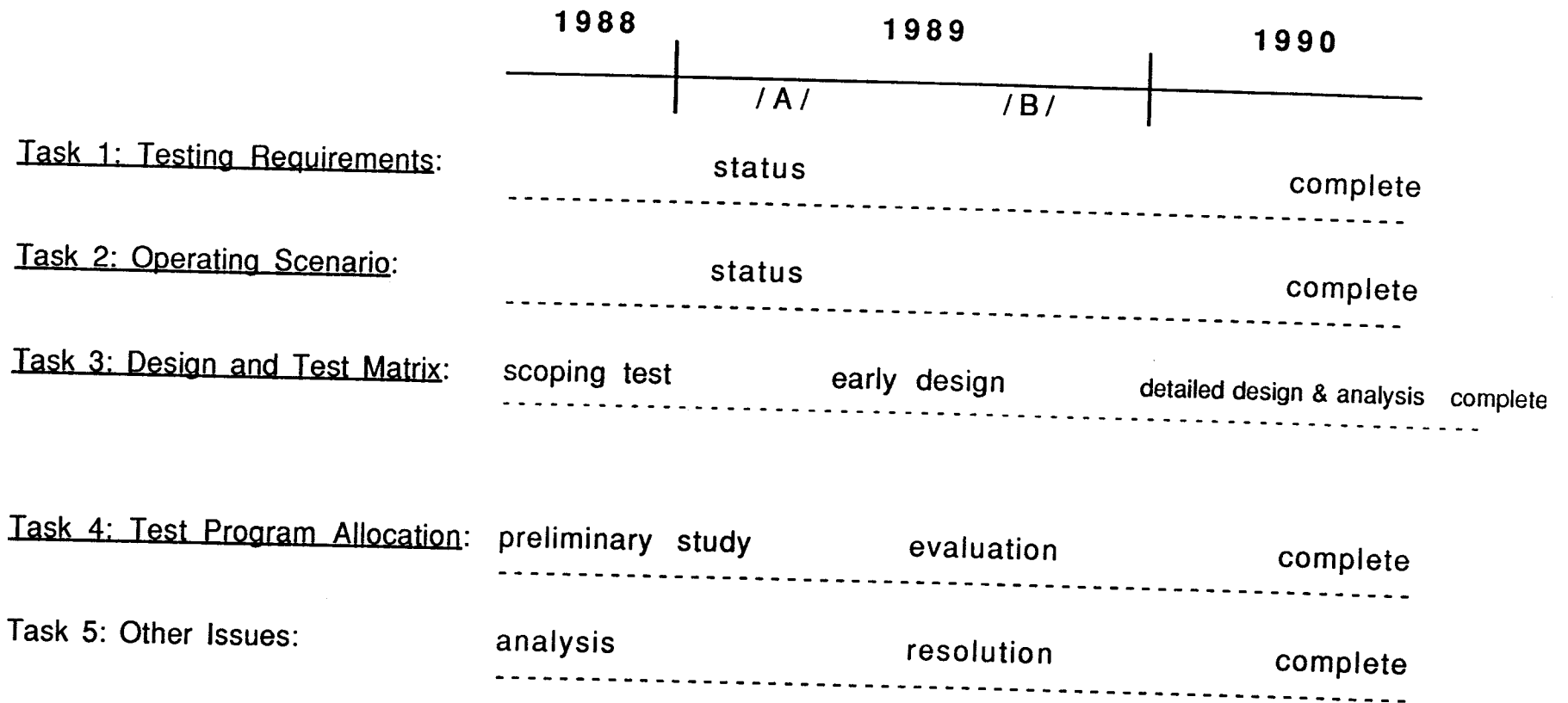
- How much space for common base program versus individual programs?
- Allocate physical space by party or by test type?

5. Other Test Program Issues

Examples:

- Ability to Accommodate Failure/Damage in Test Modules
- Impact of Failure of Test Modules on ITER Availability
- Targets for Reliability/Availability of Test Articles
- Safety Related Issues

SCHEDULE FOR TEST PROGRAM HOMEWORK TASKS



A - Short Meeting/Discussion in Garching late February or early March 1989.

B - Group work on Test Program with representations from the four parties for a period of 4 to 6 weeks during the summer of 1989 (July).

ITER Test Program
Resources Required for FY89

Organization	Man-Year	Technical Areas
UCLA	$\frac{1}{2} + \frac{1}{2}$	Coordination, Requirements, Blanket (thermal, stress, tritium, etc.), Int. Collab.
ANL	1	Blanket (thermal, stress, tritium), HHFC, Ancillary Equipment
FEDC	$\frac{1}{3}$	Mechanical, Configuration, Maintenance
ORNL	$\frac{1}{4}$	Plasma Heating/CD, Materials
HANFORD	$\frac{1}{4}$	Materials
SANDIA	$\frac{1}{4}$	HHFC
LANL	$\frac{1}{8}$	Tritium Processing

ITER Test Program
U.S. Emphasis in FY89

Target Dates: February and July 1989 meetings

1. Testing Requirements
 - a) Parameters (UCLA)
Refine/focus on limited set
 - b) Configuration/Maintenance (FEDC)
Interaction with engineering group

2. Operating Scenario and Schedule (ALL)

Requires a lot of work

Resources will limit effort to "Guesses"

3. Design, Space and Test Matrix
 - A. Example Liquid Metal Test Module (ANL)
 - B. Example Helium-Cooled Solid Breeder Test Module (UCLA)
 - C. Other Systems (HHFC/SANDIA, Tritium/LANL, Materials/HEDL)
-- Resources will limit test matrix to "Guess" work

4. Test Program Allocation Among Parties

Initial Thoughts (UCLA will stimulate discussions among U.S. groups)