

(Business) Status of ITER Test Program

(Presented at ITER Management Meeting
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International Thermonuclear Experimental Reactor

B&R	WBS1	WBS2	TA	JCT TASK ID	TASK ID	MS ID	MS CAT	IND	INS	TAL	TASK DESCRIPTION	DATE	REV DATE	COMPLETE	TECH	SCH	COST	IJA	PMY	OPEX	EOEX
2B	N2			D3	2	0	0		UL	Abdou	Integration of Test Modules in the Main Blanket and Vacuum Vessel Design						3*		0.50		
2B	N2			D3	2	1	2		UL	Abdou	Integration of parties' test program into an ITER test program	Sep-94			1	1					
2B	N2			D3	2	2	2		UL	Abdou	Interface between the test program and the ITER basic device	Dec-94			1	1					
2B									UL		SUBTOTAL							0	0.50	0	0
3A	E5			D2	1	0	0		UL	Abdou	Test Program Development						3*		0.25		
3A	E5			D2	1	1	2		UL	Abdou	Test program by party	Apr-94		v	1	1					
3A	E5			D2	1	2	2		UL	Abdou	Integration of parties' test programs into an ITER test program	Sep-94			1	1					
3A	E5			D2	1	3	2		UL	Abdou	Interface between the test program and the ITER basic device	Dec-94			1	1					
3A									UL		SUBTOTAL							0	0.25	0	0
									UL		TOTAL							0	0.75	0	0
*JCT allocated 0.75 PMY to US. US reduced credit request to 0.5 PMY total. Other parties get 0.75 PMY per party. JCT wants to give US more credit for coordination and extra work.																					
* Organizations outside UCLA will provide supplementary support.																					

USA Test Program

Task Area Leader: M. Abdou, UCLA

Organizations

UCLA: Test Requirements, Module Design,
Blanket Test Program, Materials,
Integration

ANL: Liquid Metal Test Module Design

LANL: Tritium Processing

ORNL: rf testing, system integration

SNL/MDAC: PFC Tests

INEL: Safety

Table A Expected Support from Various Institutions for US Test Program

Subtask Area	Task Description	Institution	Effort (man-weeks)
A. Divertor Test Program Development	Define tests and test requirements in support of DEMO divertor development, Specify test space and test schedule, Design and provide schematic views of the test articles to be tested in ITER, Indicate test location and support services requirements.	SNL, MDAC (D. Driemeyer)	2 - 4
B. Tritium Processing Tests and Support	Define tests on the fuel cycle beyond ITER to support DEMO, Define tritium extraction systems to support test program such as tritium extraction from blanket test modules, Develop tritium processing integration system.	LANL(Scott Willms)	3 - 5
C. RF Antenna Test Program Development	Define tests and test requirements for RF antenna in support of DEMO development, Specify test space and test schedule, Design and provide schematic views of the test articles to be tested in ITER, Indicate test location and support services requirements.	ORNL(Swain's Group, Brad Nelson)	2 - 4
D. Safety	Define Safety-related Tests Assess safety implication of conducting the Test Program.	INEL (D. Petti; Longhurst's group)	2 - 4
E. Maintenance & System Integration	Develop engineering details for incorporating the test articles into the test port, Design support lines (coolant manifolds, data acquisition), Address operational/maintenance (insertion/removal/retrieval) issues.	ORNL with support from each subtask area.	6 - 8
F. Liquid Breeder Blanket Test Program Development	Define tests and test requirements in support of DEMO liquid breeder blanket development, Specify test space and test schedule, Design and provide schematic views of the test articles to be tested in ITER, Indicate test location and support services requirements.	ANL/Richard Mattas	2 - 3

ITER Test Program Status

- We are making great PROGRESS
 - The parties have developed the larger part of their test programs.
 - The parties are working together (through TPWG) and have agreed on the key guidelines for one international test program on ITER. Coordinators from various parties are already working on integration.
 - JCT has assigned six ports for the test program.
 - JCT is beginning to appreciate the importance and complexity of the test program and the need for early integration into the device.
- But, we need help solving some problems:
 - We have good suggestions for improving the efficiency of the international effort among the parties and within JCT.
 - We need help from US management in implementing these suggestions.

International Collaboration ITER Test Program

Collaboration on the test program is fundamentally different from collaboration on the basic device.

- ITER Design and R&D for construction are specific to ITER and of common interest to the parties.
- In the test program, the parties test components for DEMO, which are not the same for all parties.

- Lesson from CDA
 - ITER does not have enough space to accommodate four independent test programs for the four parties.
 - Therefore, the four parties must agree on one international test program that
 - includes only high priority tests
 - sharing of test articles among 2 or more parties
 - sharing of information
 - Allocation of test ports should be by coolant not by party.

- ITER EDA design (engineering and parameters) are different from CDA. Many aspects of the test program had to be reexamined.

Approach Developed by TPWG for ITER Test Program

1. Test Program by Party April '94
2. Integration of Parties Test Program into One International Test Program on ITER September '94
3. Integration of International Test Program into ITER (and Interface Issues) December '94

- Iterations among the three tasks is essential.
- Direct interactions among the parties, and between the parties and JCT are crucial. (TPWG has members of the parties and JCT.)

ITER Test Program
(Chronological) Events During EDA

- Until September '93
 - Test program does not appear anywhere on the ITER JCT management chart.
 - No port allocated to the test program.

- October '94
 - US Home Team management submitted a proposal to form Test Program Working Group (TPWG).
 - An agreement to form TPWG was agreed to by the ITER Director and the four Home Team leaders (documented in the record of meeting).
 - TPWG was formed; one member from each party named by the respective Home Team leader plus two members from JCT (Raffray, Lousteau) named by Deputy Director - Garching (Parker) and approved by Division Head (Shatalov).

- December '93
 - TPWG met at Garching. There was perfect harmony and understanding. The Group efficiently agreed on an excellent work plan.

ITER Test Program
(Chronological) Events During EDA (con't)

- April '94

- The parties reported on progress. They met the milestone. Everything seemed to be moving in the right direction.
- Unfortunately, problems were encountered:
 - 1.) Nobody from JCT outside the blanket group was present. JCT people responsible for key areas of maintenance, vacuum vessel, system integration and plant equipment were not there. Thus, integration issues could not be addressed satisfactorily.
 - 2.) The meeting format was the usual "Blanket Design" format. Parties were asked to make presentations. Questions were asked primarily by one JCT person. Interaction among the parties was not encouraged.
 - 3.) The JCT person in charge of the meeting implied:
 - They prefer to work with each party individually (The parties believe that this is not suitable for the test program).
 - TPWG is not a formal group.

Members of TPWG met with the Deputy Director (Parker), who was not at the meeting. Excellent suggestions evolved.

Suggestions for Further Improvement in Test Program

Suggestions evolved in discussions of TPWG members with the Deputy Director (Parker) and with members of JCT and the fusion community to improve efficiency and enable the parties to work in harmony with JCT to develop effective test programs for ITER.

1. Further Formalization of TPWG

Obtain approval of MAC or ITER council for TPWG.

- Unanimous support from the parties. Japan believes it is crucial.

Action Item: The parties request that the US management submit the proposal to the ITER council or MAC for approval of TPWG.

2. Request Formal, High Level Responsibility for Test Program within JCT

Request JCT to name a high level person within JCT to be responsible for the ITER Test Program.

The person should be at a level higher than the blanket group. The parties are doing the blanket test module design. JCT responsibilities cover many aspects of the machine: maintenance, plant equipment, vacuum penetrations and system integration. These areas are distributed among Naka, Garching and San Diego.

Suggestions for Further Improvement
in Test Program
(continued)

3. Protocol 3 for Test Program

Begin exploring the possibility of a formal agreement among the parties on the ITER Test Program.

There are many issues of sharing space, test articles, testing information, safety, etc. and other legal issues.

If the parties agree now (eg. through TPWG) as to how we will do the test program, will they change their minds later?