EFDA
EUROPEAN FUSION DEVELOPMENT AGREEMENT

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To the Heads of Research Units in EU Fusion Associations and to the Representatives of the new Member states and associated countries

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- Via E-mail -

Dear Colleagues

Subject: Meeting with Industry and Associations on Selected Engineering Topics for the Activities of the EFDA Power Plant Physics and Technology WP2011

As part of the EFDA Power Plant Physics and Technology (PPPT) activities, a meeting with industry and experts of Associations is organised in Garching on May 10-11 2011. Following the discussion at the meeting a number of technical assessments will be launched to revisit the rationale and technology development assumptions that have led to the selection of some design choices in the past, the assessment of their technological maturity and / or development prospects in view of factual information available today and finally to provide a provisional roadmap for possible realistic developments in the various areas, with an estimate of the resources needed. The early involvement of industry with its culture of 'design for buildabilty, operability, reliability and maintainability', in this respect, is welcome and would represent an important step to complement the expertise of the Associations.

Further details on the meeting can be found in the annex together with a tentative agenda.

Preparation efforts are at the moment already underway in the areas of Heating and Current Drive and Fuelling and Pumping Systems and Materials with the help of the relevant EFDA Topical Groups and Coordinating Committees, but the progress of the assessments in these areas will be given at the meeting with emphasis on specific questions to be addressed to Industry.

I would welcome the participation of experts from the Associations to the meeting. Specifically I encourage their involvement in the preparation of specific review assignments that should lead to a number of EFDA Tasks being launched pending the approval of the 2011 PPPT WP at the next EFDA SC meeting.

Please contact the Head of the PPPT Department in the CSU Garching, Gianfranco Federici (gianfranco.federici@efda.org), for further details and to confirm the participation of your experts.

This meeting is eligible for mobility support pending approval at the next EFDA SC.

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Francesco Romanelli
EFDA Leader
FR/ag-112
8 March 2011

In case you have any questions or need any further clarifications please do not hesitate to contact me.

Sincerely yours

Meeting with Industry and Associations on Selected Engineering Topics for the Activities of the EFDA Power Plant Physics and Technology WP2011

EFDA CSU Garching (Germany)

10-11 May 2011

Background

A Power Plant Physics and Technology Department (PPPT) has been recently established under EFDA, with the purpose to begin a coordinated effort in Europe to quantify the key physics and technology prerequisites for a Demonstration Power Fusion Reactor (DEMO) and to address the remaining outstanding physics and engineering problems that need to be solved to confirm our ability to design, construct and operate a device that meet the requirements. The most important technology problems to be solved include the qualification of resilient materials for in-vessel components, the development of sound technological solutions for the divertor and of optimised remote maintenance schemes for high machine availability, the achievement of adequate thermal efficiency and tritium breeding, and the reliability and efficiency of heating and current drive systems. Among the physics questions, the divertor power exhaust, the definition of a reliable modes operation, the need to guarantee plasma performance at high density, the avoidance and mitigation of disruptions and ELMs, which can damage the in-vessel components, are the most important.

Meeting Goals

The meeting aims at fostering a technical discussion with Industry and experts of the Associations on a limited number of selected topics (below) The goals are essentially *(i)* to revisit with the help of Industry and experts of the Associations the rationale and technology development assumptions that have led to the selection of some design choices in the past; *(ii)* to assess their technological maturity and/ or development prospects in view of recent factual information; and finally *(iii)* to provide provisional roadmap for possible realistic developments in the various areas, with an estimate of the resources needed. The early involvement of industry with its culture of 'design for buildabilty, operability, reliability and maintainability', in this respect, is welcome and would represent an important step to complement the expertise of the Associations.

Proposed Assessment Topics

1. Current conceptual solutions for DEMO divertor and breeding blanket including an assessment of the coolants for in-vessel components;
2. Candidate remote maintenance schemes and solutions;
3. Technology/ engineering issues of steady-state vs. pulsed tokamaks;
4. Status and prospects of high temperature superconducting magnets;
5. Technological maturity/development needs of Heating and Current Drive and Fuelling and Pumping Systems for DEMO;
6. Material Database status and needs for DEMO conceptual design activities

Organization/ Deliverables

A tentative agenda is provided in annex. A number of presentations on the topics above will be given on the first day of the meeting by well-known experts in the field. On the second day working groups will be formed with experts of Associations and Industry, and a number of (parallel) sessions will be organised (and guided by assigned coordinators) to discuss and finalise the review assignments, for each of the topics above, including a detailed Terms of Reference with the clear definition of (i) specific questions to be addressed in the course of the study to be carried out via EFDA tasks to be launched shortly after the meeting; (ii) specific areas where Industry can provide support to the review assignments; and (iii) background technical information (e.g., scientific papers and technical reports) available on each specific area, and which would facilitate the assessment work.

The outcome of this assessment, which is expected to be available 3-6 months, should then be presented in a second meeting, to be held before the end of the year and the findings documented in a comprehensive report. This should include an evaluation of the design and technological maturity of the solutions considered, identify possible development risk recommend more attractive alternatives if any, and define a provisional roadmap for possible realistic developments in the various areas, with an estimate of the resources needed.

Local Arrangements

The meeting will be held in Garching and arranged by EFDA. Further details and technical questions can be addressed to the Head of the PPP&T Department, Gianfranco Federici (tel. +49-89-32994228, email: gianfranco.federici@efda.org). EFDA CSU Garching would provide support for arrangements of accommodations and transportations. Please contact Anne Graebner (tel. +49-89-32994201, email: anne.graebner@efda.org).

Meeting with Industry and Associations on Selected Engineering Topics for the Activities of the EFDA Power Plant Physics and Technology WP2011

10-11 May 2011, Venue EFDA CSU Garching

	Day 1- 10.5.2011 Introduction of Selected Topics
09.00 – 09.20	**Welcome and Objectives:** Commission / FIIF Chair / EFDA Leader
09.20 – 09.50	**DEMO Design: Physics and Technology Challenges** K. Lackner
09.50– 10.20	**2010 DEMO Ad Hoc Group Report: Priorities for Research Programme and general Power Plant Gap Analysis** D. Stork
10.20 – 10.50	**System Studies** D. Ward
10.50 – 11.10	*Coffee*
11.10 – 11.40	**Overview of the PPCS** D Maisonnier
11.40 – 12.10	**Operation scenarios (e.g., quasi-continuous vs. steady-state)** H. Zohm
12.10 – 12.40	**Materials** E. Diegele
12.40 – 13.40	*lunch*
13.40 – 14.10	**Power exhaust in DEMO** J. Rapp or A. Kallembach/ tbc
14.10 – 14.40	**Breeding blankets and divertor design solutions for DEMO** L. Boccaccini
14.40 – 15.00	**Assessment of He coolants for in-vessel components** R. Stiglitz
15.00 – 15.20	**Assessment of water/alternative coolants for in-vessel components** A. Pizzuto/ (tbc)
15.20 – 15.50	**Thermal and Mechanical cycling associated with Pulse operation** A. Pizzuto/ (tbc)
15.50 – 16.00	*Coffee*
16.00 – 16.30	**Candidate remote maintenance schemes and solutions.** C Damiani
16.30 – 17.00	**Heating and current drive systems** A. Becoulet/ (tbc)
17.00 – 17.30	**Status and prospects of high temperature superconducting magnets;** W. Fietz
17:30-18:00	**Questions/ Discussions**
18:00	**Adjourn**
	Day 2- 11.5.2011 Definition of Review Assignments
9:00-9:30	**Guidelines for review assignments** G. Federici

9:30-12:30	**Break-out in working groups to discuss/ finalise terms of references for review assignment on** **1)** assessment of design solutions and the coolants for in-vessel components; **2)** Assessment of the candidate remote maintenance schemes and solutions; **3)** Assessment of technology/ engineering issues of steady-state vs. pulsed tokamaks; **4)** Assessment of Status and prospects of high temperature superconducting magnets; **This will include definition of** (i) specific questions to be addressed in the course of the study to be carried out via EFDA tasks to be launched shortly after the meeting; (ii) specific areas where Industry can provide support to the review assignments; and (iii) background technical information (e.g., scientific papers and technical reports) available on each specific area, and which would facilitate the assessment work. It should be noted that the assessments of the topics 4) Technological maturity/development needs of Heating and Current Drive and Fuelling and Pumping Systems for DEMO; and 5) Material Database status and needs for DEMO conceptual design activities will be launched prior to this meeting with the help of relevant EFDA Topical Groups and Coordinating Committees and progress report will be given at the meeting emphasis on specific questions to Industry.
12:30 - 13:30	*lunch*
13:30-15:30	**Briefing of each working group coordinator and finalisation of the working plan**
15:30	Close