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INFORMAL MEETING ON ITER DEVELOPMENTS

by Dr. E. Canobbio, IFRC Chairman

Responding to the wide interest in the ITER developments by the world fusion community, the International Fusion Research Council (IFRC), advisory body of the IAEA, organized an informal meeting on the General Status and Outlook for ITER. The Meeting was held, under IFRC and IAEA auspices, on 9 October, at Sorrento, Italy, in conjunction with the 18th IAEA Fusion Energy Conference. Almost all IFRC members and more than 100 Conference participants were present.

In his introductory remarks, the IFRC Chairman said he was gratified to see the breadth of interest represented in the meeting, in particular, members of scientific communities from countries not currently involved in ITER. He encouraged those interested in pursuing possible participation in ITER in the future to make their interests known to their governments.

Following this introduction, three well-known scientists, one from each of the present ITER Parties, presented their personal views on the issues related to the ITER General Status and Outlook. The following is a compressed version of their presentations.

Speaking on the ITER General Status, **Professor V. Smirnov (Russian Federation)** gave a brief history of the ITER Engineering Design Activities (EDA), specifically referring to Article 2 (e) of the EDA Agreement. This Article indicates what Activities the ITER Parties shall conduct jointly during the EDA. Among those

Activities, as contained in Point (e) of the Article, is "to develop proposals on approaches to Joint Implementation for decisions by Parties on future construction, operation, exploitation and decommissioning of ITER."

For that purpose, a Special Working Group (SWG-P2) was established by the ITER Council (IC) in 1999 under Protocol 2 to the EDA Agreement. After four Meetings, the SWG-P2 confirmed:

- A shared single vision of the ITER goal and of the means to realize it;
- recognition of the technical and social impact of ITER for the realization of fusion energy;
- the common desire to promote construction of ITER through international co-operation;

The Group also stated in its report to the IC that the time is now ripe for initiating international efforts with governmental involvement with the aim to establish a firm international legal framework for Joint Implementation of the ITER Project.

Referring to the Activities in Russia related to the ITER EDA, Prof. Smirnov said that a domestic review of the ITER Status and Outlook had been carried out. The issues were discussed in depth in the Scientific Councils of the five leading fusion institutions; at a Special Meeting of the Russian Academy of Sciences; in the Committee for Science of the Russian Parliament (Duma); and in the Collegia (Ministry Board) of Minatom.

The ITER Project was supported at all these meetings. This support was based on the general understanding that this Project is the optimal way to realize fusion as a source of energy. Subsequently, the Russian Government took the decision to send a Russian Delegation to the "Explorations", which are pre-negotiation (exploratory) discussions among the current ITER Parties interested in preparing for possible Negotiations.

In accordance with the invitation by the Russian Minister for Atomic Energy, E. Adamov, the first Explorers' Meeting (EX-1) was held on 13-14 April 2000 in Moscow, with participation of Explorers from the European Union, Japan and the Russian Federation.

In the Explorers' discussions, high priority is laid on the legal framework, cost/benefit sharing scheme, and preparatory joint technical activity, and the international framework after 2001.

The Explorers' Interim Report was adopted at EX-2 in June in Moscow. The Final Report will be ready by the end of 2000.

The Reference Schedule towards Joint Implementation, according to Prof. Smirnov, is as follows:

- End of Explorations - December 2000
- Start of Negotiations - March 2001
- End of EDA and start of the Co-ordinated Technical Activities (CTA) - July 2001
- Site Proposal - during 2001
- End of CTA - 2002
- Signing of the Agreement of Construction, Operation, Exploitation and Decommissioning Activities - beginning of 2003

In concluding his presentation, Prof. Smirnov emphasized that

> "The importance of fusion as a power source and its physical and technical basis have been discussed in the excellent presentations of Prof. Rubbia, Acad. Velikhov and Dr. Aymar. Many papers at this IAEA Conference confirm the high probability of an ITER-FEAT success."
>
> "Nevertheless, it is important to emphasize once more the urgent necessity for the fusion community to prove 50 years of research with real results."
>
> "Today, ITER is the only option to satisfy this challenge. Any other choice would mean some more decades' delay in reaching the goals of the fusion community."

"For the Russian fusion activities, stopping the ITER Project implementation would shortly lead to a drastic decay. It seems quite likely that more or less the same would occur in any of the other national fusion programs. At least, the scope of fusion research would be strongly reduced."

Finally, he stated that now the most critical point is to receive a site proposal with governmental support.

The next speaker at the meeting was **Professor C. Varandas (European Union)**. His chosen topic was "From now to Joint Implementation", and he concentrated on the Co-ordinated Technical Activities (CTA), which are deemed necessary to prepare for ITER Joint Implementation. Such activities will build on the results of the EDA and be conducted by participants, considering the specific conditions of the offered construction site(s) and under the auspices of the IAEA. The term "Participants" here means Parties that have been involved in the ITER Engineering Design Activities (EDA) and wish to participate in the CTA as well as qualified third countries that have presented to the negotiating parties a specific construction site offer with governmental endorsement.

The scope of the CTA, whilst assuring the coherence of the ITER project, will include:

- Design adaptation to the specific site(s) conditions
- Safety analysis and licensing preparation based on specific site offer(s)
- Evaluation of cost and construction schedule
- Preparation of procurement documents
- Other technical issues raised by the Negotiators collectively.

The organizational structure for the CTA will consist of:

- Project Board (PB) set up with with executive functions to guide and to co-ordinate the Participants' contributions to the CTA. The Board will consist of a Senior Scientist from a 'non-hosting' Participant, as Chair of the PB; the Leader of the International Team and the Leaders of each Participating Team.
- International Team (IT), to which each Party will contribute staff and which will use the current Garching and Naka Work Sites.
- Participants' Teams (PT) will be established in order to undertake activities described above as entrusted to it by the PB. The Team of the Participant(s) offering a specific construction site will play a leading role in developing details of the design adaptation and conducting licensing preparation for its specific site.

Each Participant will bear the costs related to its contribution to the CTA, within its budgetary appropriations. The Participants hosting IT work sites shall make their best efforts to provide to the IT the necessary support and facilities.

Interested third countries which possess relevant specific capabilities and which can contribute significantly to the ITER Joint Implementation may join in the CTA under terms to be unanimously approved by the Participants.

The CTA will be initiated after the start of Negotiations and following the receipt of site offers with governmental endorsement and terminated by the end of 2002.

The last speaker at the Meeting was **Dr. H. Kishimoto (Japan)**. He expressed his views on the ITER Joint Implementation. Considering that the term "Implementation" includes Construction, Operation, Exploitation and Decommissioning Activities (COEDA), the issues to be negotiated by the participating Parties and to be incorporated in the ITER Joint Implementation Agreement are:

- Opening Provisions (Parties, purpose and scope, Device)
- Institutional Structure
- Legal Personality, Establishment and Management, Structure of Legal Entity
- Cost/Benefits Sharing Schemes
- Budget and Accounts

- Staffing
- Procurement Schemes
- Information and Intellectual Property
- Site Support Arrangement
- Privileges and Immunities
- Applicable Laws and Regulations of the Host Country
- Decommissioning Scheme
- Liability
- Participation and Accession of Third Countries
- Closing Provisions (Territorial Application with regard to Euratom, Entry into Force, Amendments, Consultations, Duration and Withdrawal).

Following the initial investigations in the SWG-P2, the ITER Explorations (Informal Governmental Consultations) are now in progress among the current ITER Parties. The Governmental Negotiations will be initiated at the beginning of 2001 and the formal signing of the Agreement is expected at the beginning of 2003.

The purpose of the Project is to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes. The Parties are expected to be the current EDA Parties and qualified Third Countries. Qualified Third Countries could join the COEDA by unanimous agreement of the ITER Parties. An "Associate Membership" could also be considered for lesser conditions and status in the collaboration and participation of a "Consortium" might be accepted.

Two options are now considered for the COEDA Institutional Structure: A Legal Entity established by International Law and a Legal Entity established by Domestic Law.

As it is expected now, the Management Structure during the COEDA will consist of the Council and the Director General. The Council (Project Board), composed of Parties' representatives, will be responsible for the promotion and overall direction of the activities. It will supervise the overall execution of the Project. The Director General, as an executive officer and representative of the Legal Entity, will execute the activities in compliance with the direction of the Council and be responsible to it for the execution of the Project.

The approach to the sharing of the Project costs among the Parties will be as follows:

Each Party shall make a significant contribution to the total cost of the Project in each phase of the COEDA. The cost for construction will be divided into two areas: a common area and a non-common area. The cost of the common area will be shared among the Parties in a way which is as balanced as possible. The non-common area will include the cost of the following parts of the Project:

- Non-transportable items,
- Items where the provider needs specific experience and detailed knowledge of the site conditions and the national and local regulations and standards,
- Labour-intensive work, e.g. assembling of the Tokamak, to be carried out on site,
- Items where a high percentage of low-tech work has to be provided on site, thus discouraging or preventing firms from non-host countries from participating.

It is expected that the non-common area will comprise up to 15-25 % of the total direct capital cost.

The Host Party will bear the cost for the non-common area and its part in the shared common area. In addition, site preparations will be undertaken, in principle, by the Host Party at its cost. The annual cost during the operation phase will be shared among the Parties, in principle, in a way as compatible with the sharing of the construction cost as possible.

The procurement of the ITER components/systems should primarily be focused on technical performance, quality, schedule of delivery and cost. Components/systems could be procured, according to each Party's preference, either as contribution in-kind or, by fund. However, some parts of a Party's contribution should be provided in funds.

All information generated in the execution of the COEDA will be available to each of the Parties. When protectable subject matter is created by the ITER Legal Entity (ILE) personnel, the ILE could obtain all rights, title and interest to intellectual property in any country, or in some countries upon Council decision. In all cases, where intellectual property is obtained by a Party's personnel seconded to the ILE, that Party ensures that the ILE can freely use the protected subject matter.

The possible privileges and immunities during the COEDA are very important for the effective execution of the Project. Therefore, such issues as facilitation of the movement of personnel, import and export of materials, equipment and other goods, transfer of currencies, etc. are under discussion.

At the end of his presentation, Dr. Kishimoto emphasized that success in fusion is critically dependent on ITER and, therefore, world wide efforts should be focused on this Project.

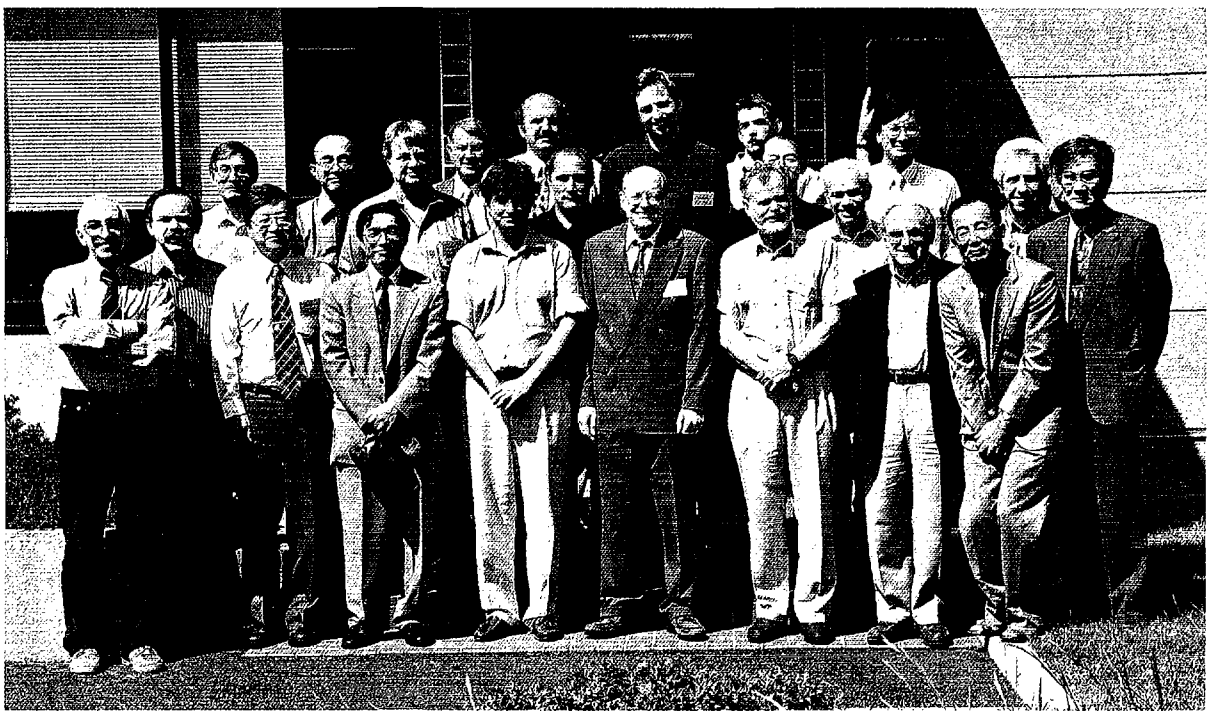
THIRTEENTH MEETING OF THE ITER PHYSICS EXPERT GROUP ON DIAGNOSTICS

by Dr. A. E. Costley, ITER JCT, and Dr. A. J. H. Donné, FOM Institute for Plasma Physics 'Rijnhuizen'.

The Thirteenth Meeting of the ITER Physics Expert Group on Diagnostics was held in Naka, Japan, on 21 and 22 September. The meeting immediately followed a Workshop on 'Diagnostics for Burning Plasma Experiments' organized under the IEA Three Large Tokamaks arrangements, held at Naka on 18 - 21 September. This article covers ITER-related issues discussed at both meetings.

The main objectives of the IEA workshop were to consider the diagnostic needs of burning plasma devices, to review recent relevant diagnostic developments, and to identify areas where further developments are necessary. The topics included measurement requirements and diagnostic choices for burning plasma experiments, relevant experience on existing machines, radiation effects on key diagnostic components, diagnostic engineering, and developments of specific diagnostic techniques. About 40 specialists attended from eight countries.

The main objectives of the Expert Group meeting were to review and update the requirements for measurements on ITER-FEAT in the light of the discussions at the IEA workshop, to review the progress and plans in meeting the goals of the "Voluntary R&D" tasks within the ITER Parties, as approved by the ITER Physics Committee, and to agree on future actions. Recent progress in relevant diagnostic developments in the Parties was also reviewed.



Participants in the Meeting