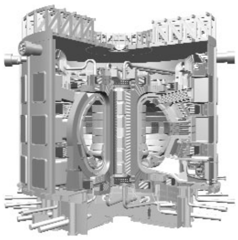

ITER CTA NEWSLETTER

No. 16, JANUARY 2003

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

ISSN 1683–0555

TRANSITIONAL ARRANGEMENTS FOR ITER STARTED

Negotiations by the ITER Parties on the Agreement on the Establishment of the International Fusion Energy Organization for the Joint Implementation of the ITER Project (ITER Implementation Agreement, or simply "the Agreement") and on the site selection for construction of the ITER machine are making good progress. Therefore, the ITER Parties decided that subsequent to the ITER Co-ordinated Technical Activities (CTA), the Transitional Arrangements for ITER (ITA or "the Arrangements") will start on 1 January 2003, conducted under the auspices of the IAEA, and will terminate upon the entry into force of the Agreement, or at such earlier date as the Participants may decide. The Parties to the ITER Engineering Design Activities and the participants in the Negotiations on the ITER Joint Implementation wishing to co-operate in the ITER Transitional Arrangements will be the ITA Participants ("the Participants").

All four current ITER Parties, namely Canada, the European Union, Japan, and the Russian Federation confirmed, before the end of 2002, in their letters to the IAEA Director General their intention to participate in the ITA. The Arrangements are also open to new Participants acceding the Negotiations.

The purpose of the ITA is to prepare for an efficient start of the Agreement, if and when so decided, and to maintain the integrity of the ITER Project. The scope of the ITA shall include:

- Organizational preparations directed at enabling the ITER Legal Entity (the International Fusion Energy Organization) to enter into effective operation with least possible delay following the entry into force of the ITER Implementation Agreement;
- Joint technical preparations directed at maintaining the coherence and integrity of the ITER design and at preparing for an efficient start of ITER construction.

The overall direction of the Arrangements, as well as the supervision of their implementation will be exercised by the ITER Preparatory Committee ("the Committee"). It will be composed of two members from each Participant to the Arrangements. The Committee shall, in particular:

- Approve the top level structure of the Transitional Project Team (TPT) and designations to that level;
- Approve the programme of work in preparation for ITER construction and exercise overall supervision of its implementation.
- Approve the designation of Sites for joint technical work by the TPT;
- Co-ordinate the development in the ITA Participants of organizational structure aimed at providing an appropriate frame for the entry into force of an ITER Implementation Agreement.

In exercising its functions, the Committee shall work for a smooth transition towards the organization and structure for ITER construction being developed in the frame of the ITER Negotiations.

The first meeting of the Committee is scheduled for St. Petersburg, RF, on 17 February 2003.

In addition to the Committee, the structure for the Arrangements shall also comprise a Nominee Director General, assisted by his TPT and the Participant Teams (PT).

Each Participant shall contribute staff to the TPT. The TPT should have the capability of assisting the Nominee Director General in the exercise of his responsibilities and functions. The TPT shall be located at one or more sites for joint technical work so designated by the Committee. Following consensus on site preference, the Participant on whose territory the site is located shall present to the Committee proposals to establish a designated site for joint technical work at the preferred site.

Each Participant shall establish its own Team and designate a PT Leader that shall act as a single point of contact with the Nominee Director General for the purpose of ensuring the coherence of the Project. The Participant Teams will undertake technical tasks assigned to them in the agreed Work Programme.

Providing auspices for the ITER Transitional Arrangements, the IAEA will, in addition, undertake assistance functions to the ITA, as agreed between the Participants and the IAEA. These functions will include, inter alia, publication of ITER ITA documents and technical reports and the monthly Newsletter; providing assistance in the organization of ITER meetings and in ensuring rapid communications between individual Participant Teams.

UNITED STATES REJOIN ITER

by Dr. M. Roberts, US Contact Person for ITER Negotiations

Upon pressure from the United States Congress, the US Department of Energy had to withdraw from further American participation in the ITER Engineering Design Activities after the end of its commitment to the EDA in July 1998. In the years since that time, changes have taken place in both the ITER activity and the US fusion community's position on burning plasma physics. Reflecting the interest in the Untied States in pursuing burning plasma physics, the DOE's Office of Science commissioned three studies as part of its examination of the option of entering the Negotiations on the Agreement on the Establishment of the International Fusion Energy Organization for the Joint Implementation of the ITER Project. These were a National Academy Review Panel Report supporting the burning plasma mission; a Fusion Energy Sciences Advisory Committee (FESAC) report confirming the role of ITER in achieving fusion power production, and "The Lehman Review of the ITER project costing and project management processes (for the latter one, see ITER CTA Newsletter, no. 15, December 2002). All three studies have endorsed the US return to the ITER activities.

For instance, the Lehman Committee Report was uniformly positive using expressions like "…the ITER Team has prepared a complete cost estimate that is based on sound management and engineering principles …" and "The credibility of such a value estimate is supported by the design and R&D results that are unusually mature for a science project facing the decision to fund construction."

As recent as 28 January, five key members of the US Congress House Science Committee wrote to the Energy Secretary Spencer Abraham: "We urge you to send a clear message to the ITER community that the US plans to participate in the Negotiations and the subsequent design, construction and operation of the facility."

Based on its analysis of the situation, and responding to all these and similar opinions and views expressed in the United States, the White House released on 30 January a statement by the President, in which it was said:

"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."

This historical decision was announced by DOE Secretary Abraham during his remarks to employees of the Department's Princeton Plasma Physics Laboratory.

The United States will be working with the other Participants in the ITER Negotiations on the Agreement and is preparing to participate in the ITA.

As Secretary Abraham said in his remarks, the US proposes to provide a number of hardware components for ITER construction, to be involved in the project construction management and to participate in the ITER scientific research and technology development. The nature and details of the US participation and contributions would be determined during the negotiations. DOE's Office of Science, which has extensive experience in large, international programs, will lead US negotiations on ITER.

PEOPLE'S REPUBLIC OF CHINA JOINS ITER

by Prof. HUO Yuping, Zhengzhou University, People's Republic of China

The People's Republic of China is the largest developing country with a projected population of 1.6 - 2 billion people and an energy consumption growing from the current 1.3 Billion Tons Coal Equivalent (TCE) to more than 4 Billion TCE by 2050. This large demand needs to be accommodated in a sustainable way, requiring energy generation in an environmentally friendly way. Fusion is one of the most promising candidates to solve this important issue.

This explains why in the second half of 2002, the ITER Participants' delegations to the ITER Negotiations received expression of interest from the People's Republic of China in the possibility of Chinese participation in ITER, including joining the ongoing Negotiations.

Subsequently, the exchange of views on that matter was the subject of an informal meeting of the ITER Parties' legal experts with Chinese representatives held in Bejing on 25-26 November 2002. As a follow-up to this meeting, it was decided at the Seventh ITER Negotiations Meeting (Barcelona, 9-10 December 2002) to agree to the Chinese request to be given a copy of the seventh draft agreement, taking into account the PRC's commitment to join the ITER Negotiations.

In January 2003, an official technical delegation from the ITER International Team and Participant Teams visited China's plasma physics laboratories and relevant industries in Bejing, Hefei, Cheng-du and Xi'an. The visitors were impressed by the dynamism and optimism shown by all the scientists met and by their strong wish to participate in ITER. It should be noted that the history of fusion in China goes back to the 1950's when Magnetic Confinement Fusion research was first started at the Institute of Atomic Energy in Bejing.

Equipment and methods in use in the laboratories and industries visited were similar to those in the more developed countries. In particular, quality assurance programmes were implemented in a manner that already satisfies European and Japanese customers. It was clear that the Chinese would be able to make an in-kind contribution of satisfactory quality to ITER construction.

The speed with which the Chinese authorities had made their decision to participate in the ITER Negotiations was impressive. The Prime Minister and the State Council had already confirmed their decision to apply to join ITER as soon as possible, and Mr. Xu Guanhua, Chinese Minister of Science and Technology, wrote on behalf of his government, on 10 January 2003, to the four heads of delegation in the ITER Negotiations, requesting that China participate in the present ITER Negotiations, pointing out that China intends to provide a substantial contribution to the Project, comparable to what is currently envisaged by some of the participants in the present Negotiations.

Therefore, a Chinese delegation will participate in the forthcoming Eighth Meeting of the Negotiators in St. Petersburg in February.

PRIME MINISTER OF JAPAN SPEAKS AT KURCHATOV INSTITUTE

Prime Minister J. Koizumi, accompanied by Acad. E. Velikhov at the conference at the Kurchatov Institute in Moscow

During his official visit to the Russian Federation, Mr. J. Koizumi, Prime Minister of Japan, was invited to speak on 11 January 2003 to the participants in the International Scientists Conference to commemorate the 100th birthday of Academician I.V. Kurchatov. In the box there are some excerpts from his speech.

When asked from people in the audience at the Kurchatov Institute, Prime Minister Koizumi confirmed that during his recent meeting with the President of the Russian Federation, Vladimir Putin, at the Kremlin, they have discussed the construction of a fusion installation, which is the ITER Project.

30 years ago, when elected for the first time a Member of the Japanese Parliament (Diet Member), Mr. Koizumi already participated in the Group of Diet Members for Future Energy. He expressed his pleasure to see his young dream come true with the realization of ITER.

"It is a great honor to be here at the international scientists conference and to speak before such a distinguished gathering. I would like to extend my sincere appreciation to Acad. Evgeny Pavlovich Velikhov, President of the Russian Research Center "Kurchatov Institute", for giving me an opportunity to speak here today. I would like to give you my basic points of view regarding the role of science and technology for the future of mankind."

"The 20th century brought about drastic economic developments for mankind. At the same time, however, it was a century in which mankind experienced several disastrous wars. Science and technology, which greatly contributed to the economic development, were employed in these wars, to our great regret. In the 21st century we must concentrate the wisdom of mankind, and use science and technology for noble purposes of attaining peace and prosperity."

"Nuclear power, an achievement of science and technology that should be used to open a bright future for mankind, was used for atomic bombs. This tragedy is felt most strongly by Japan, the only country victimized by those weapons."

"Acad. Igor Vassilievich Kurchatov, whose 100th birthday falls in this year of 2003, was involved in the development of nuclear weapons for his own country, amid the U.S.-Soviet confrontation. In parallel with the development of such nuclear arms, however, he continued research on means for peaceful use of nuclear power."

"A month before his death, Acad. Kurchatov stated in his last speech: "I am of the firm belief that our government and people will use science only to promote mankind's well-being."

"We must give thoughts again to this statement by Acad. Kurchatov, which may be regarded as his will. On the occasion of this commemorating symposium, I would like to appeal strongly to the scientists and peoples all over the world to accept the responsibility for the use of science and technology for the benefit of mankind."

"It is a dream of mankind to secure environmentally friendly energy resources, featuring strong safety, and allowing practically endless use. It is an objective that must be attained without fail, if the world is to maintain sustained growth and to accomplish prosperity. Nuclear fusion, which has no restraint in resources and has the least effect on the environment, is a potential power production technology of great significance for the realization of this dream. We can say that ITER is a project which symbolically demonstrates the significance of the partnership between Japan and Russia in the field of science and technology."

"In Russia, Acad. Velikhov, President of the Russian Research Center "Kurchatov Institute", and staff members of this Institute, have been the central figures in the research and development of ITER. Above all, the Tokamak system, used in ITER, was developed in this Kurchatov Institute. In designing the ITER device, a superconducting coil manufactured by Russia was incorporated in test facilities in Japan, and the feasibility of a Toroidal Field Coil for ITER was verified. It was a brilliant achievement of the cooperation between Japanese and Russian scientists, being part of ITER's history."

"Japan strongly hopes that the ITER device will be constructed in Rokkasho Mura, Aomori Prefecture. If the technology developed in Russia eventually would blossom in Japan, it would be the best result of the Japan-Russia cooperation. We look forward to inviting ITER to Rokkasho Mura, and to working with researchers from Russia and other parts of the world in the ITER project."

MEETING OF THE ITPA TOPIC GROUP ON SOL AND DIVERTOR PHYSICS

by Drs. B. Lipschultz and N. Asakura

The most recent meeting of the Scrape-Off Layer (SOL) and Divertor Physics Group of the International Tokamak Physics Activity (ITPA) was held in Lausanne, Switzerland, on October 21-23, 2002 at the CRPP/EFL laboratory. The meeting was hosted by Dr. R. Pitts of that laboratory, with the help of other laboratory staff. There were 23 participants. The meeting format was slightly changed from that of the previous meeting (February 25-27, 2002) in so far that more time was allowed for discussions, thus making the meeting more productive.
There were 28 detailed presentations over two and a half days falling into three primary areas:

- the physics of ELMs and their effects;
- radial transport and wall recycling;
- materials issues (T codeposition, use of W for tiles, etc.).

Those presentations might be summarized as follows:

ELMs and disruptions: ELMs were shown to strongly affect the SOL density and temperature profiles leading to particle deposition on the first-wall (DIII-D). Fast measurements of the divertor ELM energy pulse (duration longer than MHD time scale, and triangle waveform) in JET indicate reduction in power loading predictions for ITER. During disruptions (thermal quench), power balance studies cannot explain exhausted plasma energy (JET). In addition, the JET divertor disruption energy deposition (< 10%) is much lower than other experiments (AUG and DIII-D). These results suggested that part of power loss reached to the first wall. Better measurements of radial transport during ELMs and disruptions are planned and are required for prediction of the heat load level on first wall in ITER (see meeting summary).

Radial transport studies: An initial comparison of SOL plasma profile in DIII-D and C-MOD L-mode plasmas using dimensionless scaling showed that the two experiments had similar normalized Te and ne profiles at the outer SOL. The analysis of radial transport coefficients D_{eff} and V_{eff} also showed essentially the same scaled transport even though the neutral penetration is significantly different near the separatrix. Data has been collected at JET for similar comparisons. Data collection from other tokamaks is being planned.

An initial comparison of the separatrix density profiles from JET and AUG were compared with the goal of better predicting the seperatrix density in future tokamaks. The pedestal profiles appear to follow a similar scaling – $(n\nabla T/T\nabla n) \sim 2$. which would have important implications for predicting pedestal behavior. Profiles from other tokamaks are being collected.

T retention: Estimations of T-retention, behind the plasma facing components such as louvers (in JET) were shown to be very variable (a factor of 40), but still imply too large a T inventory in ITER where carbon is used at the divertor target tiles. The selection of C in a BPX divertor will be reviewed based on these results and the JET disruption power loading. Amelioration/removal techniques must be emphasized as well. Long pulse (200s) operation in Tore Supra indicated that 60% of the injected gas was absorbed at the wall and limiter at the start, and drops as a function of time. The result suggested that wall retention limit was 600 s. This evaluation has important implications for density control and T inventory as well as the JET louver results. New results on He bubble formation in W stirred considerable interest.

Other areas: Detlev Reiter presented a study of the effect of including radiation transport in 2D edge plasma transport codes. This has not been fully implemented yet. But the effect is very strong, reducing the degree of detachment. The inclusion of line broadening mechanisms (Zeeman splitting) should reduce this effect.

The discussions emphasized what all experiments could provide on ELM characteristics, ranging from characteristic energy deposition times and profiles to dependence on pedestal characteristics. The excitement of a variety of experiments contributing data extended to radial transport measurements as well. At one point the participants came to the issues of the choice of first-wall materials, both the wall itself and the divertor. There was a strong mandate to review the ITER materials choices in view of the new knowledge of ELMs, disruptions and general radial transport. This topic has been chosen for being emphasized at the next meeting.

The next meeting is scheduled to take place immediately after the Thirtieth International Conference on Controlled Fusion and Plasma Physics in St Petersburg (July 2003) and another one in Japan sometime in November or December 2003.

Participants in the Meeting

N. Asakura (Japan), G. Counsell (EU), G. Federici (ITER), W. Fundamenski (EU), P. Ghendrih (EU), A. Kallenbach (EU), G. Kirnev (RF), A. Kirschner (EU), S. Krashenninkov (US), A. Kukushkin (ITER), A. Leonard (US), B. Lipschultz (US), T. Loarer (EU), A. Loarte (EU), A. Mahdavi (US), G. Matthews (EU), V. Philipps (EU), R. Pitts (EU), G. Porter (US), D. Reiter (EU), M. Shimada (ITER), S. Takamura (Japan), D. Whyte (US).

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Printed by the IAEA in Austria
April 2003

03-00561