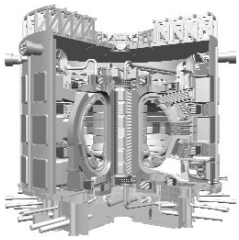

ITER ITA NEWSLETTER

No. 4, MAY 2003

IAEA

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

ISSN 1727–9852

EIGHTH NEGOTIATORS' STANDING SUB-GROUP AND RELATED MEETINGS

by Dr. J.-P. Rager, ITER EU Contact Person

The Max-Planck-Institute for Plasma Physics (IPP) at Garching near Munich was the venue for the eighth meeting of the ITER Negotiators' Standing Sub-Group (NSSG-8) and a number of related meetings over an intensive nine day period of work from 14 to 22 May 2003. The European Union hosted the meeting, which was also attended by delegations from Canada, China, Japan, the Russian Federation (RF) and the USA. This was the first time at the NSSG for the Chinese and US delegations, following their accession to the ITER Negotiations at the previous Negotiators' meeting (N-8) (see ITER ITA Newsletter No. 1, February 2003).

In accordance with guidance from N-8 the NSSG meeting, which took place on 19–20 May, was preceded by a number of meetings of specialist Working Groups (see chart overleaf) each focusing on a specific aspect of the Joint Implementation of ITER and was followed, as usual, by a meeting of the working group charged to develop the draft of the International Agreement for the Joint Implementation of ITER and of its related instruments.

Participants in NSSG-8

Topical Working Groups in support of ITER NSSG 8

- Intellectual Property Rights (IPR)
- ITER Staffing
- Procurement Systems and Methods
- Management Structure
- Procurement Allocation
- Decommissioning
  - Technical aspects and cost estimates
  - Funding aspects
- Financial Regulations
- Drafting Group for the Agreement and Related Instruments

Over the course of four days the Working Groups met, at times in parallel sessions, to make progress in their respective topic areas. The work of each group was led by a rapporteur, who subsequently presented the group's findings and recommendations to the NSSG as a whole for consideration and guidance.

This new approach to the work of the NSSG allowed for focussed discussion and development of the many different elements that will be involved in the Joint Implementation of ITER.

The Delegations recognized the importance of the issues of uncertainty and risk management to a long term and complex undertaking such as ITER and agreed to set up a Working Group on Risk Management to address the issues.

The NSSG also discussed the conclusions of recent informal missions to the Republic of Korea by technical and legal specialists and other informal interactions concerned with Korean expressions of interest in joining the ITER Negotiations.

BILATERAL BLANKET MEETING

by Dr. V. Rozov, ITER International Team

The Research and Development Institute of Power Engineering (ENTEK) in the Russian Federation (RF), collaborates with the ITER International Team (IT) in the development and preparations for the future production of the blanket module flexible supports and the port-limiters. In recent years, the RF has positioned itself as a candidate for the manufacture of these components.

It is becoming a good tradition to "check the clocks" between the IT and ENTEK at the regular bilateral meetings. The last meeting took place in Moscow on May 22 and 23, 2003.

A number of topics were covered during the two days, touching nearly all the related points of common interest. The traditional greetings and the short briefing between the representatives of IT and RF Participants Team (PT) started the meeting. Dr. Chuyanov informed the participants about the current ITER status and the recent updates. Dr. Ioki reported the recent progress in the ITER blanket design and the latest achievements of other PTs. Dr. Strebkov reviewed a number of activities, completed in the RF since the last meeting, which took place at the beginning of December 2002.

After this introductory part, the participants proceeded to a detailed technical discussion of the different items on the agenda.

Strong emphasis is placed in ENTEK nowadays on the experimental assessment of the developed units and on the search for advanced technological methods for their manufacture. G. Sysoev reported on the results of the lifetime tests, performed for the flexible cartridges of the blanket supports. The successful tests were conducted in the facility MTS-2500 mounted on-site in the Central Aero-Gaz-Dynamics Laboratory (TsAGI —

the certified centre for experimental test assessment of the elements of the aerospace technique for their fatigue life and structural integrity). Further plans include the combined dynamic testing of the supports with keys integrated into the entire supporting system under the blanket module simulator, installed on a Vacuum Vessel section mock-up (under construction). The complete assembled units with their applied electric insulating coatings will be installed in this facility. This should demonstrate the different aspects of the montage and disassembly operations as well. It will also answer the questions about the behaviour of the large structural threads with the insulating coatings, methods of auto-compensation of the tolerances, etc. Analytical support is also provided for all these experiments. The numerical modelling performed with the use of finite element methods of analyses (S. Khomyakov) helps to formulate correct approaches for the testing. At the same time, comparison of the results from modelling and the experiments validates the analytical methods of assessments, enabling their applicability as tools for operative use.

Several interesting design modifications have been proposed by the representatives of ENTEK to decrease cost and improve reliability. Recent steps in this direction concern the production of the flexible support cartridges from hot pressed hollow shapes of Ti–6Al–4V, and the implementation in the design of the thread locking and auto-compensating features, avoiding custom machining of the titanium.

In this context the new concept for the manufacture of the port-limiter, developed in ENTEK and proposed at the meeting, should also be mentioned. The emphasis in the development of the port limiter is placed on the technological aspects of the manufacture. A new design and the construction method assumes manufacture of the Cu–Cr–Zr heat sink by extrusion of the corresponding bulk profile separately from the stainless steel shield part and consequent mechanical joints between them (D. Mitin). An additional technique for the production of the cooled panels with the embedded tubes, providing double containment, has been under development in ENTEK for many years. Now this work has been accomplished with quite acceptable results in getting a reliable joint (K. Skladnov). As an alternative to the swirl tape, the RF proposes to produce just a helical groove inside the cooling channels by cold drawing. This technique is already used in heat exchangers and increases the heat transfer coefficient about two times compared with a plain surface. Such an intensification is found to be enough for this application (A. Razmerov). The plates are integrated together mechanically by two sets of rods, inserted from both sides and reaching the vertical mid-plane. The removal of the heat, deposited in the rods, towards the cooled plates was one of the key problems in the option with the use of mechanical attachments. In the proposed design it is achieved by washers, expanded in the annular clearance (these devices are already used in fission reactors). The proposed modifications represent a definite step towards a simpler industrial manufacture of this component.

From the other presentations and discussed questions, one should also mention the hydraulic analysis of blanket cooling passages (P. Balabin). The task is to provide a balanced flow distribution between the channels with no use of diaphragms, but by means of size control of the passages only. This time, a new 3D finite element code FLOW-VISION developed in the RF will be used for the analysis. New results of stress corrosion tests during the nitrogen gas drying of steel and of the bimetallic steel–copper specimens have been presented by K. Shuytko. Corrosion damage has been observed on the steel specimens under drying by nitrogen. These results of the recent activities in this traditional problem looked interesting but so far are not clear enough to reach a final conclusion. The work certainly has to be completed on the basis of systematic analysis and of the large amount of accumulated data, including those available from similar experiments in other countries. Information has been presented about the availability of the alternative method of inspection for detection and measurements of cyclic damage in the austenitic steel. This method is based on the dependence of the local content of the magnetic phase in the material of the inspected unit, subject to the cyclic loading, on the propagation of micro-cracks and, thus, on the exhausted/residual resource of the material. It might well be applicable for the estimation of the cyclic damage to the stainless steel elements with a large structural thread (A. Popov).

The meeting was concluded with a “Summary of finding agreements and open issues” (K. Ioki, Y. Strebkov) and a “Conclusion on the Meeting” (V. Chuyanov). The compiled traditional “action list” defines the details of the future co-operative works.

The meeting helped to clarify the positions of the parties and the status of joint activities, discuss the recent results and agree on the plans for the near future, assigning priorities and putting the emphases on the different aspects. This style of collaboration eliminates a certain amount of redundancy and makes the efforts, undertaken by the parties, more effective. In some cases, sharing the information about details enable a better

understanding of the background behind the different opinions. Furthermore, discussions supported by all the involved persons contribute much to the process of convergence of the positions. The presented results, achieved within a short period and the common understanding between the Parties in key problems demonstrated that ENTEK is assigning a high level of priority to the collaboration with ITER, aimed at full scale participation in the Project during the construction phase.

Meeting in Session

LIST OF PARTICIPANTS

IT: V. Chuyanov, K. Ioki, F. Elio, V. Rozov, V. Barabash

RF PT: Y. Strebkov, G. Kalinin, S. Khomyakov, G. Sysoev, A. Epinatev, D. Sizarev, A. Popov, P. Balabin, K. Shuytko, D. Mitin, A. Razmerov, K. Skladnov, V. Efimov, P. Romanov, A. Kalashnikov

Items to be considered for inclusion in the ITER CTA Newsletter should be submitted to B. Kuvshinnikov, ITER Office, IAEA, Wagramer Strasse 5, P.O. Box 100, A-1400 Vienna, Austria, or Facsimile: +43 1 2633832, or e-mail: c.basaldella@iaea.org (phone +43 1 260026392).

Printed by the IAEA in Austria
July 2003

03-01349