

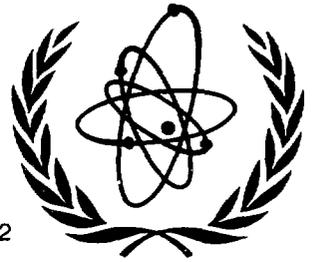
INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR



ITER EDA NEWSLETTER

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INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

SECOND ITER COUNCIL MEETING

by Dr. V. Vlasenkov, ITER Council Secretary

The Second ITER Council Meeting (IC-2) was held in Moscow, Russia, which is the formal seat of the Council, on 15-16 December 1992. On the occasion of the meeting, the ITER Council Office, which is located at the premises of the Russian Research Centre (RRC) "Kurchatov Institute", was formally inaugurated.

Acad. E.P. Velikhov, Chairman of the ITER Council, presiding over the first session, welcomed the Delegations of the four ITER Parties and their leaders as well as the Deputy Director General of the IAEA, Dr. S. Machi. A total of 36 participants were attending the meeting.

The meeting began with an exchange of views by the Parties' delegations on the current domestic events relating to ITER activities.



Participants of the Second ITER Council Meeting, Moscow, Russia

Some decisions taken by the Council upon treating the 21 agenda items were the following:

- The Council endorsed the TAC and MAC recommendations on the Director's proposals for urgent tasks, which include construction/upgrading of two model coil test facilities, feasibility studies of the manufacture of ITER magnets and procurement of strand for the manufacture of model coils.
- The Review Report prepared by SWG-1 was accepted and the recommendations contained in it were adopted. The Council agreed that SWG-1 had accomplished the task entrusted to it (for details see a separate article).
- The Council accepted the Report of SWG-2 and adopted the Guidelines for implementation of task assignments.
- To ensure that the Director's proposals are acted upon quickly between Council Meetings, the Council asked MAC to meet as frequently as necessary and agreed that electronic and other communication would be used to ensure rapid approval by the Council of MAC's unanimous recommendations.
- The Council directed SWG-2 to prepare a draft of Protocol 2 at minimum length.
- The lists of further tasks for SWG-2, TAC and MAC were adopted.

In the discussion the response of the IAEA with regard to the assistance to ITER the idea of establishing a formal working relationship with the IAEA Atomic and Molecular Data Unit was supported.

The Council accepted the invitation of the Japanese Party to hold the IC-3 meeting in Tokyo on 21-22 April 1993.

OPENING CEREMONY OF THE ITER COUNCIL OFFICE



Ribbon cutting ceremony. From left to right:
Dr. M. Yoshikawa (JA), Prof. P. Fasella (EC),
Acad. E. Velikhov (RF), Dr. J. Decker (US)

The opening ceremony of the ITER Council Office at the Russian Research Centre (RRC) "Kurchatov Institute", Moscow, took place on 15 December 1992, on the occasion of the second ITER EDA Council Meeting. Over 100 persons, including IC-2 meeting participants, RRC "Kurchatov Institute" staff members and representatives from the Russian Federation Ministry for Atomic Energy attended the ceremony.

Acad. E.P. Velikhov delivered the welcoming speech on behalf of the Russian Federation as the ITER Party and RRC "Kurchatov Institute". His speech was followed by the congratulatory speeches of the IAEA representative, Dr. S. Machi, and of the leaders of the ITER Parties' delegations, Prof. P. Fasella, Dr. M. Yoshikawa and Dr. J. Decker. After that the name plate at the entrance of the premises was unveiled.

The inauguration ceremony was video-taped and presented as part of the evening news on Channel 1 of the Russian TV on the same day.

The ceremony was followed in the evening by a reception at the "President Hotel" given by Prof. V. Mikhailov, Minister of the Russian Federation for Atomic Energy, and Acad. E.P. Velikhov, Vice-President of the Russian Academy of Sciences, Chairman of the ITER Council.

The ITER Council Office consists of one meeting room for up to about 40 participants and three smaller rooms for meetings of 6-12 participants. Secretarial support and technical equipment (xerox, computers, fax, E-mail, etc.) are available

FIRST MEETING OF THE ITER MANAGEMENT ADVISORY COMMITTEE (MAC)

by Dr. M. Yoshikawa, MAC Chair

The first MAC meeting was held at the ITER Co-Centre, Naka, Japan, on 1-3 December 1992. All MAC members participated in the meeting.

The first day's meeting was devoted to a discussion of the Director's proposals of urgent R&D tasks including construction of Model Coil Test Facilities, Feasibility Studies of the Manufacture of ITER Magnets and Procurement of Strand for Superconducting Magnets.

After the discussions, the MAC made recommendations to the IC to start procedures to implement these proposals.



First MAC Meeting in session

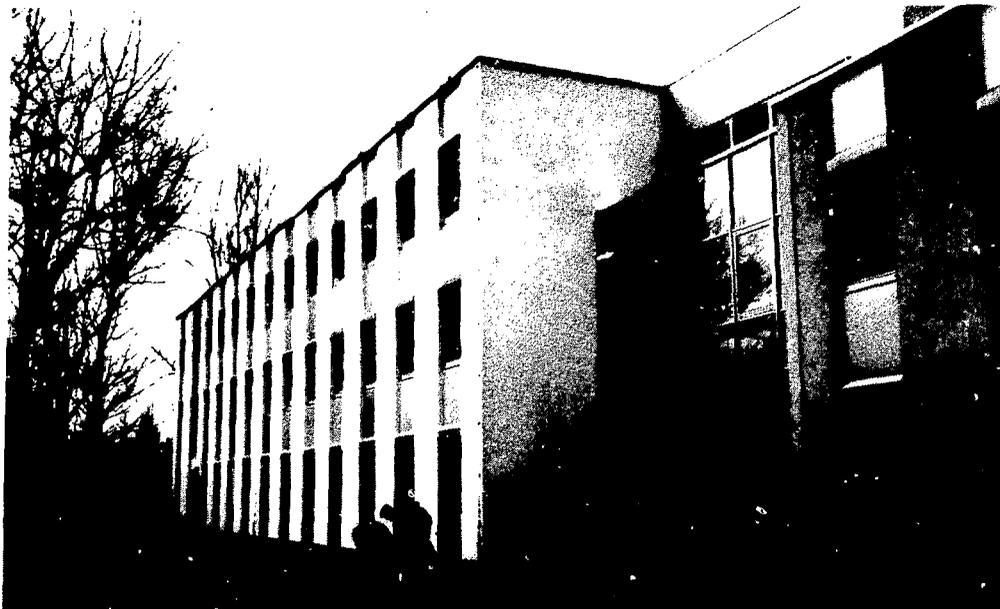
Discussions on the staff of the Joint Central Team (JCT), the Work Programme, the Publishing guidelines, and the ITER Process Management System (IPMS) for CAD Management were made on the second and third days of the meeting.

START-UP OF ITER EDA AT GARCHING

by Dr. R. Parker, Garching Co-Centre Head

During the spring of this past year the first steps to prepare the site for the Engineering Design Activities at the Garching Co-Centre were started with the construction work on the extension of the ITER building. A new floor on top of the existing building providing additional 19 single offices, a meeting room, and 2 large offices for a Division Head and a secretariat has been completed, thus providing in the building the office space necessary for the full complement of staff now envisaged to work at the Garching Co-Centre. A total of 2300 m² is ready for occupancy.

An order for CAD-work stations was placed in May, and the first three units were delivered in July. Several draughtsmen who will work on ITER detailed design have attended courses for the new system KATIA, and their training is continuing. Another delivery of six work stations was received and installed before Christmas to complete the equipment for the drawing office. When the design work is in full swing, it is expected that 60-80 MB of data will have to be transmitted to the other Co-Centres every day, and this will require a dedicated link



Final touch! West wing of the ITER Building with a new floor on top

to the United States ESN_{et}, providing the connectivity for San Diego as well as for the Naka site. The procedure for the installation of this link has been started, and we expect to see the line operational in summer 1993. Until that time we will continue to use the scientific network which is quite capable of handling the more modest volume of data we expect to produce during this period of time.

For Desktop computing a local supplier for Apple equipment has been identified, and the first 12 Macintoshes have been delivered. The reference model for the engineers and the physicists will be the Macintosh IIci 4/80, and a full complement of desktop computers will be installed at a rate commensurate with the buildup of staff.

At the present time, the Garching Co-Centre Head, Dr. Ronald Parker, the Deputy Head Dr. Wilhelm Gauster, and two Division Heads, Dr. Juergen Dietz (Divertor and Plasma Interface) and Dr. Takashi Nagashima (In-Vessel Ancillaries) are on site. The third Division Head, Dr. Guelli Shatalov (Vacuum Vessel and Blanket) is expected soon. The first high priority activity is to lay out workplans for the R&D and design tasks that will be carried out by the home teams in support of the Co-Centre work on in-vessel systems. The most challenging technical problem for these systems is of course the divertor design, and work is underway to develop the concept of a gas and/or plasma target divertor which presents the best possibility for a robust solution.

Interviews for key positions at Garching and the other Joint Central Team Co-Centres are being conducted and a number of offers are being made. The rate of buildup of the JCT staff is, however, limited by the rate at which candidates are being put forward by the Parties. Nevertheless, a reasonable expectation is to reach a staffing level of about 60% of the ultimate steady-state level by mid-year. In the planning of the work at the Garching Co-Centre, and in the selection of personnel, careful attention is being given to the numerous interfaces such as safety, remote maintenance and project integration which occur as a result of siting the JCT at the three Co-Centres.

A Relocation Service has been established and has been very helpful in assisting the staff in finding housing, etc. Of course, the Relocation Service is also available for inquiries, and every candidate or a person seriously considering a position in the Garching Co-Centre is invited to contact Mrs. Hilly Weinfurter (Tel. +49 89 3299 4177 or fax +49 89 3299 4163/5) for information concerning relocation in the Garching area.

ITER CO-CENTRE NAKA

by Dr. M. Huguet, Naka Co-Centre Head

The ITER Co-Centre in Japan is located at the Naka Fusion Research Establishment of the Japan Atomic Energy Research Institute (JAERI). Naka is a small town not far from Tokai where JAERI has a large nuclear fission research establishment. This area is 10-15 km to the North of Mito, the main city of the Ibaraki Prefecture which is located on the east coast of Japan to the north of Tokyo. Mito lies about 120 km from Tokyo and has road and rail links with it. In this coastal region of the Ibaraki Prefecture there are several fission reactors operated by different organizations.

The JAERI Naka fusion site is large including the facilities of the large tokamak JT-60U as well as supporting fusion technology research on neutral beam injectors, superconducting magnets, vacuum, plasma-wall interactions, tritium and radio-frequency heating systems. There is also a library, exhibition hall, cafeteria and shop plus recreational facilities (sports fields, gymnasium - under construction - and tennis courts). About 350 persons are employed at this site.

There will be three Joint Central Team (JCT) divisions at Naka:

- Superconducting Coils and Structure (R. Thome - USA).
This division is responsible for the design of the superconducting conductors and coils as well as of the mechanical structure.
- Plasma and Field Control (P.L. Mondino - EC).
This division is responsible for the design of the magnet power supplies necessary to maintain the plasma in stable equilibrium, of the cryostat for the superconducting coils, and of the neutral beam heating system.
- Nuclear Technology (R. Haange - EC).
This division is responsible for the design of the reactor hall, of the tritium plant and of the remote handling of external components.

The Heads of these divisions have already been selected and their names are shown in brackets. Recruitment of staff has begun with interviews at various locations.

For the ITER JCT, which is now being established at this site, a new building is being built which will be provided with computing facilities and office equipment. It should be ready by mid-1993 when the JCT will transfer to it from its present accommodation in the JAERI administration building. In addition, teaching facilities are already available for the children of JCT staff in the age range of 5 to 15. This school is run by an international school in Tokyo, and a school building under construction on the Naka site should be available early in 1993.

The host organization JAERI has made considerable preparations to facilitate the transfer of staff from other countries to Japan. Apartments have been made available in Mito, and houses are under construction near Naka town. A daily bus service to and from work will be established between the ITER Co-Centre and this location. In addition, Japanese administrative support staff have made extensive preparations to supply foreign JCT members with the information necessary for them and their families to live happily in Japan.

ITER CO-CENTRE SAN DIEGO

by Dr. V. Chuyanov, San Diego Co-Centre Head

The ITER San Diego Co-Centre hosts the ITER Joint Central Team (JCT) Integration Centre and the ITER Director. The San Diego Co-Centre is located at the Torrey Pines Science Park in La Jolla, California. In close proximity is located the DIII-D Tokamak of General Atomics.

The Co-Centre is operated by the University of California, San Diego (UCSD) under an Agreement with the U.S. Department of Energy (DOE). UCSD provides support such as relocation services, visas and library services for staff members of the ITER JCT. The on-site facility management, support staff, and equipment are being provided by Science Applications International Corporation (SAIC). The government of the State of California and the local industrial community also support the Co-Centre activities.

After the ITER Engineering Design Activities had officially been started by the first ITER EDA Council Meeting, the Council's appointees for the JCT at the San Diego Co-Centre took up residence in San Diego. However,



ITER Deputy Directors, Heads of the Co-Centres with the Director Dr. P.-H. Rebut and the Deputy to the Director Dr. Y. Shimomura at San Diego Co-Centre
From left to right: Dr. V. Chuyanov (San Diego), Dr. M. Huguet (Naka), Dr. P.-H. Rebut, Dr. R. Parker (Garching) and Dr. Y. Shimomura

the formal process of secondment has yet to be completed. To date, the three ITER Council appointees are working at the Joint Work Site:

- Paul-Henri Rebut, Director, Joint Central Team
- Dr. Valeriy Chuyanov, Deputy Director and Head of the San Diego Co-Centre
- Dr. Yasuo Shimomura, Deputy to Director Rebut and Deputy Director

The JCT plan for technical staffing is to reach the level of 150 scientists and engineers by the end of Protocol 1, in roughly equal number at the three Co-Centres. However, five months after the signature of the ITER EDA Agreement, only 10 members of the JCT have started their work at the San Diego Co-Centre in anticipation of their secondment agreement. Because of this slow rate of build-up of the JCT, selecting and assembling the team is a heavy burden especially on the senior JCT members. This situation may have an impact on the progress of the overall ITER EDA programme.

24 of the initial 28 support personnel to be provided, including 5 designers, computer, communications and secretarial staff are available now at the ITER San Diego Co-Centre.

The Co-Centre is operational, and preliminary ITER design work has started. It is the technical judgement of the Director and Deputy Directors that to complete the ITER EDA, specifically including site-specific elements, within the six-year time frame, proposals for the construction would need to be reviewed and a construction site would need to be determined by the fourth year. This aggressive schedule underlines the urgency of a rapid assembly of an international team of leading scientists and engineers from the countries of the participating Parties.

As part of the preparation of the future full-scale activities the selected Division Heads of the JCT met with the management on 26-29 October at the San Diego Co-Centre. This was the first meeting of the senior managers during which the plans and activities implementing the ITER EDA Agreement were presented and discussed, including implementing the ITER EDA Agreement, proceeding expeditiously into the design, and supporting research and development. The ITER Director and his staff provided the participants of the meeting with the overview information and guidance on how the JCT plans to organize and function. Individual presentations by the Deputy Directors and Division Heads describing the plans, issues, and actions required were also made.

A priority task for the JCT is to formulate the Work Programme including the specification of tasks. Resources permitting, the ITER Director hopes to submit the first Work Programme at the third meeting of the ITER Council, that is in April 1993. A small number of urgent tasks has also been identified, work on which should start before April 1993. These tasks were submitted to the ITER Council for its approval. The assignment of tasks is a dynamic process because, in general, the specifications of any particular task will depend on the results of ongoing design and R&D activities. Therefore, it is important that procedures for assigning tasks should be flexible and timely.

As part of the ITER activities and in preparation of the Work Programme, a technical meeting on Safety and Environment has been held at the San Diego Co-Centre on 12-16 October and has involved the participation of 20 representatives and 7 observers from the Parties.

During the meeting, safety issues were discussed in broad terms and a findings and recommendations report was drafted. Among various subjects, the discussion focussed on four main issues: general and critical safety issues of ITER; safety related research and development and future requirements; radiological criteria, design standards, and regulatory and siting requirements; as well as the safety programme for the EDA.

Communication among the three ITER Co-Centres has been established through dedicated or shared lines of communications. Tests have been carried out and CAD drawings were exchanged successfully. Six IBM CAD stations, including 2 servers, are operating and all offices are equipped with desktop computers connected via Ethernet into a local network. Communication among desktop computers and over the three Co-Centres is operating through E-mail and faxes. After agreement of the ITER Council, the design of a database aiming at managing the ITER activities will start at the beginning of 1993. It is hoped that a preliminary version will be operational by summer of 1993.

CONTACT PERSONS ACTIVITIES

by M. Roberts, USCP

At the first IC meeting, Council members discussed and agreed on the merit of having a person from each Party identified as the point of contact for each delegation between Council meetings. These persons, called Contact Persons (CPs), would also serve a similar function during Council meetings by assisting the Council Secretary, V. Vlasenkov, when drafts of various Council statements were being developed.

The delegations identified as their CPs the following persons, who had served a similar function during the CDA and the interim period, in particular, to ensure satisfactory resolution of any substantive points of difference:

EC	E. Canobbio
JA	A. Kitsunezaki
RF	L. Golubchikov
US	M. Roberts

To ensure that the business of the Council could be effectively conducted between meetings, a Point of Contact with the Director (PCw/D) was also identified. M. Drew, JCT, serves as the PCw/D.

Two of the principal ongoing tasks on behalf of the Parties' delegations are assisting V. Vlasenkov in the development of the Council minutes and B. Kouvochnnikov in the review of the drafts for the ITER Newsletters.

The CPs were also assigned various ad hoc tasks at the first Council meeting, including recommendation of detailed approaches to an ITER logo and stationery, review of the list of contents for the first red-covered document to be published by the IAEA containing the Relevant Documents Establishing ITER EDA, and together with the Director, discussion with the IAEA and the Host Parties on the options for publishing ITER documents.

Reports on these tasks were given at the second Council meeting where each of the CPs' recommendations was accepted by the Council.

THE ITER COUNCIL ADOPTED THE RECOMMENDATIONS OF SPECIAL WORKING GROUP 1 (SWG-1)

SWG-1 conducted, in accordance with provisions contained in Protocol 1, the Review of the ITER Conceptual Design. As a general guideline for SWG-1 the ITER Council recommended that the reviewed technical objectives and technical approaches, including appropriate safety margins, should be compatible with the aim of maintaining the cost of the device within limits comparable to those indicated in the final report of the ITER CDA as well as keeping its impact in the long-range fusion programme.

The Group had in-depth discussions of the ITER technical objectives and approaches and the views of the ITER Parties on the critical issues of the Engineering Design. On the basis of these discussions and also taking into account the views on guidelines for ITER presented to the Group by ITER Director P.-H. Rebut, SWG-1 prepared and unanimously approved the Review Report.

In this Report SWG-1 recommended, inter alia, that ITER should:

- demonstrate controlled ignition and extended burn for a duration sufficient to achieve stationary conditions on all time-scales characteristic of plasma processes and plasma-wall interactions, and sufficient for achieving stationary conditions for nuclear testing of blanket components. This can be fulfilled by pulses with flat top duration in the range of 1000s. For testing particular blanket designs, pulses of approximately 2000s are desirable;
- aim at demonstrating steady-state operation using non-inductive current drive in reactor-relevant plasmas;
- demonstrate the availability of technologies essential for a fusion reactor (such as superconducting magnets and remote maintenance);
- test components for a reactor (such as systems to exhaust power and particles from the plasma);
- test design concepts of tritium breeding blankets relevant to the reactor. The tests foreseen on modules include the demonstration of a breeding capability that would lead to tritium self-sufficiency in a reactor, the extraction of high-grade heat, and electricity generation.

SWG-1 also recommended that the ITER operation should be divided into two phases:

- The first phase, the Basic Performance Phase, is expected to last a decade including a few thousand hours of full DT operation. This phase should address the issues of controlled ignition, extended burn, steady-state operation and the testing of blanket modules. Function tests of blanket modules in this phase should consist of a few thousand hours of integral burn time, including continuous test campaigns of 3-6 days at a neutron wall loading of about 1 MW/m².
- The second phase, the Enhanced Performance Phase, is also expected to last a decade, with emphasis placed on improving overall performance and carrying out a higher fluence component and materials testing programme. Operation during this phase should include continuous testing campaigns lasting 1-2 weeks and should accumulate a fluence of at least 1 MWA/m².

In its Review Report the Group specifically noted that ITER should be designed to operate safely and to demonstrate the safety and environmental potential of fusion power.

The ITER Council accepted the Report of SWG-1 and at its second meeting adopted the recommendations contained in it.

NEWS IN BRIEF

- A Technical Meeting on Safety and Environment was held at the ITER San Diego Co-Centre on 12-16 October 1992. 20 representatives and 7 observers from the ITER Parties discussed safety issues in broad terms and prepared the findings and recommendations report. Among various subjects, the discussion focussed on four main issues: general and critical safety issues of ITER; safety related R&D and future requirements; radiological criteria, design standards, and regulatory and siting requirements; as well as the safety programme for the ITER EDA.

- The selected Division Heads of the JCT met with the management on 26-29 October 1992 at the ITER San Diego Co-Centre. This was the first meeting of the senior managers during which the plans and activities for the ITER EDA were presented and discussed. The first day of the meeting was devoted to overview information and guidance from the Director and his staff on how the JCT plans to organize and function. The remaining days were devoted to individual presentations by Deputy Directors and Division Heads describing the cognizant plans, issues, and action required.

COMING EVENTS

- US Home Team National Meeting, San Diego, USA, 25-26 January
- Magnet Technical Meeting, Naka, Japan, 26-29 January
- Special Working Group 2 meets in Tokyo, Japan, 16-18 February
- Technical Meeting on Divertor Experiments, Garching, Germany
- US ITER Industry Council, San Diego, USA 27 January
- TAC meets in Garching, Germany, 15-17 March (tentatively)
- The ITER Council meets in Tokyo, Japan, 21-22 April

Items to be considered for inclusion in the ITER Newsletter should be submitted to B. Kouychinnikov, ITER Office, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria, or Facsimile: 43 222 237762 (phone 23606392).

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