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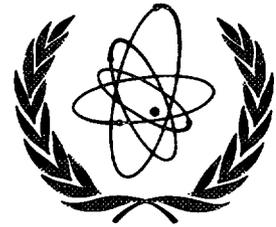
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TENTH ITER COUNCIL MEETING

by Dr. L. Golubchikov, ITER RF Contact Person

The Tenth Meeting of the Council of the International Thermonuclear Experimental Reactor (ITER) was held on July 24 and 25, 1996, in St. Petersburg, Russia.

The four delegations that attended the meeting were headed, for the EU, by Prof. J. Routti, Director-General for Science, Research and Development of the European Commission; for Japan, by Mr. N. Oki, Deputy Director-General of the Atomic Energy Bureau of the Science and Technology Agency; for the Russian Federation, by Academician E. Velikhov, President of the RRC "Kurchatov Institute"; and, for the United States, by Dr. J. Decker, Deputy Director of Energy Research of the Department of Energy.

On the occasion of the meeting, each Party made a significant move forward by announcing its readiness to enter non-committal, pre-negotiation, exploratory discussions called Explorations, aimed at identifying issues for subsequent Negotiations toward a possible ITER construction, operation, exploitation and decommissioning and identified its Explorers (see the list on the next page). These Negotiations would hopefully allow the start of construction without any unnecessary hiatus after the present EDA.



Participants in the Meeting

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PARTICIPANTS IN EXPLORATIONS

EU - J. Routti, Ch. Maisonnier, E. Canobbio
JA - N. Oki, M. Yoshikawa*, S. Tanaka*, A. Kitsunezaki*
RF - E. Velikhov, N. Cheverev, Y. Sokolov, L. Golubchikov
US - J. Decker, N.A. Davies, M. Roberts

* Participants in first Explorers' Meeting (see further note at the end of this article)

The Council noted with appreciation that the Parties had made their decisions to begin the Explorations in a timely manner in accordance with the Tentative Sequence of Events approved at IC-9. The Council further noted that the actions taken by the CPs had been effective in enabling these decisions and asked the Director to assist the Explorers as needed.

The Council accepted a report by the Special Working Group (see separate article in this issue) preparing the basis for these exploratory discussions on arrangements for possible future ITER construction and subsequent exploitation, as well as the CPs' Report on the facilitation of Explorations. The Council also decided to transmit the SWG Report to the Parties to serve as a basis for the start of Explorations among the Parties toward ITER implementation. The Council expressed its appreciation to the SWG members and especially to the Co-Chairs, Drs. Canobbio and Tomabechi, and to the Director for his considerable assistance to the SWG. With this action, the SWG Task #1 was completed.

The Council took note of the Director's ITER Status Report (see separate article by Dr. R. Aymar on the next page), confirming by that the steady progress of the technical work and accepting the preparations for finalizing the ITER Detailed Design Report Package to be presented to the Council by the end of 1996. On that occasion, the Council heard the Parties' statements on their willingness to continue fulfilling their obligations to contribute to the ITER EDA.

Following the Director's Joint Fund proposals and on the advice of MAC, the Council approved:

- the consolidated Joint Fund Accounts for 1995, and took note of the Director's report on the operation of the Joint Fund in 1995;
- new allocations of the 1996 Joint Fund budget;
- the Joint Fund budget for 1997 of \$2.4M in total, with contributions of \$0.6M per Party.

The Council noted the successful initiation of the RF Design Support Contracts. While noting the Director's statement that the funds available for this work were limited, the Council endorsed the idea of amplifying this support where possible, and invited the Director to consider proposing to the next meeting of the IC a supplementary Joint Fund budget for this purpose. The Council requested the Parties to consider by IC-11 increasing their contributions to the Joint Fund. Due to shortage of time for scientific visits to the institutions involved, the participants in the meeting were briefed on the activities being undertaken in the JCT Design Offices at the Efremov Institute and VNIPIET through posters and comments made by the designers.

IC-10 was held on the premises of the Business Center and Hotel "Neptun", and the participants in the meeting had an opportunity to meet Acad. I. Spassky, General Designer and Chief Executive of the Central Design Bureau of Sea Technologies "Rubin", who is also governing the activities of "Neptun", and with whose support the meeting, both scientifically and socially, was held in a highly satisfactory and harmonious atmosphere.

All participants were happy to visit St. Petersburg's beauties on a bus excursion around the city and by ship along the Neva River, as well as the fountains and palaces of Peterhof during a further bus trip.

The next Council Meeting (IC-11) will be held in Tokyo, on December 17 - 18, 1996.

Note: Based on the SWG Report and in accordance with the Tentative Sequence of Events, the first Explorers' meeting was held in St. Petersburg on July 24, chaired by Acad. Velikhov. It should be noted that the Explorations are not part of the ITER EDA. During this meeting the Explorers considered the matters arising from the SWG Report and agreed on the Work Schedule till July 1997 and on the Work Plan for the Preparatory Sub-Group Meeting (October, 1996) for the next Explorers' Meeting, which will be held on December 18, 1996 in Tokyo.

STATUS OF THE ITER EDA

by Dr. R. Aymar, ITER Director

This article summarises the report made to IC-10 on progress in the ITER Engineering Design Activities in the period between IC-9 and June 1996.

Overview

The overall focus of the Project is towards the next major milestone - the presentation of the Detailed Design Report to IC-11 at the end of 1996. Key features of this work include:

- * progress from the definition of component concepts towards their integration at system and plant level;
- * holding main component design stable to make detailed design possible;
- * the introduction of specific changes determined at the start of 1996
 - to include in design the results of safety analyses;
 - to improve assembly and maintenance characteristics;
 - to include physics results on divertor operation, Vertical Displacement Events (VDEs), and operating scenarios;
- * the start of commissioning and operation plans.

At the same time, the JCT and Home Teams have worked intensively on seven major R&D Projects as presented to MAC-8 and IC-8. The objectives, management organisations and work plans were developed in detail by January 1996 and issued as an initial document among the Project Managements and responsible persons. Details of the Work Plan and schedule of the Projects were presented to MAC-10.

The work on ITER Physics carried out in the Parties' voluntary Physics programmes continues to progress well within the effective structure of the Expert Groups. The immediate target is to prepare for the review of the overall Physics Performance of ITER in autumn of 1996 in the context of the Detailed Design Report. A large number of contributions from the JCT and Home Teams is planned for the coming IAEA conference.

The Director and JCT assisted the Special Working Group in its first task in analysis of issues related to possible ITER construction, mainly by providing input on project needs as concerns regulatory environment, procurement strategy, and project organisation.

Design Work

Following extensive work arising from the IDR and related documents, a JCT Design Review Meeting review meeting was held over two weeks at the end of January 1996 with the objective of establishing a "point design" to serve as the basis of the ITER detailed design work. The meeting led to decisions on design changes from the IDR, and to directions for design revisions to be developed and eventually approved when reviewed for insertion in the DDR. A summary of the report from the design review was circulated to Home Team Leaders in February. The design changes from the IDR were presented to TAC-10 for informal review.

The General Design Requirements Document (GDRD) has been updated to reflect the results of the Review, and there is a full set of CAD models and drawings with "working" status which describe the point design.

Plans for preparation of the DDR have been circulated in the JCT and shared with Home Teams. The schedule allows for two informal partial reviews in October - of the safety assessment and of the basis for Physics performance - before the formal review of the DDR as a whole by TAC-11. The informal reviews will take place around the time of the IAEA conference.

Work has also continued in collaboration with Home Teams in the analysis of design changes linked to variations in the site assumptions, including seismic, grid power, plane crash and extreme temperatures.

Joint Central Team and Support

The status of the JCT is summarised by Joint Work Site and by Party in the Table below. In the period from IC-9 to 30 April 1996, 3 (1 JA, 2 US) members left the team, and 13 new members joined (3 EC, 6 JA, 1RF and 3 US). Under the Canadian association through the EU, two more Canadian staff have been selected and are expected to be on site shortly.

JCT - Status of JCT Staff on site at 30 April 1996

Garching	Naka	San Diego	EC	JA	RF	US	Total
49 ¹⁾	56 ¹⁾	55 ¹⁾	48 ¹⁾	44	28	40	160

¹⁾ includes three Canadians provided through the Canadian association with the EC Party.

JCT - Cumulative PPY's on-site to 1 May 1996

	EC	JA	RF	US	Total
Garching	37.2	30.3	12.7	26.2	106.4
Naka	37.2	31.8	14.4	32.9	116.4
San Diego	28.2	35.7	25.1	42.8	132.3
Total	103.2	97.8	52.3	101.9	355.1

The estimated cumulative PPY effort on site to 30 April 1996 is shown above by JWS and by Party.

The Work Programme assumed a significant buildup of JCT members throughout 1995 as part of a rising trend to meet the approved target of 798 PPY for the EDA. The Parties were advised of the priority vacancies most urgently requiring to be filled. Whilst the recent net increase in Team members on site is welcome, the target of filling at least all of the priority posts by the end of 1995 was not achieved and it now appears unlikely that the total levels of JCT resources will reach the previously planned level.

The increases foreseen in the Work Programme in the CAD support staff and equipment at Garching and Naka have been implemented. The US Party's current budget limitations have made it impossible to enhance Host Support at San Diego as foreseen.

Visiting Home Team Personnel (VHTP) Scheme

IC-3 adopted proposals to set up a VHTP scheme with the overall objective of enhancing the collaboration between each Home Team and the Joint Central Team, and of offering Parties some flexibility in the modalities of their interactions with the JCT. Under the scheme, Home Team personnel from the Parties can make extended visits to Joint Work Sites (normally of a duration from a few months up to two years) to execute tasks agreed upon between the Director and the Home Team leader concerned.

The scheme has been used to the mutual advantage of the Parties and the JCT since its approval by the ITER Council. In particular, its inherent flexibility has proved valuable since it offers an approved formal basis for bringing to the JWS a variety of Party personnel for whom secondment as JCT members would have not have been appropriate, for instance:

- * many of the Home team personnel who provided urgent assistance at the end of 1993 were on site as VHTP;
- * physicists from the Parties have made valuable contributions to developing the Physics basis of ITER in the course of extended visits to the Joint Work Sites under the VHTP scheme. (Where the people concerned have been outside the Home Team, they have been assigned under specific visiting scientist assignment arrangements based, mutatis mutandis, on the VHTP assignment.);
- * VHTP visits within the frame of Task Agreements have brought specific expertise to bear on particular problems and issues at the Joint Work Sites and have helped the Home Teams to focus their effort in assigned tasks.

About 52 people have paid extended visits to the JWS's under the VHTP and related schemes, for a total of about 18 ppy's. 24 of the 52 were assigned for short periods (<2 months) to provide urgent assistance to the JCT at the end of 1993. Excluding this group, the average duration of a visit was 6-7 months.

RF Design Support Contracts

One possible means of supplementing limited JCT effort is being pursued through actions taken to follow up IC-8 decisions to use the Joint Fund for RF design support directly to the JCT. First steps in that direction were reported and noted with satisfaction at IC-9.

The work to be done under the contracts is additional to, and independent of, the ITER Tasks assigned to the Russian Home Team. It is normally to be performed by people who are not members of the RF Home Team. (Eee ITER EDA Newsletter Vol. 5, No.1)

Each contract is staged, with stages typically of 3 months duration. A new stage is released only after review and acceptance of a previous stage report by a responsible contract officer nominated by the JCT. Payment authorisations to Minatom also depend on satisfactory acceptance of the specific stage reports. Each contract and each major stage leads to final written reports submitted to the JCT. Under the Joint Fund rules, the data from these contracts will be treated like information generated by the JCT and thus available to all Parties in line with the IPR provisions of the EDA Agreement.

Up to May 1996, contracts had been placed with four RF Institutions - Kurchatov Institute, Efremov Institute, ENTEK, and VNIPIET. These contracts have built up to an intensity of the order of 30 full-time professionals. In addition, the RF Agent has procured enabling CAD hardware and software to the value of \$355K which it makes available to the design institutes. All contract teams have demonstrated a satisfactory performance and the stages completed to date have been accepted without any problems. Depending on the continued progress and efficiency in delivery, the work is expected to continue at a similar level up to the end of the year and in future years, within a financial limit of about \$400K/year.

Task Assignments

The total value of technology R&D credits granted, or proposed, now stands at 585.4KIUA compared with the previously reported value of 621.5KIUA. Because of current budget limitations in some Parties, some resources approved at previous meetings have been reallocated. Since details of the task sharing negotiations for the Seven Large Projects are still in progress, some further revisions may be expected. The total design credit now stands at 705.07 PPY (including 17.25 PPY of VHTP effort). Total values of task allocations to date, including the VHTP tasks, are as shown below:

Type	IUA	PPY
TA Work Completed ¹⁾	128,359	218.80
L7 Tasks	329,800	
Other Tasks Committed/Ongoing	127,214	486.27
Totals	585,373	705.07

¹⁾ Tasks for which the HTL concerned has submitted the final report

The pattern of assignment to Parties is summarised below :

Party	IUA	PPY
EC	188,386	196.05
JA	171,427	167.43
RF	93,237	157.20
US	132,323	184.39
Totals	585,373	705.07

It has been just possible, by joint planning, to accommodate significant budget reductions in 1996 and beyond. As a consequence, the Parties' programmes are now closely interwoven and critically dependent on maintaining budgets at least at the levels pertaining in 1996.

ITER Public Information

An ITER Brochure has been prepared in consultation with the Home Teams and Party contacts. The first print run of 12,000 copies is being distributed to Joint Work Sites, Home Team Offices and other interested parties. Publication of other language versions is under discussion with the Home Team Leaders concerned.

ITER Physics

Physics continues to be of key importance to the ITER EDA, both in terms of specific topics that bear directly on design as well as larger issues such as uncertainties in projected performance and scenarios for steady-state operation.

During December 1995, the ITER Physics Committee completed its first annual cycle of reporting and assessment by the Physics Expert Groups of contributions from the Four Parties' Voluntary Physics research programs. Based on these presentations, "urgent" and "high-priority" needs were identified for 1996 via discussions involving the Director, the Physics Designated Persons, other members of the ITER Physics Committee and Expert Group Chairs and CoChairs. Every effort was made to reduce the number of "urgent" needs to a minimum. The 1996 ITER Research Needs highlighted selected code development and database assembly activities where increased efforts were considered necessary to meet ITER requirements. The 1996 ITER Research Needs will provide valuable guidance to voluntary physics research throughout the year. It is planned to update this document at the October meeting of the ITER Physics Committee in Montreal.

A major physics issue in 1995-96 has been the magnitude and toroidal asymmetry of halo currents associated with vertical displacement events (VDEs). A halo-current database, with contributions from JET, ASDEX-U, JT-60U, DIII-D, TFTR, and, most notably, Alcator C-Mod, has found a common physics among these devices upon which to base estimates of the electromagnetic loads on vessel and in-vessel components. Still under development is a 3D resistive MHD modelling of the physical process. The timely response of the Four Parties' voluntary physics research programmes on this issue is highly appreciated.

Limiting values for density and pressure in tokamaks remain issues for which understanding is limited. The empirical density limit (Greenwald) has been exceeded in a small number of experiments. For present experiments the usual working parameters do not need to exceed this limit, but normal operations in ITER are envisaged at 1.5 times this limit. On present experiments, the trends may be that the maximum values of pressure decrease from higher values to marginally satisfactory ones for ITER operations when going from short pulses towards steady state.

Five Expert Groups meetings took place in the period February-April 1996, the results of which have been summarised in recent editions of the ITER Newsletter.

REPORT ON TASK #1 BY THE ITER SPECIAL WORKING GROUP

by Drs. E. Canobbio and K. Tomabechi, SWG Co-Chairs

Halfway through the ITER EDA, at the 8th meeting of the ITER Council (IC-8), 26-27 July 1995, the ITER Council reaffirmed that a next step such as ITER is a necessary step in the development of fusion as an energy source, that the objectives of ITER are valid and timely, that the cooperation among four equal Parties has shown to be an efficient frame to achieve the ITER objectives and that the right time for such a step is now.

Pursuant to Protocol 2 to the ITER EDA Agreement, proposals on approaches to joint implementation for decisions by the Parties on future construction, operation, exploitation and decommissioning of ITER, as specified in Article 2(e) of the ITER EDA Agreement, are to be developed, with the assistance of the Director, by a Special Working Group (SWG). At IC-9 (12-13 December 1995), the ITER Council established the SWG and adopted its charter. The charter specifies that the SWG should undertake tasks as directed by the ITER Council in accordance with the Tentative Sequence of Events (ITER Interim Design Report (IDR) Package, Part 5).

At IC-9, the ITER Council also defined Task #1 for the SWG as the development of the basis for the start of Explorations, which consists of three parts (see box below). For the duration of Task #1, the Parties designated their SWG members and the ITER Council appointed two SWG Co-Chairs (see list on the next page). The ITER Council directed that the Report on Task #1 be submitted by the SWG to IC-10, with an Interim Report by the middle of March 1996, for consideration by the ITER Council.

The SWG met four times (San Diego, 13-15 February; Paris, 12-14 March; Naka, 14-16 May; Vienna, 1-3 July) and duly submitted its Interim Report on Task #1.

**SWG TASK # 1
BASIS FOR THE START OF EXPLORATIONS**

- Part 1 - Elaboration of a set of possible global framework "scenarios" toward siting, licensing and host support specifying the following:
- a) benefits and costs
 - b) siting and hosting including licensing and decommissioning
 - c) organizational structure and legal arrangements
 - d) participation and accession
- Part 2 - Analysis of these "scenarios", considering Parties' constraints and project's needs, to prepare possible approaches to joint implementation
- Part 3 - From the analysis, identification of those specific issues that should be resolved by the Explorers as a priority to ensure their timely success as they seek convergence to an acceptable approach for possible decisions on the future activities.

As requested, the Report on Task #1 - a basis for the start of Explorations among the Parties - presents possible scenarios toward siting, licensing and host support, including a brief analysis of these scenarios based on Parties' constraints and project's needs as well as the specific issues that should be resolved by the Explorers. For the purpose of this Report, Explorations are defined as the non-committal, pre-negotiation exploratory discussions among the Parties interested in identifying issues for possible Negotiations toward ITER Construction, Operation, Exploitation and Decommissioning Activities (COEDA). In order to minimize the probability of any unnecessary hiatus following the completion of the ITER EDA, the Explorations should, as noted in the Tentative Sequence of Events, begin in Summer 1996 and focus early on issues which are critical to the timely implementation of ITER construction.

As tentatively planned, these Explorations should end about mid-1997.

In accordance with its charter as adopted by the ITER Council, the SWG has identified and examined scenarios toward siting, licensing and host support of ITER during the phases of construction, operation, exploitation and decommissioning, following the current EDA. The results of the work of the Group are contained in its Report to the Council.

Regarding the issues associated with siting, licensing and host support, the SWG Report discusses:

- ◆ benefits to be derived from participating in the ITER program
- ◆ sharing of benefits and cost
- ◆ site selection approach for those Parties interested in being the ITER Host,
- ◆ guidance on the licensing process and associated procedures, and
- ◆ requirements for Host and non-Host support of ITER as well as a list of facilitations considered in international megascience projects.

The SWG Report also discusses the following related issues:

- ◆ procurement packages
- ◆ ITER project organizational considerations including staffing

- ◆ legal basis of the ITER entity, either domestic or international
- ◆ participation by parties other than the four ITER EDA Parties
- ◆ decommissioning topics including responsibilities and cost sharing

The SWG Report also discusses the following issues for Negotiation:

- ◆ determination of benefits and cost-sharing
- ◆ identification of site

The SWG Report contains information that is ready for further consideration and refinement during Explorations.

MEMBERSHIP OF SWG FOR TASK#1

EC:	E. Canobbio, Co-Chair J. Grunwald R. Toschi D. Jackson*)	RF:	L. Golubchikov A. Khokhlov N. Kornev A. Korshunov*)
JA:	T. Kimura A. Kitsunozaki S. Tanaka K. Tomabechi, Co-Chair K. Sugiyama*)	US:	L.C. Howe W. Marton M. Roberts

R. Aymar, ITER Director, M. Drew, ITER JCT

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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 1 237762 (phone +43 1 206026392).

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