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**Authorization and IAEA invitation**

**FOUR PARTIES AUTHORIZE NEGOTIATION OF AGREEMENT FOR CO-OPERATION IN ITER ENGINEERING DESIGN ACTIVITIES**

by Paul N. Haubenreich, ITER Secretariat

During the last months of the ITER Conceptual Design Activities (CDA), each Party independently reviewed the CDA results and evaluated the prospects for continuation of the ITER co-operation through at least the next phase, i.e., engineering design and associated research and development. Each Party's technical review arrived at favourable conclusions. By the end of January, after consideration of costs and benefits, each government had decided to proceed and had authorized negotiations on goals, organization and support of ITER Engineering Design Activities (EDA) which were described in the project plan developed during the CDA. At this point, the IAEA Director General issued an invitation to each Party to meet at Agency headquarters for "negotiations of an Agreement to pursue the EDA under the auspices of the IAEA." Each of the four Parties accepted the invitation and named delegations.

**Delegations meet at IAEA-Vienna**

**FIRST NEGOTIATING MEETING**

Delegations from the former CDA Parties and representatives of the IAEA met at the Vienna International Center on 11-12 February. The meeting was opened by IAEA Deputy Director General M. Zifferero, who welcomed the delegations and assured them of the Agency's continuing interest and willingness to assist in further ITER co-operation. Negotiating sessions were chaired in turn by the heads of the delegations:

EURATOM	Prof. P. Fasella, Director-General, Commission of European Communities
Japan	Dr. H. Ishida, Deputy Director-General, Atomic Energy Bureau, Science and Technology Agency
USSR	Dr. B.V. Nikipelov, First Deputy Minister, Ministry of Atomic Power and Industry
USA	Dr. J.F. Decker, Acting Director, Office of Energy Research, Department of Energy

**Site decision will be taken later**

Opening statements by the heads of delegations emphasized each Party's recognition of the importance of fusion energy development and the significance of the successful CDA. The agenda that was unanimously adopted considered first the basis for co-operation in the EDA, then EDA site proposals, and finally the identification of other key issues to be resolved by further negotiations.

Three informative proposals for siting the EDA joint work were presented. The European Community proposed Garching, Japan proposed Naka and the U.S. proposed San Diego. (See the article on site proposals which follows.) The delegations agreed that the choice of site would be made in conjunction with choices of key personnel and that further information and evaluation would be required before decisions could be reached.

**Draft EDA Agreement and Protocol based on Common Elements of Parties' views**

As a result of earlier quadripartite exploratory discussions, the common elements of the separate views of the Parties had been consolidated and formed a basis for the beginning of the formal negotiations. A consensus was reached to prepare an Agreement, covering the full six-year term of the EDA, and a Protocol, covering the initial phase during which the technical organization would be fully developed. The bulk of the consolidated common elements was found to be acceptable without change. However a few points were identified where further work by legal staffs would be required to resolve certain issues and to arrive at precise wording acceptable to all Parties.

**Further meetings are scheduled**

The delegations agreed to designate a Working Party, chaired by Dr. M. Roberts, to make detailed comparisons of site proposals and to develop possible resolution of issues in the Agreement and Protocol drafts. A meeting of the Working Party was scheduled for 24-27 March in Tokyo. It was further agreed that a meeting of full delegations would be held in April, with the goal of preparing the Agreement and Protocol for signature by appropriate representatives of the Parties.

The proposal of the CDA Management Committee for small-group technical meetings in April-June 1991 was considered. There was no objection to the purpose and scope of the meetings but the Parties decided to take no further action during active negotiations on the EDA agreement.

**IAEA role will be defined**

The IAEA Director General H. Blix addressed the final session of the meeting. After congratulating the Parties on the success of the CDA and progress in the negotiations, he expressed the readiness of the Agency to play a significant role, to be defined by the Parties and the Agency during the EDA negotiations.



Participants of four-Party ITER negotiations in Vienna, with IAEA Director General H. Blix

## ITER EDA SITE PROPOSALS

by B.A. Kouvcinnikov, ITER Secretariat

Garching, Naka and  
San Diego proposed

Strong support for further co-operation in ITER activities has been demonstrated by firm offers from three of the ITER CDA Parties to serve as hosts for the envisioned 6-year-long ITER Engineering Design Activities (EDA). In January the European Atomic Energy Community (EURATOM), the Government of Japan and the United States Government presented to each of the other CDA Parties detailed proposals for EDA sites and host services. The proposed sites respectively are the following.

- Max-Planck-Institut fuer Plasmaphysik, at Garching (15 km north of Munich), Germany. In 1988-90 this place had served as site for the CDA Joint Central Team.
- Naka Fusion Research Center of Japan Atomic Energy Research Institute (JAERI), at Naka (120 km north of Tokyo), Japan.
- Torrey Pines Science Park (close to both the University of California at San Diego and the D-III-D facility at General Atomics), San Diego, California, USA.

These three sites, although geographically spread over the globe and different in national traditions, life style, environment and climate, are all characterized by excellent, as it is clearly stated in the proposals, conditions for EDA Joint Central Team scientific and engineering activities.

Host will provide  
support

To confirm this, one should mention only the proposed computer services that would be made available for the Central Team, namely a modern personal computer (with all required software) for each member, 20-25 computer-assisted design (CAD) stations for two-dimensional (2D) and three-dimensional (3D) design, connected to a VAX-type mainframe cluster with access to national supercomputing facilities (CRAY or FACOM), as well as to computing facilities in the ITER home countries.

All three proposals are also very generous in respect to providing adequate office space, managerial, secretarial and technical support as well as to assistance for the Central Team members in finding accommodation and in solving other inevitable personal and family problems.

Obviously, governments and leading research establishments clearly expressed their firm support of the ITER project. However, at the ITER negotiations the Parties will be facing a complicated issue of selecting the site for the ITER Engineering Design Activities out of three excellent proposals made. Subsequently, before a decision can be taken, they have to discuss and clarify many points.

## ITER TECHNOLOGY R&D INITIAL TASK-SHARING

by V.A. Chuyanov, Chairman, ITER Council Ad Hoc Group of Experts

Immediate start on  
R&D tasks critical  
for 5-year EDA

To avoid a delay in initiation of critical technology R&D tasks after the completion of an EDA agreement the ITER Council appointed at its meeting in July 1990 an ad hoc group of experts (GOE) to start an analysis of how the most critical R&D tasks could be shared among the four Parties. After meetings at Garching on 27 August - 4 September 1990 the GOE came to the conclusion that technically feasible and efficient task-sharing of the ITER EDA technology R&D among the four Parties is possible on the pure technical background, but if the duration of the EDA is to be limited to five years, practically each task is to be started in the first year of EDA and a functioning Central Team and the permanent Director are to be in place from the very beginning of the EDA.

Analysis redone for revised (6-year) schedule

The results of the ad hoc GOE were discussed by the ISTAC and the Parties' Quadripartite Exploratory Discussions (QED) Working Party and were reviewed by the ITER Council in Washington on October 8-10. Organizational problems of prompt initiation of R&D were acknowledged and the necessity of more than five years for EDA completion was recognized. The ITER Council decided to continue the effort of the ad hoc GOE on the basis of a new revised schedule of the EDA to be developed by the IMC.

#### LIST OF CRITICAL TASKS

Task No. acc.to IMC Plan	Task Description	Participating Parties	Completion Date	ITER Credit US\$(M)	Comments
MAG 2.1.1	C.S.Model Coil Design	EC, USA, Japan USSR	1991	0.6 per Party	
MAG 2.2.2	T.F.Model Coils Design	USA, Japan USSR	1991	0.6 per Party	
MAG 3.1a	T.F. Coil Test Facility Design	USA	1991	1.0	
MAG 3.1b	C.S.Test Facility Design	Japan	1991	1.3	EC and USSR facilities can be used as a compliment if so decided by the ITER Parties
HCD 1.2	Electrostatic Quadrupole Accel. Design	U.S.	1991	0.8	
HCD 1.3	Electrostatic Accel. Development and Test	USSR	1993	8.0	Work in progress, EC and Japan development can be used as a compliment if so decided by the ITER Parties
HCD 1.5	Neutral Beam Test Facility Design	EC, USSR	1991	2.7 per Party	
BLK 1.5	Fabrication methods for ceramic blanket models	USA, Japan		0.3 per Party	
BLK 1.3	In Pile Blanket Test Facility Design and Preparatory Work	USSR	1991	1.7	
BLK 2	LiPb Blanket Channel Fabrication and Testing	USSR	1991	3.0	
COS 1.1	Vacuum Vessel Critical Elements Study	Japan, EC, USSR	1991	0.7 per Party	

The meeting of the ad hoc GOE to consider the new revised 6-year schedule of the EDA prepared by the IMC took place in Vienna on 26-27 November. As a result of the meeting the list of tasks to be included in the EDA Agreement was prepared (see list on previous page).

The longer schedule and the possibility to initiate new tasks by the Director's decision permitted to limit the number of tasks and the initial commitment with very low and manageable figures (11 tasks and \$28 million).

The effort was concentrated on the major common test facilities and on critical component testing. In all cases where it was possible tasks were limited by one year and by design only and in some cases a parallel approach was selected to create a competition and to keep a real choice for the future Director.

The results of the ad hoc GOE were reviewed by the ITER Council in Vienna during its last meeting and were recommended for inclusion in the ITER EDA Agreement.

## IAEA PUBLICATION OF ITER REPORTS

Four out, 18 to go

From the beginning of the CDA in April 1988 until November 1990, the IAEA published 14 reports on the joint work. In November and December the ITER team under the direction of the IMC completed the manuscripts of an additional 20 reports, totalling about 3100 pages. Two other manuscripts were prepared by the ITER Council and the ITER Secretariat (See list below).

IAEA/ITER/DS-	Title
15	Twin-Loop for Vertical Control of Highly Elongated Plasma
16	ITER CDA Final Report
17	Council Proceedings June-Dec. 1990
18	ITER Conceptual Design Report
19	Physics and Technology R&D for ITER Conceptual Design
20	R&D Needs for ITER Engineering Design
21	ITER Physics
22	ITER Parametric Analysis and Operational Performance
23	ITER Operation and Research Program
24	ITER Test Program
25	ITER Tokamak Device
26	ITER Magnets
27	ITER Poloidal Field System
28	ITER Containment Structures
29	ITER Blanket, Shield and Materials Data Base
30	ITER Plasma Facing Components
31	ITER Fuel Cycle
32	ITER Heating and Current Drive
33	ITER Diagnostics
34	ITER Assembly and Maintenance
35	ITER Plant Systems
36	ITER Safety

By the end of February, four reports had been printed and distributed (nos. 15, 16, 17 and 33) and all others were in various stages of publication. It is expected that the center piece of the IMC reports, ITER Conceptual Design Report, IAEA/ITER/DS/18, will be distributed about the end of March.

## CHANGES IN ITER SECRETARIAT

by D. Banner, Head, Physics Section, IAEA

Throughout the Conceptual Design Activities, the ITER Secretariat, located at IAEA headquarters, consisted of the ITER Council Secretary, the ISTAC Secretary (who also served as ITER Information Officer) and the professional Secretary provided by the IAEA. Several changes in personnel followed the completion of the CDA.

**Pozniakov** Nikolai L. Pozniakov, ISTAC Secretary since February 1989, moved on January 1 to a new position within the Agency. His new assignment, in the Division of Nuclear Safety, working in the Assessment of Safety Significant Events Team (ASSET), is in line with his previous professional experience in nuclear reactor safety. We miss "Nick" in his accustomed position, but happily, we still see him in the corridors of the VIC. He can still be reached by mail, c/o IAEA.

**Kouvchinnikov** On February 1, Boris A. Kouvchinnikov started work in the ITER Secretariat as a cost-free expert provided by the Soviet Union. Many of the readers of the ITER Newsletter already know Boris due to his work with the ITER team at Garching. He is also well known at the IAEA, because of his long-standing association with the Agency which started in 1967 and, in particular, because of his services as a staff member in 1975-82. Among other duties, Boris will assemble the Newsletter for the IAEA.

**Haubenreich** On March 5, Paul N. Haubenreich completed his work in the ITER Secretariat as a cost-free expert provided by the United States. Paul served as the Secretary of the ITER Council from July, 1988 until the end of the CDA. His previous assignment was at the Oak Ridge National Laboratory, as Manager of the U.S. effort on superconducting magnets in the multinational Large Coil Task (LCT). Upon his arrival in Vienna, Paul assisted Alexander Mavrin in initiating the ITER Newsletter. Subsequently he collaborated, first with Alex and later with Nick, in getting out the Newsletter each month. We will miss Paul's expertise, professionalism, and knowhow! Paul and his wife Mary Ann, a registered dietitian, have returned to their home in Knoxville, Tennessee. Presently he can be reached by mail at the Fusion Engineering Design Center, P.O.Box 2009, Oak Ridge, TN 37831-8218.

### NOTE REGARDING NEWSLETTER VOLUME 4

#### ITER work continues

As indicated in the first three articles in this issue, since the completion of the CDA the Parties have been quite active in assessments and negotiations. Although technical joint work was suspended at the end of the CDA, each Party has continued with fusion R&D tasks whose results will be immediately utilized when joint work in the EDA begins.

#### So does Newsletter

In view of the wide interest in the quadripartite negotiations and the concurrent ITER-relevant technical work, the IAEA felt that it would be useful to continue publication of the ITER Newsletter. Until resumption of joint work it is expected that the Newsletter will be published bi-monthly. Therefore, in this first issue of Volume 4, news and information that became available in January and February 1991 are compiled.

Contributions to the Newsletter will be welcomed.

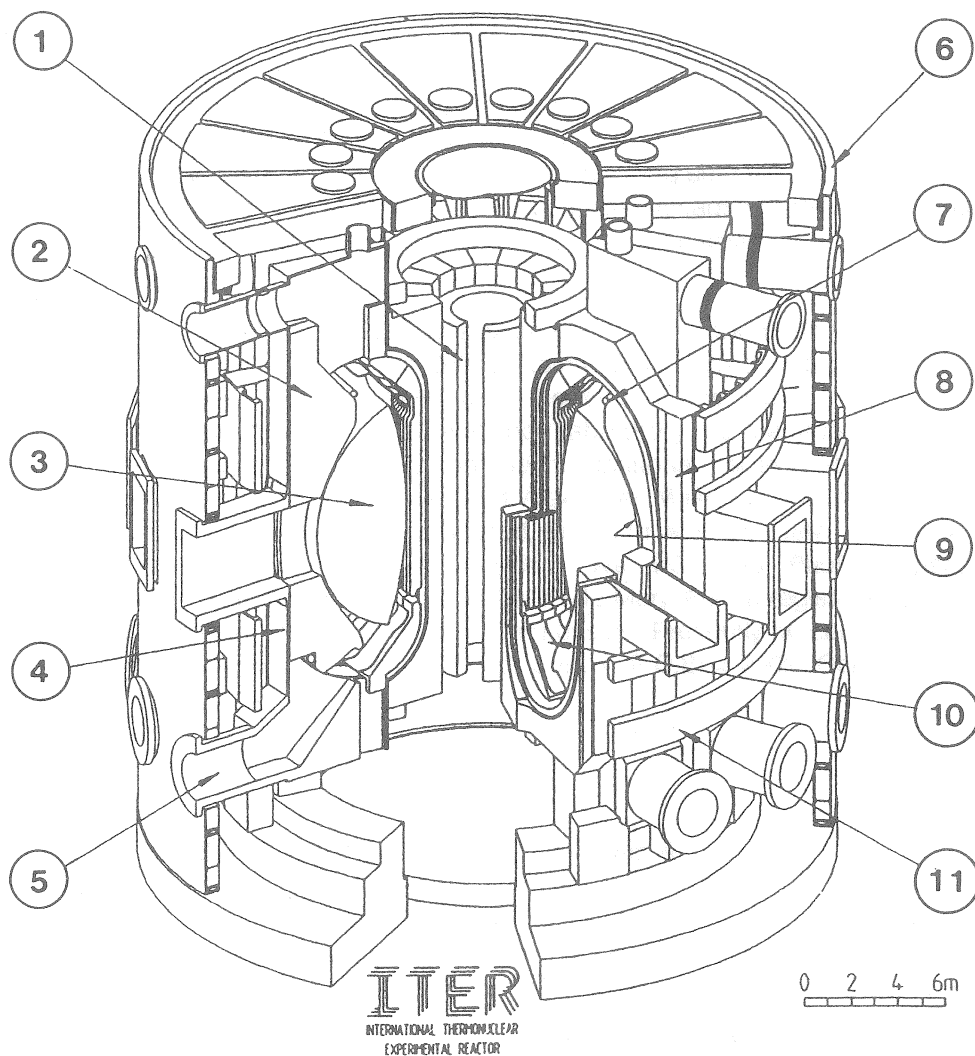
## FORTHCOMING EVENTS

Working Party on ITER EDA  
Agreement Tokyo 24 - 27 March

Four-Party Negotiation  
on ITER EDA Agreement Tokyo 18 - 19 April

## ITER REFERENCE PARAMETERS

Plasma major radius, R (m)	6.0
Plasma half-width at midplane, a (m)	2.15
Elongation, 95% flux surface	1.98
Toroidal field on axis, $B_0$ (T)	4.85
Nominal maximum plasma current, $I_p$ (MA)	22
Nominal fusion power, $P_f$ (MW)	1000



- |                         |                         |                          |
|-------------------------|-------------------------|--------------------------|
| 1- CENTRAL SOLENOID     | 5- PLASMA EXHAUST       | 9- FIRST WALL            |
| 2- SHIELD/BLANKET       | 6- CRYOSTAT             | 10- DIVERTOR PLATES      |
| 3- PLASMA               | 7- ACTIVE CONTROL COILS | 11- POLOIDAL FIELD COILS |
| 4- VACUUM VESSEL-SHIELD | 8- TOROIDAL FIELD COILS |                          |

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