

## **ITER MEETING**

**by Dr. E. Canobbio, ITER EU Contact Person**

Delegations from the ITER Parties met at Cadarache on 10-11 March 1999 to share information on domestic developments, to consider the technical progress reported by the Director and the results of the Special Working Group (SWG) on the strategic rationale for ITER and to start planning for future actions.

The Director presented the results of studies of ITER designs which take into account reduced technical objectives leading to reduced costs. The Technical Advisory Committee (TAC), under its new Chair, Prof. M. Fujiwara, confirmed that this work produced a sound basis for the future selection of design parameters as requested by the Parties.

The Delegations then endorsed the Director's proposal to use a Joint Central Team(JCT)/Home Team Task Force to pursue convergence of views as required by the Parties, with the objective of making available to the Parties by the end of 1999 a report for review by TAC and subsequent consideration and action by ITER Council on:

- 1) key elements of a specific design consistent with the objectives set at the Extraordinary ITER Council (EIC) in June 1998, following the guidelines arising from SWG Task #1, and
- 2) a restricted number of design variants consistent with the same guidelines.

The Director will present a progress report to a Program Directors' (PDs') meeting in July 1999.

The delegations expressed their gratitude to the Director and to the members of the JCT for the efforts made to re-organize the Joint Central Team under difficult circumstances.



*Participants in the Meeting*

The Co-Chairs of the SWG presented the SWG report on the strategic rationale for ITER. It was the unanimous opinion of this SWG that the world fusion program is scientifically and technically ready to take the important ITER step. The Delegations endorsed this view and expressed appreciation to the SWG for their persistence in attaining a balanced assessment in this programmatically complex matter.

The EU and JA Delegations presented their preliminary planning on sequences of events leading toward future construction decisions. Recognising the value of this approach in focusing the preparations for the decision process and establishing a realistic aid to decision planning, the Meeting asked the Delegations' Contact Persons to integrate the various inputs (including those for Canada, which has confirmed its plans for continuing participation in the ITER EDA through the EU), into a tentative sequence of events for future use.

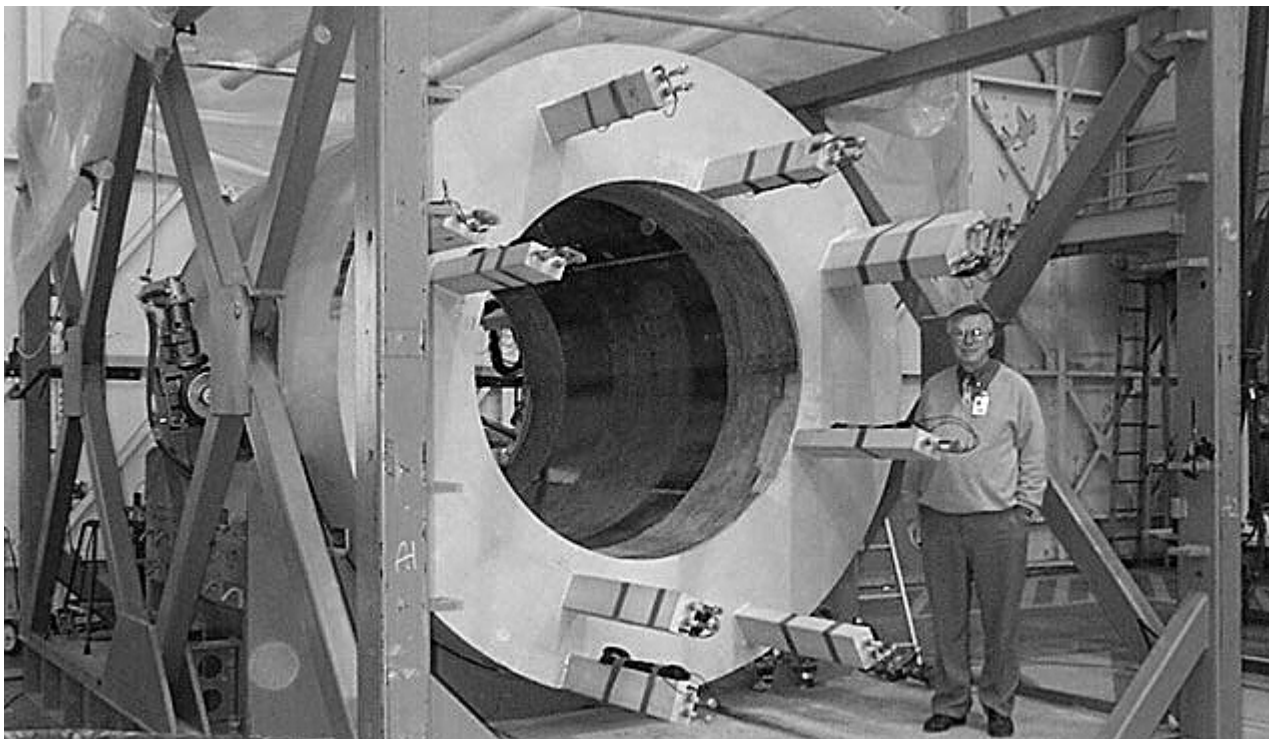
Further, the Meeting reconstituted the SWG established under Protocol 2 of the ITER EDA Agreement and defined a new task to develop proposals and all necessary supporting information for the complete realisation of ITER including key elements of a draft agreement for construction and operation and associated draft implementing arrangements.

A report shall be submitted by the end of 1999 for consideration by the ITER Council at its first meeting in 2000, with an interim report to the PDS' meeting in July. The Meeting appointed Prof. K. Pinkau and Dr. H. Kishimoto as Co-Chairs of this SWG.

The Meeting took note of proposals from the US for its continued involvement in ITER activities, principally in Physics Experts Groups and limited testing of the Central Solenoid Model Coil after July 1999; the Delegations accepted such proposed participation.

### **INNER MODULE OF THE CS MODEL COIL DELIVERED TO NAKA** **by Dr. K. Okuno and Dr. R.J. Thome for the Joint Central Team and the US Home Team**

The objective of the first ITER Large Project (L-1) - CS (Central Solenoid) Model Coil Project - is to verify key aspects of the design of the CS Coil Design and to verify the key manufacturing methods and tooling concepts, from a single strand up to a complete coil. The USA and Japan were responsible for building the two main modules of the Model Coil (Inner Module and Outer Module, respectively) using superconducting Nb<sub>3</sub>Sn strands fabricated in Europe, Japan and the USA, and cabled by each of the Parties.



*CSMC Inner Module Project Manager for Lockheed Martin Corporation, Dr. J. Wohlwend, with the Inner Module prior to its shipment to Japan*

The Nb3Sn strand for the Inner Module was supplied by the EUHT, JAHT and USHT. The Incoloy 908 jacket for the conductor was supplied by the USHT, and the conductor jacketing was done by the EUHT. The fabrication of the Inner Module in the USHT involved industries nationwide under the supervision of the Massachusetts Institute of Technology. Conductors were shipped from the EUHT to Lockheed Martin Corp, San Diego, for winding, then to the Massachusetts Institute of Technology for termination fabrication, heat treatment (at Wall Colmonoy, Dayton, Ohio), and turn insulation. Coil assembly and final processing was then performed at Lockheed Martin Corp. Lawrence Livermore National Laboratory participated in the design of certain components and their qualification.



*Unloading of the shipping container*

The Inner Module has a total weight of about 50 tonnes and an inner bore diameter of about 1.6m. It will be nested within the Outer Module (already provided by the JAHT) of the Model Coil and assembled with about 80 tonnes of structure provided by the USHT. The combined system is designed to provide 13 T magnetic field comparable to that of the full site ITER CS and Toroidal Field (TF) coils and will have a stored energy of 640 MJ.

The shipping container of the Inner Module was safely unloaded (see footnote) from the ship at Hitachi port, Japan, on 12 May, after a two-month voyage starting from San Diego, USA. From this port of entry, the responsibility of the transportation was transferred from the USHT to the JAHT.

The trailer with the 60-tonne load of the CS Model Coil Inner Module arrived at the Naka Fusion Research Establishment of JAERI on May 13, 1999. Lui Vieira, the US Installation Team Leader, and Takashi Kato, the JA Installation Team Leader, shook hands at 8 a.m. that day, happily smiling (see photograph below).



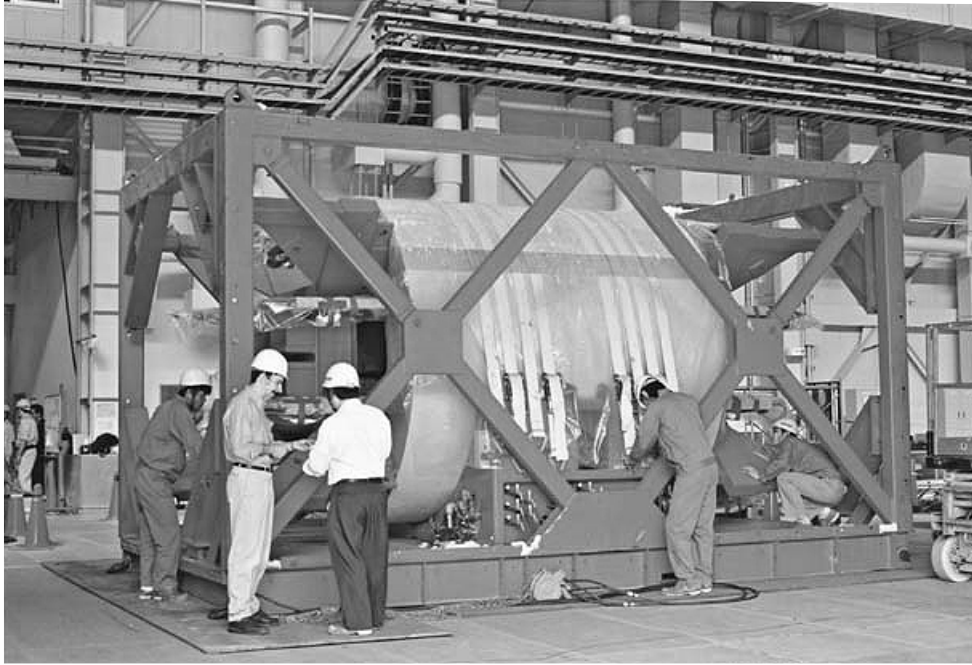
*A really good morning!*

---

Information, including the photographs, on the arrival of the Inner Coil in Japan and on the relevant event, was provided by Dr. Hiroshi Tsuji, Head, Superconducting Laboratory, JAERI, Naka.

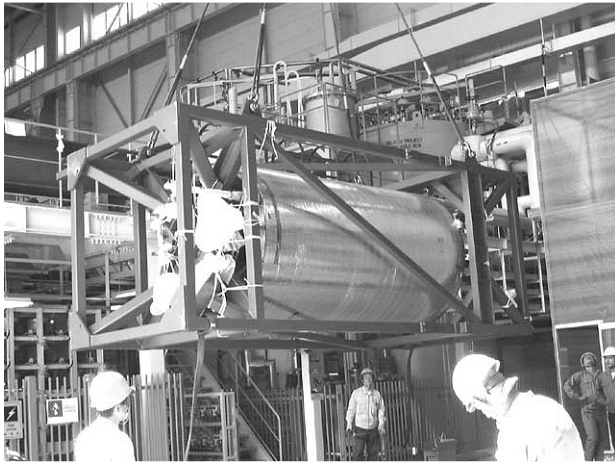
The coil container was opened on the same day, and, from external inspection, the new-born baby looked good.

This is another major milestone for the ITER program as part of the L1 (CS Model Coil) Project.



*Inner Module of the ITER Central Solenoid Model Coil at JAERI Testing Site, Naka*

In a related event, on 21 May, the Central Solenoid Insert Coil arrived at the testing site of the JAERI Naka Fusion Research Establishment from Mitsubishi Electric in Kobe.



*The CS Insert Coil during unloading*

Development and fabrication of this coil was initiated in 1993. Its superconducting cable was made in Japan, the Incoloy conduit in the USA, the conductor fabrication in the EU and the verification test sample in Russia. The winding was made in Japan, activation heat treatment in the US and the finishing insulation in Japan. After unloading the Insert at the test building, its high potential test was carried out by applying 22.8 kV DC for 10 minutes. The coil passed this test with a measured leak current of less than 1 micro-ampere. Separate Insert Coils are being made from full size Nb3Sn and Nb3Al TF conductors.

The CS Model Coil and inserts are to be tested in the CS Model Coil facility at JAERI, Naka. The test facility has been prepared by the JAHT, and the cooldown is scheduled for late 1999.

The CSMC effort is a prime example of international collaboration among the Home Teams and the Joint Central Team.

Items to be considered for inclusion in the ITER 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).