EFDA

EUROPEAN FUSION DEVELOPMENT AGREEMENT

EUR (01) CCE-FU 11/4.3

EFDA (01)-12/5.6

Summary of the findings

by the European ITER Site technical Study group

Cadarache, 31 May 2001

1. Background

ITER is intended to demonstrate the scientific and technological feasibility of fusion; it is designed to produce 500MW of fusion power in long pulses (400s). Engineering Design Activities, carried out in the framework of the ITER international collaboration, will be completed by 21st July 2001, with the issue of a final design report. Negotiations will start soon between international partners, aiming at the choice of the site and the establishment of an ITER Legal Entity (ILE), responsible for construction (10 years) and operation (about 20 years) of the device. During the Engineering Design Activities, the international ITER team has elaborated a reference design, called hereafter "generic design", including minimum requirements to be satisfied by any proposed site.

In July 2000, the French delegation to the European Consultative Committee for FUsion proposed that Cadarache should be considered, as a European site, for hosting ITER. A "European ITER Site technical Study group" (EISS) was created and structured with the goal to prepare the technical basis for European ITER site proposal(s), in the first instance Cadarache, by the end of July 2001. The present document summarises the main conclusions of the work carried out so far.

The group has covered four main areas:

- **Technical aspects** (including site layout, electricity and water supply, seismic evaluation, transport of large and heavy loads)
- **Safety and Licensing** (safety analysis, effluent release, waste management, tritium handling, preparation of Dossier d'Options de Sûreté).
- **Cost and schedule**
- **Socio-economic aspects** (inventory of regional infrastructure, impact of ITER construction on industry and economy).

The work has been shared between many fusion associations, European industry and universities.

2. Findings

The main conclusion is that **Cadarache fulfils all ITER requirements**.

- **Technical aspects:**
  - Location and layout: the exact location of ITER at Cadarache has now been established. The proposed layout requires only minor modifications to the *generic ITER layout* , and responds fully to the technical specifications.
  - Seismic issue: the conclusion of the first studies, on the basis of the Cadarache specific seismic level, as established by the French safety authorities, is that the buildings will only require limited reinforcement with respect to ITER generic design.
  - Electrical and water supplies: ITER requirements can be fully met.
  - Transport of large and heavy components: a fully evaluated reference solution has been identified; an alternative solution that could be cheaper is still under technical and administrative evaluation.

- **Safety and licensing**
  - The ITER installation will follow the established procedure for dealing with nuclear research facilities in France. The necessary steps of the licensing procedure are well documented at Cadarache, with already 18 nuclear plants on site.
  - The part of the procedure for licensing which is not dependant on the establishment of the ITER Legal Entity (ILE) has been already launched. In particular, the writing of the "Dossier d'Options de Sûreté" is underway and is planned to be submitted by CEA to the French Safety Authority end of 2001, with the contribution of the ITER international team.
  - The liquid and gaseous releases, during normal operation and all foreseable accidents, could be accommodated within Cadarache present authorisations.
  - Waste produced during the entire operation phase could be stored in a designated part of the ITER buildings. An evaluation of machine dismantling and subsequent decommissioning is being made according to the French regulation.
  - For tritium transport, a container has already been internationally qualified and can be used in France.
- **Cost and schedule**
  - The detailed evaluation of Cadarache particularities with respect to ITER layout and requirements is not yet complete. A preliminary evaluation shows that the cost of making Cadarache ready to host ITER will be of the order of 100M.
  - Assuming that the ITER Legal Entity is established in mid-2003, the construction schedule would be determined by the timetable for licensing. Provided work is actively progressing in all aspects (detailed design, licensing, call for tender for items on the critical path), site preparation and long-term procurements could begin in 2004, in anticipation of an official authorisation to start construction in mid-2005.
- **Socio-economic aspects**
  - Local and regional authorities have expressed their strong support and their services are participating in the studies.
  - The European industry would greatly benefit from its participation in ITER construction and operation in both conventional and advanced technology fields, if ITER were hosted at Cadarache.
  - Cadarache has already the capacity of welcoming an international team.
  - There is a rich socio-economic environment (industry, facilities...) and the Provencal quality of life is well known.

In conclusion, Cadarache appears to be a fully satisfactory site to host ITER: the site has considerable experience in dealing with nuclear installations, contains broad expertise on magnetic fusion research and offers already most of the necessary social and technical infrastructure.