ITER Press Release

Cadarache, 24 October 2007

ITER Organization formally established

As of today, Wednesday, October 24, 2007 the new International Organization ITER will be formally established.

On 21 November 2006 the representatives of the People's Republic of China, EURATOM, the Republic of India, Japan, the Republic of Korea, the Russian Federation and the United States of America signed the ITER Joint Implementation Agreement which since has been ratified by the governments of all seven member states and will today officially enter into force.

The overall aim of the ITER Organization, implemented in Cadarache, France, is to demonstrate the technical and scientific feasibility of fusion power. ITER will be the first fusion experiment to produce net power on a large scale. ITER will also test most of the key technologies that will be needed to use fusion as a future energy source and validate industrial production techniques of the large and high-quality components needed for future fusion power plants.

"Today is a historic milestone in the history of our organization", Kaname Ikeda, ITER Director General Nominee, said on the occasion. "With ITER, a new international organization has been created. By creating ITER the nations of the world have understood the need for new sources of energy and the nations of the world have reacted with responsibility and vision. Furthermore, by creating ITER our Member Parties have established a completely new model for international collaboration and it is our challenge to show that outstanding talent coming from many different nationalities can also fuse to create a dynamic workforce."

Notes for editors:

More information on the ITER project and fusion energy can be found on www.iter.org

For further information, please contact:

Sabina Griffith
ITER Organization
Communications
Bat 519 CEA Cadarache
13108 Saint Paul-lez-Durance
France
T: 00 33 (0)4 42 25 65 63
E: sabina.griffith@iter.org

BACKGROUND TO THE NEWS RELEASE

Fusion - the process by which two light atomic nuclei combine to form a heavier one - is the energy source of the Sun and the stars. On Earth, fusion power has the potential to make a large-scale contribution to a future sustainable energy supply. Fusion will deliver safe and environmentally benign energy, using abundant and widely available fuel, without the production of greenhouse gases.

Scientists and engineers around the world are carrying out fusion research with the aim of constructing an electricity-producing fusion power plant as soon as possible. A big step forward was taken on the 21 November 2006, when the representatives of Europe, Japan, China, India, the Republic of Korea, the Russian Federation, and the USA signed a Joint Implementation Agreement that represents of one of the most challenging scientific undertaking of modern times: The ITER project.

The idea for ITER originated from the Geneva superpower summit in November 1985 where President Gorbachev, following discussions with President Mitterrand of France, proposed to President Reagan that an international project be set up to develop fusion energy for peaceful purposes. The ITER project subsequently began as a collaboration between the former USSR, the USA, the European Union, and Japan, under the auspices of the International Atomic Energy Agency (IAEA).

The goal of ITER is “to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes”. To do this, ITER is designed to generate 500 megawatts of fusion power, ten times more than the input power needed to keep the fusion fuel at the right temperature and density. ITER is an experimental scientific device requiring flexibility in operation. ITER will test most of the key technologies that will be needed to use fusion as a practical energy source and validate industrial production techniques of the large and high-quality components needed for future fusion power plants.

The ITER Organization

The ITER project is undertaken by a new International Organization: the ITER Organization, based in Cadarache, in the South of France. During the construction of the ITER device, 90% of the components will be contributed by the Parties “in kind”. That means that the components are produced in the respective countries of the Parties and delivered to ITER, where they are integrated in the device. In order to manage and provide their in kind contributions to the ITER project, each of the Parties is establishing its own Domestic Agency. The Domestic Agencies interact with the industry in their

respective countries to procure the ITER components. The remaining 10% of the procurements will be made directly by the ITER Organization.

The ITER Design

ITER is based on the “tokamak” concept, in which the fusion fuel is contained in a doughnut-shaped vessel. The fuel - a mixture of deuterium and tritium, two isotopes of hydrogen - is heated to temperatures in excess of 100 million degrees, forming a hot gas “plasma”. The plasma is kept away from the walls by a strong magnetic field produced by superconducting coils surrounding the vessel and an electrical current driven in the plasma. Experimentation in ITER will allow for the first time the integrated optimization of the plasma physics and the various technologies needed for efficient power production.

A number of large tokamak experiments were build in the 80’s - JET in Europe, JT-60 in Japan, and TFTR in the USA - together with numerous smaller and more specialised devices worldwide. More recent devices include KSTAR in Korea, EAST in China, and SST-1 in India. Together, these devices have provided and continue to provide the solid scientific and technical basis required to design, build and operate ITER.

To meet its objectives, ITER will be twice the size of the largest existing tokamaks, the Joint European Torus (JET) and the Japanese JT-60, its volume ten times larger. The expected fusion performance will thus be many times greater than what is known from any other fusion machine. Compared with current conceptual designs for future fusion power plants, ITER will include most of the necessary technology and operate at 0.5 Gigawatt of thermal output.

Cost and Schedule

The costs for ITER are shared by the seven Parties. The construction costs are estimated at 5 billion Euros, to be spread over ten years. A similar amount is foreseen for the twenty-year phase of operation and the subsequent decommissioning of ITER. Europe, being the Host Party, will contribute up to half of the construction costs. The other six Parties will each contribute up to 10%, thus giving a 10% contingency within the present funding.

The construction process will begin in 2009, leading to the first plasma in 2016. This will be followed by a commissioning and operational phase lasting about 20 years, and a deactivation phase of five years.

Safety

The fusion process itself is not a chain reaction, so there is no possibility of a ‘runaway’ reaction. The fusion process can be stopped within seconds by turning off the external fuel supply, which means that a fusion power plant can be shut down safely and very quickly.

One of the fusion fuels, deuterium, is a harmless substance present in water. The other fuel, tritium, is a radioactive substance. In future fusion power plants, tritium is produced within the power plant itself from the light metal lithium. Thus the only radioactive component of the fuel is both produced and burned inside the machine in a closed loop. It does not require any transport, except during the start-up of a new fusion power plant and during decommissioning.

In the case of ITER, which will test tritium production but will not yet be self-sufficient, tritium produced as a by-product in some existing fission power plants will be used. Multiple confinement barriers in the ITER device together with special transportation techniques will make sure that the tritium is handled in a safe way, subject to strict laws and licensing procedures.

The Way to Fusion Power

The long-term aim of fusion research and development is to create power plant prototypes demonstrating operational safety, environmental compatibility, and economic viability. ITER (in Latin “the way”) is not an end in itself: it is the bridge toward a first plant that will demonstrate the large-scale production of electrical power, called DEMO.

In order to prepare for DEMO, an accompanying R&D programme will be carried out in both physics and technology in parallel to ITER construction and operation. DEMO should come into operation in 30-35 years, and demonstrate continuous large-scale electrical power production and tritium fuel self-sufficiency. It will lead fusion into the industrial era and open the way towards the first commercial fusion power plants.