

ITER Backgrounder

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ITER BACRGROUNDER

ITER, the International Thermonuclear Experimental Reactor project, is an international science/energy effort to design a facility which, if built, would have the goal of demonstrating for the first time the scientific and technological feasibility of fusion power.

Last summer, negotiators from the United States, the Soviet Union, Japan and the European Community reached agreement on terms of cooperation for the engineering design phase of the project. Today, officials formally signed that agreement.

The \$1.2 billion ITER Engineering Design Activities (EDA) project is an effort to engineer a machine that would produce energy from nuclear fusion, the power source of the sun. Unlike fission in which atoms are split to create power, fusion results when two light atomic nuclei are brought together, or fused, to create a heavier particle, producing tremendous quantities of energy in the process. The fusion process being studied now involves hydrogen isotopes of deuterium and tritium which; when fused, would form a helium ion, a neutron and energy.

Since the gravitational forces of the sun cannot be replicated on earth, hydrogen isotopes need to be heated in a containment device capable of withstanding temperatures up to 400 thousand degrees Centigrade. At these temperatures, nuclei have sufficient kinetic energy to overcome their electrical repulsion and get close enough to fuse. The containment device features large electromagnetic coils to generate a powerful magnetic field. In this manner, the hot ionized hydrogen--called plasma-- is suspended away from the metal surfaces of the containment vessel. The energy ultimately would be converted to a high temperature fluid to spin a turbine which would drive electrical generators.

Fusion is viewed as a safe, clean and nearly inexhaustible form of energy that would relieve the nation of its dependence on fossil fuels.

Under the terms of the ITER agreement, a multinational team of researchers would be located at three co-centers of equivalent importance: San Diego, California; Garching, near Munich; and Naka, Japan. The director, who would reside in San Diego, is supported by the Joint Centreal Team and each party's home team, where the bulk of the EDA work will be done.

Paul-Henri Rebut, leader of the Joint European Torus (JET) lab in Culham, England, is expected to be as director of the EDA. Other key management positions expected to be filled include: P. Rutherford, of the United States, to chair the technical advisory committee; E. P. Velikhov, of the Soviet Union, as council chair; and M. Yoshikawa, of Japan, council co-chair and chair of the management advisory committee.

Overall administrative services for the San Diego Co-Center will be provided by the University of California, San Diego. UCSD will provide the facilities and support staff to the visiting scientists, overall facility management, some library services, and relocation assistance. Science Applications International Corporation (SAIC) is providing the bulk of program services, including lease of the facility, facility management, staff and purchasing of equipment and supplies.

It's expected that the international group in San Diego will consist of between 100-200 scientists, technicians and support staff. San Diego was offered as a site for the ITER engineering design activity through the combined efforts of the Department of Energy, the State of California, and a San Diego consortium led by UCSD and several local industries, including SAIC, General Atomics, and General Dynamics.

Following the design phase, the four parties will decide on the construction of the fusion reactor itself.

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