of the participants designed and constructed one or more of the six test coils to be tested in the facility. Results from the Large Coil Task will be used in the coil design for the next large tokamak device.

Plasma/Wall Interactions

Plasma interactions with the confinement chamber wall create impurities which interfere with the fusion reaction. Advances in overcoming this problem have been made previously through informal international collaboration which led to a formal international cooperative research program on minimizing the effect of plasma-wall interactions. Participants include the United States, the European Community, Japan, and Canada, under the auspices of the IEA. The United States is completing the design of an innovative pump limiter for improved impurity control that will be built by the Japanese according to United States specifications. It will then be tested on the TEXTOR tokamak in West Germany. The TEXTOR tokamak was selected over other sites because it has been designed for studies of plasma/wall interactions.

Doublet-III

In 1979 the United States and Japan agreed on a multi-year Doublet III project seeking to investigate the possibility of improving the performance of plasma fuels in tokamaks with noncircular cross sections. The Japan Atomic Energy Research Institute was to provide funds for upgrading the Doublet III facility for operation with increased magnetic field, plasma current, and neutral beam power. By 1984 Japan had invested $60 million in the Doublet III program and trained the operations team for their subsequent experiment on Japan's JT60 fusion device.

The original bilateral agreement has since been amended to include a modification of the vacuum vessel to a D-shape to achieve greater plasma performance capability. The agreement has been extended to 1988, with the United States and Japan contributing $10 million and $8.6 million, respectively.

International Tokamak Reactor

Some form of international collaboration on large facilities may become a necessity in the future since a fusion test reactor is currently estimated to cost more than one billion dollars.

The INTOR Workshop was initiated collaboratively by the United States, USSR, Japan and the European Community under IAEA auspices in 1979 to proceed jointly in phases from feasibility assessment through concept definition and design to construction and operation of the next generation major tokamak experiment.

The first two planned phases of feasibility assessment and concept definition were completed in 1979 and 1981. Subsequent phases of the INTOR activity have emphasized the focusing of worldwide effort on critical technical issues affecting such a large undertaking, rather than on detailed design and construction. As a result, the INTOR activity has substantially advanced international understanding of a number of critical technical issues and stimulated interest in investigating the feasibility of potential improvements.

Materials Research

The Rotating Target Neutron Source-II, built by the MFE Program for fusion research, is the world's most intense fusion neutron source dedicated to fusion materials research. Scheduled for shutdown in 1987, it has for about 5 years been the center of a cooperative United States and Japanese project that is now validating theories predicting how fusion neutrons will affect materials in reactor components.

Each country is contributing about $2 million annually for full operation and experimental utilization of the Rotating Target Neutron Source II facility in the United States. Japan and the United States also are spending about $1 million annually to conduct neutron irradiation tests in the High Flux Isotope Reactor and the Oak Ridge Reactor.