	FY 2005	FY 2006	FY 2007
	(dollars in thousands)		

principle class experiment. These funds will allow for the continuation of procurement of major items and fabrication of the device. This fusion confinement concept has the potential to be operated without plasma disruptions, leading to power plant designs that are simpler and more reliable than those based on the current lead concept, the tokamak. The NCSX design will allow experiments that compare confinement and stability, in tokamak and stellarator configurations. The new cost and schedule performance baseline, developed to be consistent with the FY 2006 budget request and approved in July 2005, increases the TEC of NCSX to $92,401,000, with completion in July 2009.

	FY 2005	FY 2006	FY 2007
General Plant Projects (GPP)/ General Purpose Equipment (GPE)/Other	**3,176**	**3,189**	**3,930**

These funds provide primarily for general infrastructure repairs and upgrades for the PPPL site based upon quantitative analysis of safety requirements, equipment reliability, and research needs. Funds also provide for the continuing move of ORNL fusion facilities to a new location at ORNL.

	FY 2005	FY 2006	FY 2007
ITER Preparations	**5,451**	**5,835**	**—**

Preparations funding for ITER ends in FY 2006 as the U.S. Contributions to ITER MIE begins. Funding was provided to continue the ITER transitional activities such as safety, licensing, project management, preparation of specifications and system integration. U.S. personnel are participating in these activities in preparation for U.S. participation in the international ITER Project. Discussions are proceeding on whether these costs should be accounted for within the ITER TPC. A determination will be part of the Critical Decision–1 process.

	FY 2005	FY 2006	FY 2007
U.S. Contributions to ITER - (MIE TEC)	**—**	**15,866**	**37,000**

The U.S. Contributions to ITER MIE project provides hardware, personnel, and cash to the international ITER Project. Following the ITER site selection decision of Cadarache, France, in June 2005, the United States began negotiating the remaining details of the ITER Agreement with the other ITER parties of the European Union (EU), Japan, the Russian Federation, China, and South Korea, with completion of the Agreement anticipated by early 2006. During these negotiations, ending in December 2005, the text of the draft ITER Agreement and supporting documents were completed, the designation of the Director General Nominee was approved, and India joined the negotiations as a full non-host ITER participant. The U.S. Contributions to ITER MIE project supports the fabrication phase of the international Project; however, the international negotiations and the ITER Agreement will involve all phases of the ITER Program including construction, operation, deactivation and decommissioning. For each of the ITER program phases, the United States is negotiating financial participation at the non-host level. After the ITER Agreement is completed and accepted by the negotiators, then signed by the parties' governments and entered into force, an ITER legal entity will exist. The ITER Organization, being staffed from personnel from all the ITER parties, is responsible for the realization of the ITER facility and program. The personnel, a mix of secondees from organizations within the ITER parties' countries and employees of the ITER Organization, is mobilizing to the Cadarache site.

ITER has been designed to provide major advances in all of the key areas of magnetically confined plasma science. ITER's size and magnetic field will provide for study of plasma stability and transport in regimes unexplored by any existing fusion research facility worldwide. Owing to the intense plasma heating by fusion products, it will also access previously unexplored regimes of energetic particle physics. Because of the very strong heat and particle fluxes emerging from ITER plasmas, it will extend regimes of plasma-boundary interaction well beyond previous experience. The new regimes of plasma physics that can be explored for long duration, and the interactions among the anticipated phenomena, are characterized together as the new regime of "burning plasma physics."

The ITER design is based on scientific knowledge and extrapolations derived from the operation of the world's tokamaks over the past decades and on the technical know-how flowing from the fusion technology research and development programs around the world. The ITER design has been internationally validated by wide-ranging physics and engineering work, including detailed physics and computational analyses, specific experiments in existing fusion research facilities and dedicated technology developments and tests performed during from 1992 to the present.

The ITER device is a long pulse tokamak with elongated plasma shape and single null poloidal divertor. The nominal inductive operation produces a Deuterium-Tritium fusion power of 500 MW for a burn duration of 400 to 3000 seconds, with the injection of 50 MW of auxiliary power. This provides a power gain of up to a factor of 10.

Safety and environmental characteristics of ITER reflect a consensus among the parties on safety principles and design criteria for minimizing the consequences of ITER operation on the public, operators and the environment. This consensus is supported by results of analysis on all postulated events and their consequences.

DOE will comply with all U.S. environmental and safety requirements applicable to the ITER work that will be conducted in the U.S. Compliance with the National Environmental Policy Act for the U.S. effort will be consistent with the standard DOE process in support of long-lead procurement for the manufacture of the components.

DOE's involvement with ITER at the international site will be at the level of approximately 9.1 percent, which is consistent with the other non-host participants. In addition to scientists and engineers assigned to the ITER Organization, the United States expects to provide at least one senior management staff member to the ITER Organization. All U.S. personnel assigned to the project will comply with the environmental and safety requirements of the host country and with the applicable U.S. legal requirements.

As a result of the extensive collaborative efforts during the ITER Engineering Design Activities (EDA) from 1992 to 1998, and its extension from 1999 to 2001, a mature ITER design exists including completed R&D prototypes of critical ITER components.

The MIE funding provides for procurement of long lead hardware, U.S. personnel assigned to the project abroad (the annual average number of engineers and scientists is ~22 FTEs as well as funding for support personnel at the international ITER site for ~34 FTEs), U.S. share of cash for ITER project common needs (ITER Organization infrastructure, hardware assembly and installation, and testing of U.S. supplied hardware), contingency, and operation of the U.S. ITER Project Office. The Project Office is responsible for management of U.S. Contributions to ITER including management, quality assurance, procurement, and technical follow of procurements.

DOE requires the U.S. ITER Project Office to assume a broad leadership role in the integration of ITER-related project activities throughout the U.S. Fusion Program and, as appropriate, internationally. For direct procurements with industry, the Project Office is expected to assemble experts throughout the fusion program for technical follow-up and execution of the procurements. Such experts, and their institutions, would become members of the U.S. ITER Project Office team although not necessarily located at Princeton or Oak Ridge.

Given the significant advances during the international ITER negotiations, it is the objective of the international ITER parties to obtain the negotiators' acceptance of the ITER Agreement by early 2006 indicating the end of the negotiations. The next step will be to obtain governmental signatures on the completed ITER Agreement later in FY 2006, by all ITER parties, thereby leading to a multilateral commitment for ITER. The Agreement finalizes the allocation of equipment to be provided by each ITER Party, including India, and finalizes the concepts for mode of operation among the ITER Parties and central project team during the construction, operation, and decommissioning phases of the ITER program.

The final allocation of equipment or hardware to be supplied by the United States, also called "in-kind" contributions to ITER, is indicated below.

- Niobium Tin (Nb3Sn) Superconducting Strand – Niobium, tin and copper filaments formed into long strands.
- Superconducting Cable – multi-stage cable including strand and insulation.
- Central Solenoid Coil – the U.S. has the lead role for this contribution consisting of six modules plus one spare module; and is responsible for module testing oversight and assembly oversight at the ITER site.
- Blanket Modules – a contribution consisting of 36 (of 360) modules around the tokamak vessel (plus 4 spares), 40 cm thick (including plasma facing components and shield).
- Vacuum Pumping Components – a U.S. contribution consisting of components required to create and maintain the vacuum inside the tokamak vessel.
- Tokamak Exhaust Processing System – a U.S. contribution to include recovery of hydrogen isotopes from impurities such as water and methane, delivery of purified, mixed hydrogen isotopes to the Isotope Separation System, and disposal of non-tritium species.
- Heating and Current-Drive Components for Ion Cyclotron Heating frequencies – the U.S. contribution consists of transmission lines.
- Heating and Current-Drive Components for Electron Cyclotron Heating frequencies – the U.S. contribution consists of transmission lines.
- Fueling Injector – provides for an ITER pellet injector.
- Steady-state Electrical Power System – a U.S. contribution consisting of a steady-state electric power network similar in scale and function to an "auxiliary system" of a large power plant.

- Cooling Water System – the ITER tokamak water cooling systems is a U.S. contribution including the primary heat transfer system, the chemical and volume control system, and the draining, refilling and drying system.
- Diagnostics – a U.S. contribution involving 16% of the ITER Diagnostic effort providing six diagnostic systems such as visible and infrared cameras, toroidal interferometer/polarimeter, electron cyclotron emission, divertor interferometer, and residual gas analyzers; five cover plates on the tokamak vessel on which multiple diagnostics from U.S. and other parties are mounted; and integration of diagnostic systems from other ITER parties.

The preliminary schedule and TEC funding profile for the U.S. Contributions to ITER MIE are as follows. The MIE project cost estimate for U.S. Contributions to ITER is preliminary until the baseline scope, cost, and schedule for the MIE project is established. However, the overall TPC for this MIE project will not change with the exception of possible changes from the OMB-inflation rates that are in place at the time that the performance baseline is set, and changes in currency exchange rates affecting about 15% of the TPC funding.

U.S. Contributions to ITER

	Fiscal Quarter				
	Procurements Initiated	Procurements Complete	Personnel Assignments to Foreign Site Start	Personnel Assignments to Foreign Site Complete	Total Estimated Costs ($000)
FY 2006 Budget Request (Preliminary Estimate)	3Q FY 2006	4Q FY 2012	2Q FY 2006	4Q FY 2013	1,038,000
FY 2007 Budget Request (Preliminary Estimate)	4Q FY 2006	4Q FY 2012	2Q FY 2006	FY 2014	1,077,051[a]

[a] The funding profile is a preliminary estimate incorporating the key results of the December 2005 negotiations. In addition, shifts between OPC and TEC funding have been made consistent with the intentions of DOE 413.3 to provide for R&D and design in support of the MIE project. During FY 2006, several U.S. reviews are scheduled to validate the preliminary cost and schedule profile for the U.S. Contributions to ITER MIE project. In addition, international ITER Project activities in FY 2006 will also validate the international cost and schedule which can have an affect on the U.S. Contributions to ITER project. The performance baseline, including the funding profile, will be established at CD-2 planned for September 2007.

Financial Schedule

Total Estimated Cost (TEC)[a]

(budget authority in thousands)

Fiscal Year	MIE TEC[b]
2006	15,866
2007	37,000
2008	149,500
2009	208,500
2010	208,500
2011	180,785
2012	130,000
2013	116,900
2014	30,000
Total	1,077,051

(dollars in thousands)

	FY 2005	FY 2006	FY 2007
Total, Facility Operations	**89,733**	**103,536**	**121,555**

Explanation of Funding Changes

	FY 2007 vs. FY 2006 ($000)
DIII-D	
DIII-D will increase experimental operations to 12 weeks, a five week increase over FY 2006. Power systems infrastructure will begin to be upgraded to support the full capabilities of the auxiliary heating systems that were improved in FY 2005 and FY 2006	+2,082
Alcator C-Mod	
The increase will allow C-Mod to continue ITER-relevant experiments, such as studies in high-Z vs. low-Z wall materials and lower hybrid radio frequency injection, while making important upgrades to its divertor module and diagnostics for use in future advanced tokamak experiments. The increase will also allow C-Mod to conduct 15 weeks of operation, an increase of one week over FY 2006.	+734

[a] The funding profile is a preliminary estimate incorporating the key results of the December 2005 negotiations. In addition, shifts between OPC and TEC funding have been made consistent with the intentions of DOE 413.3 to provide for R&D and design in support of the MIE project. During FY 2006, several U.S. reviews are scheduled to validate the preliminary cost and schedule profile for the U.S. Contributions to ITER MIE project. In addition, international ITER Project activities in FY 2006 will also validate the international cost and schedule which can have an affect on the U.S. Contributions to ITER project. The performance baseline, including the funding profile, will be established at CD-2 planned for September 2007.
[b] Note that the Other Project Costs associated with these MIE TEC funds are budgeted in the Enabling R&D subprogram.