





Department of Energy  
Washington, DC 20585

January 13, 2017

MEMORANDUM FOR THE DEPUTY SECRETARY

THROUGH: DAVID M. KLAUS   
DEPUTY UNDER SECRETARY  
FOR MANAGEMENT AND PERFORMANCE

FROM: PAUL BOSCO   
DIRECTOR, OFFICE OF PROJECT MANAGEMENT  
OVERSIGHT AND ASSESSMENTS

SUBJECT: **ACTION:** Approve the Revised Critical Decision-1 (CD-1R),  
Alternative Selection and Cost Range, and Approve CD-2,  
Performance Baseline, and CD-3, Start of Construction for the U.S.  
Contributions to ITER First Plasma Subproject

**ISSUE:** Whether to approve the revised Critical Decision (CD)-1R, Alternative Selection and Cost Range, and approve CD-2, Performance Baseline, and CD-3, Start of Construction, for the U.S. Contributions to ITER First Plasma subproject.

**BACKGROUND:** The genesis of the international collaboration to develop fusion energy began in November 1985, at the Geneva Superpower Summit, when Soviet Premier Gorbachev proposed to then President Reagan that an international project be established to develop fusion energy for peaceful purposes. While significant progress had been made with large fusion experiments around the world since this proposal was made, it was clear from an early stage that a larger and more powerful magnetic confinement device would be needed to create the conditions expected in a fusion reactor to demonstrate its scientific and technical feasibility. ITER became the solution. It was selected by the Department as the most viable option to demonstrate the capability of producing more energy than it takes to operate a fusion reactor.

The initial concept was to cooperatively design and build such a device as a four-party collaboration between the former Soviet Union, the United States, the European Union (EU) and Japan. Following the collapse of the Soviet Union, the Russian Federation took its place as an ITER member. The People's Republic of China and the Republic of Korea both joined the project in 2003. India joined in December 2005, bringing the total number in the consortium to seven.

The ITER Project, sited in southern France, is an international collaboration involving



construction, operation, deactivation, and decommissioning that is unique in many respects. First, to emphasize its international character, ITER is a stand-alone, international legal entity rather than a part of some pre-existing national or international institution. Second, while the project's hub is the ITER Organization (IO) located at the ITER site, comprised of scientists and engineers and supporting staff from all the ITER Members, the majority of the component fabrication is done domestically by the ITER Members (an important consideration in a collaboration funded by government resources). In concert with the IO developments of 2005, the U.S. ITER Project was formally initiated on July 7, 2005, when the Deputy Secretary of Energy signed CD-0, Approve Mission Need.

The U.S. ITER project achieved CD-1, Approve Alternative Selection and Cost Range, in January of 2008 with a cost range of \$1.45B to \$2.2B. Since 2008, the estimated cost range for the project increased such that the upper bound of the approved CD-1 cost range increased by more than 50% triggering the need for a reassessment by the Chief Executive for Project Management (CE)/Deputy Secretary. In response to a 2013 Congressional request, a DOE Office of Science (DOE/SC) Independent Project Review Committee assessed the project and determined that the existing cost range estimate of \$4.0 to \$6.5B would likely encompass the final Total Project Cost (TPC). This range, recommended in 2013, was included in subsequent President's Budget Requests and in the May 2016 DOE "Report on the Continued U.S. Participation in the ITER Project" to Congress. Following briefings and discussions with the PMRC, S4, and SC-1, the cost range was revised in December 2016 to \$4.7B to \$6.5B. The CE/Deputy Secretary is now being requested to approve the updated cost and associated schedule range.

The U.S. ITER Project schedule is integrated with the international ITER Project schedule, which is under the IO's control. In the past, the international ITER Project experienced significant schedule slippage due to previous ITER management issues which have been and are being mitigated.

In accordance with the May 2016 Report to Congress, the U.S. ITER Project hardware scope was divided into two distinct subprojects with the project focusing its efforts on subproject scope supporting achievement of First Plasma. Subproject-1 is for fabrication of First Plasma hardware and full design of all US hardware, and Subproject-2 for the acquisition of post-First Plasma hardware. The resulting split of the project into two subprojects facilitated baselining for Subproject-1 which is the primary focus of this action. A baseline for Subproject-2 will be proposed once the post-First Plasma portion of the ITER construction schedule has been firmly established by the IO. That assumes that at the end of FY 2017, the Secretary recommends that the U.S. continue its participation in ITER.

This action memo requests the approval of the revised CD-1R cost range for the U.S. ITER Project and the approval of CD-2/3 for Subproject-1 (First Plasma) of U.S. ITER project as follows:

**ITER Project CD-1R:**

- Cost Range: \$4.7B – \$6.5B
- CD-4: 2034 - 2038

**ITER Subproject-1 (First Plasma) CD-2/3:**

- Total Project Cost (TPC): \$2.5B
- CD-4: December 2027

**Scope: Subproject-1 (First Plasma) scope consists of the following:**

- Provide the design and fabrication of the U.S. hardware needed for First Plasma
- Provide all remaining preliminary/final design effort for the U.S. post-First Plasma hardware
- Provide a defined amount of “in-kind” cash contribution to fulfill the remainder of the U.S. hardware credit obligation

**Key Performance Parameters: Subproject-1 (First Plasma) criteria and key performance parameters to achieve CD-4 are:**

- The delivery to and acceptance by the IO of the Subproject-1 (First Plasma) hardware
- Obtain IO acceptance/approval of the final designs for all U.S. hardware
- Payment of the “in-kind” cash contribution due to the IO

**RECOMMENDATION:** Approve the revised CD-1R for the ITER project. Approve CD-2/3, Performance Baseline/Start of Construction, for the U.S. ITER Subproject-1 (First Plasma).

APPROVE: LY DISAPPROVE: \_\_\_\_\_ NEEDS DISCUSSION: \_\_\_\_\_ DATE: 1/13/2017

**Attachment:**

ITER Project CD-1R and Subproject-1 (First Plasma) CD-2/3 Approval Memo