Critical Decision-4a, Approve Start of Operations - New Construction for the Technology and Engineering Development Facility at the Thomas Jefferson National Accelerator Facility

Office of Safety, Security and Infrastructure
Office of Science

A. Purpose

The purpose of this paper is to document the review by the Office of Science (SC) Energy Systems Acquisition Advisory Board-equivalent for the Critical Decision (CD), "Approve Start of Operations – New Construction (CD-4a)" for the Technology and Engineering Development Facility (TEDF) Project at the Thomas Jefferson National Accelerator Facility (TJNAF).

B. Mission Need

The mission of the Science Laboratories Infrastructure Program within SC is to support the conduct of Departmental research missions at SC laboratories by funding line item construction to revitalize and repair the general-purpose infrastructure.

This project is needed to ensure TJNAF facilities can reliably support production of advanced cryomodules and develop enabling technologies with the quality required for the ongoing research programs and projects at TJNAF which include 6-GeV, 12-GeV, and Free Electron Laser as well as other DOE national and international projects such as the Spallation Neutron Source, the Relativistic Heavy Ion Collider, the Facility for Rare Isotope Beam, and the International Linear Collider, and sustain the current high demand for mounting numerous unique large scale particle detectors.

TJNAF occupies a position of world leadership in the field of nuclear physics. This leadership is built upon the unique properties of the Continuous Electron Beam Accelerator Facility (CEBAF), as well as an outstanding array of experimental facilities and strong theoretical support. It is essential for the continuation of this world leadership that core competencies be maintained and enhanced in:

- Nuclear physics, including experimental, theoretical, and computational physics.
- Accelerator science and technology, including radiofrequency superconductivity, high brightness, polarized electron beams, and cryogenics.

These core competencies enable TJNAF to deliver its mission, to perform a complementary role within the DOE laboratory system, and to attain its vision for scientific excellence and pre-eminence in the structure of nuclear building blocks, the structure of nuclei, and symmetry tests in nuclear physics. In addition to nuclear physics, TJNAF contributes to enabling technologies and emerging fields – photon science and electron-light ion colliders – including advanced radiofrequency superconductivity, 2K cryogenic engineering technology, photon science, advanced high power free electron lasers, energy recovering linacs, and electron-light ion collisions at ultra-high luminosity.

C. Project Scope Baseline

The TEDF Project is located on the TJNAF site and provides modern, 21st century technical work space, high-bay space, office space, and associated space for support functions. The design of the facility provides more open, collaborative environments and flexibility to respond to future mission changes.

The scope of the project includes design, site work (including fence, parking, and gate relocation), construction of new facilities, renovation of the Test Lab building, commissioning, building demolition, and removal of trailers. The new facilities consist of laboratories, equipment rooms, offices, and support space. In addition to the technical work space and high-bay space, the facilities include offices for researchers, small group conference rooms, equipment areas, restrooms, circulation space, and necessary supporting infrastructure. The key performance parameters for New Construction (CD-4a) that have been achieved are:

- Construction of a new 65,000 to 80,000 gsf Technology and Engineering Development (TED) building.
- Construction of a new 25,000 to 40,000 gsf Test Lab building Addition.

The actual size of the TED Building is 74,600 gsf and the actual sized of the Test Lab Addition is 46,550 gsf.

D. Project Cost and Schedule Baselines

The Total Project Cost is $73.2M. Table 1 shows the funding profile for this project.

Table 1 – Funding Profile ($000)

FY	Total Estimated Cost		Other Project Costs	Total Project Cost
	Project Engineering and Design	Construction		
2008			300	300
2009	3,700		700	4,400
2010		27,687		27,687
2011		28,419		28,419
2012		12,337		12,337
Total	**3,700**	**68,443**	**1,000**	**73,143**

The schedule baseline is shown in Table 2.

Table 2 – Schedule Baseline

CD-0	Approve Mission Need	September 2007 (A)
CD-1	Approve Alternative Selection and Cost Range	September 2008 (A)
CD-2	Approve Performance Baseline	November 2009 (A)
CD-3a	Approve Start of Early Procurement Package	March 2010 (A)
CD-3b	Approve Start of General Construction	August 2010 (A)
CD-4a	Approve Start of Operations – New Construction	March 2012 (A)
CD-4b	Approve Start of Operations – Renovation	March 2014

CD-4b, "Approve Start of Operations - Renovation," includes 12 months of schedule contingency.

The baseline cost through January, 2012 is shown in Table 3.

Table 3 – Cost Estimate ($)

WBS	Description	Cost	Total Cost
1.1	**Project Planning**		**$ 1,000,000**
1.1.1	Conceptual Planning	$ 886,000	
1.1.2	Planning	$ 114,000	
1.2	**Engineering and Design**		**$ 3,646,000**
1.2.1	Design Services	$ 2,975,000	
1.2.2	Pre-Construction Services	$ 525,000	
1.2.3	Pre-Construction Project Management	$ 146,000	
1.3	**Construction**		**$ 64,503,000**
1.3.1	Conventional Facilities Construction	$ 59,023,000	
1.3.2	Furnished Furniture/Equipment	$ 2,485,000	
1.3.3	Construction Management Services	$ 2,259,000	
1.3.4	Project Management	$ 736,000	
	Total Contingency (26.6% on costs to go)		**$4,052,000**
	Engineering and Design Contingency	$ 54,000	
	Construction Contingency	$ 3,998,000	
	Total Estimated Cost		**$ 72,200,000**
	Other Project Cost		**$ 1,000,000**
	Total Project Cost		**$ 73,200,000**

E. Energy Conservation and Sustainable Design

Sustainable design features have been incorporated into the TEDF Project as required by the Energy Policy Act of 2005 and DOE Order 436.1, Departmental Sustainability including incorporation of the Guiding Principles of Executive Order 13423 to the extent practical and life cycle cost effective.

The design will achieve energy savings of a least 30 percent below ASHRAE Standard 90.1-2004. The highest possible LEED certification is being pursued consistent with the budget and performance goals of the project. The project is on track to achieve LEED Gold certification for both the new construction and existing building portions of the project.

F. Independent Readiness Confirmation

Operational readiness documentation and acceptance testing, commissioning, and readiness activities were reviewed and satisfactorily verified as part of the readiness process. Other documents reviewed and issued included a transition to operations plan, a draft Project Closeout Report, an updated hazards analysis report, and Environmental Management System documentation. An Independent Peer Review was conducted on January 18-19, 2012, to confirm that the new construction portion of the TEDF was ready for safe operation and to obtain CD-4a. The Peer Review Team report was presented at the Independent Project Review conducted on February 15, 2012.

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3-16-12
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Recommendations:

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) approval of CD-4a, for the Technology and Engineering Development Facility as noted below.

ESAAB Secretariat, Office of Project Assessment	3/22/2012 Date	Yes X	No ___
David Goodwin Representative, Non-Proponent SC Program Office	3/22/12 Date	Yes ✓	No ___
Representative, Office of Budget	3/20/2012 Date	Yes ✓	No ___
Representative, Environmental, Safety and Health Division	3/22/2012 Date	Yes X	No ___
David Goodwin Representative, Safeguards and Security Division	3/22/12 Date	Yes ✓	No ___
Representative, Facilities and Infrastructure Division	3/22/12 Date	Yes ✓	No ___
Representative, Grants and Contracts Division	Date	Yes ___	No ___

Approval:

Based on the information presented above and at this review, Critical Decision-4a, Approve Start of Operations – New Construction is approved and authorization is provided to proceed with operation of the Technology and Engineering Development building and the Test Lab Addition.

Marcus E. Jones, Associate Director — 3/22/2012 Date
Office of Safety, Security, and Infrastructure
Office of Science, SC-31, HQ/GTN