



**Department of Energy**  
Thomas Jefferson Site Office  
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May 29, 2009

Ms. Mary Logue  
Associate Director for ESH&Q  
Thomas Jefferson National Accelerator Facility  
12000 Jefferson Avenue  
Newport News, VA 23606

Dear Ms. Logue:

**NEPA DETERMINATION: TECHNOLOGY AND ENGINEERING DEVELOPMENT FACILITY**

The NEPA Compliance Officer for the Thomas Jefferson National Accelerator Facility has reviewed the DOE National Environmental Policy Act (NEPA) analysis for the proposed project to construct the enclosed Technology and Engineering Development Facility (TEDF). He has determined that the project is covered under existing National Environmental Policy Act (NEPA) analyses and documentation.

For additional information, please contact Patty Hunt at extension 7039 or Rick Korynta at extension 7145.

Sincerely,

A handwritten signature in black ink that reads "James A. Turi".

James A. Turi, Manager  
Thomas Jefferson Site Office

Enclosure

cc w/enclosure:  
G. Hartman, SC-ORO  
R. Korynta, TJSO  
L. Even, TJNAF

UNITED STATES DEPARTMENT OF ENERGY  
THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY  
NEWPORT NEWS, VIRGINIA

# DOE NEPA Analysis – Technology and Engineering Development Facility

May 2009

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## **1.0 Introduction and the Proposed Project**

### **1.1 Purpose and Scope**

The Thomas Jefferson National Accelerator Facility (TJNAF) is a DOE facility that supports basic research of the atom's nucleus at the quark level by scientists from around the world. The Lab has a central role in nuclear physics, and its present and future program relies on maintaining its role as the world leader in hadronic physics and superconducting accelerator technologies.

TJNAF infrastructure and operations has been the subject of several previous evaluations in response to requirements of the National Environmental Policy Act (NEPA). Previous Environmental Assessments (EA) evaluated potential impacts associated with structures planned across the TJNAF campus as part of initial facility construction and subsequent additions. The construction of a new structure and renovation of an existing structure, jointly termed the Technology and Engineering Development Facility (TEDF) project, has not been specifically evaluated during previous NEPA activities.

The purpose of this analysis is to provide a basis for determining whether the existing NEPA analysis and documentation would be sufficient to allow the DOE to construct, renovate, and operate the TEDF.

### **1.2 Background**

This section provides background on the TEDF.

#### **1.2.1 TEDF Requirements**

The Technology and Engineering Development Facility (TEDF) Project will provide modern, 21<sup>st</sup> century technical work space, high-bay space, office space and associated space for support functions. The design of the facility will emphasize more open, collaborative environments and flexibility to respond to future mission changes.

The scope of the project includes design, site work (including fence and gate relocation), construction of new facilities, renovation of the Test Lab building, commissioning, building demolition, and removal of trailers. The new facilities will consist of laboratories, equipment rooms, offices, and support space. In addition to the technical work space and high-bay space, the facilities will include offices for researchers, small group conference rooms, equipment areas, restrooms, circulation space and needed supporting infrastructure. The objectives and goals for the key performance parameters of the project are shown below.

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## **Project Objectives and Goals**

The Technology and Engineering Development Facility has established the following overall project goals:

- Construct new facilities to allow for the co-location of various groups scattered throughout the Lab.
- Renovate an existing facility (circa 1965) to provide modern work space.
- Plan and design the new facilities to maximize research efficiencies and optimize space usage.
- Ensure that environmental, safety & health (ES&H), and security requirements are fully incorporated and properly implemented into the project's design and construction.
- Minimize any negative impact to ongoing research operations.
- Implement the Technology and Engineering Development Facility within the baseline cost and schedule.

## **Alternatives Considered**

Jefferson Lab is in need of new modern laboratory space to support the growth and continued operations at the Lab. Two alternatives were analyzed for obtaining the needed space; renovating portions of the existing Test Lab building (Building 58) including deferred maintenance and compliance modifications and leasing additional space at an off-site location (Alternative #2); or constructing new facilities and completely renovating the existing Test Lab building (Alternative #1). For the basis of this analysis the 'do nothing' approach (Alternative #3) was not considered viable because of safety concerns and because this would have serious impacts on the ability of the Lab to fulfill its mission. The best alternative to fulfill the mission of TJNAF was determined to be Alternative #1 – New Construction and Complete Renovation.

### **1.2.2 TEDF Project Summary**

This project has three elements:

- Construction of a new facility with about 70,000 – 90,000 square feet of additional space;
- Renovation of the existing Test Lab building, demolition of selected structures and setup of interim and some permanent work areas to allow operations to continue.
- Addition of approximately 30,000 – 35,000 square feet to the Test Lab building, including the construction and use of several small ancillary buildings to serve as chemical processing, chemical storage, and hazardous waste accumulation areas.

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Each element is briefly described below. A more detailed description of the proposed project is provided in the September 2007 CD-0 *Statement of Mission Need* which is available at the Thomas Jefferson Site Office.

**1.2.2.1 Construction of New Technology and Engineering Development Building and Selected Demolition in the Test Lab Vicinity**

A 70,000 to 90,000 square foot building will be constructed to the west of the Test Lab, adjacent to and east of SURA Road. Additional nearby areas will be used for parking facilities. The area designated for the new building is comprised of property that has been previously developed and primarily on previously disturbed land.

Construction of the new building is planned as one of the first steps in the overall project. When it is complete, the new building will be occupied by some of the technical and engineering activities and processes that currently reside in the Test Lab and elsewhere on site. Trailers currently used to house ESH&Q staff and other Test Lab support functions will be vacated and those personnel and Test Lab functions will be relocated to reside in the new building or elsewhere in the vicinity.

**1.2.2.2 Selected Demolition within Test Lab and Renovation of the Test Lab**

The Test Lab, constructed in 1965 by NASA was transferred to DOE in 1987. It is the Lab's largest facility, with over 20 percent of the Lab's building square footage. Approximately 75 staff occupies and works in the Test Lab.

The Test Lab will be reconfigured so that ongoing processes will occupy one half of the building, while the other half undergoes renovation. Renovation will involve extensive replacement of infrastructure and reconfiguration of space in the high bay area. Mechanical systems will be updated, with a focus on installing a new energy-efficient HVAC system that will result in a 30 percent reduction in energy consumption.

Upfront, there is a requirement for modification and building of interim and permanent work space. This will allow research and development as well as production operations to continue during the project.

The project will require demolition of interior and exterior structural elements of the Test Lab. Materials and equipment from demolished structures will be reused elsewhere on the site or recycled per Lab programs and applicable construction contract specifications.

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### **1.2.2.3 Selected Demolition and Addition to the Test Lab**

The addition to the Test Lab will be located immediately south of the existing building. The addition is planned to have an approximate footprint of about 30,000 SF to 35,000 SF. The addition will house some of the current Test Lab processes and activities. The work will also include utility modifications and the construction of other support buildings and additional parking areas. The area designated for this new addition is highly developed and on previously disturbed land.

## **2.0 Summary of Previous Analysis**

Four Environmental Assessments (EAs) have been prepared for various activities at the Lab, each of which resulted in a Finding of No Significant Impact (FONSI):

On January 12, 1987, DOE issued a FONSI based on an EA of the proposed construction of site infrastructure and operation of the Continuous Electron Beam Accelerator Facility (CEBAF) (DOE/EA-0257). Later, the entire installation was named the TJNAF, although the accelerator proper retains the name CEBAF. CEBAF produces an electron beam for experiments in basic nuclear physics, in particular for the study of quark structures and behaviors and the forces that govern the clustering of nucleons in the atomic nucleus. Construction of the CEBAF accelerator was completed in early 1995. Commissioning of components paralleled construction activities so that the accelerator began operating to serve the DOE physics program in late 1995. It has continued operating to this day.

In 1997, in accordance with the DOE NEPA regulation, DOE completed a new EA (DOE/EA-1204) to review the environmental, health, and safety impacts of changing the range of operating parameters of the CEBAF and operating the Free-Electron Laser (FEL). On November 5, 1997, DOE issued a FONSI based on this EA. DOE found that the proposed action did not have the potential for causing significant impacts, as was also concluded in the 1987 FONSI. DOE concluded that no further NEPA review was necessary for either the change in operating parameters of CEBAF or for the operation of the FEL.

In a third EA (DOE/EA-1384), impacts were evaluated for the construction of various site improvements that included a technical support building and the proposed installation and operation of the High-Energy Lithography Source (Helios) accelerator. The majority of the function of the technical support building evaluated in this EA is being included in the scope of the TEDF project. It was determined that the proposed improvements at Jefferson Lab did not constitute a major Federal action that would significantly affect the quality of the human environment within the context of NEPA, and a FONSI was issued on July 13, 2002.

The most recent EA (DOE/EA-1534) evaluated potential impacts associated with increasing the beam power and beam energy of CEBAF, increasing the beam power of the Free-Electron Laser, and the addition of several improvements to both the TJNAF accelerator site and the remainder of the site, known as the campus area. The function of the technical support building evaluated in DOE/EA-1534 is included in the scope of the TEDF project. The proposed Technology and

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Engineering Development building to be constructed as part of the TEDF project will be located approximately 300 feet north of the previously evaluated proposed technical support building location. In a FONSI dated January 30, 2007, the DOE found that proposed improvements at Jefferson Lab did not constitute a major Federal action that would significantly affect the quality of the human environment. No further analysis was required.

### 3.0 Estimated Impacts Associated with the TEDF Project

Figure 1 identifies the areas that are anticipated to be affected by this project. A total estimated area of about 13.8 acres (about 600,000 square feet) is included therein. As described in Section 2, for DOE/EA-1384 and DOE/EA-1534, new buildings were evaluated of a similar size and function as are included in the TEDF project scope. The larger area in this project is primarily associated with improvements to roads and parking that will provide a more environmentally cohesive site configuration. This will be obtained by moving vehicular traffic to the perimeter of the campus and providing green spaces in the center of the campus limited to foot traffic. Most of the land to be used for the new Technology and Engineering Development Building, the new Test Lab addition, and associated parking has been previously developed. The majority of the area is occupied by pavement, structures and equipment.

The environmental aspects with potential impacts that are associated with this project are summarized in Table 1:

**Table 1 – Summary of Environmental Aspects**

Aspect Category (air, wastewater, hazardous waste, solid waste, energy/natural resources, other)	Environmental Aspect *	Administrative and/or Engineering Control (if needed)
<b>Construction/Renovation</b>		
Wastewater discharge	Surface – Storm water	Virginia Permits: DCR01-08-100332 and VAR040079  Specifications include: <ul style="list-style-type: none"> <li>• Erosion &amp; sediment control</li> <li>• Good housekeeping, including secondary containment at fueling or liquid storage locations.</li> <li>• Maintaining appropriate spill control equipment at site.</li> </ul>
Refuse	Construction Debris	Refuse management in specifications.
Hazardous or regulated waste	Debris from renovation	Compliance with U.S. EPA regulations on asbestos, lead, and PCB waste management.
Air Emissions	Construction vehicles	Minimize idling; standard specifications, including application of dust suppressant if necessary.
Air Emissions	Asbestos	Emissions of asbestos are anticipated to be managed by compliance with EPA asbestos management regulations.

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Aspect Category (air, wastewater, hazardous waste, solid waste, energy/natural resources, other)	Environmental Aspect *	Administrative and/or Engineering Control (if needed)
Ecological resources	Vegetation	Site plans revised to minimize disturbance to tree cover. Tree protection measures taken to protect trees adjacent to work area.
Ecological resources	Wetlands	Wetland and its local buffer zone are outside of construction area. Adequate controls to prohibit access to wetland area included in specifications.
<b>Operation</b>		
Chemical Use & Storage	Acids	As under current operations, ES&H Manual chemical hygiene program and program specific work control documents.
Regulated Waste	Spent Solvents and other Hazardous Waste	As under current operations, ES&H Manual waste management program and program specific work control documents.
Wastewater discharge	Sanitary Sewer – industrial	Industrial wastewater permit 0117 and ES&H Manual procedures.  Ongoing practice, ensure that any changes in wastewater types are approved and permitted by sanitation district.
Wastewater discharge	Surface – Storm water	Virginia Permit: VAR040079  Rainwater only; good housekeeping practices to maintain building and surroundings.
Power Consumption	Power consumption	Standard best management practices that utilize equipment that minimizes long term resource use and maintenance costs.

\* An environmental aspect in TJNAF's Environmental Management System (EMS) is an element of an organization's activities, products, or services that can interact with the environment.

## 4.0 Analysis of Impacts and Discussion

### 4.1 Comparison of Impacts with Previous NEPA Analysis

Table 2 summarizes the findings of the previous Environmental Assessments undertaken at TJNAF. Each of these EAs resulted in DOE's issuance of a FONSI, having determined that no significant environmental impacts were anticipated.

The EA for the initial construction of the Continuous Electron Beam Accelerator Facility (CEBAF; EA-0257) found that, though there would be some effects on land use and ecological resources, no significant impacts were anticipated. No Environmental Impact Statement (EIS) was therefore required. The potential impacts from the initial construction of CEBAF greatly exceed those possible as a result of the TEDF project. The construction of CEBAF involved 169 acres, the majority of which had remained

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undisturbed for over 30 years. The TEDF project will affect a far smaller area, most of which is disturbed and has been previously developed. The two projects, the original CEBAF and this TEDF, have in common temporary construction impacts, but the TEDF impacts will be of a much shorter duration in comparison to the long-term construction and installation of CEBAF.

EAs completed in 2002 and 2007 (DOE-EAs -1384 and -1534, respectively) addressed projects of comparable or greater scope and complexity, and both resulted in FONSI. The majority of the function of the technical support building evaluated in DOE/EA-1384 is being included in the scope of the TEDF project and that project is no longer needed. The function of the technical support building evaluated in DOE/EA-1534 is included in the scope of the TEDF project and that project is no longer needed. The proposed Technology and Engineering Development building to be constructed as part of the TEDF project will be located approximately 300 feet north of the previously evaluated (DPE-EA-1534) proposed technical support building location.

The potential impacts addressed in the EAs (listed in Section 6.1) comprise a comprehensive list that include those involved with the TEDF project, with minor exceptions as noted in section 4.2.

**Table 2 – Review of Previous Jefferson Lab Environmental Assessments  
(1987, 1997, 2002, and 2007) in Support of  
NEPA Coverage for TEDF**

EA	Year	Section No.	Action Covered	Area Affected	Purpose	Impact Covered*	Summary of Potential Environmental Impacts	Relevance to TEDF Project
0257	1987	2.2, 4.0	Proposed Action – All New Physics Research Facility	Various areas on 169 acre property	Generate high-energy, high duty-factor electron accelerator to deliver 0.5 to 4.0 GeV beams for nuclear physics research. Provide all needed auxiliary space for offices, technical, and industrial use.	WQ, SE, LU, ER, AQ, RI, TC, GS, F, CR, HH, N, CI	Original NEPA documentation. No significant impacts to human health; most significant environmental impacts include land use, temporary construction, and ecological resources	Potential impacts of site-wide construction, including transformation of the SREL into the Test Lab, were not sufficient to trigger an EIS. Far exceeds current project in scope and potential impacts.
1204	1997	2.1.1, 4.2	CEBAF Operating Parameters to 8 GeV	small, scattered areas	Expand research capabilities - increase to operating levels	LU, SE, CR, N, AQ, GS, F, ER, CI	Minor impacts expected from upgrade: temporary construction, ecological resources, and human health.	These upgrade actions (CEBAF and FEL) were and are supported by Test Lab activities. -- no further impacts expected due to TEDF.
1384	2002	2.2.3, 4.2	Technical support building(TSB) #1 - ~54,000 SF affected	~1.2 acres	Tech space, offices, equipment assembly	TC, GS, F, CR, SE, EJ, WQ, AQ, N, LU, TT, PP, ER, CI	Minor impacts expected from TSB: temporary construction, ecological resources, and human health.	Scope of each project (TSB and storage building) somewhat smaller, but combined area and operations similar to TEDF; TSB #1 will not be needed. The TEDF will have processes (and potential impacts) similar to those assessed for the TSB #1
		2.2.4, 4.2	Accelerator Site Storage Building - ~20,000 - 28,000 SF building space	~0.7 acres	House equipment and components		Minor impacts expected from structure: temporary construction, ecological resources, and human health.	
1534	2007	2.2.1, 4.2, 4.6	CEBAF Upgrade to 12 and 16 GeV	~13 acres on the Accelerator site	Expand research capabilities	TC, SE, EJ, LU, TT, N, SP, WQ, AQ, WG, PP, RU, ER, CI	Only expected impacts from 12GeV and 16GeV: minor radiological increase, land use, spill potential, and temporary construction; includes functioning of other processes and activities to support accelerator operations.	The action in this EA supports the need to continue/expand processes used to build accelerator components, including cryomodule production. -- The TEDF (includes the Test Lab) project scope involves making the new areas for such support activities more effective and no greater impacts than those that already exists are expected from these support activities.
		2.2.2, 4.2, 4.6	FEL Upgrade to 190 KW light beam power	No land disturbance	Expand research capabilities		Only minimal impacts expected from 190 kW. The FEL will continue to depend on processes and activities elsewhere on site.	Same relevance as for the 12GeV and a later 16GeV upgrade.
		2.2.6, 4.2, 4.6	Technical Support Bldg. #2 (Nuclear Physics) - ~16,000 SF building area, about 21,300 SF affected	~1.0-1.5 acres	Tech space, offices, equipment assembly		Minor impacts from TSB: land use, temporary construction.	The TEDF includes remodeling the Test Lab and a new building addition and the new technology/engineering building. With this new action, there will not be a need for the Tech Support Bldg #2. The TEDF will have processes (and potential impacts) similar to those assessed for TSB #2.
		2.2.8, 4.2, 4.6	General Site Storage Structures - totalling ~9600 SF	~0.7 acres	House equipment and components		Minor impacts from structures: land use, temporary construction.	This EA action may not be needed after TEDF is built and in operation. -- Some of the site storage concerns are expected to be addressed by the TEDF. No new impacts expected from storage within TEDF.
NEPA Evaluation for TEDF	2009	n/a	TEDF: new building ~70,000 SF and new addition ~30,000 SF Renovation ~ 88,000 SF	~13 acres; 100,000 SF building area plus parking	Provide industrial and technical work space, offices, storage	All potential impacts listed previously. Assessment in previous EAs.	A new area not discussed in previous NEPA reviews is the small site wetland that is located adjacent to, but outside of the construction limits. Access to the area during construction will be prohibited. -- This NEPA Evaluation should obviate the need for further NEPA analysis. Test Lab renovation and construction of new, sustainable building will improve energy efficiency dramatically.	Larger- or similar-scale projects that were reviewed under NEPA resulted in Findings of No Significant Impact (FONSI). Additionally, some actions previously addressed via the EA process (TSB#1 & TSB#2), will be supplanted by the TEDF project.
			Test Lab renovation	No new land disturbance; 96,000 sq. ft. building	Improve infrastructure for better resource management; improve industrial utility of existing space; rectify code violations	Asbestos, lead, and PCBs to be specifically included.		
			Demolition and recycling of materials (Buildings 31, 33, trailers and unneeded structures)	See p. 12 of CR-0 review		Asbestos, lead, and PCBs to be specifically included.		

**LEGEND**

TC	temporary	TT	transportation and traffic	PP	pollution prevention
GS	geology and soils	N	noise	RU	resource usage
F	floodplain	ES	endangered species	CI	cumulative impacts
CR	cultural resources	SP	spill potential	RI	radiological impacts
SE	socioeconomics	WQ	water quality	HH	human health
EJ	environmental justice	AQ	air quality	ER	ecological resources
LU	land use	WG	waste generation		

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## **4.2 Impacts Not Previously Described**

The TEDF project has three potential impacts not previously singled out in prior EAs (all associated with the Test Lab renovation phase): the potential for the presence of asbestos, lead, and polychlorinated biphenyl (PCB). Because of the building's vintage, these may be present. TJNAF has previous experience with the disposal of PCB oils from old equipment under hazardous waste manifests. A very small amount of asbestos has been identified in the Test Lab, and the facility will be surveyed prior to remodeling. The presence of lead paint is anticipated, but has not yet been verified. PCBs might be present in some old electrical equipment to be removed during the Test Lab renovation. Any suspect material will be evaluated and handled in accordance with applicable regulations. TJNAF has programs in place to meet all applicable local, state and Federal requirements with respect to these materials. While they may pose a concern for occupational exposure to workers involved in the renovation itself, no off-site release of these materials should occur. These actions are normally categorically excluded.

## **4.3 Implementation Issues**

Construction is anticipated to take a total of four years, during which time associated effects on noise, traffic, and related areas may be expected. These impacts are directly comparable to projects previously analyzed and are determined to not be significant. Construction specifications will include requirements for control of air emissions, waste management, and proper erosion and sediment controls to minimize effects on storm water runoff during construction and long term practices to minimize storm water pollution under the site Municipal Separate Storm Sewer System (MS4) Permit and eliminate any potential short term impacts to the wetland area. Waste materials will consist of construction and demolition debris, including metal and electronic components, which will be recycled to the extent feasible.

Long term operational impacts will be avoided and or mitigated as done with existing impacts. This project will incorporate beneficial energy and water initiatives and should help to further minimize the Lab's operational footprint on the environment.

## **5.0 Conclusions**

The foregoing analysis indicates that potential impacts from the proposed action should not be considered significant within the meaning of the NEPA, as implemented through the Council on Environmental Quality. The rationale for this conclusion is as follows:

- The potential impacts associated with the proposed action have previously been analyzed for projects of similar or even much greater scope, and were found not to be significant.

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- The proposed action mitigates some anticipated environmental impacts associated with the “No Action” alternative. Construction and renovation in support of the TEDF may obviate the need for additional structures previously planned for the facility. The TEDF, which will include the renovated Test Lab, will employ state-of-the-art energy management systems that will result in a decrease in energy consumption.

Based upon this available information, the proposed project is determined to be covered under existing NEPA analyses and documentation. Additional NEPA documentation is not required.

## 6.0 References

### 6.1 NEPA Documents

- (1) Environmental Assessment for *Continuous Electron Beam Accelerator Facility, Newport News, Virginia*, January 1987 (DOE/EA-0257)
- (2) Environmental Assessment for *Change in Operating Parameters of the Continuous Electron Beam Accelerator Facility and Free Electron Laser, Thomas Jefferson National Accelerator Facility, Newport News, Virginia*, October 1997 (DOE/EA-1204)
- (3) Environmental Assessment for *Proposed Improvements at the Thomas Jefferson National Accelerator Facility, Newport News, Virginia*, June 2002 (DOE/EA-1384)
- (4) Environmental Assessment for *Proposed Upgrade and Operation of the CEBAF and FEL Accelerators and Construction and Use of Buildings Associated with the 2005 Ten-Year Site Plan at the Thomas Jefferson National Accelerator Facility Newport News, Virginia*, January 2007 (DOE/EA-1534)

### 6.2 Terms and Acronyms

CD	Critical Decision	FONSI	Finding of No Significant Impact
CEBAF	Continuous Electron Beam Accelerator Facility	FEL	Free Electron Laser
CX	Categorical Exclusion	Helios	High-Energy Lithography Source
EA	Environmental Assessment	NEPA	National Environmental Policy Act
EIS	Environmental Impact Statement	SF	Square Feet
EPA	Environmental Protection Agency	SRF	Superconducting Radiofrequency

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EMS	Environmental Management System	TEDF	Technology and Engineering Development Facility
ES&H	Environmental, Safety & Health	TJNAF	Thomas Jefferson National Accelerator Facility
ESH&Q	Environmental, Safety Health & Quality	TSB	Technical Support Building

Figure 1 - Site Plan

