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Environmental Assessment
Proposed Improvements at the Thomas Jefferson National Accelerator Facility Newport News, Virginia

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Executive Summary

Proposed Action and Alternatives

The U. S. Department of Energy (DOE), in this Environmental Assessment (EA), reports the results of an analysis of the potential environmental impacts from the proposed construction of various site improvements and the proposed installation and operation of the Helios light source at the Thomas Jefferson National Accelerator Facility (Jefferson Lab) in Newport News, Virginia. Jefferson Lab is operated by the Southeastern Universities Research Association, Inc. (SURA) under contract to DOE.

With this proposal, DOE intends to construct no more than four major two or three story additions totaling about 151,000 sq. ft. (square feet) to CEBAF Center, the main facility administration building, and the addition of three new single story and one two story operations support structures on the accelerator site. The structures are a 28,000 sq. ft. storage building, a 15,100 sq. ft. technical support building, a 3,500 sq. ft. refrigeration service building, and a two-story 22,600 sq. ft addition to the Free Electron Laser (FEL) facility. The proposed action also involves the installation and operation of the Helios (High-Energy Lithography Source) accelerator in the FEL Addition.

DOE proposes to take this action to provide Jefferson Lab with improved staff and operations support facilities that, along with the operation of Helios, will provide an increased capability to facilitate accelerator and physics program operations.

Support activities necessary to effect the installation and operation of Helios would begin in Fiscal Year (FY) 03. It is expected that the Helios machine should be available to serve developmental and operational activities in support of the physics program later in FY 04.

In this EA, DOE presents the no action alternative, alternatives considered and dismissed, and the proposed action alternative. It also evaluates the impacts of each.

No Action Alternative

If no action is taken to fund any of the projects noted, the facility would continue operating as it does today using the present buildings as effectively as possible. Specifically, if no action is taken on the proposal to put additions on CEBAF Center and the FEL Facility the current site buildings will not have sufficient space to accommodate the growing staff and user community. As well, if no action is taken to provide for existing CEBAF (Continuous Electron Beam Accelerator Facility) and FEL operations support staff and their storage needs, it could become an important factor in maintaining both CEBAF and the FEL functionality. If no action is taken on the proposal to add a new end station refrigeration support structure, proposals for future physics experiments would be limited due to the lack of cryogenic system capacity. With no action the physics community would miss out on the opportunity to use the new synchrotron light source to expand research capabilities and also would not be able to explore the future opportunities for joint Helios and FEL operations.

Alternatives Considered and Dismissed

This section reviews other options that were considered in this EA including: on-site alternatives, the choice to lease offsite space, and the use of additional portable storage containers.

Alternatives reviewed for the proposed CEBAF Center additions included building at one of two other locations on the site and just continuing to lease offsite space to meet current demands. The Technical Support Building was also considered for another location on the site and a second alternative was to lease additional space offsite. The proposed storage building was reviewed for an alternate location on the accelerator site, expanding the use of portable storage containers, and leasing additional offsite space.

The selected sites appear to make the best use of the existing site infrastructure and mostly limit disturbance to areas that are immediately adjacent to existing structures.

No alternative locations were available for the FEL Addition, as proximity to the FEL accelerator and its support staff was a priority. There is no existing building on site that was of sufficient size that could be used to operate the Helios accelerator so the location for the new FEL Addition was the only suitable choice.

Impacts for the Proposed Action and Alternatives

The findings of the impacts analysis of resources that could be affected by the proposed action or any of the alternatives are reported in this EA. Other resources or issues that would not be important and are not considered in this EA include prime farmland, aesthetically important areas, scenic rivers, special natural resources such as aquifers, and Native American concerns. Thus, the impacts analysis in this EA focuses on the effects from multiple construction projects, changes in land use and building use due to additional operational requirements, and the effects from the operation of Helios. This analysis looks at impacts to the environment, the workers, and the offsite public.

Impacts for the No Action Alternative

The environmental impacts from taking no action would be the same as those under current operations and identified in the 1987 and 1997 EAs. Jefferson Lab would continue operating using the existing structures on the site. Environmental and public health related effects would continue to be maintained within applicable regulatory and contractual limits. To take no action on any of these proposals would deny the optimization of some resources that would allow more efficient operational support.

Impacts for the Other Alternatives Considered and Dismissed

The use of other on-site settings to position the new structures was considered. These alternate locations were found not to be viable alternatives for the following reasons: poor proximity to existing structures and utilities; more undisturbed land would be affected; and costs would be higher due to working at a new site instead of expanding an existing footprint.

The alternative to consider increasing the amount of leased offsite space is not viable for two reasons, the cost of leasing the space is more expensive in the long run than operating federally owned buildings and the proximity of staff and resources to on-site facilities would be inefficient in day to day operations.

The use of additional portable storage containers is not viable as they are an inefficient means of storing materials and take up more land area than a building designed specifically for storage. These containers cannot always be located convenient to those that need regular access and cost more money in the long term than implementing the proposed action.

Impact Summary for the Proposed Action

Environmental Impacts

Construction Impacts

Negligible to minimal impacts to the following topical areas are expected from this action: Geology and Soils, as all disturbance will be within a few feet of the surface; Floodplain, as the Jefferson Lab site is not within a 100-year floodplain; Cultural Resources, as provided by the Project Review Supervisor at the Commonwealth of Virginia Department of Historic Resources;

Socioeconomics, as labor for proposed construction actions would be drawn from the local pool of tradesmen and women with only minimal additional staffing expected; Environmental Justice, since offsite impacts would be negligible from this proposed action.

Topical areas where impacts could range from minimal to moderate, but would be limited for the duration of the construction and area stabilization are summarized here. No to minimal offsite impacts are expected. This is fully presented in Section 4.

Surface Water: Erosion and sedimentation to on-site storm water channels and storm drainage systems could result from land disturbances during on-site construction activities. Standard erosion control measures would be implemented during disturbance of soils to minimize runoff and potential deposit of sediments in surface waters.

Further development on the DOE site could result in minimal to moderate offsite impacts to surface water if changes in stormwater flows are not mitigated. Site stormwater controls are being evaluated, with the intent to implement recommended measures as needed to offset impacts due to potential facility growth. Appropriate measures will be utilized to negate or minimize any offsite impacts.

Non-radiological Air Quality: The operation of construction equipment and vehicles on-site would produce non-radiological emissions common to construction sites and localized near the site of operation. Contribution from the proposed action to offsite concentrations of regulated non-radiological air pollutants would be minimal.

Noise: Construction activities would be short-term and localized at the Jefferson Lab site. No adverse effects on human hearing would occur.

Transportation and Traffic: Additional public and site roads will have increased use during the construction activities. However, no important impacts are expected.

Pollution Prevention (P2): P2 considerations, that include waste minimization, energy efficiency, and environmentally preferable purchasing (EPP), will be taken into account during the design and construction of the proposed buildings. Special consideration will be provided to subcontractors that have demonstrated commitment to environmental protection. Opportunities to conserve natural resources during design and construction will be encouraged which will result in minimizing impacts.

Long-Term Land Use and Building Operations

The potential impacts on resources as a result of the proposed action are provided in Section 4. A brief synopsis is provided here.

There are a number of topical areas discussed under the Coastal Zone Management Act section. There are minor predicted long-term land-use impacts to terrestrial resources, aquatic resources, and wetlands. Effects on stormwater control, surface waters, and air quality could range from minimal to moderate. As considerations to operate the new buildings in an environmentally sound manner are to be addressed during the planning stage, the building functions should be optimized. For long-term building maintenance and use, the implementation of best management practices (BMPs) to keep both the buildings and their support functions operating efficiently and by using environmentally sound field practices associated with landscaping and grounds management, effects on all the above areas can be negated or minimized. These BMPs would also address resource management issues that are enforceable under this Act by taking the

operational efficiencies and practical P2 and waste management factors considered during the planning stage and putting them into daily practice and use. Using integrated P2 strategies will help to minimize both the use and waste of resources to the extent possible.

The areas of Traffic and Transportation and Groundwater that do not apply under the above Act were also reviewed for impacts. Through optimizing parking and transportation layouts in the planning process, any additional traffic considerations will not impact the environment more than at present. No effects on groundwater quality or withdrawal quantity are expected.

Helios Installation and Operation
The important potential impacts on resources as a result of Helios operations are discussed in Section 4.5. A brief synopsis is provided here.

Water: There may be only minor sources of radioactive wastewater produced under the proposed operating parameters, which would be discharged to the public sewer system in accordance with an existing permit. Because of this, no additional impacts on water quality are projected for operation under the proposed parameters. No groundwater activation by prompt radiation is expected as a result of this activity, so no effects on groundwater quality are anticipated.

Air: The operation of Helios will have minimal effects on the air quality within the FEL Addition and negligible effects outside the building and at the site boundary. The radiological impacts will be minimal but still managed under site programs to remain As Low As Reasonably Achievable (ALARA).

Safety and Health Impacts
The expected level of impact regarding safety and health concerns for each of the identified activities has been evaluated for this proposed action.

Radiological Effects.
Helios Operation: The safety and health impacts to workers and the public due to radiological activity resulting from Helios operation are very low as this is a very low hazard machine and will involve using the same type of controls and support equipment that is currently in use at Jefferson Lab.

Helios Decommissioning: Impacts to workers during decommissioning would be no different than those that exist during other routine accelerator-related activities at Jefferson Lab. No more than minimal impact on worker safety is expected, and there would be only negligible impact to the public.

Construction Hazards.
The hazards of note during construction will be typical for this type of activity, such as working on elevated areas and electrical safety. There should be no more impact than that at any typical construction project.

Non-Radiological Impacts.
Non-radiological hazards associated with the proposed action, from building operation and Helios use, include electrical hazards, chemical hazards, and non-ionizing radiation hazards (lasers), which could injure and, in extreme cases, kill occupational workers. Engineering controls as well as administrative procedures minimize accidents and would be implemented during building or Helios use and operation.

Cumulative Impacts

Environment, health, and safety impacts accumulate due to incremental contributions from each effect from the proposed action discussed above, and also from impacts expected from other ongoing or planned actions within the same geographic area.

Large construction related impacts, due to this proposed action and a combination of offsite activities, will have temporary and long term impacts on the site. On-site impacts will be minimized as addressed in this EA and it is assumed that offsite actions, that we have no control over, will be performed in a responsible manner to minimize offsite and on-site environmental impacts. Note that the proposed action would add only a small increment to the impacts from other development in the surrounding area. Considerations to minimize cumulative operational impacts from routine operation of the new facilities and their support areas would be taken into account throughout the design process. Further development of offsite areas adjoining Jefferson Lab will increase local impervious areas and add an increased potential for adverse stormwater impacts. It is expected that organizations responsible for offsite activities will address these concerns through their own planning process.

Cumulative radiological impacts from operating the site accelerators, the new Helios and the ongoing operation of CEBAF and the FEL, will be managed under existing site programs to minimize consequences to the environment, occupational health factors, and public health and safety concerns. There are no other known nearby offsite radiological sources that would contribute to area impacts except for negligible radiological sources that may be present in the Applied Research Center research areas.

Thus, the construction, operation, and use of the new buildings and Helios, even when combined with other local activities, would not result in major cumulative impacts to occupational and public health and safety.

1. INTRODUCTION

1.1 PREVIOUS ACTIONS

In this EA, the DOE reports the results of an analysis of the potential environmental impacts from proposed improvements to the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) in Newport News, Virginia. See Figure 1 for a vicinity plan, Figure 2 for a site map, and Figure 3 for a site aerial view in Chapter 2. SURA operates Jefferson Lab under contract to DOE.

The main Jefferson Lab accelerator, 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. On January 12, 1987, DOE issued a finding of no significant impact (FONSI) based on an environmental assessment of the proposed construction and operation of CEBAF (DOE 1987). CEBAF construction was completed in early 1995. Commissioning of components paralleled construction activities so that the CEBAF accelerator began operating to serve the DOE physics program in late 1995 and has continued operating to this day.

In the EA (DOE 1987), the proposed action for which impacts were evaluated was the construction and operation of CEBAF to produce an electron beam in the range from 0.5 to 4.0 GeV (giga (billion) electron volts) beam energy with a maximum beam power of 1000 kilowatts (kW). In 1997, in accordance with the National Environmental Policy Act (NEPA) regulations, a new EA, DOE/EA-1204 (DOE 1997), was completed to review environmental and safety impacts of (1) changing the operating parameters of the CEBAF and (2) establishing the operating parameters for the FEL, which was operating in a demonstration mode. On November 5, 1997, DOE issued a FONSI based on this environmental assessment of the proposed changes in CEBAF and the new operating parameters for the FEL. Based on this EA, DOE found that the impacts from this proposed action would exceed those assessed in the 1987 EA and FONSI, but were found to still not be significant. Thus, DOE concluded that no further NEPA review was necessary for the change in operating parameters of the CEBAF including increasing the energy range up to 8.0 GeV at a maximum beam power of 1,000 kW or for the operation of the FEL with 10 kW UV (ultraviolet) or 20 kW IR (infrared) laser beams for experimental use.

1.2 SCOPE OF THIS PROPOSED ACTION

The proposed action evaluated in this EA involves improvements to support the operation of Jefferson Lab. With this proposal, DOE intends to construct no more than four major two or three story additions totaling about 151,000 sq. ft. to CEBAF Center, the main facility administration building, and the addition of three new single story and one two story operations support structures on the accelerator site. The single story structures are a new 28,000 sq. ft. storage building (this square footage includes a mezzanine), a new 15,100 sq. ft. technical support building, and a new 3,500 sq. ft. refrigeration service building. The proposed two-story structure is a 22,600 sq. ft addition to the FEL facility. The FEL Addition will house a new synchrotron light source named Helios. The proposed action also involves the operation of the Helios accelerator.

DOE has prepared this EA to determine the potential for adverse impacts from radiation produced with the operation of the Helios, disturbance of land from construction, effects on the offsite population, and other sources of potential impact.

1.3 PURPOSE OF AND NEED FOR DOE ACTION

DOE proposes to take this action to provide Jefferson Lab with improved staff and operations support facilities that, along with the operation of Helios, will provide an increased capability to facilitate accelerator and physics program operations. The new space will be used to accommodate the growing staff and user community. It will also be used to do a needed expansion to the computer center and would

house the facility library in a more convenient location than presently exists. The existing buildings are utilized to capacity and the use of offsite leased space to meet Lab needs is not as resource efficient or cost effective as having use of DOE owned space. The use of the Helios machine will enable a more diverse range of experiments in support of Jefferson Lab's current mission of providing the nation with physics research opportunities. Using Helios in conjunction with the FEL, both within approved operating levels, will provide even more opportunities in support of Jefferson Lab's mission.

The purpose of the proposed action is to continually improve Jefferson Lab's capability to expand its research capabilities. The proposed improvements to Jefferson Lab will require additional funding. The sources of funding are being explored (DOE, Commonwealth of Virginia, and third party agreements).

2. PROPOSED ACTION AND ALTERNATIVES

2.1 BACKGROUND

The NEPA of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA require that the environmental impacts of any proposed federal action be evaluated and considered in comparison to the impacts of various alternative actions. Alternatives available to DOE include (1) no action, (2) construction and operation of these actions at other locations at Jefferson Lab, (3) construction and operation of these actions at a location other than Jefferson Lab and (4) construction and operation of a facility using a technology different than Helios.

The proposed action evaluated herein will require additional DOE funding for construction and other DOE support for the ongoing maintenance and operation of the new structures and the new Helios machine. Looking far ahead, the Helios decommissioning is assessed in this EA. The new buildings themselves would be designed for long-term use, so decommissioning is not discussed in this document.

The following sections present a description of the proposed action and alternatives and a comparison of the impacts of each. Note that the proposed action incorporates all related activities identified when this proposal was initiated.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is comprised of a series of building construction projects and the installation and operation of a synchrotron light source that, in combination, will provide important improvements to serve the existing Jefferson Lab facility. With this proposal, DOE intends to construct up to four major additions to CEBAF Center, the main facility administration building; three new single-story structures that include a storage building, a technical support building, and a refrigeration building, and a two-story structure, the FEL addition. The proposal includes installation and operation of a new synchrotron light source named Helios in the proposed FEL Addition. A location map of the Jefferson Lab site is provided as Figure 1. Figure 2 is a site map and includes the buildings proposed for construction in this EA. An aerial photograph of the site is provided as Figure 3.

All buildings will be linked with the site's current utility infrastructure. No new connections to offsite power and communications services are expected as the 40 MVA (megavolt amp) substation on the accelerator site has plenty of available capacity to meet the power needs of the proposed action. However, the on-site utility services will require major upgrades, in the form of new substations and underground ductwork and piping, to support these new structures and to operate the new synchrotron light source.

Figure 1 – Jefferson Lab Vicinity Plan

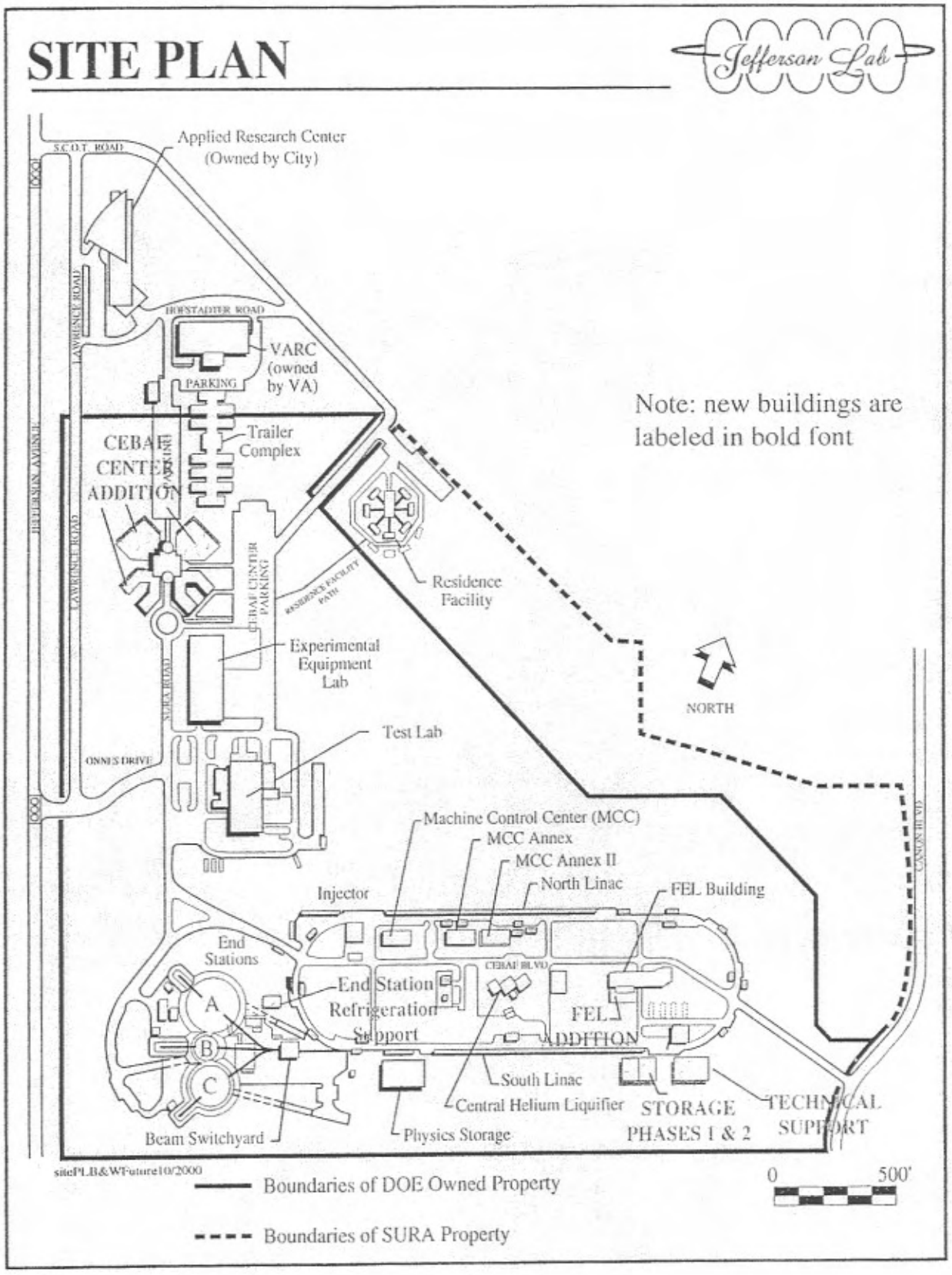

Figure 2 – Site Plan

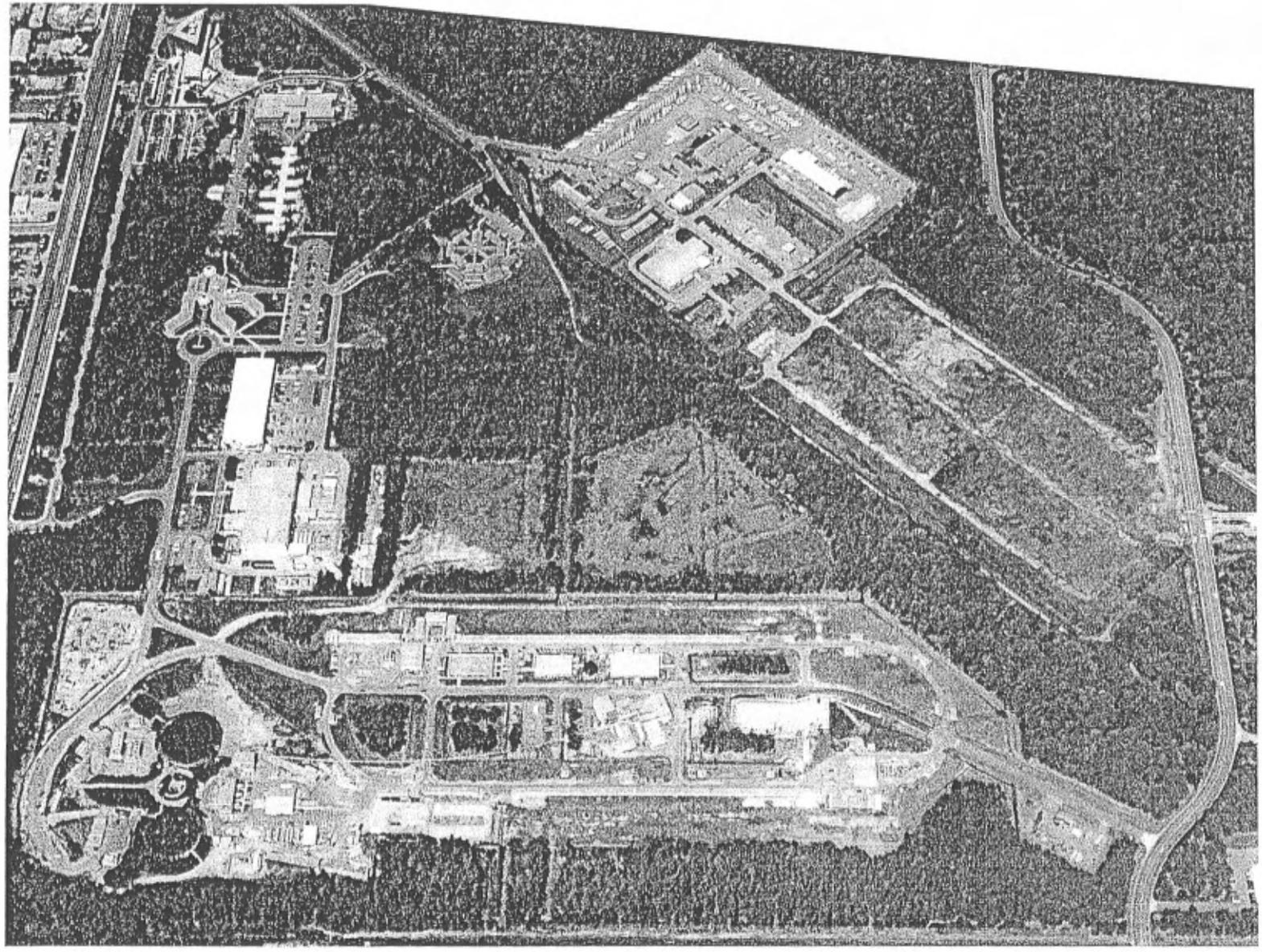

Figure 3 - Site Aerial Photo (1998)

2.2.1 CEBAF Center Additions

DOE intends to construct up to four major two or three story additions to CEBAF Center, the main facility administration building. The total size of the four major additions, which would be accomplished in three or four phases, is about 151,000 sq. ft. (Phase 1 at 59,000 sq. ft., phase 2 at 57,000 sq. ft., phase 3 at 14,000 sq. ft., and phase 4, if needed, at 21,000 sq. ft.). Each of these additions will have two or three floors to match and complement the existing structure. About 81,000 sq. ft. of additional parking and associated access roads will be included in this portion of the project.

The four major additions will provide offices, additional computer center space, a library, a document control center, a copy center, additional conference rooms, an expanded kitchen and dining area, and larger auditorium. It is currently anticipated that the existing utilities will be upgraded to include another 1.5 MVA substation with its own natural gas backup generator. Other utilities and services will be provided through upgrades and extensions of existing utility networks. No major upgrades to existing site services are required to support the operation and maintenance of this greatly enlarged building. A small increase in staffing is foreseen to appropriately maintain this and the other new structures.

The grassed areas surrounding the existing building, as well as the wooded areas to the east, west, and north of the existing building, will be disturbed for the construction and associated parking for a total of about 232,000 sq. ft. As the construction will have a substantial effect on the local surface drainage, some additional perimeter areas (about 7,500 sq. ft.) may be disturbed but restored to provide drainage to account for the new impervious areas.

2.2.2 End Station Refrigeration Support Building

The End Station Refrigeration Support Building, about 3,500 sq. ft., will be built in an area to the northeast of Experimental Hall A in the vicinity of the existing End Station Refrigerator (ESR) Building, Building 102. It will be a one-story structure, with one high bay area and a pit to support cryogenic cooling equipment. The new refrigeration capacity is needed to support the site cryogenic refrigeration system in its attempt to meet the growing demands of the three experimental halls (Hall A, Hall B, and Hall C), which are also referred to as end stations. A new driveway and a local parking area to serve several vehicles will also be included.

An existing transformer will be relocated and replaced with two units sized at 5.0 and 1.5MVA. The units will serve the new structure and the existing ESR Building. A cooling tower to support the expanded refrigeration capability is included in this proposal, thus is included in the total square footage noted below. Other utilities and services will be provided through upgrades and extensions of existing utility networks. No major upgrades to existing site services are required to support the operation and maintenance of this new building. Existing staff will primarily address the operation and maintenance of this structure and the equipment within.

The total area affected is about 5,000 sq. ft. There are no trees or wet areas, including storm channels, to be disturbed. As only a small surface area will be unavailable for stormwater retention, only minimal modification to the local storm channel system is expected.

2.2.3 Technical Support Building

The Technical Support Building will be about 16,000 sq. ft. and will be built on the south side of the South Access Building, Building 38. It will have one floor and be constructed to provide a machine shop and technical shop/office space. The machine shop will house the Cryogenics Fabrication Group. This project will disturb about 54,000 sq. ft. of land that includes its access ramp and about 25 additional

parking spaces and a material lay down area. Approximately 400 feet of the accelerator site's perimeter fence will need to be relocated about 20 feet outward to provide an adequate security clearance.

An existing spare 750 KVA (kilovolt amps) transformer will be relocated to this area and will serve this building and the new Accelerator Storage Building. The power and other utilities will be extended from an adjacent corridor that parallels the neighboring Building 2, so no major utility upgrade is anticipated to support the operation and maintenance of this new building. No increase in staffing is foreseen to appropriately maintain this structure.

This 54,000 sq. ft. proposed construction area is covered in grass and may require earth fill to level out the site. An additional approximately 8,000 sq. ft. area just outside the existing fence contains trees and vegetation that will be cleared as necessary to relocate the fence for security reasons. The remainder of the site to be disturbed contains no trees or wet areas, including storm channels. Moderate impact on the drainage area will result but only storm drainage in the immediate area will need to be modified.

2.2.4 Accelerator Site Storage Building

The Accelerator Site Storage Building is about 20,000 to 28,000 sq. ft. in area. It will be built in two phases and will be sited on the south side of the South Linac (LINear ACcelerator), Building 2. It will have one floor with an allowance for a possible mezzanine to be added in the future. It will disturb about 30,000 sq. ft. of land, including its access ramp, with no additional parking spaces needed. As noted above, about 400 feet of the accelerator site's perimeter fence will need to be relocated about 20 feet outward to provide an adequate security clearance.

Storage will include accelerator components awaiting reuse or installation, records, and other routine warehousing. Some of the materials may be slightly radioactive, but there will be no radioactive waste stored in the building. The power will be provided by way of the transformer mentioned under the Technical Support Building. The utilities will be extended from an adjacent utility corridor, along with those for the adjacent Technical Support Building. No major upgrades to existing site services are required to support the operation and maintenance of this new building. No increase in staffing is foreseen to appropriately maintain this structure.

The 30,000 sq. ft. construction area is covered in grass and also may require some earth fill. The area just outside the existing fence contains trees and vegetation that will be cleared as necessary for construction and security purposes. The remainder of the site to be disturbed contains no trees or wet areas, including storm channels. The local area drainage will be affected and will be addressed along with the construction of the proposed Storage Building.

2.2.5 FEL Addition and Operation of Helios

The FEL Addition will be about 130 feet by 90 feet (22,600 sq. ft. total) and will be added to the FEL Facility, Building 18. The addition will have 2 floors and is needed to support the FEL, Helios, and other Jefferson Lab activities. Total land disturbance is about 25,000 sq. ft. including a new driveway and about 14 additional parking spaces.

The addition will house a test cave area, a synchrotron area, a multi-use clean room, a large general purpose experimental area, about 5 user labs, a receiving area, and general storage. The utility services will be added in parallel to those serving the existing building. Bulk materials (e.g., soils, concrete) may be added to shielded areas as part of routine maintenance or installed in non-shielded areas to enhance Jefferson Lab's ALARA program for radiation protection.

A new 15 MVA transformer will be installed to service this new addition and the Helios machine. Utilities will be provided through the existing electric service for the existing FEL Building. No major upgrades to existing site services are anticipated to support the operation and maintenance of this new building. Existing staff will primarily address the operation and maintenance of this structure and Helios and its support equipment. However, a small increase in staffing is foreseen both to support Helios and its experimental uses and to maintain this and the other new structures.

The proposed 25,000 sq. ft. building site is an area that has new growth pine and grasses and was previously identified as an expansion area for this activity. There is an adjacent storm channel that will be affected and require modification.

2.2.5.1 Helios Operating Parameters

As part of this proposed action, the new Helios machine would be operated at its 700 MeV (million electron volts) average energy to produce synchrotron light beams for experiments and other purposes. Additionally, it would be used simultaneously with the FEL to study the interaction of such light beams with a variety of materials for fundamental research purposes. The FEL may be modified to accommodate Helios, but no changes in FEL operating levels are identified in this EA. The proposed maximum operating levels of the Helios accelerator are presented in Table 1.

Table 1 Helios Operating Parameters

Parameter	Proposed Operating Level	Maximum Operating Level
Stored Energy[1]	16 joules	32 joules
Beam energy	700 MeV	1000 MeV
Beam current	0.8 Amps[2]	1 Amp

Operating beam current would vary depending on the nature of the experiment or test. The stored energy is the product of the beam power, with a normal range of 500 to 1000 MW (megawatts), and the circumference period of 32 nanoseconds. The circumference period is the time it takes the beam to go once around the machine. In the Helios synchrotron, once generated, this beam is stored at the beginning of a shift, at the energy shown, and typically circulates without interruption or additional intervention for periods of many hours. In addition to the operating constraints established above, before the Helios can be operated, a DOE Accelerator Readiness Review will be performed. Also the Final Safety Assessment Document (FSAD) (SURA 1994) governs accelerator operations at Jefferson Lab. As experience with Helios increases or the need arises, the FSAD may be modified to allow operational changes that are consistent with environmental constraints examined in this EA.

2.2.5.2 Helios Decommissioning

This machine should have an expanded lifetime, as it will operate independently from the FEL. However, as the machine is being installed and operated under this EA, disassembly and reuse or disposal are taken into account. Refer to Section 4.5.1.5 for a discussion of potential impacts from this decommissioning activity.

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[1] Stored Energy is the amount of kinetic energy of the particles circulating inside the machine. The hazards from having this small amount of stored energy are minimal. Note if the stored energy is terminated or dissipated, it can only be restored through manual re-injection by the machine operators.

[2] Ampere(s)

2.2.6 Schedule and Labor Requirements

The proposed improvements to Jefferson Lab will be accomplished in phases over the next five or six years. Construction labor required for the improvements would be drawn from the local or regional construction contractor community. There is sufficient capacity to support any or all of these actions.

Jefferson Lab staffing is projected, per the November 2000 Strategic Facilities Plan (SURA 2000), to increase from 611 in FY 00 to a high of 715 in FY 06 tapering off to 667 in FY 11. These numbers are subject to change based on the program needs. The new construction will support the existing staff, users, and facility operations as well as the growing staff and user community.

2.3 NO ACTION

The impact of taking no action on these proposed site improvements on the Jefferson Lab program is described below:

2.3.1 CEBAF Center Additions

If no action is taken on the proposal to put additions on CEBAF Center, the current site buildings will not have sufficient space to accommodate the growing staff and user community. In addition, the present CEBAF Center can not support the expanding computer center needs for storing information and the facility library and document control center will continue to be housed offsite. Office space is currently leased in the City of Newport News Applied Research Center (ARC), which accommodates some staff, and additional space is currently requested in the City's planned Technology Growth Building (TGB). The computer center is currently located in CEBAF Center; however, it needs a substantial increase in space to support both the Jefferson Lab's administrative operating needs and physics program demands. The majority of the computer center staff is currently located in a trailer complex called Trailer City (Building 16), a short walk from CEBAF Center. Computer Center staff in Building 16 is scheduled to relocate further away from the computer center when the TGB is completed strictly due to the lack of space on the Jefferson Lab site. No action would prevent the currently planned collocation of staff presently located in ARC and proposed TGB into CEBAF Center as described by the Jefferson Lab FY 2000 Strategic Facilities Plan (SURA 2000).

As a matter of practice, consolidation of functions and space in both existing and future facilities were reviewed. As identified, underutilized space is reallocated for high priority uses. Space standards are being put in place. Part time staff and users already share space and desks.

2.3.2 End Station Refrigeration Support Building

If no action is taken on the proposal to add a new end station refrigeration support structure, proposals for future physics experiments will be limited due to the lack of cryogenic system capacity. There is a continuous and increasing load on the existing cryogenic support systems. The current arrangements do not enable a more methodical maintenance program that allows sections to be shut down in turn to improve operations. A new building would allow these improved maintenance opportunities and a place to locate a new refrigerator to increase system capacity.

2.3.3 Technical Support Building

If no action is taken on the proposal to build a new Technical Support Building, the already insufficient space required to adequately house Jefferson Lab technical staff, that support the current and planned scientific programs, will become an important factor in maintaining both CEBAF and the FEL functionality. Some of the technician groups currently planned for moving to this building have shops in trailers (temporary structures) and the equipment and materials, that they regularly use, are kept in separate large storage containers.

This new building will allow consolidation of several functions, which will lead to increased productivity. The space currently occupied by the Cryogenics Fabrication Group in Service Building 98, which would move to the new building, will be reallocated to the Physics Target Group from the Experimental Equipment Lab, Building 90. This new location for the Physics Target Group will be adjacent to the experimental halls (Halls A, B, and C) where the completed targets are used. The vacated space in Building 90 will be reallocated to consolidate other functions. If this building is not built, the groups will still function, however less efficiently.

2.3.4 Accelerator Site Storage Building

If no action were taken on the proposal to construct a new Accelerator Site Storage Building, the facility would continue to use the very ineffective and inefficient shipping containers to store accelerator components and continue leasing offsite storage space. Currently there are at least 64 shipping containers (19,280 sq. ft.) on-site and over 9,000 sq. ft. of offsite leased storage space. Very few of the shipping containers are either heated or cooled and several are in a degraded condition. This alternative will not provide an effective long-term storage strategy. Alternate storage would still be required to replace the deteriorating containers.

2.3.5 FEL Addition

If no action were taken on the proposal to construct the addition to the FEL building, researchers would be denied the extra laboratory space for the FEL that is crucial to accommodate the growing user group in that facility. The six existing laboratories are already fully occupied and new requests are being received every week. It is important for basic materials research that the FEL supply the capabilities required of a cutting edge international research institution.

In addition, there will not be sufficient space in any existing on-site buildings to accommodate the operation of the Helios synchrotron light source for research. Not only will the materials research community be denied an important fundamental scientific capability but also it would put at risk research in advanced semiconductor fabrication in this country. The only other existing facility in the country with a lithography source such as this is in a small university environment and cannot accommodate the wide range of research activities possible in an extensive DOE research facility. Substantial research activities could not be performed in this country and some researchers would be forced to perform their research in Japan or elsewhere with those countries gaining the benefits that accrue from potential discoveries.

2.3.6 Helios Operation

With no action, the FEL would continue to operate as already described, but the physics community would miss out on the opportunity for interaction of the present FEL with the new synchrotron light source and its capabilities. The synergy between the operation of the FEL and the synchrotron provides research opportunities for a class of experiments called pump/probe which utilize first a pulse of light from one of the sources followed a short time later by a pulse from the other source. This is a very productive area of research, which is unavailable elsewhere in the world in this set of wavelength ranges. The international community would be denied an entire branch of materials research capability if such a facility were not constructed.

The materials research planned for the synergistic operation of this facility with the FEL will provide a heretofore-unavailable set of applied research capabilities. Substantial sets of materials (metals, crystals, semiconductors, and glasses) exhibit surface functionality changes under the influence of IR and UV light, which can be probed by the light pulses produced by the synchrotron. This pump/probe capability will be unique to Jefferson Lab.

In addition, the lithography research planned for this facility can only be performed at one other facility in the US, CAMD (Center for Advanced Microstructures and Devices) in Baton Rouge, Louisiana. Other countries are pursuing such research into higher computer chip densities and if such research uncovers successful approaches to densification, the U.S. may lose its lead as a primary developer of semiconductor processors. It is important for the future of the U.S. economy to maintain several independent research efforts into this important commercial arena.

2.4 ALTERNATIVES DISMISSED FROM CONSIDERATION

2.4.1 CEBAF Center Additions

The other alternative solutions that exist are to continue to lease the existing City of Newport News space adjacent to the Jefferson Lab site and to sign new leases for additional space elsewhere offsite to accommodate the growing program requirements. Continuing to lease City space adjacent to the site is more costly than building and operating DOE owned space. It is less efficient for personnel when they are not collocated. Inadequate space exists in the currently used City building to accommodate most of the CEBAF Center additions' intended functions. Leasing elsewhere offsite would be too inefficient and disruptive in the day-to-day operation and unduly restrict the Lab's collaborative research effort. It would not offer the long-term cost savings of owning the building as compared to leasing.

Two alternative sites were considered. The first is a wooded site east of Trailer City (Building 16) and west of Rattley Road. The second is a site south of the SURA Residence Facility and east of the Building 90 parking lot. Both sites were rejected in lieu of the preferred site due to function, proximity of staff, and cost of a new site versus expansion of an existing footprint. Collocation of office and associated support functions in the same area was felt to be of primary importance. CEBAF Center was designed with expansion in mind. Overall expansion of CEBAF Center would disturb less land and better utilize the current utility infrastructure.

2.4.2 End Station Refrigeration Support Building

The other alternative considered was to expand the Central Helium Liquefier (CHL) Plant, Building 8. The primary customer for the cryogens to be provided by the equipment in the new building is the experimental program in the end stations. In addition to transfer line and piping costs from the CHL negating any construction savings, the existing available space at the CHL is reserved for an addition to support a future upgrade to 12 GeV in the CEBAF accelerator. Thus, there is insufficient room at the CHL to support the end stations. The primary reason for having the refrigeration system near the end stations is to keep power losses from transporting the extra cryogens from the refrigerator to the experimental halls to a minimum. The existing refrigerator building that supports the end stations has already reached full capacity and other existing refrigerator buildings are too far removed from the end stations to be of service in a cost effective and efficient manner.

2.4.3 Technical Support Building

Another alternative considered was to lease additional space offsite. The functions involved are long term. Leasing offsite would be more costly and inefficient, as the groups would need to transport their support materials back and forth to the Jefferson Lab site.

An alternate site that was considered on the accelerator site was located adjacent to Building 89 and across the street from the CHL and the FEL Building. This site was rejected due to limited available access to the shop and it was felt the amount of paved area could be reduced if collocated to the proposed storage building. Another consideration was a proposed location just outside the tunnel road thus reducing the impact of loading and unloading on regular site traffic. This was rejected as collocation with the proposed storage building was considered to be more efficient use of the area.

2.4.4 Accelerator Site Storage Building

Other alternatives considered were to lease additional space off the site and obtain additional storage containers. Leasing additional space off the site does not correct the situation and the removal of all on-site- storage is impractical. Leasing additional space offsite will cost more over the mid and long term not only due to increasing lease costs but also to the travel time to access the material. Additional storage containers would in effect use more land area due to the inefficient nature of this storage method and cost more money over time to maintain the storage containers in good condition.

Alternate sites considered for the building were in the wooded area north of the accelerator site, an undisturbed area, and one east of Building 54 in a fairly congested area. The first site was rejected due to the higher development cost. The second site was rejected due to the potential congestion, poor accessibility from offsite, and drainage considerations.

2.4.5 FEL Addition

There are no alternative locations at Jefferson Lab or at other facilities that could accommodate the Helios machine and permit its capabilities for research into pump/probe. No building has sufficient space to operate the Helios or provide the radiation shielding required during injection. Even if that were available, no space on the Jefferson Lab site has sufficient area available to install the required instrumentation and perform the photolithography research planned for that machine. Inaction would prevent the utilization of the research tools available with Helios and further crowd the existing FEL support and research areas. The only other possible building location is very near the chosen site to the east of the FEL and offers higher cost and larger environmental impact for a reduced capability. The proposed addition is a modest and cost-effective way to enhance the U.S. research capability in this area and no realistic alternatives are available.

2.4.6 Helios Operation

There are currently no other alternatives for use of the Helios at this time. DOE has no other existing research tool such as the Helios accelerator that could be as easily modified to perform at the operating levels proposed by this action. The synergy between the operation of the FEL and the synchrotron will provide pump-probe research opportunities, which is unavailable elsewhere in the world in this set of wavelength ranges. In addition, the lithography research planned for Helios itself can only be performed at one other facility in the US, the CAMD facility in Louisiana. However, by integrating the functionality of the FEL and Helios, no other existing facility could provide the research opportunities that would open up at Jefferson Lab. Other countries are pursuing such research into higher computer chip densities and if such research uncovers successful approaches to densification the U.S. may lose its lead as a primary developer of semiconductor processors. It is important for the future of the U.S. economy to maintain several independent research efforts into this important commercial arena. To duplicate this capability anywhere else would be substantially more expensive and require similar levels or greater impact at those locations.

3. NEPA REVIEW PROCESS

3.1 SUMMARY OF 1987 AND 1997 EA

As mentioned in Section 1.1 of this document, DOE prepared an EA (DOE 1987) prior to the construction and operation of CEBAF. The EA evaluated and compared the impacts of the construction and operation of a facility to utilize CEBAF technology as opposed to an alternative technology (i.e., pulsed LINAC with pulse stretcher ring), and considered alternatives to the proposed site at Newport News, Virginia (i.e., Charlottesville or Blacksburg, Virginia). In the 1997 EA, a proposed change in operating parameters of CEBAF and the operation of the FEL were reviewed.

CEBAF produces an electron beam for experiments in nuclear physics, particularly for the study of quark structures and behaviors and the forces that govern the clustering of nucleons in the atomic nucleus. In the 1987 EA, impacts were evaluated for the proposed operation of an electron beam in the range of 0.5 to 4.0 GeV beam energy with a maximum beam power of 1000 kW. In the 1997 EA, impacts were evaluated for operation up to 8.0 GeV while maintaining the 1000 kW beam power limit. The EA also evaluated the operation of the FEL for producing a laser beam up to 20 kW IR and 10 kW UV (DOE 1997).

DOE issued a FONSI on January 12, 1987 for the 1987 EA and November 5, 1997 for the 1997 EA. The 1987 EA identified short-term impacts to air quality, groundwater, soils, and ambient noise anticipated from construction activities. No major environmental impacts, or adverse effects on worker and public health, were predicted for either CEBAF construction or operation. Construction of CEBAF was completed in early 1995, and regular operations commenced shortly thereafter. In the 1997 EA, releases of radionuclides to the environment that could have adverse effects on worker and public health and/or any ecosystem were analyzed and it was determined that no substantial impacts would be expected from the operation of CEBAF or the FEL at the operating parameters noted above, and as construction would be minimal, there were no anticipated short-term impacts to air quality, groundwater, soils, and ambient noise.

3.2 OTHER ENVIRONMENTAL REVIEWS

Since the 1987 EA and FONSI were issued, some modifications and alterations have been made to facilities and land areas at the Jefferson Lab site. These changes have included the construction of support buildings and other improvements to maintain CEBAF and FEL operations. Before these changes were implemented, they were examined relative to activities covered in the 1987 EA to determine whether further environmental reviews were necessary. All actions were either categorically excluded using criteria in Subpart D of 10 CFR 1021, DOE NEPA Implementing Procedures, or determined to be part of the original scope of actions covered in the 1987 EA (SURA 1990; 1993; 1996). A new EA was prepared in 1997, as further discussed below, for the proposed increase in the maximum CEBAF beam energy up to 8.0 GeV and the operation of the FEL as described in Section 3.1.

The 1997 EA reported the results of an assessment of the potential for increased radiological releases due to increasing the CEBAF beam energy for the purposes of accelerator testing and operation, from energies up to 4.0 GeV with a maximum beam power of 1,000 kW, to energies of 4.0 to 8.0 GeV with a beam power not to exceed 1,000 kW as averaged over a one-week time period. This small variation in operating power level enables CEBAF operations staff to perform occasional small adjustments in beam current levels without exceeding established administrative and operational limits.

The three primary sources of potential impact identified and examined in the 1997 EA were: radiological impacts on occupational health, radiological impacts on public health, and induced radioactivity in groundwater. On examination, as the beam power would not increase beyond the present level set for

4.0 GeV operations, no increase in radiological doses to workers was expected. In evaluating offsite radiological exposure, it was determined that skyshine radiation exposure, the chief source to members of the public, would not increase, but would likely decrease with the rise in beam energy to 8.0 GeV. Therefore, no increase in exposure to the public, even taking into account the small amount of additional airborne radiation that would be generated, would be expected. For the same reason, that is, no effective increase in beam power, the activation of groundwater near the accelerator was expected to remain minimal but constant (Stapleton, G. et al. 1997). Therefore, the groundwater activity levels should remain well below the 5 pCi/ml (picocuries/milliliter) limit of the Commonwealth of Virginia Pollutant Discharge Elimination System (VPDES) Permit that primarily addresses CEBAF operation (VPDES 2001). Thus, it was determined that the action described in the 1997 EA and FONSI did not have the potential for causing impacts beyond those documented in the 1987 EA and FONSI.

In addition, the commitments reported in both EAs and FONSIs were reviewed in the course of writing this EA to determine whether they had been addressed appropriately. All of the commitments identified in the two EAs were either performed in the course of ongoing activities, such as installing temporary shielding to limit radiation dose to the general public or, as needed, as when the requirement for a new permit was identified. In line with the commitments in both EAs, current procedures are updated and new procedures are instituted as identified by Jefferson Lab staff and by the DOE. With commitments and best management practices in mind, the DOE has frequently interacted with federal, state, and local agencies and authorities to stay informed of regulatory and policy changes that could affect the operation of CEBAF and the FEL.

3.3 SCOPE OF THIS EA

The DOE prepared this EA with the assistance of SURA and Oak Ridge Operations Office staff, pursuant to Sect. 102 of NEPA of 1969 (Public Law 91-190), as implemented by regulations promulgated by the President's CEQ (40 CFR, Parts 1500–1508, November 1978 and changes) and DOE NEPA Implementing Procedures (10 CFR Part 1021, April 1992 and changes). It is intended to:

- provide sufficient evidence and analysis for DOE to determine whether to prepare an Environmental Impact Statement (EIS) or a FONSI;
- assure that DOE complies with NEPA when an EIS is not necessary; and/or
- facilitate preparation of an EIS, should one be determined to be necessary.

Pursuant to Sect. 1508.9 of the CEQ regulations, this EA presents information and analyses of the proposed action and all reasonable alternatives. Section 2 describes the proposed construction actions and alternatives for each activity and notes some of the potential environmental impacts of each. Regarding Helios, the proposed Helios operating parameters are presented in Section 2.2.5.1. The discussion on Helios includes the 'no action' alternative in Section 2.3.6 and the lack of other alternatives in Section 2.4.6. Section 4 describes the existing environment and reports the environmental, safety and health impacts of the proposed action. The discussion of impacts includes a description of any adverse effects that cannot be avoided should the proposal be implemented, irreversible impacts, if any, and any mitigation measures needed to minimize adverse impacts.

The proposed action involves construction of up to four major additions to the CEBAF Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technical support building, a new refrigeration service building, and an addition to the FEL Facility). See Figure 2 for a site map showing their locations. The FEL Addition will be the location for the installation and operation of the new high-energy lithography source called Helios. The improvements addressed in this EA will assist the Laboratory in making full use of this national

physics resource by better accommodating existing staff and additional research personnel and by extending research capabilities with the addition of a new synchrotron light source.

The proposed action primarily involves new construction activities and does not involve operational changes or equipment modifications to CEBAF or the FEL. Thus, the impact analysis in this EA focuses on (1) the temporary impacts due to some fairly large-scale construction actions on surface water, air quality, and noise concerns; (2) the ultimate changes in site land use due to these actions including effects on terrestrial resources and stormwater control and effects from building operations; and (3) the installation and operation of Helios and the assessment of the potential for radiological impacts to the public and workers and the potential for activation in the surrounding environment. There is little potential for adverse impacts from any of the following focus areas: long-term non-radiological air quality; groundwater activation; geology and soils; floodplains; wetlands; or community resources including cultural and socioeconomic effects.

4. THE EXISTING ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

This chapter describes the community and human elements that partly make up the local environment that could be affected by the proposed action. These elements include regional setting and climate, general area land use, available community resources, natural resources, worker and public health and safety and impacts from operation of the Helios.

The proposed action is expected to have moderate impacts due to land disturbance during construction (temporary); moderate to minor impacts due to long-term land use and building and Helios operation; and minor safety and health impacts from all identified activities. Note that only potential negligible impacts due to noise, non-radiological air quality, radiological air quality, surface water quality, ecology, floodplain and wetlands, and threatened and endangered species are expected. There should also be no substantial adverse impacts on groundwater, geology and soils, cultural resources, socioeconomic, and environmental justice concerns. Thus, the impact analyses that follow, that include items of regional and community concern, focuses on temporary land disturbance concerns, Helios as a radiation source, and related potential impacts to stormwater management, ecological resources, and human health.

The sites proposed for construction, all within the developed sections of the site are in the proximate vicinity of existing structures and support areas such as parking lots and utility corridors. The proposed substantial additions to floor space and parking for each of the new construction projects should provide long range building and travel usage efficiencies and some aesthetic benefits that may not be fully addressed in this EA.

All comments received from reviewers of the draft EA have been satisfactorily addressed in this final NEPA document. Reviewer satisfaction was confirmed and is documented by the correspondence included in Appendix B.

4.2 REGIONAL SETTING AND CHARACTERISTICS

4.2.1 Site Location

Jefferson Lab is located in Newport News, Virginia. Newport News is bounded on the east by York County and the City of Hampton; on the north by James City County and the City of Williamsburg; on the west by the James River; and on the south by the Hampton Roads waterway. Jefferson Lab is located just east of Jefferson Avenue, a main area thoroughfare, and is less than one mile to the west of Interstate 64. The site is just south of Oyster Point Road and just north of Middle Ground Boulevard. The general vicinity layout of Jefferson Lab is included as Figure 1. Two schools and railroad tracks serving the local rail system are located within one mile of the site. Newport News-Williamsburg International Airport is located two miles to the north. Figure 2 shows the Jefferson Lab site property and the proposed building sites identified in this EA.

Jefferson Lab is sited in the northern section of Newport News at an average elevation of 34 feet above mean sea level (MSL). The site elevation ranges from approximately 29 to 35 feet above MSL, which is above the 100-year floodplain level of 13 feet above MSL. The Jefferson Lab site is located in the coastal plain of the lower York-James Peninsula. The site is a part of the Brick Kiln Creek watershed, which discharges into the Big Bethel Reservoir. Big Bethel Reservoir is operated by the U.S. Army and

provides drinking water to Fort Monroe, Langley Air Force Base, and the National Aeronautics and Space Administration (NASA)-Langley Research Center.

4.2.2 Local Climate

The meteorology of the Jefferson Lab site is strongly affected by the nearby marine environment. The Chesapeake Bay moderates the climate and weather of the site, with land-sea breezes dominating the wind patterns during much of the year. The mean monthly temperature for the Newport News area ranges from 4°C (40°F) in January to 26°C (79°F) in July. The record low temperature is -19°C (-3°F) and the record high is 40°C (105°F). Note that temperature values are based on information from the International Station Meteorological Climate Summary, Version 4.0 (Washington Post 2001). Data is compiled using a 57-year history.

Normal annual precipitation is 112 cm (44 in.) spread evenly throughout the year. Extreme precipitation events, caused by hurricanes or tropical cyclones, have deposited as much as 29 cm (11.5 in.) of rain in a 24-hour period. Average snowfall is 23.1 cm (9.1 in.), but up to 35 cm (14 in.) has fallen in a month. Because of the proximity of the Bay, fog is a common occurrence in the area. Heavy fog, reducing visibility to less than 0.4 km (0.25 miles), occurs an average of 23 days/year. Severe weather, in the form of thunderstorms, averages 37 days/year. Tornadoes are rare in coastal Virginia but may be spawned by severe thunderstorms or when associated with hurricane or tropical cyclone activity. Hurricanes average less than one per year in Virginia, but have caused both wind and flooding damage to the area since colonial times (Gale 1978).

4.2.3 Air Quality

The Jefferson Lab site is located in the Hampton Roads Intrastate Air Quality Control Region (AQCR) 223. The AQCR is in attainment with all criteria pollutants: sulfur dioxide, nitrogen dioxide, total suspended particulates, carbon monoxide, ozone, and lead, but remains a Clean Air Act maintenance area for ozone.

4.2.4 Site Conditions

The proposed construction areas, all located on DOE property, do not have any known chemical, radiological, or other contamination in area soils, surface waters, or groundwater. The 1987 EA noted that the facility would be located on previously disturbed land, referring only to the areas around the existing buildings (DOE 1987). One of the buildings, now called the Test Lab, did have radiological contamination but was successfully cleaned up prior to occupancy by Jefferson Lab. Although a new site specific environmental investigation was not performed specifically for this proposed action, the DOE has determined that, as there has been no reported spills or known contamination found on the DOE owned property to date, except as noted for the Test Lab, and that groundwater monitoring across the site has been performed since 1989 and has identified no water quality concerns, that no site investigation is necessary at this time. The determination that no new investigation was necessary is based on these sources of information: the 1987 EA (DOE 1987); on-site groundwater monitoring records from permitted wells (VPA 1989, VPDES 2001); results from sampling effluent at a permitted groundwater withdrawal point (DEQ 1994); a search of databases in January 2002 for local area information that included reported spills and waste facilities; environmental reports provided annually to the DOE and the public; and Jefferson Lab staff knowledge. It is understood that conditions at each of the construction areas will be evaluated during the course of the excavation work, and if concerns are identified, appropriate mitigating actions will be taken as noted in Section 4.4.

4.3 COMMUNITY RESOURCES

4.3.1 Demography and Settlement Patterns

The Jefferson Lab site is now part of the Jefferson Center for Research and Technology, and is situated just north of Oyster Point Industrial Park.

The population of Newport News has steadily grown over the last 20 years, since documented in the 1987 EA. The 2000 census showed that 180,150 people lived inside Newport News (U.S. Census Bureau, 2001) vs. 144,903 in the 1980 census. The growth rate since 1980 is 24%. The Metropolitan Statistical Area, that includes Norfolk, Virginia Beach, and Newport News was estimated to have a population of 1,562,635 in 1999, up 30% from the 1,201,400 documented in the 1987 EA.

4.3.2 Area Land Use

The local Oyster Point area was developed to serve industrial and business needs, and both City and industrial development continue throughout the area. The proposed project will take place on land already occupied by Jefferson Lab. The sites for each of the proposed construction actions are directly adjacent to existing facilities that are used in support of the Lab's mission.

4.3.3 Public Services

The city of Newport News has an adequate quality and quantity of public utilities and services to support Jefferson Lab and the continued area development. The proposed action would have a negligible impact on current public services.

Natural gas is supplied by Virginia Natural Gas Company. The electrical service is provided by Dominion Virginia Power and is brought onto the site by 3 feeder lines, including through a 40 MVA master substation on the accelerator site. Water to serve site usage is provided by the City of Newport News Waterworks via two water mains. The Hampton Roads Sanitation District (HRSD) handles sanitary waste and local area landfills accept generated trash. Fire and Emergency Services are provided by the City of Newport News, with the closest station within one-half mile from the site.

4.3.4 Transportation

All vehicles traveling to the site gain access by way of Jefferson Avenue (Route 143) with a limited access entrance via Canon Boulevard. Both roads are capable of supporting current traffic loads. This proposed action is expected to have little to no effect on local traffic.

4.3.5 Economic Structure

The 1987 EA identified that there were over 150,000 people participating in the Virginia Peninsula labor market. The City of Newport News Department of Planning and Development has updated that figure so that it is estimated that there are 760,000 people currently participating in the highly diverse Peninsula labor market. Note that the Peninsula refers to all cities and counties south of Williamsburg. Newport News firms draw employees from across the Peninsula, the Norfolk-Portsmouth areas, and other areas within driving distance. Service, manufacturing, technical, sales, and administrative support positions make up a majority of the work force.

Labor for proposed construction projects would be drawn, project by project, from the area labor pool by the respective subcontractor. Minimal new staffing is expected, as practically all the labor to staff the new structures and to operate the Helios would be drawn from the pool of SURA staff and visiting researchers that already are present at Jefferson Lab. Therefore, only minor impacts to the local population, services, and economy would be expected during the larger construction projects, otherwise no impacts would be expected.

With regard to environmental justice, there would be no disproportionate adverse impacts on minority and economically disadvantaged populations in the Newport News area because no major adverse impacts are expected from any aspects of the proposed action. This is because any identified adverse impacts would be limited to the Jefferson Lab site.

4.3.6 Historic, Aesthetic, and Cultural Resources

No previous investigations have been performed to determine the presence of subsurface historic or archeological features. This was based on a Virginia Historic Landmarks Commission determination that one was not needed, as cited in the 1987 EA. The Project Review Supervisor at the Commonwealth of Virginia Department of Historic Resources (VADHR) advised DOE in 1992 that no adverse impacts to archaeological and historic resources would be expected from activities at Jefferson Lab. It was also documented that no survey was required when the 1997 EA was prepared. Major construction has occurred since 1987 and no trace or sign of historic or archeological value has been noted. For this action, the DOE requested reaffirmation that no survey was required through a letter to the VADHR. The VADHR responded with a request for information on the age of existing site structures, which were provided to the VADHR by letter, dated August 29, 2001. The VADHR responded, in a letter dated September 6, 2001, reaffirming that the proposed actions in the EA will not affect historic properties. Based on the correspondence regarding this action (see Appendix B), it is apparent that no archeological surveys need to be performed.

The local peninsula area has a vast array of cultural and historic resources, with none in the immediate vicinity of Jefferson Lab. The current facility has preserved some visually pleasing original vegetation buffers along the periphery of the site. Landscaping around buildings and along the main site entranceways was performed for aesthetic reasons.

There are no impacts to any historic or cultural resources, so no mitigations are addressed. If an item or evidence of an area of historic significance were found during this project, no action would be taken until an appropriate mitigation strategy was worked out. As for aesthetics, various trees at CEBAF Center and the FEL Addition and a portion of the vegetation buffer at CEBAF Center and the new Storage Building will be removed under this proposed action. These actions will be mitigated by incorporating native plant species that are low maintenance and resource-friendly into the landscaping at each of the disturbed areas.

4.3.7 Not Applicable Considerations

The Commonwealth of Virginia Department of Conservation and Recreation, Division of Natural Heritage (VADCRDNH) confirmed, in correspondence to the Commonwealth's Department of Environmental Quality (DEQ) dated November 20, 2001, that this action would not affect federal or state listed rivers or have an impact on existing or planned recreational facilities. As well, the Virginia Department of Transportation said there would not be an impact on existing or planned transportation facilities. The Commonwealth's Department of Forestry said there would be no significant impact to Virginia forestlands, however, precautions to protect trees in the vicinity of the construction projects will be taken as identified in Section 4.4.9.2.2. Other actions that did not have to be considered in this EA involve prime farmland, Native Americans, aesthetically important areas, scenic rivers, and special natural resources such as aquifers.

4.4 RESOURCES AND ENVIRONMENTAL IMPACTS

This section presents the expected level of environmental impacts for each factor that is taken into account for this proposed action. The three main focus areas, construction impacts, long-term land use and building operations, and impacts due to Helios, are noted below. Areas with minimal or no impact are noted in Section 4.3.7. Impact information on specific species is discussed in Section 4.4.9. The DOE

advocates P2 principles that include source reduction, energy efficiency, waste minimization, and EPP. Therefore, the DOE intends to integrate these principles into all phases of the proposed action.

This assessment takes into account that, by implementing the general performance criteria provisions of the Chesapeake Bay Preservation Area Designation and Management Regulations (CBPADMR), the impacts to the environment will be minimized to the extent possible. These provisions include minimizing erosion potential, reducing the land application of nutrients and toxics, maximizing rainwater infiltration, and ensuring that these performance criteria are incorporated in a long term site strategy.

Construction Effects:
The proposed construction areas are all located on DOE property. There is no known chemical or radiologically contaminated soil or groundwater within the limits of the proposed construction sites or anywhere on the DOE property. If any unusual materials are encountered at any of the construction sites, sampling will be performed to identify possible contaminants. If any are identified, all appropriate means will be taken to remove contaminated materials and provide for proper disposal. Also, soil conditions within the proximity of an accelerator enclosure or building will be checked by radiation control staff in the course of any excavation to verify that no special soil handling precautions are necessary. If a problem is identified, the soil will be collected as directed by radiation control staff and disposed of as a low level radioactive waste. Refer to Section 4.2.4 for more information on existing site conditions.

Construction activities and the resultant disturbance will be separated by both location and phasing and would be spread over a number of years. Each specific construction activity would range in duration from one to three years. All new structures and their associated parking will have a moderate impact on local drainage patterns, so surface water and stormwater are addressed in Section 4.4.2. Air and noise quality impacts, potential transportation effects, and waste management implications resulting from construction activities are also presented starting at Section 4.4.4. As each of these concerns can be mitigated with proper planning and controls, no large impacts should result.

In order to integrate environmental stewardship and P2 principles into the construction phase, the DOE intends to perform the following: include related guidance and directives in the building design scopes and encourage and support opportunities to conserve natural resources during design and construction that could aid in minimizing impacts.

Long-term Land Use and Building Operations: The multiple construction projects will involve the disturbance of about 8 acres of vegetated land, with the permanent removal of almost all of it from serving its natural drainage function. Some of the disturbed land will end up reducing local wind and noise buffer zones. The impacts due to the change in local land use and utilizing the new buildings are considered here. The proposed changes are needed to support Jefferson Lab operations and the land disturbance is typical of that occurring throughout the local area. The entire Oyster Point area, including the Jefferson Lab site, is zoned for industrial use. This means that continuous industrial-related development by Jefferson Lab, the City, and by neighboring businesses is a normal process. Jefferson Lab, through long range planning, attempts to minimize land disturbance. Jefferson Lab will use best management practices to optimize building and parking layouts to minimize negative effects to the environment.

The architect/engineering firm tasked for each building will be required to design the buildings to incorporate healthful and environmentally beneficial features into the structures. The Jefferson Lab Environmental Protection Program elements that encourage reducing waste at the source,

promoting the reuse of items, and recycling to the maximum extent will be emphasized by line management and integrated into the building designs to the extent possible.

Also in place is the Spill Prevention, Control, and Countermeasure (SPCC) Plan that is the site program to minimize spills from any oil-containing items and the contractor's Environment, Health, and Safety (EH&S) Manual procedures that document the procedures for the proper handling and storage, including secondary containment for chemicals and/or waste materials stored outside.

Proposed construction and use activities at the projects within the accelerator site would not change the accelerator site's industrial nature. Only a small part of the forested buffer to the south will be disrupted. The actions at CEBAF Center, which is located closest to Jefferson Avenue, will result in some forest buffer removal and this will have at least a moderate impact on the environment. The installation and operation of Helios in the proposed FEL Addition will simply augment the research activities already in progress, so no change in land use is associated with Helios operation.

Note that all potential impacts regarding land use, building and site layouts, and building operations will be mitigated and addressed during planning and incorporated into the individual project scopes. Factors that could have long-term effects are considered in the discussions below.

Helios Installation and Operation: Helios installation and operation will occur within the proposed FEL Addition. The effects of the construction of the FEL Addition are addressed above. Thus, this portion of the impact analyses addresses (1) installation of Helios in the FEL Addition, (2) operation of Helios as an independent device, (3) new experimental apparatus within the proposed FEL Addition, (4) operation of Helios to support experimental apparatus, and (5) operation in conjunction with the existing FEL machine.

This analysis is being prepared to assess the potential for radiological and non-radiological impacts to the public and workers and the potential for activation in the surrounding environment. The factors to be considered, indoor and external radiological air quality, the potential for water activation both within and outside the building, worker safety, and worker and public health concerns are primarily addressed in Section 4.5. Very minimal to minor impacts are expected, as the radiation and power levels involved with Helios operation are very small and is thus a very low hazard machine. Helios operations will use the same type of controls and support equipment that is currently in use for the existing CEBAF and FEL accelerators.

4.4.1 Coastal Zone Management Act Considerations

4.4.1.1 Coastal Zone Management Act (CZMA) as implemented in Virginia as the CBPADMR

All of the relevant regulations under the CZMA that could apply to the activities described in this proposed action have been taken into consideration in this EA. According to City of Newport News Department of Planning and Development correspondence dated April 25, 2001 included in Appendix B, there are no areas on the Jefferson Lab site that are designated as either a Resource Protection Area (RPA) or a Resource Management Area (RMA) under the CBPADMR. As further documentation of the site status under the CBPADMR as requested by the DEQ, an area review to determine the presence of RPA features was performed in early 2002. This review clarified that there is at least a 500 foot separation between the DOE site and any designated RMA so that the site does not encroach on any RMA or RMA buffer zone. The local RMAs are located as show on Figure 4. Area soil maps indicate that there are no City of Newport News defined "highly erodible soil" types on the Jefferson Lab site. As this was the only

potential RPA or RMA feature on the site, it is concluded that there are no RPA or RMA features that need attention under the CBPADMR.

As the site is situated on a coastal plain where it could potentially have a small impact on downstream CZMA designated areas, the DOE has provided a Certification of Consistency in Section 4.4.1.2. The resources described in the relevant CZMA regulations, and how DOE is addressing them and any necessary mitigation measures in regards to the proposed action, are discussed below. Based on this EA review, it appears that there should be no adverse impacts to any of the resources described under the CZMA, which includes resources in any designated Chesapeake Bay Preservation Area (CBPA).

4.4.1.2 CZMA Consistency Certification

Although the Jefferson Lab property does not fall under the purview of the applicable Virginia law, the Chesapeake Bay Protection Act, the requirements of the CZMA have been reviewed. To be consistent with the CZMA programs, the DOE intends to obtain all applicable permits and approvals listed in the Virginia program prior to commencing this action. Upon granting of a permit or other approval, the DOE affirms that it will comply with any identified terms and conditions, as well as with the goals and objectives of the CBPADMR and other relevant regulations, to the maximum extent practicable. How the requirements of the CZMA are being addressed regarding this proposed action are discussed here.
The applicable Regulatory Programs that require addressing under the CBPA and Virginia's Coastal Resources Management Program (VCP) follow:

- Coastal Lands Management: The Jefferson Lab site in Newport News has not been designated by the local government as a Chesapeake Bay RPA or RMA, as defined in §10.1-2107 of the CBPA. This was documented in correspondence dated April 25, 2001, which is included in Appendix B. The average site elevation, of roughly 32 feet above MSL, places Jefferson Lab outside of the nearest RMA. Refer to Figure 4 for the locations of local RMAs.

  By taking due care to avoid, or minimize as possible, the discharges of any sediments from any of the construction areas, no impacts beyond the immediate construction areas are expected, so there should be no chance of any effect beyond the site boundary. There will be only minimal discharges, such as from cooling towers, expected from the use of the new buildings and Helios. Therefore, there is effectively no chance of any impact to any downstream coastal areas of concern.

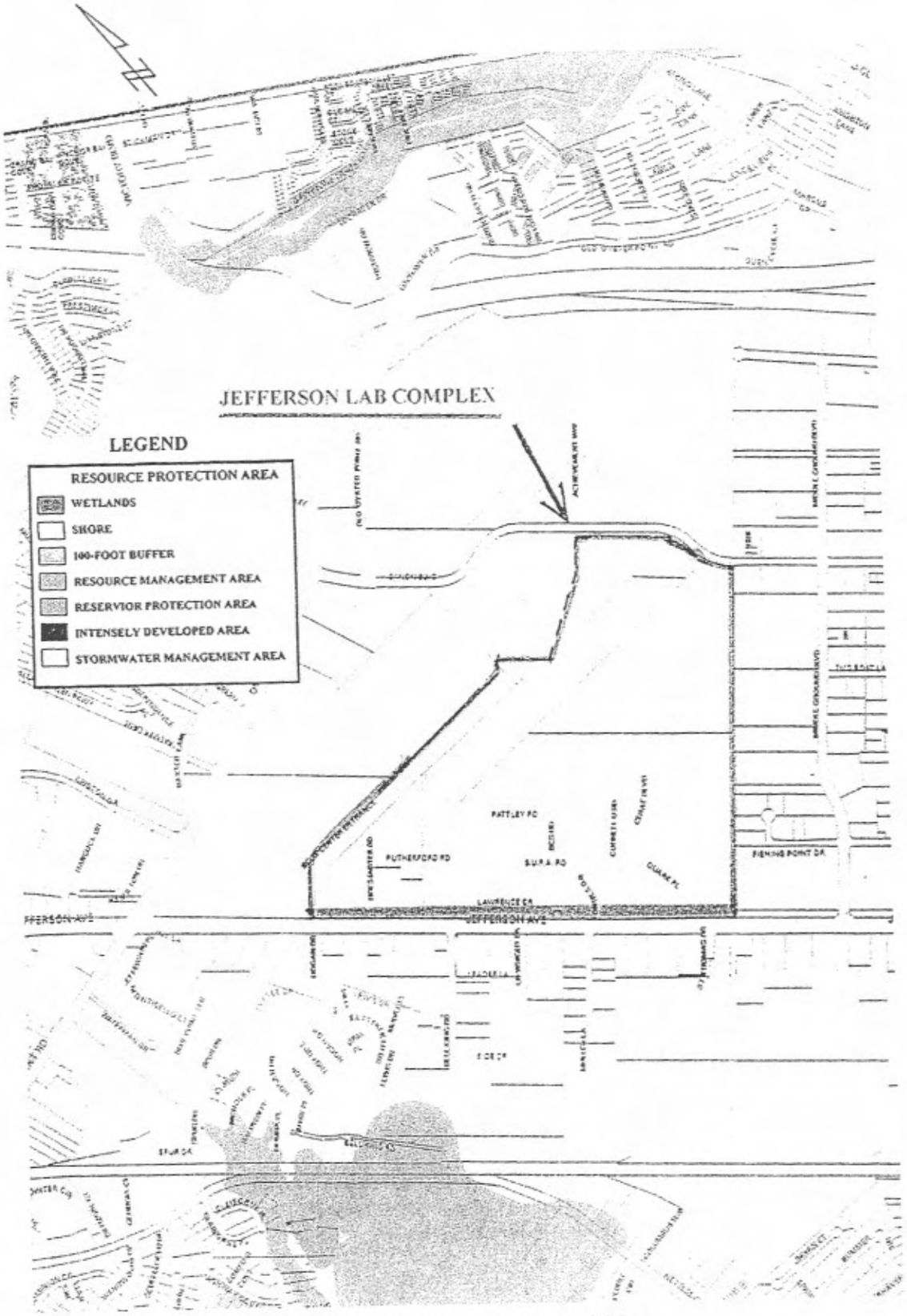

Figure 4 Jefferson Lab Area RMA Map

- Wetlands Management: No wetlands were identified at any of the proposed construction sites as identified in the Wetland Delineation and Threatened and Endangered Species Survey (REMSA, Inc. 2001). The Corps of Engineers, as documented in Appendix B, verified that none of the proposed construction areas had any wetlands. As land disturbance will be strictly limited within the defined construction sites, there will be no impact on adjoining on-site areas and, therefore, no impact that would disturb or otherwise affect any other wetlands that could be in the general vicinity of the laboratory. Any discharges from building operations, such as cooling towers, if directed to existing storm channels, should have no adverse affect on any downstream wetlands. As no offsite impacts are expected from construction or operations, no coastal or other wetlands should be affected by this proposed action.

- Non-point Source Pollution Control: All construction projects will be managed for erosion and sediment control, following at a minimum the Virginia Erosion and Sediment Control Law. This proposed action would have a temporary moderate impact at each construction location. To mitigate this disturbance, Erosion and Sediment Control (E&SC) plans will be required for each individual activity, and one or more permits will be obtained as identified applicable. Proper E&SC practices, to be overseen by a robust inspection program, will ensure that impacts are restricted to within the limits of construction for each activity. No other disturbance to the Jefferson Lab site beyond the construction limits is expected. There should be no non-point sources affecting surface water from building use or Helios operations. So, no offsite effects at any downstream locations are anticipated.

- Stormwater Management: Stormwater retention BMPs will be implemented with the new projects in order to address runoff concerns, such as from construction-related sediment. The practices to be implemented will be identified in a pending stormwater management study. Refer to Section 4.4.2.2. The DOE will implement control measures consistent with the performance standards in the CBPADMR so this proposed action should not have a negative affect on offsite stormwater quality.

- Point Source Pollution Control: The only potential point source discharges are from: construction dewatering, which is expected to be none to minimal; cooling towers for equipment, with expected minimal to moderate amounts of discharge; and accidents, with a low to minimum likelihood of occurrence. No more than minor impacts would be expected from these possible point sources, as the discharges would be no different from those already addressed under existing programs. These programs include E&SC Plans, permits, and other site programs that address spill control and accident prevention. Any identified dewatering or cooling tower discharges would likely be incorporated into an existing site permit, with new permits obtained if identified necessary (VPDES 1998; HRSD 1999). No offsite impacts are expected.

- Air Pollution Control: No local or regional impact on National Ambient Air Quality Standards (NAAQS) parameters is expected from the construction activity, building use, or from Helios operation. Refer to Non-radiological Air Quality in Section 4.4.4.

The Jefferson Lab site is not directly adjacent to beaches or tidal areas so a number of enforceable regulatory programs comprising the VCP do not apply so are not addressed here. These programs are: the Fisheries, Subaqueous Land, Dunes Management programs, and Shoreline Sanitation.

No potential downstream effects on Coastal Natural Resource Areas and other shorefront property identified in VCP Advisory Policies are expected. Refer to the sections above on how non-point and point source pollution control shall be addressed.

4.4.2 Water Resources

The facility site is located on the York-James peninsula, situated between the York and James Rivers, part of the eastern Coastal Plain of Virginia. Groundwater is located at shallow depths and drainage is provided to alleviate seasonal flooding due to heavy precipitation. Even with proper drainage controls, the site is susceptible to flooding from major precipitation events.

As land disturbance will be phased by project, the DOE intends to use controls to maintain water quality and flow quantities during significant rainfall events during construction and long term operation so as not to have a major impact on or off the site. The next two subsections address the situations involving surface water quality and stormwater flow.

4.4.2.1 Surface Water

On site surface flow is made up of rainfall, of which a small fraction is from City property, ongoing structural dewatering effluent, and some cooling tower discharges. The DOE facility is located in the watershed of Brick Kiln Creek, which discharges to the Big Bethel Reservoir. An area topographic map is provided as Figure 5 at the end of this Chapter. There are no perennial streams on the site, though there are some small, ephemeral streams and storm channels just beyond the DOE site boundary. Localized ponds that form during storm events are drained through surface channels and groundwater recharge. Stormwater flow management is discussed in Section 4.4.2.2.

The Big Bethel Reservoir, located roughly 2.7 km (1.7 miles) east of the property, is owned by the U.S. Army at Fort Monroe, and is the water supply for 20,000 personnel at Fort Monroe, Langley Air Force Base, and the NASA Langley Research Center. The U.S. Army surveys the water quality of the Reservoir. The DOE Site Office informs the Fort Monroe U.S. Army Corps of Engineers annually regarding groundwater withdrawal quantities and other information that could affect the flow to the Big Bethel Reservoir.

In the course of implementing this proposed action, the DOE shall comply with the terms of applicable federal, state, and local regulations and directives with regards to surface waters, including Virginia's Erosion and Sediment Control, see below, and stormwater management programs, see Section 4.4.2.2. The DOE will cooperate with state, regional, and city agencies and departments to ensure that surface water quality concerns are given appropriate consideration through all activities described in this EA. DOE will ensure that SURA flows down applicable provisions of federal and state agency policies and mandates to its subcontractors as required in the DOE/SURA Contract.

> Construction: Expected impacts could result from erosion and sedimentation to on-site stormwater channels and from increased storm flows with the loss of vegetated ground from land disturbances during on-site construction. Up to 5 acres would be affected at any one time, for a total of about 8 acres overall. Impacts due to the potential for increased storm flow runoff are discussed in Section 4.4.2.2.
>
> Standard erosion control measures would be implemented prior to and during disturbance of soils to minimize runoff and the potential deposit of sediments in surface waters and include the protection of stockpiled earthen materials. These measures would be identified in the form of one or more either site-approved or agency-approved E&SC Plans. The plan or plans would be prepared and provided to the DEQ in support of a General VPDES Permit for Discharges of

Stormwater Associated with Construction Activity that will be obtained prior to the initiation of any construction activity. As E&SC plans will be utilized to minimize any disturbance outside of the immediate construction area, there should be no impacts due to erosion or sediment on adjacent on-site or offsite areas or regions further downstream that may have CBPA designations. No mitigation of impacts from sedimentation is expected to be necessary after construction and area stabilization is complete.

It is anticipated that there will be no herbicides or pesticides, beyond termite controls, used during construction. If identified necessary for a specific problem, the product will be selected so as to minimize toxicity and used only in accordance with manufacturer's instructions.

Operations and Use: The actions identified in this EA are not expected to influence the quantity or quality of the dewatering effluent that is discharged from the experimental halls to the surface. Cooling towers that discharge to the surface are discussed under 4.4.1.2. At least one new cooling tower has been identified under this proposed action. There would be only minor changes to surface flow and minimal impact to site surface water quality as a result of this action. Incorporating the tower effluent into an existing site permit (VPDES 1998; HRSD 1999), after coordination with either the DEQ or the HRSD, would address the mitigation of this discharge. Impacts involving stormwater flow during long term building operation and use are discussed in 4.4.2.2.

Long-term operations should not result in an increase in the use of vehicles on the site and the implementation of existing site practices and procedures will ensure that potential contaminants are properly transported and stored. There are no plans for outside storage of liquids included in this proposed action.

If any herbicides, pesticides, or fertilizers are to be used during normal operations and landscape maintenance, an integrated approach will be used. The herbicide, pesticide, or fertilizer will be selected so to minimize toxicity and would only be used according to manufacturer's instructions. Any usage of toxic materials within the proximity of any storm channel would be prohibited. As a result, very limited impacts from the use of chemicals for pest control and landscape maintenance are expected, as use will be carefully managed, with no such materials being stored on the Jefferson Lab site. There should be no impact from unintentional applications, spills, or runoff to surface waters.

With no changes in dewatering quantities, using properly implemented E&SC measures, incorporating cooling water discharges into an existing permit, using stormwater controls noted in Section 4.4.2.2, and by strictly minimizing the use of any toxic substances, only minor impacts on the site and no impacts on offsite surface waters are predicted from construction or from building and Helios operations as described in this proposed action.

4.4.2.2 Stormwater Control

The removal of wooded and other vegetated areas from serving their natural functions continues in the Oyster Point area, as the City and other Oyster Point area developers continue to restructure the local landscape. This area development, as performed throughout the business and industrial zoned Oyster Point area, has added more challenges to the City management of area stormwater, and the DOE will cooperate as practicable. The City, in a letter dated December 20, 2001 in response to the draft of this EA, questioned the Jefferson Lab site's current and future stormwater retention capability.

The site's current retention is structured so that almost all non-developed site areas and all storm channels are vegetated to the extent possible and the change in elevation across the site is minimal so surface

waters generally permeate into the ground or move slowly across the site. The vegetated open grounds and storm channels collect storm runoff, from the Jefferson Lab site and a fraction of the City property, and Jefferson Lab dewatering and cooling tower effluents. Note that there are two sluice gates, one at each of the two site water outflows that were installed as control measures to contain chemical or oil spills on the DOE site and were not intended to control stormwater.

The DOE will address runoff as provided in applicable Federal, State, and local regulations and agreements, including the general performance criteria identified in the CBPADMR, and the terms and commitments for a planned VPDES general permit for Stormwater Discharges During Construction Activities. The effects on surface waters and site retention capabilities from additional loading due to stormwater runoff, both during construction and with long-term operations, will be minimized to the extent practical. These criteria include minimizing overall disturbance, preserving existing vegetation, and minimizing impervious cover to the extent practicable.

To address the City concerns regarding the site's stormwater control status, and to assist in the determination of effects on stormwater flow quantities due to this proposed action, a site wide stormwater drainage study is to be performed in FY 2002. This stormwater management study is being contracted to provide a comprehensive evaluation of current and future stormwater flow and control requirements. This study will consider all existing site drainage channels and features, including the possible use of the sluice gates for stormwater control. The study objectives also include determining measures to improve current site stormwater management practices if identified necessary, and to document a plan to address the effects of this proposed action and possible future on and offsite actions that could affect the DOE property. Adjacent undeveloped SURA and City land, that could be made available to the DOE, will also be considered in the study if an opportunity for additional open space or a stormwater retention area is identified necessary.

The DOE will discuss the results of the stormwater management study with the City and the Hampton Roads Planning District Commission (HRPDC). The study results will be used to develop a stormwater pollution prevention (SWP2) plan, that will cover all EA construction activities, to be used in support of the VPDES general permit noted above for the actions described in this EA. The DOE will work with the City and the HRPDC to ensure their concerns involving the new construction actions are addressed.

This additional stormwater runoff will utilize at least one water quality BMP to be identified in the pending site drainage study. The DOE will use available resources and BMPs to ensure that stormwater flow leaving the Jefferson Lab site, including the proposed 8 acres of newly impermeable land, is managed to minimize downstream impacts in the event of a major storm event.

DOE commits to perform BMPs and other measures to assure that no stormwater, beyond present site levels, leaves the site in the event of a major rainfall event. Critical measures provided in the stormwater study to address existing runoff concerns will be implemented as soon as practicable but certainly prior to the start of the first construction project. Other identified measures that are more practical to install along with the new construction projects will be implemented with the respective project. Other future control measures, such as retention ponds, that may be noted in permit-related documents, such as an SWP2 Plan, will be implemented either prior to or in the course of the construction for each activity.

As a result of implementing measures in this manner, there should not be a major impact on the site or offsite drainage system. Also, by having all strategies and mitigations dealing with stormwater and sediment control issues (which seem to be the primary CZMA concerns) addressed in one SWP2 Plan will help demonstrate that we intend to consistently use BMPs in all construction activities.

By implementing measures as needed as identified in the stormwater study, long-term impacts regarding stormwater retention, including that from localized flooding during significant rainfalls, should have the potential to be minimized. Due to planned improvements in the stormwater control function of the DOE site, no increased flows or flow rates as waters leave the site are expected as a result of this action so there should be no impacts, CZMA or otherwise, on downstream areas. This is in compliance with the stormwater criteria identified in the CBPADMR.

Water quality related impacts, such as due to the application of pesticides, are to be mitigated as discussed in the previous section.

4.4.2.3 Groundwater

The 1987 EA described regional and local hydrogeologic conditions and characteristics at Newport News, Virginia. Updated and new information on both geology and local hydrologic patterns, such as groundwater flow, were provided in a more recent Hydrogeologic Review (Malcolm Pirnie, Inc. 1995). The 1997 EA included this updated information. The monitoring of dewatering effluent and water quality at the monitoring wells is performed under a current VPDES permit (VPDES 2001).

There should be no need of any permanent dewatering for any of the construction projects, as there will be no below grade construction. Also, Helios will be installed with ample shielding in an above ground structure. Consequently, Helios operation will not result in activation of the groundwater in excess of any permit requirements. Therefore, there should be no effects on any of the site groundwater characteristics of dewatering quantity, water table elevation, or water quality, as a result of the proposed construction activities or new building or Helios operation.

The existing monitoring well network is positioned around the accelerator site to allow water quality to be monitored. Refer to Figure 6 at the end of this Chapter for the locations of the monitoring wells. Note that any groundwater activation due to ongoing CEBAF and FEL activity, at current operational levels, has been addressed in the 1987 and 1997 EAs with minimal to no impacts expected. No impacts to groundwater are expected due to Helios operation. From past history, it is recognized that there may be some follow-up minor variations in non-radiological parameters at the wells that are positioned downstream of construction activity. No mitigation actions are necessary, but the DOE will notify the DEQ, who holds the relevant VPDES permit, regarding planned activity within the accelerator vicinity prior to the start of any such activity (VPDES 2001).

4.4.2.4 Radioactivated Wastewater

Sources of radioactivated wastewater at Jefferson Lab include the air conditioning systems (dehumidification condensate) for the linear accelerator and experimental halls, the low-conductivity cooling water system for accelerator equipment, and the cooling water system for the high-power beam dumps, that serve as beam energy dissipaters for CEBAF. Disposal of this radioactivated wastewater is managed in accordance with an industrial wastewater discharge permit through the HRSD (HRSD 1999).

Very small quantities of cooling water may be affected at the Helios facility. Any activated water resulting from this proposed action would be addressed under existing site procedures and disposed of through the HRSD permit mentioned above. A negligible impact on the present program is predicted.

4.4.2.5 Accidents

Jefferson Lab's SPCC Plan is designed to mitigate releases of oil and petroleum products (SURA 1995). The site's general spill prevention program is documented in the contractor's EH&S Manual (SURA 2001). The program ensures that activated water and chemicals are properly stored and contained. If an inadvertent release reaches the ground surface, it would be contained locally by spill control equipment or retained on-site by the closing of sluice gates positioned near the property boundary.

The subcontractors involved in the construction projects will be obligated to utilize similar practices to reduce the event of a spill or release to the surface, to be documented in their own Safety Plan. The proposed operation of Helios and the other buildings would not involve the use of chemicals that aren't already addressed under existing site procedures. Therefore, even if an accident did occur, the impacts and mitigations would be the same as those that exist for current site operations.

4.4.3 Geology and Soils

The Jefferson Lab site is located in the Coastal Plain of the lower York-James Peninsula in an area of low seismic risk as noted in the 1987 EA. The site geology and hydrogeology were thoroughly reviewed in 1995 to support a new Commonwealth of Virginia permit (Malcolm Pirnie, Inc. 1995; VPDES 2001). Discussion is limited, as activities will only involve surface construction.

As provided in the 1987 EA, the site is located on the Huntington Flat, which is very flat and poorly drained (DOE 1987). Since 1987, overall site and area drainage has changed, in that there is less open ground to absorb flow, as nearby offsite commercial and industrial development has progressed. Site elevations range from roughly 29 to 35 feet above MSL. The surface soil is underlain by the clayey-sand and sand facies of the Norfolk Formation.

The soil types in the areas to be disturbed are: Chickahominy silt loam, Slagle fine sandy loam, and Udorthents-Dumps Complex. (REMSA, Inc. 2001) The soil types across the site seemed fairly similar, with most meeting the criteria for hydric soils. The new buildings will be designed as best suits the local soil types. As minimal activity below the surface will occur under this proposed action, there should be only minor construction related impacts and no impacts from operations. BMPs will be implemented and no geology or soil related mitigations are necessary.

4.4.4 Non-Radiological Air Quality

During construction, the operation of construction equipment and subcontractor vehicles on-site would produce non-radiological emissions common to similar activities elsewhere (hydrocarbons, sulfur dioxide, carbon monoxide, etc.). Emissions would occur throughout the course of each construction activity and would be localized near each construction site. Because the project site is within an ozone maintenance area, precautionary measures will be employed during construction to reduce ground level ozone concentrations, especially during ozone alert days. In the event an ozone alert is issued during vehicle-intensive construction activities, vehicles that are not being actively used will be removed from service and turned off. Extra support will be provided to keep construction traffic moving and to verify fuel containers are tightly sealed to help minimize ozone generation. Measures to accomplish this would include the design of access roads and intersections to avoid or minimize traffic congestion. Other measures during construction would include the use of low volatile organic compound (VOC) coatings where practical. There is minimal to no anticipated use of pesticides or herbicides during construction, so there should be no impact to air quality from that type of activity.

Control methods identified in applicable regulations would be implemented to minimize fugitive dust resulting from construction activities. The methods, that include the use of water for dust control and the covering of open equipment when conveying materials, will be included in the construction specifications for each project. There are no concerns involving open burning, as there will be no open burning of debris. All waste materials will be disposed of in the most resource efficient manner. BMPs, including optimizing vehicular use as practicable, would be implemented to minimize impacts.

There would be minimal non-radiological air quality impacts from the activities to be pursued in the new buildings, to include the operation of the Helios accelerator, refer to Section 4.5.1.7 for discussion, as

they will function as office space, tech workshops, storage, and research support areas. Except for minute effects from Helios, operations described in this proposed action do not have any known sources of pollutants as identified in the NAAQS. As the project site is within an ozone maintenance area, measures to minimize the generation of pollutants will be incorporated into the designs as practical. This includes using energy efficient natural gas boilers to heat the buildings. As all the boilers will operate well under any state permit limits, it has been determined that no air permits are needed. The facility will reevaluate permit requirements if unit sizing or regulatory conditions change. As well, no refrigeration equipment that uses ozone-depleting substances will be used in any of the new buildings. The parking lot and access road layouts to serve these structures would be designed to minimize idling vehicles to the extent practical. The application of herbicides, pesticides, and fertilizers will be managed under an integrated program that minimizes the use of toxic materials, including VOCs, so effects on air quality would be minimal.

In the event an extended ozone alert is issued during regular building operations, Lab management could choose to stagger working hours to minimize traffic congestion upon entering and leaving the site. Any chemicals kept outdoors should already be sealed so extra precautions would not be necessary. Also, no applications of herbicides, pesticides, or fertilizers would be authorized or performed in the event of an ozone alert.

Therefore, contribution from the proposed action to offsite concentrations of regulated non-radiological air pollutants would be kept to a minimum. No mitigations beyond using best management practices to both optimize operations and minimize equipment use are necessary.

4.4.5 Noise

Though no monitoring of area noise levels has been performed, noise levels in the site vicinity are typical of current land use practices. Noise is generated by the traffic flow along adjacent streets, by ongoing construction activities on and off the site, by the nearby Chesapeake and Ohio Railroad, and from activity at the Newport News/Williamsburg International Airport and Langley Air Force Base. Estimates at nearby residential areas provided in the 1987 EA were in the 50 to 55 decibel range.

Given the industrial nature of the site and its vicinity, noise from construction would not be unique. Construction activities, to be separated by structure and phase, would be spread over a number of years. The construction tasks would range from short to long-term, though all noise concerns would be localized at the Jefferson Lab site. While regular noise from construction equipment and traffic would be highly perceptible locally and less perceptible in nearby offsite areas, no adverse effects on human hearing would occur. No mitigations beyond the implementation of best management practices are identified.

Operating equipment in the proposed buildings would produce various levels of noise. Mechanical rooms and the entire new ESR Support Building would likely require designated areas where hearing protection would be required as identified in site programs. Equipment and soundproofing measures would be selected to minimize these impacts to the extent possible.

4.4.6 Transportation and Traffic

Jefferson Lab is situated in the middle of a busy industrial area. The effect on the local traffic on both public and site roads from the additional personal vehicles and trucks during the proposed construction activities will be noticeable. There will be minor offsite traffic impacts due to the proposed construction activity. To facilitate entries and exits to the site, and to take into consideration on-site staff, special construction routing and parking needs will be evaluated for each activity. The impacts to staff will be minimized through coordinated planning and by providing advance notification of alternate routing and parking arrangements. Only minimal impacts should result.

As there will be only small changes in staffing and only minimal changes in the present level of transporting goods and services at the site over the next ten years, no impacts involving site traffic and transportation during building operations and use are expected as a result of this proposed action.

4.4.7 Pollution Prevention

Pollution prevention, as accomplished through energy efficiency, waste minimization, and affirmative procurement principles and practices, will be emphasized at all stages of this proposed action. The DOE places considerable importance on integrated safety management principles, which include environmental protection considerations, into planning, construction, and regular facility operations. The facility is committed to continuously improving its performance with respect to environmental protection.

The proper application of P2 BMPs will result in major resource savings and will mitigate a moderate to high impact if compared to the cost to the environment if these measures and efficiencies are not incorporated.

4.4.7.1 Resource Use Reduction

Factors to reduce the use of natural resources will be considered. These factors include items such as incorporating drought tolerant plants and through other beneficial landscaping practices to minimize water usage, and improving the Lab's performance with regards to EPP. As well as procuring materials with recycled content, EPP refers to further reducing the Lab's need for toxic materials and to choosing products that take into account environmental sustainability.

4.4.7.2 Energy Efficiency

Building scopes will include applicable factors to make the buildings as energy and utilization efficient as practicable. New structures will have individual lighting and temperature controls and staff will be trained to make the best use of these features.

4.4.7.3 Waste Management

In addition, as construction subcontractors are familiar with the materials and techniques that will best accomplish the job, it is expected that they will use BMPs to utilize materials with recycled content and to minimize waste generation.

During construction, waste, including all recyclable materials, resulting from construction activities will be managed through each project construction subcontractorusing existing site programs that are in adherence to applicable laws and regulations. Construction specifications will designate the applicable laws and regulations appropriate for the type of wastes involved. No special provisions for contaminated or activated soil are necessary.

Management shall continue to support and encourage efficient waste minimization and recycling practices as the new areas are put into use. Recycling centers will be established in each of the buildings where practical. These practices will help to minimize the low to moderate impacts that result from performing any waste management activities.

A discussion on the impacts from future Helios decommissioning is presented in Section 4.5.1.5.

4.4.8 Land Use

The overall Jefferson Lab site still remains a temporarily wet, upland area but only portions of the site retain the hardwood-pine forest that extended over the site in an earlier time. The site is within an area

that the City of Newport News has zoned for research and development. The surrounding Oyster Point area supports a mix of residential, commercial, and light to medium industrial developments.

The proposed construction areas are all within the site limits and are all adjacent or nearby to existing buildings that have been built since 1987 to support the facility.

Proposed construction and use activities at the four projects within the fenced accelerator site would not change the accelerator site's industrial nature. Storm drainage and other minor impacts will be mitigated as described or as otherwise appropriate. The environs of CEBAF Center, that includes elements that serve as natural areas that provide noise buffers and natural area drainage, will be considerably affected. All impacts, including those during construction, during long-term area functioning, and during Helios operation will be mitigated. All identified mitigations will be fully addressed in the construction project scopes. Prior to undertaking any action that could require mitigation, the DOE will validate that the mitigation actions described in the project scopes have been fully addressed.

4.4.9 Ecological Resources

4.4.9.1 Ecology

In accordance with Endangered Species Act requirements, DOE formally requested written comments regarding the proposed action from the U.S. Department of Interior Fish and Wildlife Service. Contact was also made with the Commonwealth of Virginia DEQ, the Virginia Department of Game and Inland Fisheries (VADGIF), the Virginia Department of Agriculture and Consumer Services' Office of Plant and Pest Services, the VADHR, the VADCRDNH, and the City of Newport News Department of Planning and Development for comment on the proposed actions. Additional telephone conversations were made to some of these agencies to clarify provided information. All agencies generally reported that no adverse impacts to protected species and/or habitat would be expected from the proposed action (see Appendix B). All listed species were reviewed during the preparation of this EA. Included was a review of the potential effects on three state-sensitive terrestrial species as requested by the VADGIF.

The VADGIF species of concern that were to be evaluated and coordinated with the Department are the state endangered canebrake rattlesnake, the striped bass, and a local water bird colony containing great egrets and great blue herons. The potential impacts involving them are evaluated in 4.4.9.3 and 4.4.9.4 below. The VADCRDNH had also requested that three rare plant species be included in this review. Refer to Sections 4.4.9.2 for a discussion that includes the results from the 2001 review.

4.4.9.2 Terrestrial Resources

4.4.9.2.1 Vegetation

The portions of the Jefferson Lab site that will be disturbed by this proposed action are located in, or are directly adjacent to, previously developed areas. All projects on the accelerator site will affect grassy areas, and two will affect wooded areas. One of the areas has a small loblolly pine wooded area adjacent to the proposed FEL Addition site and the other is a section of oak-loblolly pine forest to be cleared in order to maintain security at the site's perimeter fence. The area surrounding CEBAF Center that will be affected includes: primarily a large oak-loblolly pine forest; large grassy areas that contain sloping surface water drainage channels and scattered single trees (e.g. paperbark maples and crepe myrtles); landscaped planting areas; and an existing paved driveway and parking areas. Both the FEL Addition and CEBAF Center sites have vegetated storm channels that will be affected.

The VADCRDNH identified three rare plant species of concern for this review. The species are: Cuthbert turtlehead, hazel dodder, and a St. John's wort. The Wetland Delineation and Threatened and Endangered Species Survey (REMSA, Inc. 2001) addressed them in the report. Upon completion of the site-wide field investigations for species and habitat, which were performed in the spring and again when the plants would most likely be in flower, the report concluded that there were no sitings of either the plants or any preferred habitats for any of the three species. In the course of the review, the survey crew also checked the site for other special species. It was documented in the report that there were no resident threatened, endangered, or rare plant species identified on the subject property during any of the field surveys.

It is concluded that there will be no disturbance of any special concern species or habitat with the approval of this proposed action. Note that the Department of Agriculture and Consumer Services' Office of Plant and Pest Services has reviewed the activity and anticipates no adverse impacts from this project. No mitigations, beyond minimizing the areas of disturbance, are necessary.

4.4.9.2.2 Trees

Though this action will not have an important effect on Virginia forestlands, as identified in correspondence dated November 30, 2001, necessary measures will be taken to protect trees in the vicinity of the construction areas. Specific requirements will be incorporated into the construction specifications and coordinated in the field by the authorized facility representative.

Trees within the construction limits that are earmarked to remain and trees situated on the perimeter of the construction areas will be visibly marked and fenced. The fencing should extend to at least the tree drip line or to the end of the root system, whichever is farthest from the tree. These fenced areas will be maintained as off limits to all activities, including vehicular traffic, parking, equipment staging, or soil stockpiling in order to minimize soil compaction in the vicinity of the trees. If parking or stacking of equipment is deemed unavoidable, that is performing them elsewhere would have a greater adverse consequence, then the subcontractor would be required to use temporary crossing bridges or mats to minimize compaction and any resulting injury to plants. Refer to Section 4.4.2.1 for information on erosion control at stockpiles.

Under the guidance in the Lab's Environmental Protection Program, trees removed under this activity will be replaced with new trees or shrubs at suitable locations to the extent possible.

4.4.9.2.3 Fauna

The 1987 EA cited that 257 species of terrestrial vertebrate fauna had geographic ranges that encompassed the site, though only a fraction would be expected to actually exist on the site. The continuing expansion of development, both on the Jefferson Lab site and in all adjacent areas and beyond have further reduced wildlife habitat and wildlife populations, so the chances of having an on-site existence of many species has grown even smaller. Information on the fauna of concern to the VADGIF is provided in the next section.

4.4.9.3 Threatened and Endangered Species

No Threatened or Endangered species or suitable habitats for any of the species were identified on-site in the most recent Wetland Delineation and Threatened and Endangered Species Survey performed by REMSA, Inc. (REMSA, Inc. 2001). Several surveys of the complete Jefferson Lab site have been conducted over the history of the facility, including the one performed for the 1987 EA and the recent Wetland Delineation and Threatened and Endangered Species Survey (REMSA, Inc. 2001). Most of the new information noted is from this most recent survey. The survey states that there were also no state-sensitive species or the listed rare plants observed and that there were no suitable habitats or conditions

for them anywhere on the Jefferson Lab site property. The specific VADGIF and VADCRDNH species of concern are addressed below.

In this recent agency correspondence, the federal and state listed threatened bald eagle was identified as the only federally protected species possible at this site. State listed species present in the project area could include the threatened peregrine falcon and the endangered canebrake rattlesnake. Other rare animals that could be in the Jefferson Lab vicinity, as indicated by the VADGIF, are the special concern species: yellow-crowned night heron, least tern, great egret, great blue heron, and the striped bass. All species were considered in the 2001 survey noted above. The striped bass is discussed in Section 4.4.8.5. All other state identified species, including rare plants, are addressed below.

The most recent investigation identified no resident threatened or endangered species on the Jefferson Lab site. No other state or federal agencies contacted at the time of this investigation had indicated the possible presence of any threatened, endangered, or otherwise protected species on the DOE site (REMSA, Inc. 2001). Area development has minimized or eliminated any possible local habitats. As well, the recent survey found no rare or special concern species on the site. They, as well as the threatened and endangered species, may appear only as transients as there are no suitable foraging or nesting habitats in existence on the site. The discussion of VADGIF-identified species follows.

The canebrake rattlesnake, a state-endangered species, could be present in the general area. The most recent survey (REMSA, Inc. 2001) noted that there have been no area canebrake rattlesnake sightings in recent years. This survey included checking for the presence and or likely habitats for the rattlesnake. None were noted during the review, which paid special attention to this species. It was noted that it is a secretive species that could be overlooked, but the review cited that it is usually present in unfragmented areas, and any likely habitat on Jefferson Lab property and in the surrounding area is very fragmented, so the likelihood of finding one anywhere in the local area is very low. As the construction projects will be limited to areas that are already developed or just adjacent to developed areas, it is unlikely that any canebrake rattlesnake habitat will be disturbed. All staff and subcontractors involved in construction will be informed about the potential presence of the canebrake rattlesnake or other endangered species, not to disturb or interfere if encountered, to stop all work in the vicinity (at a minimum of 50' from the sighting), and to promptly report it to their Jefferson Lab contact. If a canebrake rattlesnake is observed anywhere on site, Jefferson Lab will promptly notify the VADGIF's designated contact.

The VADGIF is interested in the effect of disturbance on one local water bird colony that includes great egrets and great blue herons. The only one known to Jefferson Lab is located at or near the Big Bethel Reservoir, roughly located just over one mile from the site boundary. The recent REMSA, Inc. report identified no suitable habitat for these species on the Jefferson Lab site. The report also noted that there was no evidence of the use of any site area by great egrets or great blue herons. As the disturbance for this proposed action will be limited to the local construction areas on the DOE property and proper controls will be included to prevent any disturbance outside of the construction limits, no impacts on any downstream water bird colonies are expected. No yellow crowned night herons or least terns nor any appropriate habitats were observed on the Jefferson Lab site during the course of the survey. No impacts to any individual birds or breeding colonies would occur under this proposed action.

There are no federally protected plants in the project area, however, the VADCRDNH identified Cuthbert turtlehead, hazel dodder, and St. John's wort as rare plant species that could be present in the City of Newport News. These plants were taken into consideration in the 2001 survey that included at least one field trip during the predicted blooming time in August. None of these plants were identified in the proposed areas to be disturbed. Therefore, no on-site or offsite impacts to any of these identified plants are expected under this action.

This EA finds that there should be little to no potential for adverse impact to any of the listed species from either construction disturbance or long-term facility operation. As construction disturbance will be limited to within very local construction areas and be properly managed so that no downstream areas containing these species should be affected. As there are no expected impacts on any of these species, no mitigation actions beyond minimizing disturbed areas are believed necessary. As well, there should be no CZMA impacts on any coastal wildlife, plants, or habitats.

4.4.9.4 Aquatic Resources

There are no permanent aquatic habitats on the site. There are small drainage channels that move water across and off the site, with a few channels just beyond the DOE site limits. The few channels that almost always contain water pass under Canon Boulevard to eventually flow into Brick Kiln Creek. Brick Kiln Creek flows to the closest important body of water, Big Bethel Reservoir, located approximately 2.7 km (1.7 miles) east-southeast from the site.

The VADGIF has identified striped bass as a species of concern in our general area. The most recent survey (REMSA, Inc., 2001) identified that no habitat for striped bass exists on the Jefferson Lab property. Striped bass exist in tributaries well downstream of the site. The only known location for striped bass is at Lake Maury, which is located roughly 2.4 km (1.5 miles) south-southwest of the site. As the property does not drain in that direction, and as our impacts for this proposed action would be limited to, at most, the property limits, there should be no effect on that particular habitat or on any downstream population of striped bass.

There should be no impact to any downstream aquatic resources from the proposed action, as only minimal pollutants, such as dust, should penetrate past the local construction areas.

4.4.9.5 Floodplain and Wetlands

The Jefferson Lab property, at an average elevation of about 32 feet above MSL and with no permanent streams, is in a Zone C area on the local flood maps, so is not considered a floodplain. Most of the Oyster Point area is in this class. As localized flooding due to large rainfall events is possible, the DOE is addressing storm flow management to minimize any local area impacts. Short and long-term stormwater management concerns and solutions will be worked out with local and regional agencies as discussed in Section 4.4.2.2. Hence no higher risk floodplains should be directly or indirectly affected by the proposed action.

The site was originally primarily forested temporary wetlands (1987 EA). The Corps of Engineers approved the site development for the original project. Since then, the site was resurveyed for wetlands (REMSA, Inc., 2001) according to the U.S. Army Corps of Engineers criteria for wetlands. Except for one small area found to meet the Corps of Engineers technical criteria, which is not located in any of the areas to be disturbed under this EA, none of the sites to be disturbed under this proposed action met all three criteria that define a jurisdictional wetland. The Corps of Engineers performed a site visit on September 25, 2001 and reviewed the conditions at the proposed construction sites. It appeared that none of the proposed construction sites met defined wetland conditions. This was confirmed in a letter from the Corps of Engineers dated September 25, 2001. Refer to Appendix B for a copy of the correspondence. Therefore, this proposed action should not affect any on-site wetlands. As construction disturbance will be limited to the immediate construction area vicinities, no downstream wetlands, that could include any CBPAs, should be affected.

4.5 HEALTH AND SAFETY IMPACTS

The expected level of impact regarding health and safety concerns for each of the identified activities has been evaluated for this proposed action. The safety and health impacts to workers and the public due to

radiological activity resulting from Helios operation are very low and are discussed in Section 4.5.1. The impacts on subcontractor staff, lab workers, and the public due to construction do not exceed normal levels and are discussed in Section 4.5.2. Other impacts during normal use of the new buildings are evaluated in Section 4.5.3.

4.5.1 Radiological Effects

4.5.1.1 Radiological Background

Humans are exposed to natural background radiological sources in the form of radionuclides present since the formation of the earth (e.g. uranium, thorium, and their decay products) and radionuclides created by solar and cosmic rays (e.g., ^{3}H, ^{7}Be, ^{14}C, ^{22}Na). Humans are also exposed to the same solar and cosmic rays. The estimated total effective dose equivalent for a typical resident in the United States from natural background radiation is about 300 mrem/year (millirem/year) (NCRP 1987). For comparison, the average annual contributions from cosmic and solar rays and the natural background radiological sources mentioned above are 30 mrem and 230 mrem, respectively. These added to the internal dose of 40 mrem from foodstuffs containing background radionuclide sources, yields a dose of 300 mrem for the average resident of the United States.

4.5.1.2 Radiation Associated with Accelerator Operation

Particle beams created by an accelerator produce (1) prompt radiation and (2) induced radioactivity in matter caused by prompt radiation. Prompt radiation is an intentional, routine consequence of accelerator operation. It is localized near the accelerator itself and can be shielded and controlled. Induced radioactivity (also called "activation") results when prompt radiation from an accelerator beam strikes matter (e.g., experimental targets, beam pipes, concrete shielding, soils, water, etc.). Radiation and the changes it causes in matter enable scientists to use accelerators to study the properties of materials or the structure of the nucleus of the atom.

Accelerator operators routinely engage in practices designed to minimize the extraneous production of radiation in undesirable locations. The quantity of induced radioactivity depends on several factors: (1) the type of accelerated particle (e.g., electron, ion, proton); (2) the beam energy; (3) the intensity (beam current); and, (4) the matter or object that it strikes (e.g., experimental targets or shielding). CEBAF, the FEL, and the proposed Helios machine each accelerates an electron particle beam, which induces radioactivity primarily in the beam-dissipating devices (beam dumps), although the amount of induced radioactivity from any of the Jefferson Lab machines is substantially less than that produced by other particle (e.g., proton) accelerators with comparable power. In addition, some activation occurs in the structural material enclosing the accelerators and their experimental halls or other target areas (Stapleton, G. et al. 1997). Less than 0.1% of induced radioactivity may be produced outside the accelerator enclosure, primarily in adjacent groundwater and soils.

Accelerators and experiment facilities are typically sited either underground or at grade with thick concrete walls and substantial earth berms to provide cost-effective shielding. By design, radiation reacts with the shielding materials. Induced radioactivity in the shielding materials—whether steel, lead, concrete or earth—is related to both the composition of the material and the type of radiation interacting in the shield. To be conservative, concrete, that is used as primary shielding for CEBAF and the FEL to minimize the production of radionuclides in the environment will be used for the same purpose for Helios. In general, the induced radioactivity remains fixed-in-place in the shield material and cannot be separated from the material.

There are also mechanisms for inducing radioactivity into groundwater, but as Helios will be located in an above ground structure, and there is virtually no potential effect on groundwater, the mechanisms are not presented here.

4.5.1.3 Radiation Protection at Jefferson Lab

DOE's Jefferson Lab is operated by SURA in accordance with applicable federal laws and regulations, including those specified in a Radiation Protection Program Plan (DOE 1995) approved by the DOE. All important aspects of radiation safety and protection, including DOE's ALARA goals, are regularly addressed in workshops and programmatic reviews. These reviews, that include peer reviews by other DOE laboratories in accordance with the DOE/SURA management and operations contract, will also apply to Helios.

4.5.1.4 Impacts to Radiation Workers

The level of prompt radiation is directly proportional to the amount of electron beam power lost in the accelerator components. Exposure to prompt radiation is managed by installing shielding and excluding personnel from areas where prompt radiation is above applicable limits. Most of the occupational radiation exposure at Jefferson Lab would continue to occur during maintenance activities on activated components involved with any of the site accelerators, including Helios.

Induced radioactivity in the components is directly proportional to the energy deposited in those accelerator components. This quantity, watts x seconds (or Joules), is the product of the electron beam power lost and the duration of that loss. Most of the activated components in the Helios accelerator are associated with the injector and transport line to the electron storage ring (SR). Continuous electron beam loss is typically associated only with operation of the Helios injector and transport line, which together are termed the Helios Linac. The injector is operated minutes per day. Helios operation will occur at beam energies between 700 and 1000 MeV. This would result in a normal beam power in the 500 to 1000 MW range. (Refer to Table 1 in Chapter 2.) The SR ring operates for hours per day but is not capable of sustaining a prolonged electron beam loss. Although the beam power is high, the energy stored in the ring is very low and activation of accelerator components in the ring is very minimal.

The DOE regulatory limit for occupational exposure of radiation workers is 5000 mrem/year (5 rem/year). Jefferson Lab uses 2000 mrem/year as an administrative limit and all facilities at the lab were designed to maintain radiation worker exposure at less than 250 mrem/year, in accordance with DOE's ALARA objectives. The 250 mrem/year administrative limit applies to all Jefferson Lab radiation workers and reflects the cumulative occupational exposure from operations and maintenance activities involving the FEL, CEBAF, and the proposed Helios. The exposure from operations reflects both normal and any accidental beam loss scenarios. The FEL and CEBAF operations are restricted by engineering and administrative controls such as shielding, the Personnel Safety System, interlocks, and beam absorbers. The proposed Helios will operate under the same constraints.

As Helios can produce beams of intense synchrotron light, which are a low energy x-ray hazard, these same controls will be implemented at the Helios accelerator. As well the administrative controls currently in use at Jefferson Lab will be supplemented with area monitors to ensure that robust exposure controls remain in place because of the x-ray hazard. As a result the typical annual exposures will be much less than the 250-mrem/year design goal. No changes to the administrative limits used by Jefferson Lab are necessary due to the operation of Helios. Jefferson Lab has a good record for occupational exposure management. Since 1996, only 0.2% of those occupationally exposed to radiation had doses in excess of 100 mrem in any one year. No workers are expected to exceed the 250-mrem/year design goal and no substantial addition to the collective exposure of workers at the lab is expected with the operation of Helios.

4.5.1.5 Impacts from Helios Decommissioning

For a full review of effects, the distant future consequences of decommissioning Helios are discussed. The Helios facility has two major components, the injector/linac, referred to as the Linac, which is the most likely place for the generation of detectable radiation, and the SR (electron storage ring). Helios is designed to produce synchrotron radiation. It is designed for negligible loss of electrons in the SR during operation. Poor quality electron storage in the SR is undesirable since it results in shorter operational periods and degraded quality for the synchrotron light. The synchrotron radiation produced by electrons in the SR is intense, but it is too low in energy to induce radioactivity in the Helios' Linac or in the SR components. Most of the electron losses come from the acceleration of electrons prior to storage in the SR, that is the losses come from the Linac. The Linac is somewhat inefficient during acceleration. In addition, poor quality electrons are intentionally removed (scraped) from the electron beam during transport, prior to injection into the SR. The electron losses during transport and injection can result in elevated levels of ionizing radiation and the production of radioactive material in the Helios components, in air and water systems, and in adjacent shielding. Most of the residual radioactive material will be collocated with the Helios components designed to produce, steer, focus, and select electrons for injection into the SR. The removal of accelerator components and testing of the remaining facility to verify the absence of appreciable residual radioactivity will accomplish facility decommissioning.

Upon decommissioning, some residual radioactivity may remain in the concrete shielding, and some radioactive material may be concentrated in air handling, solvent extraction, or related cooling water systems. The air handling, solvent extraction, or cooling water systems can be sampled by conventional means and evaluated for radioactivity content. Portions of these systems can be decontaminated or removed as radioactive waste if necessary. The concrete shielding may also be sampled for radioactivity content. Only Na-22, with its 2.62-year half-life, is of consequence to Helios decommissioning activities. If necessary, concrete may be removed to reduce external exposure rates to meet any decommissioning goals set for the facility. It should be noted that, after a successful ten year operating history, no residual activity was detected in any system, in shielding, or at the facility where Helios was previously located. Therefore, no more than a minimal impact on the environment or on worker safety would be expected. There would be negligible impact on public health from this action.

4.5.1.6 Effects of Prompt Radiation on the General Public

The annual DOE regulatory limit for prompt radiation dose to members of the general public is 100 mrem as cited in 10 CFR 835. Normal practice for implementing this limit is to identify a maximally exposed member of the general public near a facility, estimate their exposure and measure the follow-up radiation dose resulting from operation of that facility. DOE and Jefferson Lab, however, have adopted a "good neighbor" policy, which requires that radiation exposure of the affected population near CEBAF be maintained much below any pertinent regulatory limit. Consequently, a design goal of 10% of the regulatory limit at the site boundary was established for the Jefferson Lab site (DOE 1995) and was incorporated in Jefferson Lab policy as stated in the CEBAF FSAD (SURA 1994).

The chief source of prompt radiation exposure for members of the general public is "skyshine" radiation. Skyshine is due to radiation produced in fixed physics targets, transiting through the concrete shielding and soil on each end station roof and into the air. This shielding is effective but limited by structural considerations. This radiation scatters back to earth from the air above the end station roof. Currently, skyshine is unique to the operation of the CEBAF accelerator, but a minimal amount could be produced with Helios operation. The Helios accelerator produces no skyshine at the site boundary due to its position on the accelerator site and because it is not designed as a fixed target irradiation facility. Appropriate overhead shielding to minimize skyshine will be designed into the new FEL Addition, which will house Helios.

Reasonable methods of calculation for a wide range of operating conditions have been used to estimate a dose from prompt radiation to members of the general public at the site boundary and allow DOE to manage the annual site radiation dose effectively. These calculations and measurements substantiate the methodology used in the 1987 EA (Stapleton, G. et al. 1997) and confirm that, under present conditions, Jefferson Lab is meeting its administrative control level policy of 10% of the regulatory limit of 10 mrem per year for radiation exposure to the general public. Table 2 displays radiation doses taken from measurements at the site boundary monitor RBM-3 that verify our compliance. No changes in this dose rate from prompt radiation are expected as the Helios machine is not expected to contribute to radiation exposure to the general public. In a worst-case accident scenario, possibly where the building is damaged while the machine is operating, the machine would automatically turn off when the safety system noted a problem or would fail to operate due to damage to the machine or its support systems. Therefore, there would be no possibility of unshielded exposure at the site boundary and to the public.

Table 2 Radiation Boundary Monitor RBM-3 Results for 1998, 1999, and 2000

Period	Neutron (mrem)	Gamma (mrem)	Total (mrem)
1998	0.81 ± 0.03	0.20 ± 0.02	1.01 ± 0.04
1999	4.27 ± 0.03	1.06 ± 0.02	5.33 ± 0.05
2000	3.05 ± 0.04	0.76 ± 0.02	3.81 ± 0.04

4.5.1.7 Effects of Airborne Radionuclides, Ozone, and Nitrogen Oxides

The public may be exposed to small quantities of radioactivity induced in air in an accelerator enclosure as a result of nominal ventilation during routine operations. The Environmental Protection Agency (EPA) has established a dose limit to members of the general public from radioactive material in air of 10 mrem/year. Based on very conservative modeling (Stapleton, G. et al. 1997) and monitoring of CEBAF and FEL operations, the calculated dose to the general public is in the range of 0.05 mrem/year or 0.5% of the EPA annual dose limit. (The EPA requires an approved program of periodic confirmatory air measurements at 1.0% of the limit.) Negligible airborne emissions are expected from Helios operation. The airflow around the locations of highest beam loss, the Helios injector and linac, is provided by the FEL vault heating and ventilation system. The FEL produces a very small increment of the 0.5 mrem/year airborne emissions and no additional detectable contribution from Helios to this increment is expected. The radiological dose to workers or to the general public at the site boundary due to airborne emissions from Helios will be indistinguishable from the already small FEL contribution.

Any activated air generated by Helios would also contain the pollutants ozone and oxides of nitrogen. Ozone concentrations have been calculated and measured at CEBAF, and the time-weighted average concentration of ozone has been below the Occupational Safety and Health Administration (OSHA) limit and the American Conference of Governmental Industrial Hygienists' Threshold Limit Values for occupational exposure (0.1 parts per million) (Stapleton, G. et al. 1997). Since the production of ozone and oxides of nitrogen stop when an accelerator (CEBAF, Helios, and FEL) is turned off, normal chemical dissociation and ventilation loss quickly reduce ozone and oxides of nitrogen to negligible values in the accelerator facility. As with the contribution of airborne radionuclides, only negligible levels, if any, of any of these pollutants would be generated upon operation of Helios. Therefore, there would be no impact from these pollutants to the public or to workers.

4.5.2 Construction Hazards

Normal construction-related hazards will be present during the building of each of the structures identified in this EA. These common industrial hazards include: transporting materials and equipment to and around each jobsite; noise in the immediate work area; electrical safety; lifting; and working on elevated areas. Each of these hazards will be mitigated using a combination of OSHA Construction Standards; best industry practices; and other special practices and procedures to be identified in the subcontractor's Safety Plan. The subcontractor's Safety Plan must be accepted and approved by Jefferson Lab prior to the issuance of any notice to proceed. Jefferson Lab provides a robust inspection program and incorporates financial safety incentives into the contract agreements to further encourage safe work practices.

4.5.3 Non-radiological Hazards

Non-radiological hazards associated with the proposed action include electrical hazards, chemical hazards, and non-ionizing radiation hazards (lasers), which could injure and in extreme cases, kill occupational workers. All such hazards were examined in the CEBAF FSAD (SURA 1994) and reexamined in the recently concluded Work Smart Standards effort at Jefferson Lab. Refer to the Jefferson Lab EH&S Manual for the list of Work Smart Standards hazards. The appropriate regulatory standards that are needed to control the hazards were also identified and are implemented through the EH&S Manual which can be accessed through the Internet at http://www.jlab.org/ehs/manual/EHSbook.html (SURA 2001).

Electrical hazards include the potential for electric shock and injury from accidental exposure to radio frequency (RF) power. Electric shock hazards are well understood and are readily prevented by standard industry practices. RF power can cause burns to those nearby if a wave-guide is damaged so that it allows RF power to leak. Administrative procedures in place at Jefferson Lab to minimize such accidents are specified in the Jefferson Lab EH&S Manual.

The principal chemical hazard at Jefferson Lab is buffered chemical polish, which is a mixture of nitric, phosphoric, and hydrofluoric acids. A spill could lead to burns from splashed liquid and lung damage from acid mists to those in the immediate vicinity. Procedures to minimize such accidents are specified in the Jefferson Lab EH&S Manual. Additional chemical hazards that may arise from the operation of Helios will be governed by administrative procedures specified in the EH&S Manual.

Non-ionizing radiation exists at Jefferson Lab principally in the form of laser beams and laser systems. Hazards associated with the use of lasers are direct exposure to the laser light and exposure to specular or diffuse reflections. Procedures for laser safety require that each potential experimenter be formally trained in pertinent local safety regulations and specific safety procedures for their test area. Safety operating procedures are developed and approved by qualified Jefferson Lab laser staff. Operation of Helios would present no additional laser impacts than those already identified.

4.6 CUMULATIVE IMPACTS

Cumulative environment, health, and safety impacts are those which result from the incremental contribution from each effect discussed above along with impacts expected from other past, ongoing, or planned actions within the same geographic area.

Both on and offsite major construction activities will have temporary and long term site related impacts. On-site construction actions would be managed to keep impacts to a minimum, but DOE has no control over offsite activities. However, it is assumed that both short and long term impacts from offsite construction activities, including any on the adjacent SURA property, would be limited to effects outside of the DOE property lines. In actuality, as wooded areas belonging to the City of Newport News and

other property owners are eliminated; their current denizens seek refuge wherever possible, many towards the partially wooded DOE and SURA land.

As for environment, health, and safety related operational impacts, the routine operation and use of the new DOE facilities would be managed to keep impacts to a minimum, as is done to the extent possible for existing site buildings. It is anticipated that any development on the adjacent SURA and City properties would also be managed to keep impacts to a minimum and to result in no impact to the DOE site. The long-term effects from the additional impervious cover on-site will be studied in a planned stormwater management analysis. Identified control measures, including BMPs, would be implemented to address long-term strategies to minimize on-site effects and to not affect offsite properties. DOE will work with the City of Newport News, SURA, and other area developers on this stormwater management issue. The DOE will promote the use of BMPs to minimize further stress on the area's stormwater retention and flow channeling systems.

The minimal impacts related to Helios operations will be long term, but will be managed to keep them to a minimum as noted in this EA. The radiological impact of the action proposed in this EA will be offset by factors such as radioactive decay and dilution. Radioactivity levels will remain well below permit limits and, therefore, any changes will be inconsequential. There will be cumulative impacts involving radioactivity from the combination of operating the existing CEBAF and FEL accelerators along with the new Helios machine. This is true even though there are no changes in CEBAF or FEL operations proposed under this action. The only other known source of radioactivity in the general site area is in the adjacent Applied Research Center. Helios, CEBAF, and the FEL will be operated within their proposed or specified operating limits and within identified site limits to minimize cumulative impacts to the environment, occupational health factors, and public health and safety concerns.

Thus, there would be cumulative impacts when taking into account the construction, operation, and use of the new buildings and Helios when combined with the other impacts from beyond the site boundaries, though none of these actions would have major impacts to occupational and public health and safety.

4.7 IMPACTS OF NO ACTION

If no action were taken on this proposal, DOE would continue operating the Jefferson Lab facility in a manner that is not optimal to support staff and researchers. This applies for both the identified construction projects, with each one serving at least one important purpose, and for the commissioning and operation of Helios.

With no action, the disturbance from construction activities would be avoided, but the benefits possible from having more efficient work areas and storage facilities would be lacking.

With no action, the minimal environmental effects due to Helios operation would not occur, but the materials research planned for the operation of Helios and the future synergistic operation of Helios with the FEL, which will provide a heretofore unavailable set of applied research capabilities, will also not take place. Other countries are pursuing such research into higher computer chip densities and if such research uncovers successful approaches to densification the U.S. may lose its lead as a primary developer of semiconductor processors. It is important for the future of the U.S. economy to maintain several independent research efforts into this important commercial arena. With no action, we would miss out on numerous research opportunities.

Figure 5 Topographic Map

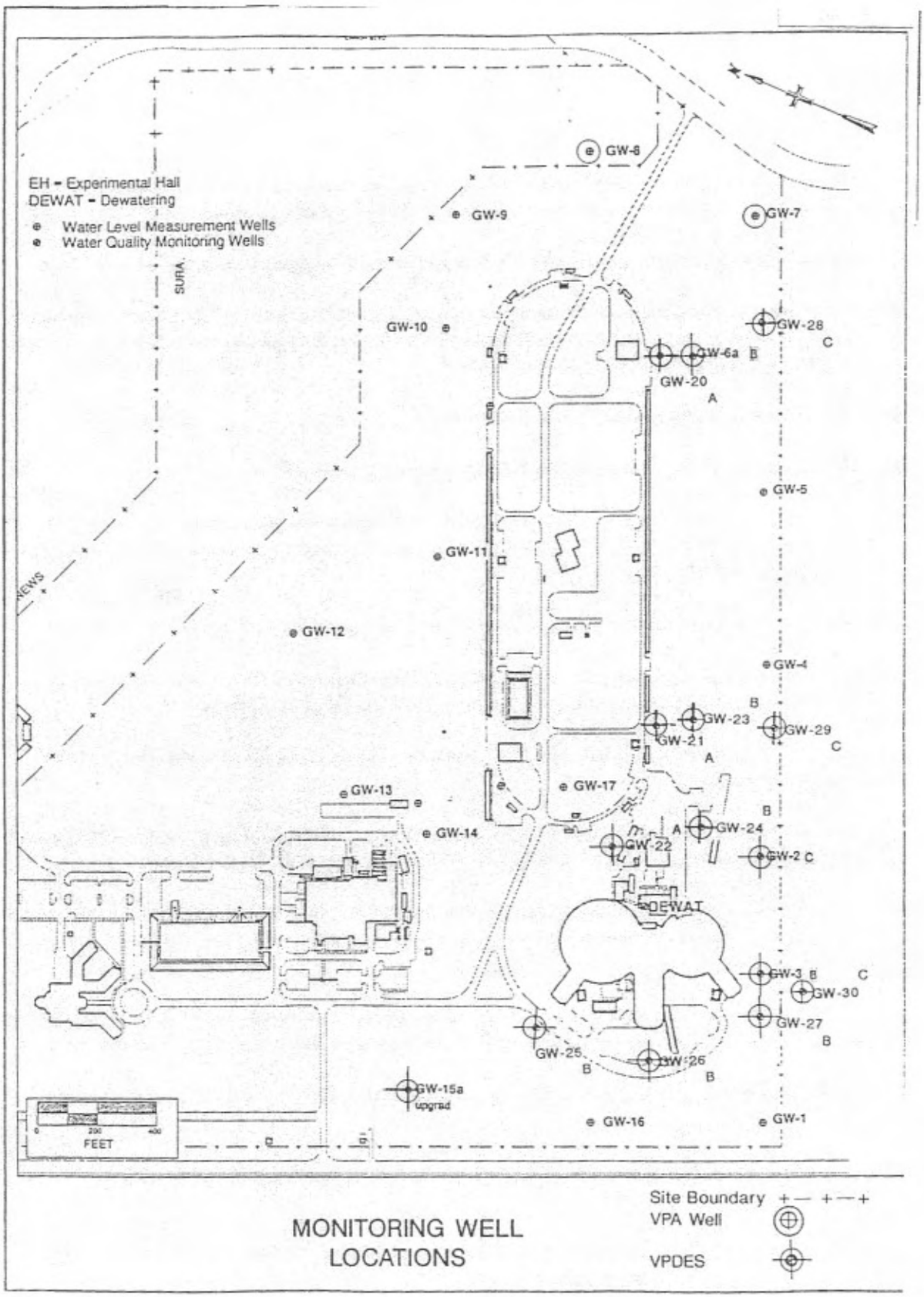

Figure 6 Monitoring Wells

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NOTE: All references are available for review at the DOE Site Office at Jefferson Lab in Newport News, Virginia.

6. LIST OF PREPARERS

L. L. Even, Office of Technical Performance, Jefferson Lab; B.S., Environmental Engineering, Northwestern University; M.S., Civil Engineering, Illinois Institute of Technology; 12 years experience in environmental protection projects and environmental program development. Contribution: co-author Sections 1, 2, 3, 4, and 5; reviewer Section 6.

R. T. May, CHP; Radiation Control Group Head, Accelerator Division, Jefferson Lab; B.S., Virginia Polytechnic Institute and State University; 19 years of experience in Radiological Controls for Environmental, Industrial and Research Applications. Contribution: reviewer Sections 1 and 3; co-author Sections 2 and 4.

B. M. Morgan, CSP, CHMM; U.S. Department of Energy, Jefferson Lab Site Office; M.S., Industrial Hygiene, Old Dominion University; 20 years experience in Environment, Health, and Safety. Contribution: NEPA Document Manager; co-author Sections 1, 3, and 5; reviewer Sections 2 and 4; author Section 6.

G. R. Neil, Ph. D.; FEL Deputy Program Manager, Accelerator Division, Jefferson Lab; B.S., University of Virginia, Engineering Science; MS and Ph.D. University of Wisconsin in Nuclear Engineering; 23 years of experience in laser and accelerator research Applications. Contribution: reviewer Sections 1 and 3; co-author Sections 2 and 4.

S. L. Prior, REM, CHMM; Accelerator Division Environment, Health, and Safety Officer, M.S., Industrial Hygiene, Old Dominion University; 23 years experience in environment, safety and health program management and oversight. Contribution: reviewer Sections 1, 2, 3, 4, and 5.

J. R. Sprouse, PE, CFM; Plant Engineering Director, Jefferson Lab; B.S, U.S. Coast Guard Academy, Engineering; MS, University of Illinois, Civil Engineering; MS, University of Alaska, Engineering Management, 26 years experience in project development and environmental assessments. Contribution: co-author Sections 2 and 4; reviewer Sections 1, 3, and 5.

R. K. Yasky, PE, Facilities Maintenance and Construction Section Manager, Jefferson Lab; B.S., University of Wisconsin, Civil Engineering; M.S., Stanford University, Civil Engineering; 16 years experience in engineering project management. Contribution: reviewer Sections 1, 2, 3, 4, and 5.

Appendix A – Abbreviations and Acronyms

ALARA	As-Low-As-Reasonably-Achievable
amp	Ampere
AQCR	(Hampton Roads Intrastate) Air Quality Control Region
ARC	Applied Research Center (City of Newport News)
BMP	Best Management Practice
°C	(degrees) Celsius
CAMD	Center for Advanced Microstructures and Devices
CBPA	Chesapeake Bay Preservation Area
CBPADMR	Chesapeake Bay Preservation Area Designation and Management Regulations
CEBAF	Continuous Electron Beam Accelerator Facility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHL	Central Helium Liquefier
cm	Centimeter
CZMA	Coastal Zone Management Act
DEQ	(Commonwealth of Virginia) Department of Environmental Quality
DOE	Department of Energy
EA	Environmental Assessment
EH&S	Environment, Health, and Safety
EIS	Environmental Impact Statement
E&SC	Erosion and Sediment Control
EPA	Environmental Protection Agency
EPP	Environmentally Preferable Purchasing
ESR	End Station Refrigerator
°F	(degrees) Fahrenheit
FEL	Free Electron Laser
FONSI	Finding of No Significant Impact
FSAD	Final Safety Assessment Document
FY	Fiscal Year (1 October to 30 September)
GeV	Giga (billion) electron volt
Helios	High-energy lithography source
HRPDC	Hampton Roads Planning District Commission
HRSD	Hampton Roads Sanitation District
in	Inch
Jefferson Lab	Thomas Jefferson National Accelerator Facility
km	Kilometer
KVA	Kilovolt Amp

kW	Kilowatt
IR	Infrared
LINAC	Linear Accelerator
MeV	Million electron volts
ml	Milliliter
MW	Megawatt
mrem	Millirem
MSL	Mean Sea Level
MVA	Megavolt Amp
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NCRP	National Commission on Radiation Protection and Measurement
NEPA	National Environmental Policy Act
OSHA	Occupational Safety and Health Administration
pCi	Picocuries
P2	Pollution Prevention
RF	Radio frequency
RMA	Resource Management Area
RPA	Resource Protection Area
SPCC	Spill Prevention, Control, and Countermeasure (Plan)
sq. ft.	Square Feet
SR	Storage Ring
SURA	Southeastern Universities Research Association, Inc.
SWP2	Stormwater Pollution Prevention (Plan)
TJNAF	Thomas Jefferson National Accelerator Lab (Jefferson Lab or JLab)
TGB	Technology Growth Building
UV	Ultraviolet
VADGIF	Commonwealth of Virginia Department of Game and Inland Fisheries
VADHR	Commonwealth of Virginia Department of Historic Resources
VADCRDNH	Commonwealth of Virginia Department of Conservation and Recreation, Division of Natural Heritage
VCP	Virginia's Coastal Resources Management Program
VPA	Virginia Pollution Abatement Permit
VOC	Volatile Organic Compound
VPDES	Virginia Pollutant Discharge Elimination System

Appendix B – Consultation and Correspondence with Agencies

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Department of Energy Ltr to Virginia Department of Environmental Quality dtd February 23, 2001[1] B-2

Virginia Department of Environmental Quality Ltr dtd March 6, 2001[2] B-3

Department of Energy Ltr to Virginia Department of Agriculture and Consumer Services' Office of Plant & Pest Services dtd April 10, 2001[3] B-4

Virginia Office of Plant & Pest Services Ltr dtd April 25, 2001 ..... B-5

Department of Energy Ltr to United States Department of the Interior Fish and Wildlife Service dtd April 10, 2001[3] B-6

Department of Interior, Fish and Wildlife Service Ltr dtd April 18, 2001 ..... B-7

Department of Energy Ltr to Virginia Department of Game and Inland Fisheries dtd April 10, 2001[3] B-8

Virginia Department of Game and Inland Fisheries Ltr dtd May 16, 2001 ..... B-9

Department of Energy Ltr to Virginia Department of Historic Resources dtd April 10, 2001[3,4] B-10, B-11

Virginia Department of Historic Resources Ltr dtd April 16, 2001 ..... B-12

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City of Newport News, Department of Planning and Development Ltr dtd April 25, 2001 ..... B-17

Commonwealth of Virginia Department of Environmental Quality Ltr to Department of Energy dtd December 17, 2001 ..... B-18

City of Newport News, Department of Engineering Ltr to C. Ellis at the Commonwealth of Virginia Department of Environmental Quality dtd December 20, 2001 ..... B-19

Hampton Roads Planning District Commission Ltr to C. Ellis at the Commonwealth of Virginia Department of Environmental Quality dtd December 20, 2001 ..... B-20

Department of Energy Memorandum to File dtd May 31, 2002 ..... B-21

1. One attachment is the same as Figure 1. The second attachment, the Environmental Assessment Determination, is not included.
2. The attachment, a list of organizations to inform about the EA, is not included.
3. Refer to Figure 1 of this EA for the attachment.
4. The attachment, previous correspondence dated Oct. 16, 1992, is included here.
5. The attachment is not included.
6. Refer to Figures 1, 2, 3, and 5 of this EA for four of the attachments. The other attachments, including the REMSA, Inc. report, are not included.

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

February 23, 2001

Ms. Ellie L. Irons
Environmental Impact Review Manager
Virginia Department of Environmental
Quality
P.O. Box 10009
Richmond, VA 23240-0009

Dear Ms. Irons:

It is Department of Energy (DOE) policy to notify states in which DOE facilities are located of each National Environmental Policy Act of 1969 (NEPA) determination regarding environmental review documentation to be prepared for a proposed action at the facility. Such notification is intended to facilitate early and open communication between the DOE and host states as part of the NEPA process.

Accordingly, with this letter I am advising you that during calendar year 2001, the DOE plans to prepare an Environmental Assessment (EA) for proposed improvements at the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) in Newport News, Virginia. The proposed action involves construction of three major additions to the Continuous Electron Beam Accelerator Facility (CEBAF) Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technician support building, a new refrigeration service building, and an addition to the Free Electron Laser (FEL) Facility.) The FEL Building Addition will include the installation and operation of the new Helios, a High energy lithography source. A copy of the Environmental Assessment Determination (EAD) is enclosed. The EAD will provide you with more information on the different activities planned for the EA and a site plan that notes where the activities involving construction will take place.

These improvements to TJNAF will assist the Laboratory in making full use of this national physics resource by improving the facility to accommodate existing staff and additional research personnel and to extend research capabilities by the addition of a new synchrotron light source.

As discussed in a telephone conversation between you and Ms. Barbara Morgan of my staff, when the draft EA is completed we will provide the necessary copies for your review, comment and coordination with other State Departments and Agencies. I understand that you have a list of contacts that we should use to make our notifications. During the telephone call you mentioned that you would fax this list to our office upon receipt of our notification. Our fax number is (757) 269-7146. If you or your staff wishes to receive further information about this action, please contact Barbara Morgan at (757) 269-7139. Information on the Department Of Energy's

NEPA Process should be directed to Mr. David Allen, NEPA Compliance Officer, located in our Operations Office in Oak Ridge, Tennessee at (865) 576-0411.

Sincerely,
/S/
Jerry Conley, Site Manager
Jefferson Lab Site Office

Enclosure

BMM:Notification Ltr to State:2/23/01:5440.I (Improvements EA)

B-2 (cont.)

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

Dennis H. Treacy
Director

(804) 698-4000
1-800-592-5482

March 6, 2001

Mr. Jerry Conley
Site Manager
Jefferson Lab Site Office, U.S. Department of Energy
12000 Jefferson Avenue
Newport News, Virginia 23606

RE: Notification of Intent to Prepare Environmental Assessment for Proposed Improvements at the Jefferson Lab (your February 23 letter)

Dear Mr. Conley:

Thank you for your February 23 letter in which you indicated the Department of Energy's intent to prepare an Environmental Assessment covering proposed improvements at the Thomas Jefferson National Accelerator Facility (Jefferson Lab).

Thank you, as well, for your willingness to send copies where needed according to our list. A copy of the list, appropriately marked, has been faxed to Barbara Morgan and is enclosed. We ask that you send one copy to our office and one copy to each recipient checked on the list, except as indicated on the list.

If you have questions, please feel free to contact me (telephone (804) 698-4325) or Charles Ellis of my staff (telephone (804) 698-4488).

Sincerely,

/S/

Ellie L. Irons
Environmental Impact Review
Program Manager

Enclosure
cc: Charles H.
Ellis III

An Agency of the Natural Resources Secretariat

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News; Virginia 23606

April 10, 2001

Mr. Frank Fulgham
Office of Plant and Pest Services
1100 Bank Street
Richmond, VA 23219

Dear Mr. Fulgham:

U.S. DEPARTMENT OF ENERGY PROPOSAL TO MAKE IMPROVEMENTS TO THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY (TJNAF OR JEFFERSON LAB)

On behalf of the U.S. Department of Energy (DOE) I am writing to advise you of a proposal to make improvements to the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) which is located in Newport News, Virginia (Figure 1 attached). Jefferson Lab is managed and operated by the Southeastern Universities Research Association, Inc. (SURA) under contract to DOE.

This proposal is being analyzed in an Environmental Assessment (EA) to ensure that these proposed improvements present no significant impact to the environment. The proposed action involves the construction of three or four major additions to the Continuous Electron Beam Accelerator Facility (CEBAF) Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technician support building, a new refrigeration service building, and an addition to the Free Electron Laser (FEL) Facility). The FEL Building Addition will include the installation and operation of the new synchrotron light source called Helios, a high-energy lithography source. These improvements to Jefferson Lab will assist the Laboratory in making full use of this national physics resource by: improving the facility infrastructure to better accommodate existing staff and additional research personnel; and, extending research capabilities by the addition of a new synchrotron light source.

We are in the process of conducting a survey of threatened and endangered species on our property using a contractor who has expertise in that area. The survey will include the plants and animals listed by the Virginia Natural Heritage Program for the local area, those identified by Virginia State Agencies, and any species identified on Federal lists. As we want to ensure that the survey addresses all areas of concern, we would appreciate your input on the survey content, including the identification of any special concerns that your office believes should be addressed during the preparation of this EA.

If you have any questions or concerns about this request or our EA proposal, please contact Ms. Barbara Morgan, DOE Site Office at (757) 269-7139 or e-mail at: bmorgan@jlab.org. If you would like to send your comments by facsimile, our number is (757) 269-7146. Thank you in advance for your assistance in this endeavor.

Sincerely,

/s/

Jerry M. Conley, Site Manager
Jefferson Lab Site Office

Enclosure

cc:
D. R. Allen, ORO NCO, SE-32

Ms. Ellie L. Irons
Environmental Impact Review Program Manager
Department of Environmental Quality
P.O. Box 10009
Richmond. VA 23240

BMM:Ltr to Dept of Agriculture:4/9/01:5440.I

J. Carlton Courter, III
Commissioner

COMMONWEALTH of VIRGINIA
Department of Agriculture and Consumer Services

Division of Consumer Protection
Office of Plant & Pest Services
PO Box 1163, Richmond, Virginia 23218
Phone: 804/786-3515 • Fax: 804/371-7793 • Hearing Impaired: 800/828-1120
www.vdacs.state.va.us

April 25, 2001

Jerry M. Conley
Dept. of Energy
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, VA 23606

RE: Jefferson Lab Construction, Newport News, VA

This letter is in response to your request concerning threatened or endangered plant or insects species in the vicinity of the proposed construction at the Thomas Jefferson National Accelerator Facility in Newport News, VA. To date, Virginia Department of Agriculture and Consumer Services records indicate that no threatened or endangered plant or insect species have been documented in the area indicated in maps you provided. We do not anticipate significant adverse impacts upon plant or insect species under our jurisdiction to result from this project. However, the absence of data does not necessarily mean that no listed species occur in the area, but that our files do not currently contain information to document their presence.

The Virginia Department of Agriculture and Consumer Services has jurisdiction only over plant and insect species listed as threatened or endangered by the Commonwealth of Virginia. To better serve citizens and agencies of the Commonwealth, the Virginia Departments of Agriculture and Consumer Services and Conservation and Recreation have entered into an agreement for the review of projects within Virginia. **Future requests for information concerning endangered and threatened plants and insects should be directed to the Natural Heritage Division of the Department of Conservation and Recreation for initial evaluation.** Projects found to demonstrate potential impact on these species will be referred to the Department of Agriculture and Consumer Services for further review and possible mitigation. Additional information on unique geologic formations, rare or critical habitat, and rare and candidate species can be obtained from VDCR/NH. The Virginia Department of Game and Inland Fisheries has jurisdiction over similarly listed endangered and threatened animal species.

Sincerely,

/s/

Keith R. Tignor
Endangered Species Coordinator

- Equal Opportunity Employer –

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

April 10, 2001

Ms. Karen L. Mayne
United States Department of Interior
Fish and Wildlife Service
P. 0. Box 99
6669 Short Lane
Gloucester, VA 23061

Dear Ms. Mayne:

U.S. DEPARTMENT OF ENERGY PROPOSAL TO MAKE IMPROVEMENTS TO THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY (TJNAF OR JEFFERSON LAB)

On behalf of the U.S. Department of Energy (DOE) I am writing to advise you of a proposal to make improvements to the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) which is located in Newport News, Virginia (Figure 1 attached). Jefferson Lab is managed and operated by the Southeastern Universities Research Association, Inc. (SURA) under contract to DOE.

This proposal is being analyzed in an Environmental Assessment (EA) to ensure that these proposed improvements present no significant impact to the environment. The proposed action involves the construction of three or four major additions to the Continuous Electron Beam Accelerator Facility (CEBAF) Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technician support building, a new refrigeration service building, and an addition to the Free Electron Laser (FEL) Facility). The FEL Building Addition will include the installation and operation of the new synchrotron light source called Helios, a high-energy lithography source. These improvements to Jefferson Lab will assist the Laboratory in making full use of this national physics resource by: improving the facility infrastructure to better accommodate existing staff and additional research personnel; and, extending research capabilities by the addition of a new synchrotron light source.

We are in the process of conducting a survey of threatened and endanger species on our property using a contractor who has expertise in that area. The survey will include the plants and animals listed by the Virginia Natural Heritage Program for the local area, those identified by Virginia State Agencies, and any species identified on Federal lists. As we want to ensure that the survey addresses all areas of concern, we would appreciate your input on the survey content, including the identification of any special concerns that your office believes should be addressed during the preparation of this EA.

If you have any questions or concerns about this request or our EA proposal, please contact Ms. Barbara Morgan, DOE Site Office at (757) 269-7139 or e-mail at: bmorgan@jlab.org. If you would like to send your comments by facsimile, our number is(757) 269-7146. Thank you in advance for your assistance in this endeavor.

Sincerely,
/s/
Jerry M. Conley, Site Manager
Jefferson Lab Site Office

Enclosure

cc:
D.R. Allen, ORO NCO, SE-32

Ms. Ellie L. Irons
Environmental Impact Review Program Manager
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

BMM:Ltr to Dept of Interior:4/9/01:5440.1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

April 18, 2001

Mr. Jerry M. Conley
U.S. Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National Accelerator Facility
12000 Jefferson Avenue
Newport News, Virginia 23606

Re: Improvements to Thomas Jefferson National Accelerator Facility, City of Newport News, Virginia

Dear Mr. Conley:

The U.S. Fish and Wildlife Service (Service) has reviewed your April 10, 2001 request for information on federally listed species for the referenced project. The proposal is to make improvements to the Thomas Jefferson National Accelerator Facility in the City of Newport News, Virginia. This letter is submitted in accordance with provisions of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and the Natonal Environmental Policy Act (NEPA) of 1969 (83 Stat. 852; 42 U.S.C. 4321 et seq.).

The Service believes that the proposed action will have no effect on federally listed species.

If you have any questions or need further assistance concerning this projeet, contact Mr. Eric Davis at (804) 693-6694, extension 104.

Sincerely;

/s/

Karen L. Mayne
Supervisor
Virginia Field Office

cc: VDGIF (Tom Wilcox)
VDCR, DNH (Rene Hypes)

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News; Virginia 23606

April 10, 2001

Mr. Ray Fernald
Chief, Wildlife Information
and Management
Department of Game and
Inland Fisheries
4010 W. Broad Street
Richmond. VA 23230

Dear Mr. Fernald:

U.S. DEPARTMENT OF ENERGY PROPOSAL TO MAKE IMPROVEMENTS TO THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY (TJNAF OR JEFFERSON LAB)

On behalf of the U.S. Department of Energy (DOE) I am writing to advise you of a proposal to make improvements to the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) which is located in Newport News, Virginia (Figure 1 attached). Jefferson Lab is managed and operated by the Southeastern Universities Research Association, Inc. (SURA)under contract to DOE.

This proposal is being analyzed in an Environmental Assessment (EA) to ensure that these proposed improvements present no significant impact to the environment. The proposed action involves the construction of three or four major additions to the Continuous Electron Beam Accelerator Facility (CEBAF) Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technician support building, a new refrigeration service building, and an addition to the Free Electron Laser (FEL) Facility.) The FEL Building Addition will include the installation and operation of the new synchrotron light source called Helios, a high energy lithography source. These improvements to Jefferson Lab will assist the Laboratory in making full use of this national physics resource by: improving the facility infrastructure to better accommodate existing staff and additional research personnel; and, extending research capabilities by the addition of a new synchrotron light source.

We are in the process of conducting a survey of threatened and endangered species on our property using a contractor who has expertise in that area. The survey will include the plants and animals listed by the Virginia Natural Heritage Program for the local area, those identified by Virginia State Agencies, and any species identified on Federal lists. As we want to ensure that the survey addresses all areas of concern, we would appreciate your inputon the survey content, including the identification of any special concerns that your office believes should be addressed during the preparation of this EA.

If you have any questions or concerns about this request or our EA proposal, please contact Ms. Barbara Morgan, DOE Site Office at (757) 269-7139 or e-mail at: bmorgan@jlab.org. If you would like to send your comments by facsimile, our number is (757) 269-7146. Thank you in advance for your assistance in this endeavor.

Sincerely;
/s/
Jerry M. Conley, Site Manager
Jefferson Lab Site Office

Enclosure

cc:
D. R. Allen, ORO, NCO, SE-32

Ms. Ellie L. Irons
Environmental Impact Review Program Manager
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

BMM:Ltr to Fish Wildlife2:4/9/01:5440.1

James S. Gilmore, III
Governor
John Paul Woodley, Jr.
Secretary of Natural Resources

COMMONWEALTH of VIRGINIA
Department of Game and Inland Fisheries

William L. Woodfin, Jr.
Director

May 16, 2001

Jerry Conley
Site Manager
US Department of Energy
TJNAF Site Office
12000 Jefferson Avenue
Newport News, VA 23606

RE: ESSLOG 14765; TJNAF Improvements

Dear Mr. Conley:

This letter is in response to your request for information related to the presence of threatened or endangered species in the vicinity of the above referenced project.

Information about fish and wildlife species was generated from our agency's computerized Fish and Wildlife Information System, which describes animals that are known or may occur in a particular geographic area. Field surveys may be necessary to determine the presence or absence of some of these species on or near the proposed area. Also, additional sensitive animal species may be present, but their presence has not been documented in our information system.

The *state endangered* canebrake rattlesnake *(Crotalus horridus atricaudatus)* has been documented in the project area. The applicant should coordinate with this Department to evaluate potential impacts on this species.
The state special concern species' yellow-crowned night heron *(Nyctanassa violacea)* and least tern *(Sterna antillarum)* have been documented in the project area. The classification of "state special concern species" is not a legal designation and does not require further coordination.
This project is located in the vicinity of a stream reach that contains a documented occurrence of striped bass *(Morone saxatilis)*. The applicant should coordinate with this Department regarding potential impact on this species.
This project lies within 0.5 mile of a documented waterbird colony containing great egret *(Ardea alba egretta)* and great blue heron *(Ardea herodias)*. Therefore, the applicant should coordinate with this Department and with the US Fish and Wildlife Service concerning potential impacts to these colonies.

Endangered plants and insects are under the jurisdiction of the Virginia Department of Agriculture and Consumer Services, Bureau of Plant Protection. Questions concerning sensitive plant and insect species occurring at the project site should be directed to Keith Tignor at (804)

4010 WEST BROAD STREET, P.0. BOX 11104, RICHMOND, VA 23230-1104
(804) 367-1000 (V/TDD) *Equal Opportunity Employment, Programs and Facilities* FAX (804) 367-9147

Jerry Conley
USDOE
May 16, 2001
Page 2

786-3515.

This letter summarizes the likelihood of the occurrence of endangered or threatened animal species at the project site. If you have additional questions in this regard, please contact me at (804) 367-0909. Please note that this response does not address any other environmental concerns; these issues are analyzed by our Environmental Services Section, in conjunction with interagency review of applications for state and federal permits. If you have any questions in this regard, please contact Ray Fernald or Tom Wilcox at (804) 367-8999.

The Fish and Wildlife Information Service, the system of databases used to provide the information in this letter, can now be accessed via the Internet! The Service currently provides access to current and comprehensive information about all of Virginia's fish and wildlife

resources, including those listed as threatened, endangered, or special concern; colonial birds; waterfowl; trout streams; and all wildlife. Users can choose a geographic location and generate a report of species known or likely to occur around that point. From our main web page, at www.dgif.state.va.us, choose the hyperlink to "Wildlife Information Online". For more information, please contact Amy Marti,; Online Services Coordinator, (804) 367-2211.

Thank you for your interest in the wildlife resources of Virginia.

Sincerely;

/s/
Amy Martin
Online Services Coordinator

cc: R.T. Fernald, VDGIF
Karen Mayne; USFWS

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

April 10, 2001

Ms. Cara Metz
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Dear Ms. Metz:

U.S. DEPARTMENT OF ENERGY PROPOSAL TO MAKE IMPROVEMENTS TO THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY (TJNAF OR JEFFERSON LAB)

On behalf of the U.S. Department of Energy (DOE) I am writing to advise you of a proposal to make improvements to the Thomas Jefferson National Accelerator Facility (TJNAF or Jefferson Lab) which is located in Newport News, Virginia (Figure 1 attached). Jefferson Lab is managed and operated by the Southeastern Universities Research Association, Inc. (SURA) under contract to DOE.

This proposal is being analyzed in an Environmental Assessment (EA) to ensure that these proposed improvements present no significant impact to the environment. The proposed action involves the construction of three or four major additions to the Continuous Electron Beam Accelerator Facility (CEBAF) Center, the main facility administration building, and construction of four important structures on the accelerator site (a new storage building, a new technician support building, a new refrigeration service building, and an addition to the Free Electron Laser (FEL) Facility). The FEL Building Addition will include the installation and operation of the new synchrotron light source called Helios, a high-energy lithography source. These improvements to Jefferson Lab will assist the Laboratory in making full use of this national physics resource by: improving the facility infrastructure to better accommodate existing staff and additional research personnel; and, extending research capabilities by the addition of a new synchrotron light source.

In 1992, we received a letter from the Department of Historic Resources (copy enclosed) in response to a letter we wrote requesting an assessment of the requirements of Section 106 of the National Historic Preservation Act of 1966 as it relates to Jefferson Lab. Your office identified no concerns at that time since the Jefferson Lab site had been extensively disturbed and had a low potential to contain archeological features. We are again beginning to prepare a new EA and want to ensure that the EA addresses all areas of concern and would like to confirm the conclusion of your office in 1992. We would appreciate your input including the identification of any special concerns that your office believes should be addressed during the preparation of this EA.

If you have any questions or concerns about this request or our EA proposal, please contact Ms. Barbara Morgan, DOE Site Office at (757) 269-7139 or e-mail at: bmorgan@jlab.org If you would like to send your comments by facsimile, our number is (757) 269-7146. Thank you in advance for your assistance in this endeavor.

Sincerely,

/s/

Jerry M. Conley, Site Manager
Jefferson Lab Site Office

Enclosure

cc:
D.R. Allen, ORO NCO, SE-32

Ms. Ellie L. Irons
Environmental Impact Review Program Manager
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

BMM:Ltr to Historic Resources:4/9/01 :54401

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Hugh C. Miller, Director

221 Governor Street
Richmond, Virginia 23219

TDD: (804) 786-1934
Telephone (804) 786-2121
FAX: (804) 225-4261

October 16, 1992

K. Dean Helms
Manager, CEBAF Site Office
Department of Energy
Oak Ridge Operations
Continuous Electron Beam
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

Re: Proposed Continuous Electron Beam Accelerator Facility
City of Newport News, Virginia
VDHR File No. 92-2142-F (formerly 997-NN)

Dear Mr. Helms:

Thank you for your letter of September 16, 1992 requesting updated comments on the proposed facility.

We have previously reviewed the environmental assessment for the proposed project. We understand that the selected site is in the City of Newport News. Our comments on this site remain the same as in our correspondence dated April 1, 1987. No historic districts or structures will be affected by this project. An archeological assessment was prepared for this property in May, 1985 by Daniel V. Mouer, Ph.D. of Virginia Commonwealth University's Archaeological Research Center. As a result of his study, we concurred with his opinion that the property has been extensively disturbed and has a low potential to contain contact archeological levels and features. No archeological investigations are warranted in connection with this project.

Our comments remain the same. Construction of the proposed facility will have no effect on historic properties. The requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, have been met for this particular project.

If you have any questions, please contact Ethel R. Eaton of our staff.

We look forward to working with you on future projects.

Sincerely,

/S/
Bruce J. Larson
Project Review Supervisor

cc. Barbara Morgan

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural

COMMONWEALTH of VIRGINIA

Department of Historic Resources
2801 Kensington Avenue, Richmond Virginia 23221

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386

April 16, 2001

Mr. Jerry M. Conley
Site Manager
Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
1200 Jefferson Avenue
Newport News, Virginia 23606

Re: Improvements to Jefferson National Accelerator Facility
DHR File Number 1992-2142

Dear Mr. Conley:

Thank you for your letter of April 10, 2001 requesting updated comments on the proposed project.

Before we can make an effect determination for the referenced project we will need the following information:

- Updated information on the standing structures at the Jefferson Facility. Existing architectural information was collected 13 years ago; it is possible that structures previously found ineligible have since then gained sufficient age to be considered potentially eligible.

Thank you again for consulting with us concerning the referenced project. Once we have received the requested information we will proceed with our effect determination. If you have any questions or if we can be of any further assistance, do not hesitate to contact me at (804) 367-2323 ext. 140.

Sincerely,
/s/
Lily A. Richards
Archaeologist, Division of Resource Services and Review
Cc. Ellie Irons, DEQ

Program Services Div.
10 Courthouse Ave.
Petersburg, VA 23808
Tel: (804) 863-1685
Fax: (804) 862-6196

Petersburg Office
19-B Bollingbrook Street
Petersburg, VA 23803
Tel: (804) 883-1620
Fax: (804) 863-1627

Portsmouth Office
612 Court St., 3rd Fl.
Portsmouth, VA 23704
Tel: (757) 396-6707
Fax: (757) 396-6712

Roanoke Office
1030 Penmar Ave., SE
Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7688

Winchester Offices
107 N. Kent St.# 203
Winchester, VA 23801
Tel: (540) 722-3427
Fax: (540) 723-7535

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

August 29, 2001

Ms. Lily A. Richards
Archaeologist
Division of Resource Services and Review
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Dear Ms. Richards:

U. S. DEPARTMENT OF ENERGY PROPOSAL TO MAKE IMPROVEMENTS TO THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY (TJNAF OR JEFFERSON LAB)

In response to your April 16, 2001 letter that you were so kind to fax to me last month and subsequent telephone messages, enclosed is a printout of the facilities on site that provides the building age and year built. We hope that this information will assist you in making a determination regarding any special concerns that your office believes should be addressed during the preparation of an Environmental Assessment (EA) that we are in the process of performing. Our letter dated April 10,2001, provides further information on the EA proposal.

We are trying to finalize the draft of the EA before the end of September 2001. If you have any questions or concerns about this request or our EA proposal, please contact Ms. Barbara Morgan, DOE Site Office at (757) 269-7139 or e-mail at bmorgan@jlab.org. If you would like to send your comments by facsimile, our number is (757) 269-7146. Thank you in advance for your assistance in this endeavor.

Sincerely,
/s/

Barbara M. Morgan
DOE NEPA Document Manager

Enclosure

cc w/enclosure:
D.R. Allen, ORO NCO, SE-32
Ms. Elllie L. Irons
Environmental Impact Review Program Manager
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

(FIMS 04)

U.S. Department of Energy
Facilities Information Management System
Owned Building Age Report

Field Office 10 Oak Ridge Ofc
Site 10012 Thomas Jefferson National Accelerator Facility
Area 001 All

Property ID	Property Name	Building Age	Year Built	Deficiency	Model Bldg	Usage Code	Usage Description
	EXIT STAIR 1	0			Steel Braced Frame	785	Accelerator Building
	Central Helium Liqifier	11	1990		Steel Light Frame	785	Accelerator Building
	Cryo Trailer	11	1990		Wood, Light Frame	731	Electrical/Electronics Laboratory
	Physics Trailer	8	1993		Wood, Light Frame	101	Office
	Accelerator Trailer	0			Wood, Light Frame	101	Office
	Accelerator Trailer	12	1989		Wood, Light Frame	101	Office
	CEBAF Center	12	1989		Steel Moment Frame	101	Office
	Trailer City	15	1986		Wood, Light Frame	101	Office
	PE MAINTENANCE SHED	2	1999		Steel Light Frame	400	General Storage
	Free Electron Laser Building (FEL)	4	1997		Steel Light Frame	785	Accelerator Building
	Acid Building	12	1989		Unreinforced Masonry Bearing Walls	410	Hazardous/Flammable Storage
	Chemical Storage	12	1989		Unreinforced Masonry Bearing Walls	410	Hazardous/Flammable Storage
	Accel. Tech.	14	1987		Wood, Light Frame	791	Laboratories, General (Non-Nucl
	Accel Tech Trailer B	14	1987		Wood, Light Frame	791	Laboratories, General (Non-Nucl
	User Liaison Group	14	1987		Wood, Light Frame	612	Electronics Shops
	User Liaison Group	13	1988		Wood, Light Frame	801	Other
	Accel Tech Trailer F	14	1987		Wood, Light Frame	401	Programmatic General Storage
	User Group Trailer	11	1990		Wood, Light Frame	709	Other Support Labs
	Accelerator EH&S Trailer	12	1989		Wood, Light Frame	101	Office
	Test Lab Annex	36	1965		Unreinforced Masonry Bearing Walls	709	Other Support Labs
	Radiation Control Trailer	11	1990		Wood, Light Frame	101	Office
	Radiation Control Trailer	6	1995		Wood, Light Frame	101	Office
	Radcon Training Center	7	1994		Wood, Light Frame	709	Other Support Labs
	Accel Installation Trailer	6	1995		Wood, Light Frame	101	Office
	Accel Installation Trailer	6	1995		Wood, Light Frame	101	Office
	Accel Installation Trailer	6	1995		Wood, Light Frame	101	Office
	Radcon Calibration	6	1995		Steel Light Frame	709	Other Support Labs
	Cryogenics Test Facility	14	1987		Steel Light Frame	709	Other Support Labs
	Test Lab	39	1962		Precast/Tilt-up Concr Walls/Lightwght Fla	709	Other Support Labs
	Accelerator Tech Shop	13	1988		Steel Light Frame	709	Other Support Labs
	Physics Storage Building	3	1998		Steel Light Frame	400	General Storage
	Machine Control Center	11	1990		Steel Light Frame	702	Computation Laboratory
	Accel Maintence & Support Bldg	6	1995		Steel Light Frame	101	Office
	ATS Building	5	1996		Steel Light Frame	101	Office
	Experimental Equipment Lab	11	1990		Steel Light Frame	709	Other Support Labs

(FIMS 04)

U.S. Department of Energy
Facilities Information Management System
Owned Building Age Report

Page 2
08/14/2001

Field Office	10	Oak Ridge Ofc
Site	10012	Thomas Jefferson National Accelerator Facility
Area	001	All

Property ID	Property Name	Building Age	Year Built	Deficiency	Model Bldg	Usage Code	Usage Description
094A	Physics Trailer Hall B	14	1987		Wood, Light Frame	791	Laboratories, General (Non-Nucl
096D	Install Trailer Hall B	8	1993		Wood, Light Frame	611	Machine Shops
097	Counting House	8	1993		Steel Moment Frame	703	Applied Science Laboratory
098	Cryo Weld Shop/Service Bldg	8	1993		Steel Light Frame	601	Maintenance Shops, General
101B	Hall A Tech Trailer	4	1997		Wood, Light Frame	612	Electronics Shops
102	End Station Refrigeration Bldg	8	1993		Steel Light Frame	801	Other
803	Container SNS	0			Other-Describe briefly in comments field/s	400	General Storage
804	Container	0			Other-Describe briefly in comments field/s	400	General Storage
805	Container	0			Other-Describe briefly in comments field/s	501	Production/Manufacturing Buildi
810	Container F2667	0			Other-Describe briefly in comments field/s	400	General Storage

Total Buildings: 45 Total Avg Age: 9

08/14/01(TUE) 15:26 [TX/RX NO 6085]

AUG.-14'01(TUE) 16:24 JEFF. LAB. HR&S TEL:757 269 7559 '.003

B-13 (cont.)

COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.state.va.us

September 6, 2001

Ms. Barbara Morgan

DOE NEPA Document Manager
Department of Energy
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

Re: Improvements to Thomas Jefferson National Accelerator Facility
Newport News, Virginia
DHR File Number 1992-2142

Dear Ms. Morgan:

Thank you for providing us with the additional information requested. Based on that information, the DHR concurs with the DOE that the proposed improvements to the Thomas Jefferson National Accelerator Facility will not effect historic properties.

Thank you again for consulting with us. If I can be of any further assistance, do not hesitate to contact me at (804) 367-2323 ext. 140 or lrichards@dhr.state.va.us.

Sincerely,

Lily A. Richards
Archaeologist and Historian, Division of Resource Services and Review

Program Services Div.
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 863-1685
Fax: (804) 862-6196

Petersburg Office
19-B Bollingbrook Street
Petersburg, VA 23803
Tel: (804) 863-1620
Fax:(804) 863-1627

Portsmouth Office
612 Court St, 3rd Fl.
Portsmouth, VA 23704
Tel: (757) 396-6707
Fax: (757) 396-6712

Roanoke Office
1030 Penmar Ave., SE
Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7588

Winchester Office
107 N. Kent St., #203
Winchester, VA 22601
Tel: (540) 722-3427
Fax:(540) 722-7535

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

August 1, 2001

Department of the Army
Norfolk District, Corps of Engineers
ATTN: Richard Berg
Regulatory Branch
803 Front Street
Norfolk, Virginia 23510

Dear Mr. Berg:

REVIEW OF WETLAND DELINEATION SURVEY FOR THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY

In accordance with our telephone conversation today, enclosed for your review is a copy of the "Wetland Delineation and Threatened and Endangered Species Survey" for the Thomas Jefferson National Accelerator Facility (Jefferson Lab) located in Newport News, Virginia. This survey was performed by Research, Environmental & Management Support (REMSA), Inc. In addition, I am enclosing a U.S.G.S. Topographic Map, aerial photograph, soil map, a colored site plan, and a black and white site plan marked to show you where the new building construction will be performed.

I would appreciate your review of this information to determine if there are any jurisdictional wetlands on our property. If you have any questions or need to visit the facility, please call me at 269-7139.

Sincerely,
/s/
Barbara M. Morgan
ES&H Manager
TJNAF DOE Site Office

Enclosures

cc: w/o
enclosures R.
Sundelin
R. Sprouse
L. Even

BMM:5440.1:ImpEA::8/1/01

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

September 25, 2001

Western Virginia Regulatory Section
01-R1917-29 (Brick Kiln Creek)

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National Accelerator
Facility Site Office
Attn: Barbara Morgan
12000 Jefferson Avenue
Newport News, Virginia 23606

Dear Ms. Morgan:

Robert Berg of my staff met with you on September 25, 2001 to examine a number of areas into which the expansion of existing buildings and construction of new buildings is proposed.

The proposed work, as shown on the Environmental Assessment Site Plan (enclosed), will not impact any areas within U.S. Army Corps of Engineers jurisdiction. No Department of the Army permit will be required for the proposed work. However, be aware that not all portions of the facility were examined and jurisdictional areas may exist on other portions of this property. Should any deviation from the above cited plan, or new work be proposed in the future, contact Robert Berg of my staff at (757) 441-7793 for advise on wetland matters.

Sincerely,

Michael A. Schwinn

Michael A. Schwinn
Chief, Western Virginia
Regulatory Section

City of Newport News
Department of Planning and Development
2400 Washington Avenue • Newport News, VA 23607
Planning (757) 926-8761 • Development (757) 926-8428
Graphic Services (757) 926-8881 • Harbor Master (757) 247-8437
FAX (757) 926-3504

RECEIVED
DOE/TJNAF
01 APR 31 PM 3:31

April 25, 2001

Department of Energy
Garry Conley
12000 Jefferson Avenue
Newport News, VA 23606

Dear Mr. Conley:

The property located at 12000 Jefferson Avenue contain neither Chesapeake Bay Resource Protection nor Resource Management features. It, therefore, does not fall under the purview of the Chesapeake Bay Protection Act.

Sincerely,

David Watson

David Watson
Environmental Planner

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

Dennis H. Treacy
Director

(804) 698-4000
1-800-592-5482

December 17,2001

Mr. Jerry M. Conley, Site Manager
Thomas Jefferson National Accelerator Facility Site Office
U.S. Department of Energy
12000 Jefferson Avenue
Newport News, Virginia 23606

RE: Draft Environmental Assessment, Improvements at the Thomas Jefferson National Accelerator Facility ("TJNAF" or "Jefferson Lab"), Newport News, Virginia (DOE/EA-1384)
DEQ-01-205F

Dear Mr. Conley:

The Commonwealth of Virginia has completed its review of the Environmental Assessment for the above project. The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies participated in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Agriculture and Consumer Services
Department of Conservation and Recreation
Department of Transportation
Marine Resources Commission
Department of Historic Resources
Department of Mines, Minerals, and Energy
Department of Forestry
Chesapeake Bay Local Assistance Department.

In addition, the Hampton Roads Planning District Commission and the City of Newport News were invited to comment.

Mr. Jerry M. Conley
December 17, 2001
Page 2

Project Description

The Department of Energy (DOE) proposes to construct several buildings and building additions in the Jefferson Lab complex along Jefferson Avenue (state Route 143) in the City of Newport News. The individual projects include:

- as many as four additions, totaling 151,000 square feet, to the main CEBAF Center administration building. Each would have two or three floors, and approximately 81,000 square feet of parking area and access roads would be provided;
- one Refrigeration Support Building, total disturbance about 5,000 square feet;
- a one-story Technical Support Building, with an access ramp and 25 additional parking spaces and a "material lay-down area." This part of the project would involve moving 400 feet of the security fence about 20 feet outward. It would disturb about 54,000 square feet;
- a one-story Accelerator Site Storage Building, built in two phases, disturbing about 30,000 square feet of land; and
- A two-story addition to the PEL (Free Electron Laser) Building, including a new driveway and about 14 parking spaces, covering approximately 25,000 square feet. This building is to house a Helios particle beam accelerator, which may generate "small quantities of radioactivity" and also NOx and ozone.

(See Draft EA, pages 12-13, sections 2.2.1 through 2.2.5; page 40, section 4.5.1.7)

Environmental Impacts and Mitigation

1. Air Quality Impacts. The DEQ's Division of Air Programs Coordination indicates that the project site is located within an ozone maintenance area, and recommends that precautionary measures be employed to reduce ground-level ozone concentrations, especially during ozone alert days. This can be done by minimizing the generation of ozone precursors such as volatile organic compounds (VOC) and nitrogen oxides (NOx) during operation of construction equipment and vehicles. Any access roads, parking lots/garage, ingress/egress, or interchanges/intersections should be designed and constructed so as to avoid or minimize traffic congestion and/or unnecessary localized vehicular idling. Precautions relative to NOx and ozone are also important because of the operation of the Helios machine, which is likely to emit both pollutants, in the proposed FEL Addition (EA, page 13, section 2.2.5 and page 40, section 4.5.1.7).

B-18 (cont.)

Mr. Jerry M. Conley
December 17, 2001
Page 3

During construction, fugitive dust must be kept at a minimum by using control methods outlined in 9 VAC 5-50-60 et seq. of the Regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets, and of dried sediments resulting from soil erosion.

(See the Regulations, 9 VAC 5-50-90.)

One or more of the buildings in this project may include heating facilitiesor other fuel-burning equipment. DOE staff should contact the DEQ's Tidewater Regional Office to determine the application of air permitting requirements to this project; see "Regulatory and Coordination Needs," item 1, below.

2. Natural Heritage and Wildlife Resources. According to the Department of Conservation and Recreation and the Department of Game and Inland Fisheries, the canebrake rattlesnake *(Crotalus horridus atricaudatus),* a state-listed endangered species, has been documented in close proximity to the project area. The canebrake rattlesnake inhabits hardwood and mixed hardwood-pine forests, cane thickets, and the ridges and glades of swampy areas. These snakes are generally terrestrial and feed on a variety of small animals. The species is widespread throughout the Southeast, but the northern limit of its range is in Virginia, where it is known in only six counties. Primary threats to the species are loss of habitat due to development and also persecution. Based on the scope of the project, the amount of disturbance existing on the property, and the minimal disturbance to potential habitat for this species, the Department of Game and Inland Fisheries does not anticipate that the project will have significant adverse impacts upon the canebrake rattlesnake. However, if one is observed during construction, DOE staff should contact that Department. See "Regulatory and Coordination Needs, "item 2, below.

The Department of Agriculture and Consumer Services, which has responsibility for state-listed endangered and threatened plant and insect species, anticipates no adverse impacts to such species from this project.

3. Chesapeake Bay Preservation Areas. According to the Chesapeake Bay Local Assistance Department (CBLAD), the graphics in the Draft EA do not provide the detail

B-18 (cont.)

necessary for verification of any Chesapeake Bay Preservation Areas in the project area. Accordingly, CBLAD staff scaled the location of the proposed construction onto a U.S. Geological Survey topographic map of the Newport News North quadrangle. From this analysis, it appears that the existing buildings may have previously obliterated a perennial stream, ponds, and any wetlands associated with them. If so, CBLAD would agree with DOE that there do not appear to be any Resource Protection Areas (RPA, the more restrictive of two categories of Chesapeake Bay Preservation Areas) on the property (Draft EA, page 30, section 4.4.1 and Appendix B, page B-17). However, CBLAD recommends that DOE conduct a site-specific survey to verify whether any RPA features (including the 100-foot buffer) exist on the property affected by the new buildings, or the property adjacent to it. This applies particularly to the Accelerator Site Storage Building (Phases 1 and 2) and the Technical Support Building.

"RPA features" in Newport News include the following:

- tidal wetlands;
- non-tidal wetlands which are connected by surface flow and contiguous to tidal wetlands or to perennial tributary streams;
- tidal shores;
- a 100-foot vegetated buffer area adjacent to and landward of the other RPA features.

"RPA features" in Newport News do not include man-made watercourses such as any ditch, canal, drain, or culvert; or a waterbody used in a system to achieve stormwater management either by detention or retention of stormwater runoff.

Resource Management Areas (RMAs, the less restrictive category of Chesapeake Bay Preservation Areas) in Newport News include:

- all lands within 100 feet landward of the landward boundary of the RPA buffer;
- all land containing slopes greater than 15%;
- all areas within the 100-year floodplain;
- highly erodible soils.

In this regard, CBLAD notes that soil types in the areas to be disturbed include Chickahominy silt loam. This soil has a K factor of 0.37, which is in a range considered highly erodible. It appears, accordingly, that some RMA features do exist on the property.

B-18 (cont.)

Mr. Jerry M. Conley
December 17, 2001
Page 5

In order to be consistent with the Chesapeake Bay Preservation Act (*Virginia Code* sections 10.1-2100 et seq.), DOE must demonstrate that its project activities address the performance criteria in the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10 et seq.). According to descriptions in the Draft EA (pages 12-13, sections 2.2.1 through 2.2.5), approximately 8 acres of existing vegetated land will be disturbed, and yet the Draft EA does not state how stormwater will be managed. The discussion of stormwater control on page 24 (section 3.4.2.1.3) is vague. However, unless runoff from the new development is collected and treated through a water quality Best Management Practice, it is unlikely that these buildings will meet the stormwater quality criteria of the Regulations. Accordingly, CBLAD recommends that DOE document consistency with the performance standards of the Regulations. See "Regulatory and Coordination Needs," item 3, below.

4. Solid and Hazardous Waste Management. The Draft EA mentioned some potential solid and hazardous waste contamination issues, such as buffered chemical polish, but the Draft EA did not include a search of environmental data bases. A full environmental investigation should be conducted before construction begins, according to the DEQ's Office of Remedial Programs, in order to ensure that there are no unaddressed waste or contamination issues. The Office of Remedial Programs conducted a cursory review of its data files and found no additional contamination sites.

Any soil that is suspected of contamination, and any wastes generated, must be tested and disposed of in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60 et seq.) and the Virginia Regulations for the Transportation of Hazardous Materials (9 VAC 20-110 et seq.). Other federal and state regulations may also apply, since the Jefferson Lab is also a small-quantity generator of hazardous waste. Liquid hazardous wastes will be located on the property after construction, so the Spill Prevention, Control, and Countermeasures provisions of Title 40, Code of Federal Regulations, Part 112 must also be followed.

With regard to solid wastes, DEQ recommends that they be reduced at the source, re-used, and recycled to the greatest extent practicable.

5. *Water Quality and Wetlands.* According to the Draft EA (page 25, section 3.4.2.1.5), the Army Corps of Engineers has reviewed a recent wetland delineation and confirmed that these buildings will not affect any wetlands. For this reason and because there will be no direct stream impacts, a Virginia Water Protection Permit will not be required for this project. In general, DEQ's Virginia Water Protection Program recommends use of appropriate erosion and sediment control measures and careful construction practices to minimize project impacts upon state waters.

B-18 (cont.)

Mr. Jerry M. Conley
December 17,2001
Page 6

6. Erosion and Sediment Control; Stormwater Management. Executive Order 12088, "Federal Compliance with Pollution Control Standards and the Sykes Act," authorizes cooperation between state and federal agencies regarding the conservation of natural resources. Compliance with the state Erosion and Sediment Control and Stormwater Management programs through proper design and implementation is consistent with the mandate of these federal directives. Notwithstanding cooperation with the Department of Conservation and Recreation, federal agencies are responsible for ensuring compliance with the state program on regulated activities under their authority through separate agreements with contractors, training, field inspection, enforcement action, or other means that are consistent with agency policy and federal and state mandates. See "Regulatory and Coordination Needs," item 5, below.

7. Historic and Archaeological Resources. This project will not affect any historic properties, according to the Department of Historic Resources. This conclusion is based on an earlier request for information, and satisfactory fulfillment of that request (see Draft EA, Appendix B, letters on pages B-12 through B-14).

8. Recreation Resources. The Department of Conservation and Recreation has indicated that the proposed project will not affect any streams on the National Park Service Nationwide Inventory, Final List of Rivers, or existing or potential State Scenic Rivers. Nor will the project affect existing or potential State Scenic Byways.

9. Pesticides and Herbicides. If pesticides or herbicides must be used, their use should be strictly in accordance with manufacturers' recommendations. In addition, we recommend that DOE use the least toxic herbicides or pesticides effective for landscape maintenance. Products containing volatile organic compounds as their active ingredient should be avoided in order to protect air quality. For more information on this subject, please contact the Department of Agriculture and Consumer Services (telephone (804) 786-3501).

10. Transportation Impacts. This project will not affect existing or planned transportation facilities.

11. Forest and Tree Protection. In order to protect trees on the DOE property from the effects of this project, DOE should mark and fence them at least to the drip line or the end of the root system, whichever extends farther from the tree stem. Marking should be done with highly visible ribbon so that equipment operators see the protected areas easily. Parking and stacking of heavy equipment and construction materials near trees can damage root systems by compacting the soil. Soil compaction, from weight or vibration, affects root growth, water and nutrient uptake, and gas exchange. The protection measures suggested above should be used for parking and stacking as well as

for moving of equipment and materials. If parking and stacking are unavoidable, DOE should use temporary crossing bridges or mats to minimize soil compaction and mechanical injury to plants.

Any stockpiling of soil, such as from the trenches for the water lines, should take place away from trees. Piling soil at a tree stem can kill the root system of the tree. Soil stockpiles should be covered, as well, to prevent soil erosion and fugitive dust (see item 2, above).

Questions on tree protection may be directed to the Department of Forestry (Mike Foreman, telephone (804) 977-6555).

12. Pollution Prevention. The DEQ advocates that principles of pollution prevention be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices (BMPs) will help to ensure that environmental impacts are minimized. However, pollution prevention techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source. We have several pollution prevention recommendations that may be helpful in constructing or operating this project:

- Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the proposed facility is committed to minimizing its environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program.
- Consider designs, techniques, and technologies that will facilitate the re-circulation and re-use of waters used for cooling and steam generation. These techniques can save money by minimizing intake and treatment needs.
- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider contractors' commitment to the environment (such as an EMS) when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.

B-18 (cont.)

- Choose sustainable materials and practices for infrastructure and building construction and design. These could include asphalt and concrete containing recycled materials, and integrated pest management in landscaping, among other things.
- Integrate pollution prevention techniques into the facility maintenance and operation, to include the following: inventory control (record-keeping and centralized storage for hazardous materials), product substitution (use of non-toxic cleaners), and source reduction (fixing leaks, energy-efficient HVAC and equipment). Maintenance facilities should be designed with sufficient and suitable space to allow for effective inventory control and preventive maintenance.

DEQ's Office of Pollution Prevention provides free information and technical assistance relating to pollution prevention techniques and EMS. If interested, DOE may contact that Office (Tom Griffin, telephone (804) 698-4545).

Regulatory and Coordination Needs

1. Air Quality Regulation. As indicated above, one or more heating facilities, or other fuel-burning equipment, may require an air permit, pursuant to the Regulations for the Control and Abatement of Air Pollution, 9 VAC 5-80-10. In addition, if any open burning of land-clearing or other debris is contemplated as part of project construction, an open burning permit will be required, pursuant to 9 VAC 5-40-5600 et seq. in the Regulations. Both of these permit programs are administered by the DEQ's Tidewater Regional Office. Questions on permit applicability may be addressed to that Office (Jane Workman, Air Permits Manager, telephone (757) 518-2112).

2. Endangered Species Protection. To ensure compliance with endangered species legislation, DOE staff should contact the Department of Game and Inland Fisheries (Ray Fernald, telephone (804) 367-6913) if a canebrake rattlesnake is encountered.

3. Chesapeake Bay Preservation Act Compliance. The Chesapeake Bay Local Assistance Department (CBLAD) offers to discuss these buildings further with DOE or its project manager, in order to help DOE achieve and maintain compliance with the performance standards of the Chesapeake Bay Preservation Area Designation and Management Regulations (see the discussion in "Environmental Impacts and Mitigation," item 3, above). We recommend that DOE contact CBLAD (Catherine Harold, telephone (804) 371-7501) to begin this consultation,

B-18 (cont.)

4. Water Quality Regulation. Because the project will disturb 5 acres or more of land area (see "Environmental Impacts and Mitigation; item 3, above), there may be a need for a Virginia Pollutant Discharge Elimination System (VPDES) Stormwater General Permit. DOE should consult with the DEQ's Tidewater Regional Office (Sheri Kattan, telephone (757) 518-2156) to determine whether its existing VPDES Stormwater Permit needs modification.

5. Erosion and Sediment Control and Stormwater Management Plans; Compliance. Advice on meeting requirements for erosion and sediment control and for Stormwater management may be obtained by contacting the Department of Conservation and Recreation's Chowan-Albemarle Watersheds Office (Ernie Brown, telephone (757) 925-2468).

6. Radiological Health Considerations. We recommend that DOE consult with the Radiological Health Division of the Virginia Department of Health (Les Foldesi, telephone (804) 786-5932) in order to more effectively address questions of radiological health associated with this project (see Draft EA, pages 37-41, section 4.5).

7. Federal Consistency under the Coastal Zone Management Act. The Virginia Coastal Resources Management Program is comprised of a network of programs administered by several agencies. In order to be consistent with the VCP, the DOE must obtain all the applicable permits and approvals listed under the Enforceable Programs of the VCP prior to commencing the project. Based on the commitments provided in the consistency determination that DOE will obtain and comply with all approvals from agencies administering the applicable enforceable policies (Draft EA, pages 30-31, section 4.4.1), and subject to the guidance given by the Chesapeake Bay Local Assistance Department (item 3, above), we concur with the finding that this proposal is consistent with the VCP. Questions on federal consistency may be directed to DEQ's Office of Environmental Impact Review (Charles Ellis, telephone (804) 698-4488).

8. Local Government Coordination. The City of Newport News expects to reply directly to you concerning this Draft EA.

Thank you for the opportunity to review this project.

Sincerely,

Michael P. Murphy, Director
Division of Environmental Enhancement

B-18 (cont.)

Mr. Jerry M. Conley
December 17, 2001
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Enclosures

cc: Catherine M. Harold, CBLAD
Sheryl A. Kattan, DEQ-TRO
Derral Jones, DCR
Keith R. Tignor, DACS
Alan D. Weber, VDH
Leslie P. Foldesi, VDH
K. S. Narasimhan, DEQ-DAPC-OADA
Thomas D. Modena, DEQ-DWPC-ORP
Carolyn Browder, DEQ-VWPP
Angel N. Deem, VDOT
Raymond T. Fernald, DGIF
Lily A. Richards, DHR
J. Michael Foreman, DOF
Eugene K. Rader, DMME
R. B. Stagg, MRC
Deborah Ossa, City of Newport News
Shonia Holloway, Hampton Roads PDC

City of Newport News

Department of Engineering
2400 Washington Avenue
Newport News, Virginia 23607

Tel (757) 926-8611

Fax (757) 926-8300

OFFICE OF THE DIRECTOR

December 20, 2001

Mr. Charles H. Ellis, III
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, Sixth Floor
Richmond VA 23219

Re: Improvements to the Thomas Jefferson National Accelerator Facility Newport News, VA; Project Number: 01-205F

Dear Mr. Ellis:

The October 2001 draft Environmental Assessment (EA) for the referenced project does not clearly or adequately address stormwater quantity control issues for the site. In Section 3.4.2.1.3 there appears to be conflicting statements as to exactly how, when and to what extent the resulting impacts to both on- and off-site storm drainage facilities will be evaluated and/or mitigated.

The original TJNAF site plan included an onsite retention system that was never built. Instead, manually controlled floodgates were installed on the two outlet pipes that serve the entire 160+ acre facility. The need for stormwater retention in this area of the City has long been established as evidenced in the surrounding developments. The Oyster Point Business Park to the south has a combination pond/canal retention system and the proposed Jefferson Center Development to the north will be required to install two retention ponds to handle planned improvements.

It is requested that a comprehensive evaluation of stormwater quantity control requirements be included as a prerequisite to proposed improvement at the TJNAF. This evaluation should determine the effectiveness, reliability, and operational guidelines for the manually controlled floodgates; and whether stormwater retention can be adequately handled on-site or incorporated with planned offsite retention in the Jefferson Center Development.

Should you have any questions please contact Lambert Logan at 926-8314.

Sincerely,

Mostafa A. Sabbah, Ph.D., P.E.
Director of Engineering

MAS:LBL:mcm

cc: Director of Planning & Development, P. Miller
Director of Public Works, R. Fowler
HRPDC, Shonia Holloway

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

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Mayara E. Oberndof, *Mayor*
Nancy K. Parker, *Council Member*
James K. Spore, *City Manager*

WILLIAMSBURG
Jackson C. Turtle, II, *City Manager*
Jeanne Zeidar, *Mayor*

YORK COUNTY
Sheila S. Noll, *Board Member*

December 20, 2001

Mr. Charles H. Ellis III
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street. Sixth Floor
Richmond; Virginia 23219

Re: Improvements to the Thomas Jefferson National Accelerator Facility. Newport News, Virginia, **DEQ#01-205F (ENV:GEN)**

Dear Mr. Ellis:

Pursuant to your request of November 13, 2001, the staff of the Hampton Roads Planning District Commission has reviewed the Improvements to the Thomas Jefferson National Accelerator Facility, Newport News, Virginia. We have contacted the City of Newport News concerning the project.

The City of Newport News is concerned that the proposed stormwater quantity controls mitigation does not adequately address the issues for this site. Past measures to implement an onsite retention system were substituted with manually controlled floodgates on only two outlet pipes that service the entire site^ This area of the City has historically demonstrated the need for effective stormwater control measures. Other surrounding developments have or will require onsite retention systems to handle current and planned development. We recommend that the applicant coordinate with the City to develop a comprehensive evaluation of stormwater quantity control measures that address these issues.

We appreciate the opportunity to review this project. If you have any questions, please do not hesitate to call.

Sincerely,

Arthur L Collins
Executive Director/Secretary

SMH:fh

Cc: Dr. Mostafa A. Sabbah, P.E., NN
Mr. Jerry M. Conley, TJNAF

Department of Energy
Oak Ridge Operations Office
Thomas Jefferson National
Accelerator Facility Site Office
12000 Jefferson Avenue
Newport News, Virginia 23606

MEMORANDUM TO FILE

DATE: May 31.2002

FROM: Barbara M. Morgan /s/
NEPA Document Manager

SUBJECT: CLOSURE OF COMMENTS FROM THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, HAMPTON ROADS PLANNING DISTRICT COMMISSION, AND THE CITY OF NEWPORT NEWS DRAFT ENVIRONMENTAL ASSESSMENT FOR THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY

This Memorandum documents that the comments received from the Virginia Department of Environmental Quality, the Hampton Roads Planning District Commission, and the City of Newport News on the Thomas Jefferson National Accelerator Facility's draft Environmental Assessment (EA) have been addressed and coordinated with each commenter. Each commenter or a representative from their organization was contacted regarding the actions that were taken to address their comments. Follow-up correspondence documenting the changes made to the EA to address each of the commenter's input was faxed or emailed to them for review. All commenters found the changes to be acceptable.

This memorandum is included in the EA in lieu of the follow-up correspondence addressing comments. If anyone would like to review the letters, please make a request to:

Department of Energy
Jefferson Lab Site Office
ATTN: Barbara Morgan
12000 Jefferson Avenue
Newport News, VA 23606