

## **Appendix C – Finding of No Practicable Alternative (FONPA)**

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# FINDING OF NO PRACTICABLE ALTERNATIVE FOR DECOMMISSIONING AND DISMANTLEMENT OF THE DEACTIVATED SM-1 NUCLEAR REACTOR FACILITY

## US ARMY GARRISON FORT BELVOIR

### FAIRFAX COUNTY, VIRGINIA

#### 1.0 Introduction

The United States Army Corps of Engineers (USACE), Baltimore District proposes to decommission and dismantle the Deactivated SM-1 Nuclear Reactor Facility at United States (US) Army Garrison Fort Belvoir in Fairfax County, Virginia (Proposed Action). SM-1 operated from 1957 to 1973 and was deactivated between 1973 and 1974. Since deactivation, SM-1 has been maintained by USACE under a Reactor Possession Permit issued by the US Army Nuclear and Countering Weapons of Mass Destruction Agency (USANCA) with oversight from the Army Reactor Office (ARO). The Proposed Action would remove all buildings, structures, and equipment from the SM-1 site and restore the site to a standard that allows for unrestricted future use. Although SM-1 is on Fort Belvoir's fee title land, Army Regulation (AR) 50-7, *Army Reactor Program* designates USACE as the lead Army component and the single point of contact at Headquarters, Department of the Army for nuclear reactor decommissioning to ensure compliance with environmental requirements for decommissioning Army nuclear reactors.

USACE has determined that elements of the Proposed Action must occur within portions of the 100-year floodplain on Fort Belvoir. Under Executive Order (EO) 11988, *Floodplain Management*, USACE must find that there is no practicable alternative to development within the 100-year floodplain and take all practicable measures to minimize harm to or within the floodplain.

This Finding of No Practicable Alternative (FONPA) incorporates the analysis and conclusions of the April 2020 *Final Environmental Assessment for the Decommissioning and Dismantlement of the Deactivated SM-1 Nuclear Reactor Facility*. In accordance with the EO, the Draft FONPA was made available for public review and comment during the six-week Draft Environmental Assessment (EA) public review period that began on 20 December 2019 and ended on 31 January 2020.

#### 2.0 Notice of Floodplain Involvement

EO 11988 requires federal agencies to determine whether a proposed action would occur within a floodplain and to avoid floodplains to the maximum extent possible when there is a practicable alternative. The 100-year floodplain is defined as an area adjacent to a water body that has a 1 percent or greater chance of inundation in any given year. The Deactivated SM-1 Nuclear Reactor Facility occupies a 3.6-acre site along Gunston Cove, a tidal embayment of the Potomac River (**Figure 1**). The Proposed Action includes the removal of infrastructure associated with the former operation of SM-1 in the 100-year floodplain adjacent to Gunston Cove.

Structures in the 100-year floodplain that would be removed by the Proposed Action consist of a water intake pier and pump house, and a wastewater discharge pipe (**Figure 2**). The water intake pier and pump house extend approximately 100 feet from the shoreline into Gunston Cove. The water discharge pipe extends in a northwest direction from the facility. The end of the pipe is situated in the 100-year floodplain where it previously discharged into Gunston Cove.

Activities associated with the removal of these structures in Gunston Cove would temporarily disturb floodplains, resulting in the loss or degradation of their natural functions such as water storage, infiltration, and filtration. These impacts could extend to the intrinsic value of this resource or the benefits associated with its use, such as wildlife habitat, recreation, and aesthetic enjoyment. Floodplain functions and values are also susceptible to

changes in the volume, rate, and quality of stormwater discharge, particularly as influenced by the amount of impervious surface within a watershed.

Publication of the Notice of Availability (NOA) for the Draft EA commenced the six-week public comment period. The NOA also stated that the six-week public comment period applied to comments on the Draft FONPA. No comments on the Draft FONPA were received during the public review period.

### 3.0 Description of the Proposed Action and Discussion of Alternatives

The Proposed Action would execute the SM-1 Decommissioning Plan (DP) approved by the Army Reactor Office (ARO). Decommissioning activities under the Proposed Action would begin with site preparation and mobilization of equipment and personnel. As space is limited at the SM-1 site, heavy equipment needed to support the Proposed Action (e.g., cranes, skid loaders, forklifts, boom lifts, excavators) would not be mobilized until needed to support planned decommissioning activities.

Initial decommissioning and dismantlement activities would focus on the safe removal of non-radioactive and radioactive materials and equipment (M&E) from the Deactivated SM-1 Nuclear Reactor Facility. Upon the removal of radioactive M&E from the SM-1 site, remnant structures and foundations would be surveyed to ensure residual radioactivity is below applicable regulatory criteria for release and then demolished. All radioactive and non-radioactive waste generated from decommissioning activities would be packaged in accordance with applicable US Department of Transportation (DOT) and Nuclear Regulatory Commission (NRC) requirements, transported in trucks by licensed contractors, and disposed of or recycled at permitted off-post facilities.

Removal of the water intake pump house and pier would likely require the use of a barge-mounted crane and other vessels to give the demolition crew and equipment access to the structure. Superstructures would be removed first, followed by the piles. To minimize disturbance of sediments and the subaqueous bottom, the piles would be cut below the mudline and the portions below the cut would be left in place.

Site restoration would be the final step in the decommissioning process. These activities would commence upon confirmation of the site's compliance with unrestricted use criteria. Temporary structures or infrastructure used to support the prior phases of the Proposed Action would be dismantled and either removed from the site or broken down for use as backfill. Clean soil stockpiled onsite would be used to backfill excavated areas; however, clean fill materials imported from other sources would also be required.

Finally, the SM-1 site would be regraded to emulate current elevation and topography. Following application of a loamy top soil, the site would be seeded with native grasses or shrubs to promote revegetation. As practicable, native trees and/or shrubs would also be replanted onsite in accordance with Fort Belvoir's Policy Memorandum #27, *Tree Removal and Protection*, to replace vegetation removed during the decommissioning process.

#### Alternatives Selection Criteria

The practicability of a given alternative is evaluated by considering pertinent factors such as community welfare, environmental impact, and feasibility in light of the overall purpose and need. USACE developed screening criteria to assess whether an alternative would meet its purpose and need and, therefore, could be considered reasonable. The following criteria were used to evaluate a range of reasonable alternatives:

- **Safety.** Protect public and worker safety, to the maximum extent possible, by reducing the probability of accident or injury in all phases of the decommissioning process.
- **Health.** Reduce risk to public and worker health, to the maximum extent possible, including compliance with the radiological criteria for release of the site for unrestricted use.

- **Time.** Select and implement a decommissioning approach that adheres to the 60-year post-deactivation timeframe in accordance with NRC regulations and the program objectives of USACE's Deactivated Nuclear Power Plant Program.
- **Space.** Select and implement a decommissioning option that provides adequate space to safely and efficiently perform all associated work activities.
- **Cost.** Complete the programmatic, technical, and administrative elements of decommissioning at a reasonable cost.
- **Environmental.** Avoid or minimize adverse effects on protected, beneficial, or valued environmental resources, to the maximum extent possible.

### Alternatives Considered and Dismissed

USACE considered alternatives to implementing the proposed decommissioning that were subsequently eliminated through a screening process and detailed analysis. These alternatives, as summarized below, failed to meet USACE's screening criteria and would not satisfy the Proposed Action's purpose and need.

In-place decommissioning of the Deactivated SM-1 Nuclear Reactor Facility was an alternative considered and dismissed. Under this alternative, portions of SM-1 would remain intact in the long term. Only radioactive components exceeding the regulatory threshold for unrestricted use would be removed prior to demolition, while M&E with low levels of contamination would be decontaminated to preserve the equipment in place. Selection of this option would likely limit the frequency and extent of final status and confirmatory surveys, potentially leading to improper waste disposal. Such factors increase the risk and cost involved in decommissioning a nuclear reactor. Following removal of key reactor components, the main reactor facility building (Building 372) would require extensive retrofit and modernization to meet current building codes and make it suitable for future human occupancy. Further, if any reactor systems were left in place, the site would not directly support the military mission on-post, nor would the land use be consistent with Fort Belvoir's future land use plans. Therefore, this alternative was eliminated from further consideration.

Alternate transport routes within Fort Belvoir were also considered to provide access to and from the SM-1 site to conduct decommissioning activities. Factors evaluated for this purpose included, but were not limited to, public safety, traffic, roadway conditions and capacity, travel distance and time, and security. None of the alternate routes sufficiently met the varied requirements necessary to support the decommissioning of SM-1. Therefore, alternate transport routes on Fort Belvoir were eliminated.

USACE also considered utilizing a barge to transport demolition debris for disposal. Under this option, waste containers would be delivered via truck to a staging/transfer point along the existing seawall on the north side of Ponton Basin, an inlet on Fort Belvoir approximately 0.3 mile east of the SM-1 Reactor Facility. A land- or barge-based crane would then load the containers onto a moored barge for transport via the Potomac River and Chesapeake Bay to a barge-to-rail transfer facility in Norfolk, Virginia. This alternative would require dredging more than 10,000 cubic yards of spoils in Ponton Basin and portions of Gunston Cove, which would substantially increase time, cost, and impact of decommissioning SM-1 (a barge-mounted crane and associated vessels would still be required to remove the water intake pier as described above for the Proposed Action). Therefore, the barge transport option was eliminated from detailed analysis in the EA.

## Alternatives Subject to Further Analysis

Based on the selection criteria, two alternatives were selected for more detailed analysis in the EA: the Proposed Action Alternative and the No Action Alternative.

### No Action Alternative

The No Action Alternative would maintain the current safe storage configuration of the Deactivated SM-1 Nuclear Reactor Facility. USACE would continue to maintain the site under the existing Reactor Possession Permit until its expiration or amendment at a later date. Regular inspections and monitoring of site conditions would continue in accordance with the status quo. Under this Alternative, the natural decay of residual radioactivity would continue slowly over the long term. The No Action Alternative would not allow USACE to release SM-1 for unrestricted use in the short term; therefore, USACE program objectives would not be met as ARO would not terminate its permit for the site. While the No Action Alternative does not meet the screening criteria nor the Proposed Action's purpose and need, it is carried forward for analysis in the EA to provide a comparative baseline against which impacts of the Proposed Action Alternative could be measured, as required under the CEQ regulations (40 CFR Part 1502.14). Because it does not meet the Proposed Action's purpose and need, this alternative is not "practicable" within the meaning of EO 11988.

### Proposed Action Alternative

The Proposed Action Alternative would implement the ARO-approved SM-1 Reactor Facility DP. Under this Alternative, individual reactor components would be dismantled and removed prior to demolition. To the extent practicable, contaminated radioactive components would be removed intact for disposition, and non-radioactive components verified as uncontaminated would be removed and segregated onsite for recycling or disposal, as appropriate. The Proposed Action Alternative would also excavate and remove subsurface infrastructure and any contaminated media from the SM-1 site (e.g., soils). Following dismantlement and removal of structures, components, and wastes, including the intake pier and pump house and wastewater discharge pipe, all debris would be packaged for transport by licensed contractors to permitted off-post disposal or recycling facilities. Access to and from the site for all personnel, vehicles, and equipment associated with the Proposed Action would be provided by the existing on- and off-post road network.

Following the completion of demolition activities and surveys to verify that radiation levels are below applicable standards for unrestricted release, the site would be restored and revegetated, and returned to Fort Belvoir for future use.

### Impacts and Mitigation Measures

Approximately 0.5 acre of the SM-1 site is situated within the 100-year floodplain associated with Gunston Cove (**Figure 3**). The intake pier and pump house and the wastewater outfall pipe associated with SM-1 are located within the 100-year floodplain. The area of the floodplain that would be temporarily occupied and potentially impacted by equipment needed to remove these structures would be exceedingly small relative to the overall 100-year floodplain associated with Gunston Cove; thus, in-water activities would not noticeably impair the floodplain's capacity to absorb or convey floodwaters, nor would they noticeably displace floodwaters further downstream. Because there would be no noticeable displacement of floodwaters, the proposed activities would have no potential in the short term to threaten human life or property downstream of the SM-1 site. In the long term, no permanent structures would be built or operated in the 100-year floodplain under the Proposed Action Alternative. The removal of the structures would result in a long-term beneficial impact by enhancing the capacity and function of the 100-year floodplain and promoting the restoration of the Gunston Cove shoreline and subaqueous bottom to conditions resembling those that existed prior to the development of SM-1.

EO 11988 states that if the only practicable alternative requires action in a floodplain, the agency shall design or modify its action to minimize potential harm to or within the floodplain. Under the Proposed Action Alternative, best management practices (BMPs) and low impact development (LID) measures would be implemented to reduce the potential for adverse impacts on the 100-year floodplain and areas downstream. BMPs and LID measures incorporated into the Proposed Action Alternative to avoid or minimize impacts on floodplains are collectively described, as follows:

- Erosion and sediment controls during decommissioning and demolition activities would function to capture or re-direct stormwater flows for infiltration or evapotranspiration onsite.
- During removal of the intake pier/pump house structure in Gunston Cove, support piles would be cut below the mudline and the portions below the mudline would be left in place to minimize sediment and subaqueous bottom disturbance.
- Containment booms and sediment curtains would be used during in-water and nearshore work to contain debris that inadvertently enter the water, prevent the migration of disturbed sediment into the water column, minimize turbidity, and ensure disturbed sediments settle near their original location.
- As necessary, the decommissioning contractor would delineate wetlands, obtain a jurisdictional determination from USACE, and submit a JPA identifying avoidance, minimization, and/or compensatory mitigation measures to receive permit coverage pursuant to Sections 401/404 of the Clean Water Act.
- Adherence to Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* dated 21 September 2016 would help to offset permanent and temporary impacts on riparian buffer zones established to preserve water quality and provide flood and erosion control on the installation. RPAs reduce the velocity and volume of storm and flood waters by encouraging their retention in the soil, allowing sediment and attached nutrients and toxins to filter out and settle.

Taken together, these and other yet to be determined BMPs and LID measures would avoid or minimize the loss of and impacts on floodplains at the SM-1 site. These measures represent all practicable measures to minimize harm to floodplains.


#### 4.0 Finding

During development of the Proposed Action, USACE sought ways to avoid impacts on floodplains while still implementing the DP and adhering to applicable regulations. By necessity of the location of the intake pier, pump house, and wastewater outfall pipe, and the requirement to remove those structures to complete decommissioning and demolition of the SM-1 Reactor Facility, it was determined that avoidance of floodplains was not feasible. As such, USACE has determined there is no practicable alternative to avoiding action within floodplains on the SM-1 site during implementation of the Proposed Action.

Following a thorough evaluation of alternate plans that would satisfy the Proposed Action's purpose and need, I find that there is no practicable alternative to siting elements of the Proposed Action entirely outside of floodplains. Therefore, USACE will ensure that all practicable measures to minimize impacts to and within the floodplain environment are incorporated into the Proposed Action.

26 MAR 20

Date

  
COL John T. Litz  
District Engineer  
US Army Corps of Engineers, Baltimore District

**Attachments:** Figure 1: Location of the SM-1 Reactor Facility on Fort Belvoir  
Figure 2: SM-1 Reactor Facility  
Figure 3: Water Resources at the SM-1 Site



**Figure 1: Location of the SM-1 Reactor Facility on Fort Belvoir**

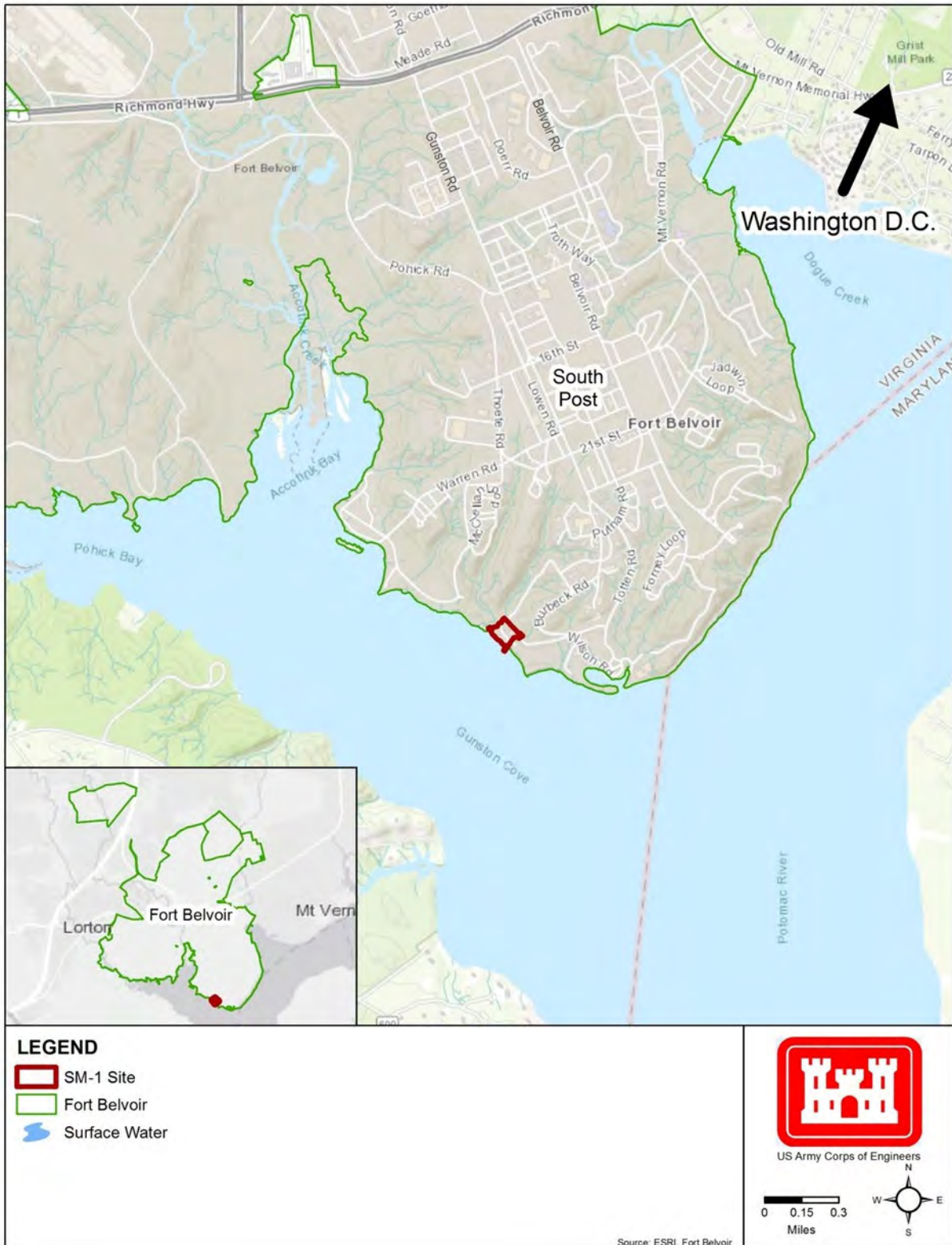


Figure 2: SM-1 Reactor Facility



Figure 3: Water Resources at the SM-1 Site

