DOE/EA-1538

# ENVIRONMENTAL ASSESSMENT FOR THE SAFEGUARDS AND SECURITY UPGRADES FOR STORAGE OF PLUTONIUM MATERIALS AT THE SAVANNAH RIVER SITE


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**U. S. DEPARTMENT OF ENERGY**
**SAVANNAH RIVER OPERATIONS OFFICE**
**SAVANNAH RIVER SITE**

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## LIST OF ABBREVIATIONS/ACRONYMS

The following is an alphabetized list of the abbreviations and acronyms found within the text of this document:

| | | |
|---|---|---|
| ALARA | - | As low as reasonably achievable |
| ATTA | - | Advanced Tactical Training Area |
| CEQ | - | Council on Environmental Quality |
| CERCLA | - | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | - | Code of Federal Regulations |
| CSSC | - | Container Surveillance and Storage Capability |
| DOE | - | U.S. Department of Energy |
| EA | - | environmental assessment |
| EIS | - | environmental impact statement |
| EPA | - | U.S. Environmental Protection Agency |
| FAMS | - | F-Area Materials Storage Area |
| FFA | - | Federal Facilities Agreement |
| FONSI | - | finding of no significant impact |
| FSA | - | Final Storage Area |
| HEPA | - | High Efficiency Particulate Air |
| HNUS | - | Halliburton NUS |
| KIS | - | K-Area interim surveillance |
| MEI | - | maximally-exposed individual |
| mrems | - | 1/1000 roentgen equivalent man |
| NEPA | - | National Environmental Policy Act |
| NESHAP | - | National Emission Standards for Hazardous Air Pollutants |
| NPDES | - | National Pollutant Discharge Elimination System |
| OSHA | - | Occupational Safety and Health Act |
| RCRA | - | Resource Conservation and Recovery Act |
| RCW | - | red-cockaded woodpecker |
| rem | - | roentgen equivalent man |
| SCDHEC | - | South Carolina Department of Health and Environmental Control |
| SNM | - | Special Nuclear Material |
| SRARP | - | Savannah River Archaeological Research Program |
| SRS | - | Savannah River Site |
| STD | - | Standard |
| T&E | - | threatened and endangered |
| USFS-SR | - | U.S. Forest Service – Savannah River |
| USFWS | - | U.S. Fish and Wildlife Service |
| WSRC | - | Westinghouse Savannah River Company |

# 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Savannah River Operations Office (SR) prepared this environmental assessment (EA) to analyze the potential environmental consequences of safeguards and security upgrades for storage of plutonium-bearing materials at the Savannah River Site (SRS) in Aiken, South Carolina as driven by the enhanced terrorist threat. In the EA, DOE evaluates the de-inventory of special nuclear material (SNM) from a building in F Area, construction and operation of the Container Surveillance and Storage Capability (CSSC) project in K Area, installation and operation of the K-Area interim surveillance (KIS) capability (prior to operation of CSSC), physical security upgrades in K Area, and modifications at the Advanced Tactical Training Area (ATTA) (hereafter ATTA Range, Figure 1-1) to allow training of protective force personnel so that they may counter the enhanced terrorist threat. In this EA, DOE only evaluates the safeguards and security upgrades required for plutonium currently stored at SRS.

The proposed action is to enhance the safe and secure storage of plutonium-bearing materials at SRS to meet DOE guidance, including significantly increased capabilities and numbers of postulated adversaries that a DOE site is required to defend against. This effort would require numerous physical modifications to the K-Area facilities, and land-clearing activities in both K Area and the ATTA Range. The general activities associated with the proposed action are as follows: (1) physical safeguards and security enhancements of storage and training facilities and, (2) surveillance and material packaging capabilities, and (3) modified storage capability within K Area to support F Area de-inventory and surveillance activities.

This document was prepared in compliance with the requirements of the Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508); and the DOE Regulations for implementing NEPA (10 CFR Part 1021). NEPA requires the assessment of environmental consequences of Federal actions that may affect the quality of the human environment. Based on the potential for impacts described herein, DOE would either publish a finding of no significant impact (FONSI) or prepare an environmental impact statement (EIS).

## 1.1 Background

After September 11, 2001, DOE faced many challenges. One of these was to assure the protection of the national security assets in the Department's custody. A reassessment of the existing threat criteria relative to the protection of SNM resulted in a number of changes to the criteria and capabilities of those who might perpetrate acts of violence against DOE's assets. As a result of the new threat guidance, SRS has determined that the consolidation of SNM into one location, and enhancing the security of that location, would provide the most advantageous means to meet this challenge and assure the stability and accountability of the stored nuclear material.

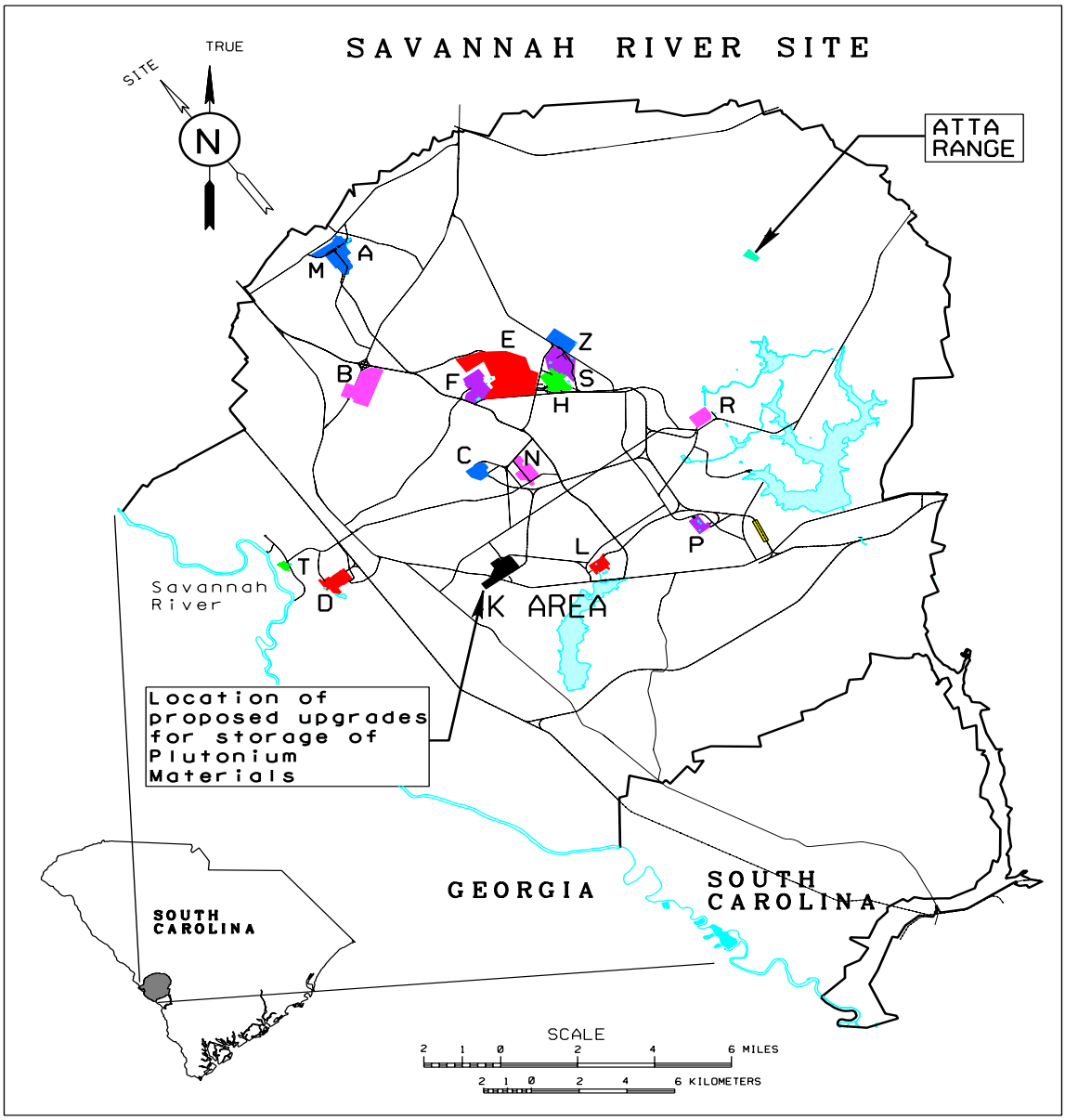


**Figure 1-1. Location of the proposed upgrades for storage of plutonium materials in K Area and the Advanced Tactical Training Area at the Savannah River Site, Aiken, S.C.**

Prior to the increased terrorist threat, DOE had intended to modify a building in F Area to implement the surveillance and stabilization requirements of DOE Standard (STD)-3013 (DOE 2004) including the capability to re-stabilize and re-package any material found to be out of compliance with DOE-STD-3013. This was called the CSSC project. At the same time, DOE intended to continue to store plutonium in compliance with DOE-STD-3013 in the K-Area Material Storage facility. However, providing safeguards and security to respond to the enhanced terrorist threat at both facilities would entail significant cost. DOE decided to suspend the 3013 CSSC project for the F-Area building. DOE also directed Westinghouse Savannah River Company (WSRC) to develop a pre-conceptual estimate for installing the CSSC in K Area, as well as other related operations to support the mission changes.

DOE is proposing that the building in F Area be de-inventoried and deactivated, and that the de-inventoried material be placed in K Area. This would dramatically reduce the operational and security costs associated with maintaining two facilities. This de-inventory of plutonium-bearing materials from the F-Area facility, interim surveillance capability in K Area (KIS project), CSSC, physical security upgrades in K Area, and modifications at the ATTA Range to allow training of protective force personnel are all part of the safeguards and security upgrades evaluated in this EA.

The ATTA Range has provided a range area for protective force training since the early 1980's. DOE plans to expand this range to allow for continuation of the current training and to provide training to respond to the enhanced terrorist threat.

### 1.2 Purpose and Need for Action

The purpose of the proposed action is to enhance physical safety and security for plutonium-bearing materials stored at SRS and to ensure the safe storage of plutonium-bearing materials by providing the capability to comply with the material surveillance and stabilization requirements of DOE-STD-3013. DOE needs to implement these actions in order to meet DOE STD-3013 surveillance and stabilization requirements and to provide the safeguards and security improvements necessary to respond to the enhanced terrorist threat.

## 2.0 PROPOSED ACTION AND ALTERNATIVES

### 2.1 Proposed Action

The proposed action is comprised of the following activities: (1) the de-inventory of plutonium-bearing materials from the F-Area facility and installation of modified storage capability in K Area, (2) the construction and operation of container surveillance and stabilization capabilities in K Area, (3) K-Area interim surveillance, (4) the installation of physical security upgrades in K Area, and (5) the modification and upgrade of the ATTA Range.

### 2.1.1 Modified Storage Capability within K Area for De-inventory of F-Area Facility

DOE needs to modify an existing room in K Area in order to accommodate the receipt of additional plutonium-bearing material, primarily from F Area, in different packaging configurations than that approved for current storage in K Area. These materials are "in process" materials and are intended for interim storage periods. The estimated cost is $5 million. The physical modifications that are needed to provide safe, secure storage can be summarized as follows:

- Modifications of rooms. This would include the removal of existing equipment and general construction activities
- General building modifications related to ventilation systems, electrical distribution, drum handling equipment, etc.
- Installation of security equipment and monitoring capabilities

### 2.1.2 Construction and Operation of Container Surveillance and Storage Capability

DOE-STD-3013 provides criteria for the stabilization, packaging, and safe storage of plutonium-bearing materials for up to 50 years. The standard also requires that a surveillance and stabilization program be established to validate the safety of stored packages and to ensure no reactions are occurring that could jeopardize the security of the 3013 container during long-term storage (Erickson 2001). The surveillance and stabilization program includes both non-destructive and destructive examination techniques that are estimated to cost $110 million. The non-destructive examination program would include digital radiography, prompt gamma assay, calorimetric assay, and weight verification. The destructive examination part of the surveillance and stabilization program would include head gas sampling, chemical and moisture analysis, and container integrity analysis. The CSSC project would also include packaging and unpackaging equipment and the capability to place any anomalous material or containers in a safe configuration. The physical modifications that are necessary to support surveillance activities can be summarized as follows:

- Installation of a ventilation and filtration system
- Installation of diesel fuel powered electric generator for backup power supply
- Installation of equipment and systems necessary for performing non-destructive and destructive surveillance activities on the 3013 containers
- Installation of equipment and systems necessary to provide samples to the Savannah River National Laboratory for analysis
- Installation of equipment and systems necessary for the stabilization and packaging of material to meet DOE-STD-3013

- Installation of storage racks for the 3013 containers

- General building modifications related to worker safety and habitability, such as fire protection, electrical distribution, and breathing air

- Installation of security equipment and monitoring capabilities

### 2.1.3 K-Area Interim Surveillance (KIS)

Non-destructive examinations of 3013 container and 9975 shipping packages are currently performed at the F Area Materials Storage (FAMS) Area. Destructive examinations of the 3013 containers are scheduled to start in early 2007. However, the FAMS is scheduled to be de-inventoried by the end of 2006. The CSSC Project discussed in Section 2.1.2 would provide the necessary 3013 and 9975 surveillance capabilities, along with the ability to restabilize and re-package material in accordance with the 3013 Standard. However, the CSSC is not expected to be operational until 2009. Therefore an interim capability is needed to meet the DOE surveillance requirements. The KIS project would be implemented (in K Area) to meet these interim needs.

The KIS project includes non-destructive evaluation steps of weight verification, visual inspections, digital radiography, and prompt gamma analysis. Destructive examination aspects would involve can puncture for head space gas sampling and can cutting for oxide sampling. The material would be properly re-packaged to safely store on an interim basis or be transferred for disposition to H Area. The objective of this project is to provide a short-term (while CSSC is being completed) capability to conduct 3013 and 9975 surveillance activities. The estimated cost is $15 million.

In summary, the proposed activities for the KIS project are:

- Addition of equipment to unload and reload 3013 containers from 9975 shipping packages and scales for weighing

- Addition of various equipment and tools to perform non-destructive examinations of 3013 containers and 9975 shipping packages

- Addition of non-destructive assay equipment

- Addition of a wall and airlock to create a destructive testing room and a non-destructive testing room

- Addition of a glove box line and associated equipment to accommodate can puncturing, can opening, gas and material sampling, and material repackaging

- Building modifications include ventilation and filtration upgrades, electrical distribution, and backup power

- Fire protection upgrades required by safety analysis

### 2.1.4 Physical Security Upgrades in K Area

Several physical security modifications in K Area (see Figure 2-1) would be made to respond to the enhanced terrorist threat. As described earlier, some land clearing and grubbing would occur beyond the K-Area restricted area (approximately 210 acres would be harvested) to enhance observation, patrol, etc. Monitoring systems and detection devices/systems would be installed to further fortify the safeguards and security posture. The estimated cost is $90 million. The K-Area security upgrades can be summarized as follows:

- Clear and grub land (total area for clearing is approximately 210 acres)
- Add fences to the existing fence lines
- Add barriers
- Install lighting with diesel generator backup power
- Install new security features and systems inside K-Area facility

### 2.1.5 ATTA Range Modifications and Upgrades

This project would consist of the construction of two ranges in a wooded area adjacent to the existing ATTA Range. The estimated cost is $4 million. Figure 2-2 shows the existing and proposed ranges with the location of the adjacent wetlands and set-aside areas.

The 984-foot Range would include a new graveled road. The road would provide access to a new range (with a surrounding berm) that would be approximately 984 feet in length and 328 feet wide. This range would be situated to the west of the existing Known Distance Range. Clearing and grubbing would only occur in areas that would be used for roads. The range would have a 10-foot berm around the perimeter. The area for the berms would also be cleared and grubbed. A suitable grass cover would be installed on the berms, and best management practices would be in place to protect the nearby wetlands and set-aside areas. DOE estimates that about 7.4 acres would be disturbed by construction of the proposed range. The existing area consists of a mature mixed forest stand that is adjacent to a set-aside area.

The 1,312 foot Range would be constructed in the area of the Old Shotgun Range. This area was used as a training area from 1984 to 1989. It now consists of a reforested immature pine forest. This area would be cleared and grubbed. This range would also have a 10-foot berm around the perimeter. A suitable grass cover would be established and maintained on all exposed surfaces, both range and berms. Additional erosion and sediment control devices would be installed as necessary. In addition to the construction of the ranges, two Handi-Houses would be installed on the ranges. DOE estimates that about 9.9 acres would be disturbed by construction of the proposed range for a total of 17.3 acres of new disturbance in the ATTA Range area. DOE does not expect that the Surface Danger Zone would be expanded as a result of this project; however, access to the ATTA Range may be restricted when the ranges are in operation.

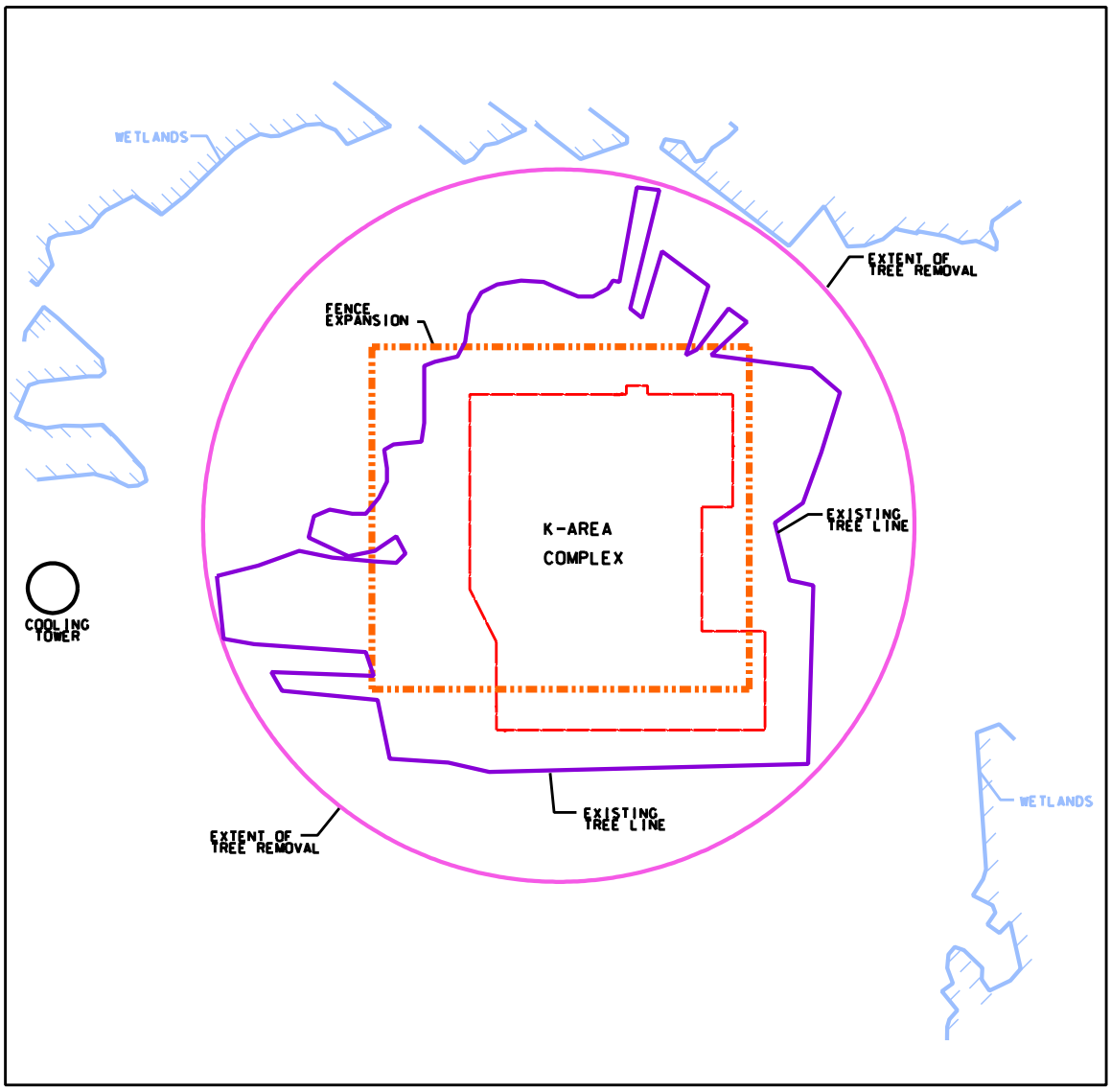


**Figure 2-1. Proposed new security fence, area to be cleared of trees, and identification of associated wetland areas in support of security upgrades in the K-Area Complex at the Savannah River Site, Aiken, S.C.**

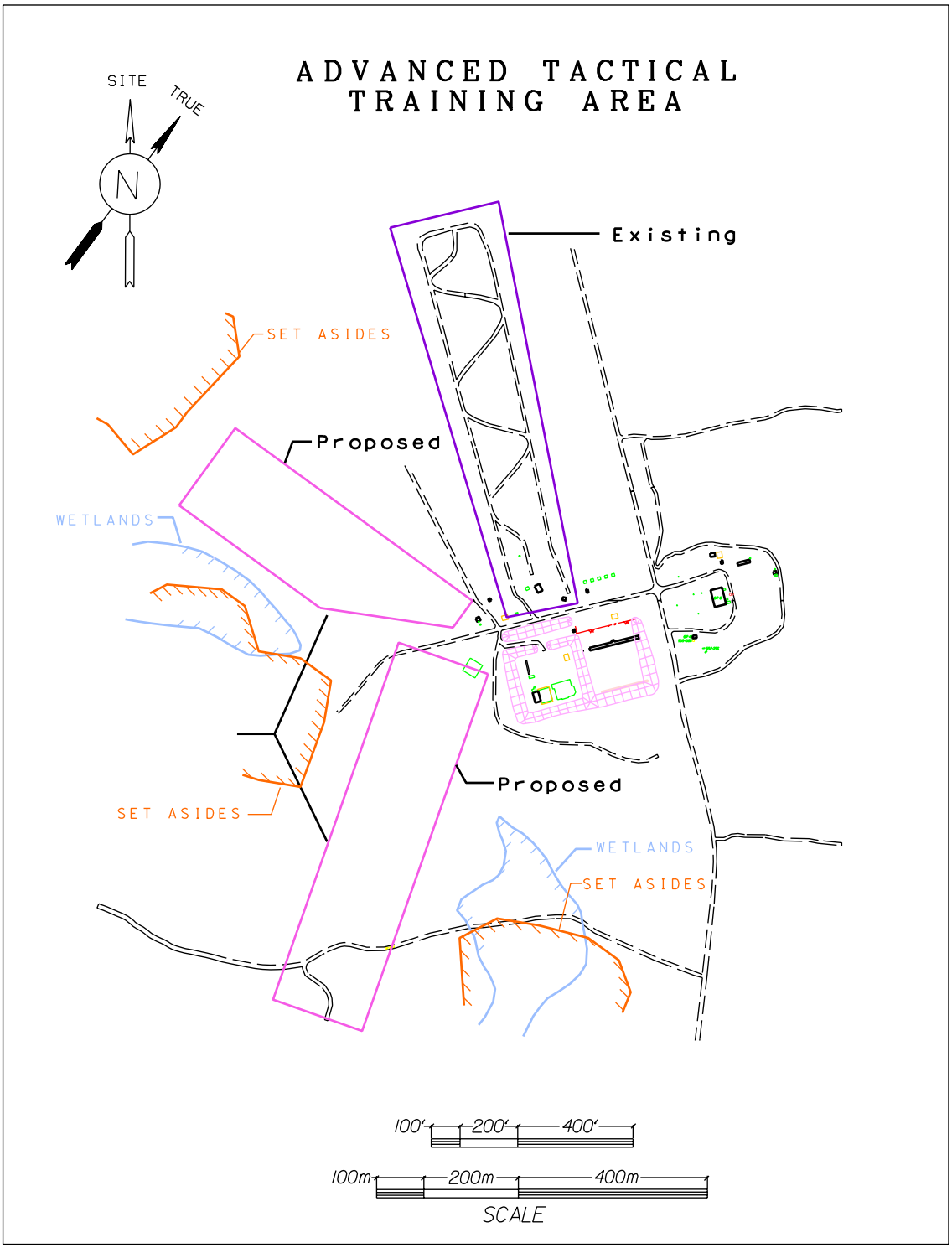


**Figure 2-2. Construction layout, with wetland and set-aside areas noted, for the two proposed multi-purpose ranges for the Advanced Tactical Training Area at the Savannah River Site, Aiken, S.C.**

## 2.2 Alternatives to the Proposed Action

In accordance with NEPA regulations, DOE examined the following alternatives to the proposed action:

- No action: Continue to store plutonium in K and F Areas without meeting long term safe storage, surveillance, stabilization and packaging criteria and not implementing DOE guidance upgrades to assure long-term secure storage of plutonium-bearing materials

- Alternative 1: Maintain two facilities to support the current plutonium storage and surveillance capability, without installing the ability to re-stabilize and re-package plutonium

- Alternative 2: Implement DOE-STD 3013 criteria for plutonium storage, surveillance, stabilization and packaging in K Area, but do not implement the DOE Security Order requirements to meet an enhanced terrorist threat

- Alternative 3: Construct the ATTA Range modifications at alternate locations

### 2.2.1 No Action- Continue to Store Plutonium in K and F Areas without Meeting Long-Term Safe Storage, Surveillance, Stabilization and Packaging Criteria and Not Implementing Upgrades to Assure Long-Term Secure Storage of Plutonium-Bearing Materials

One alternative to the proposed action would be to take no action. This would consist of SRS continuing to store plutonium separately in K and F Areas, and not implementing the DOE-STD-3013 criteria for surveillance, stabilization, and safe storage of DOE-owned plutonium-bearing materials. In addition, no action would be taken to install defense and monitoring systems against a terrorist threat to enhance the security posture of the plutonium storage facilities. Plutonium stored in K Area would be stored in DOE-STD-3013 compliant containers inside 9975 shipping packages, and there would be no capability to conduct the surveillance required to monitor the stability of the stored plutonium materials. DOE would be unable to implement the destructive evaluation (analysis) needed to ensure continued safe storage and to re-stabilize and re-package plutonium, should an unsafe condition be identified. Plutonium storage and surveillance functions would be duplicated in F and K Areas, or material would have to be transported between the two areas to have access equipment required for the surveillance functions. Either action would be extremely costly. Environmental permitting and monitoring programs for F Area would have to be updated and continued. The no action alternative could also increase the potential of a radioactive release to the public or environment due to the lack of material and container integrity controls identified in the surveillance and stabilization program.

### 2.2.2 Alternative 1- Maintain Two Facilities, One in K Area and One in F Area, to Support the Current Plutonium Storage and Surveillance Capability, Without Installing the Ability to Re-Stabilize and Re-Package Plutonium

This alternative would entail maintaining facilities in K and F Areas to support the plutonium surveillance, storage, and stabilization mission. This alternative would result in significant additional security costs associated with implementation of upgrades at two locations and would reduce the tactical effectiveness offered by a single facility. This alternative would also not be as convenient for control, transport, and surveillance. In addition, the F-Area building does not meet all of the current safety standards suitable for extended storage of plutonium without substantial upgrades. Two plutonium storage and surveillance functions would be duplicated in different areas or material would have to be transported between the two areas to have access to equipment required for the surveillance functions. Either action would be extremely costly. Plutonium stored in K Area would be stored in DOE-STD-3013 compliant containers inside 9975 shipping packages, and there would be no capability to conduct the surveillance required to monitor the stability of the stored plutonium materials. DOE would be unable to implement the destructive evaluation (analysis) needed to ensure continued safe storage and to re-stabilize and re-package plutonium, should an unsafe condition be identified. Environmental permitting and monitoring for F Area would have to be updated and continued.

### 2.2.3 Alternative 2- Implement DOE-STD 3013 Criteria for Plutonium Storage, Surveillance, Stabilization, and Packaging in K Area, but Do Not Upgrade Physical Security

This alternative would entail maintaining facilities in K Area only to support the plutonium surveillance, storage, and stabilization mission. This alternative would result in significant security costs savings associated with implementation of upgrades at one location and would be convenient for control, transport, and surveillance. K Area would be able to perform DOE-STD 3013 storage and surveillance. This alternative would eliminate the high costs associated with management of plutonium materials in both K and F Areas. DOE would be able to implement the destructive evaluation (analysis) needed to ensure continued safe storage and to re-stabilize and re-package plutonium, should an unsafe condition be identified. Environmental permitting and monitoring for F Area would not have to be updated or continued.

### 2.2.4 Alternative 3- Construct the ATTA Range Modifications at Alternate Locations

This alternative would involve constructing the ATTA Range modifications at alternate locations. The areas to the west of the existing ranges and immediately behind the ATTA administrative building and to the northwest of the road leading to the existing range were considered. Both locations would be too close to U.S. Highway 278 and could impact known red-cockaded woodpecker (RCW) colonies, a Federally-endangered species. In addition, closely co-located security training areas are both uneconomical and

inefficient in terms of supporting simultaneous training and the varied skills required to comply with DOE guidance.

## 3.0 AFFECTED ENVIRONMENT

SRS occupies an area of approximately 310 square miles in southwestern South Carolina (Figure 1-1). The site borders the Savannah River for about 17 miles near Augusta, Georgia, and Aiken and Barnwell, South Carolina. SRS contains five non-operational nuclear production reactors, two chemical separations facilities (one is being deactivated), waste treatment, storage and disposal facilities, and various supporting facilities. The SRS High-Level Waste Tank Closure Final EIS (DOE 2002) and the most recent socioeconomic survey of the six-county SRS area of influence (HNUS 1997) contain additional information on SRS facilities and the areas surrounding the site.

### 3.1 Land Use

The proposed K-Area 25-acre fence expansion and 210 acre buffer area is largely undeveloped and has a number of isolated infrastructure features, including river water system lines, power lines, the K-18 National Pollutant Discharge Elimination System (NPDES) outfall structure and some remediated waste site areas. Imm (2005; Appendix A) recently characterized the flora in this area. The K Reactor at SRS was initially constructed and operated as a material production reactor in the 1950s. The facility design provided for the safe production of weapons materials. The function did not change until the early 1990s when the K Reactor was shut down. The mission for this facility has changed to safe, secure storage of nuclear materials.

The proposed ATTA Range expansion project includes a range that would be in a previously undeveloped area which consists of a mature mixed forest stand. The other range would be constructed in the Old Shotgun Range that now consists of an immature pine forest.

### 3.2 Meteorology and Climatology

The SRS region has a temperate climate with mild winters and long summers. The average annual rainfall at SRS is about 49.5 inches and the average annual relative humidity is 70 percent (DOE 2002). Tornadoes have been observed during every month of the year in the area encompassing SRS, but occur most frequently in the spring (Bauer et al. 1989). Only a few instances of slight to moderate tornado damage to support facilities have been documented for the site to date. Bauer et al. (1989) contains additional information on SRS meteorology and climatology. The general meteorological and climatological data for SRS would be representative of that for the K Area and ATTA Range locations.

## 3.3 Geology and Seismology

SRS is located in the Aiken Plateau physiographic region of the upper Atlantic Coastal Plain approximately 25 miles southeast of the Fall Line which separates the Piedmont Plateau from the Atlantic Coastal Plain. The topographic surface of the coastal plain slopes gently seaward and is underlain by a wedge of seaward-dipping unconsolidated and semi-consolidated sediments from the Fall Line to the coast of South Carolina. The Atlantic Coastal Plain tectonic province in which SRS is located is characterized by generally low seismic activity that is expected to remain subdued (Haselow et al. 1989).

No faults are located within the proposed project areas. The most active seismic zones in the southeastern United States are all located over 100 miles away from the site. A recent EIS (DOE 2002) contains information on SRS fault location and earthquake occurrences.

## 3.4 Ecological and Cultural Resources

### 3.4.1 Ecological Resources

Since 1951, when the U.S. Government acquired SRS, natural resource management practices and natural succession outside of the construction and operation areas at SRS have resulted in increased ecological complexity and diversity of the site. Forested areas support a diversity of wildlife habitats that are restricted from public use. Forest management practices include controlled burning, harvesting of mature trees, and reforesting. Wildlife management includes control of white-tailed deer (*Odocoileous virginianus*) and wild pig (*Sus scrofa*) populations through supervised hunts. SRS, which was designated as the first National Environmental Research Park in 1972, is one of the most extensively-studied environments in this country (Kilgo and Blake 2005). Halverson et al. (1997) contains additional information on the biotic characteristics of SRS.

Seven species on SRS are afforded protection by the Federal Government under the Endangered Species Act of 1973. These are the bald eagle (*Haliaeetus leucocephalus*), wood stork (*Mycteria americana*), red-cockaded woodpecker (RCW) (*Picoides borealis*), American alligator (*Alligator mississippiensis*), shortnose sturgeon (*Acipenser brevirostrum*), smooth coneflower (*Echinacea laevigata*), and pondberry (*Lindera melissifolia*). None of these species, with the exception of the RCW near the ATTA Range, are known to occur on or near the ATTA Range or K Area (Halverson et al. 1997; Imm 2005).

Though the ATTA Range is part of the RCW habitat management area (Edwards et al. 2000), there are no current colonies of RCWs within the proposed activity area. In fact, the nearest RCW colony lies roughly 1.5 miles to the north near the northern boundary of the ATTA Range, thus it is unlikely that the proposed project area serves as foraging for the nearest RCW colonies. There are no RCW colonies near K Area, though K Area is within the supplemental RCW habitat management area (Edwards et al. 2000). The nearest RCW colonies to K Area are four miles to the east near Tennessee Road.

Based on field review, the impacted habitat areas within the 210 acres for the K-Area expansion project would include the following habitats: managed grassy meadow, unmanaged meadow, meadowed clean-up sites, young longleaf pine stands, young loblolly pine stands, mid-rotation densely forested loblolly pine stands, and mature longleaf pine forest that transitions into mature pine-hardwood and hardwood-pine adjacent to a stream (Imm 2005).

Based on field review, the impacted habitat areas associated with the ATTA Range expansion would include an unmanaged meadow area, a young recently planted longleaf pine stand, a partially functioning wetland depression, a densely forested unhealthy mature mixed pine forest that transitions into an open recently burnt longleaf pine forest (Imm 2005). For a discussion and listing of plants associated with the above habitats for both K-Area and ATTA Range expansions, see Appendix A (Imm 2005).

As part of the SRS Site Use application review process, both project sites were evaluated for the documented presence of any endangered, threatened, or sensitive species prior to clearing. No Federally-listed or state-listed sensitive species were found to be present in either the ATTA Range or K-Area projects (Imm 2005).

A number of wildlife species are present in and around the general area of the proposed project location. The species composition is comparable to similar habitat types elsewhere on SRS. Comprehensive listings of wildlife species can be found in Halverson et al. (1997) and Kilgo and Blake (2005).

The management and utilization of forests, soils, watersheds, and wildlife at SRS are described in the SRS Natural Resources Management Plan (DOE 2005) and defined under the terms of a Memorandum of Agreement between DOE, U.S. Forest Service-Savannah River (USFS-SR), the Natural Resources Conservation Service, and WSRC. DOE uses this Memorandum of Agreement to define the roles and responsibilities of the various agencies and organizations in the management of natural resources on SRS.

### 3.4.2 Archeological Resources

The areas that would be affected if the proposed action is implemented have been reviewed by the University of South Carolina's Savannah River Archaeological Research Program (SRARP). The proposed K-Area 210 acre expansion is situated within the lowest (Type III) archaeological sensitivity zone for SRS (SRARP 1989). No archeological resources have been recorded and the proposed area (fence line and tree removal zones) is highly disturbed due to early land modification activities for the K Reactor (Stevenson 2005a). An archaeological review of the proposed K-Area buffer zone expansion (perimeter of 2,461 feet, encompassing 210 acres) has also been completed. There are no previously recorded archaeological resources in the 210 acre-proposed buffer zone expansion area according to the SRARP site files database. However, there are several known archaeological sites (38BR73, 38BR74, 38BR75, and 38BR310) immediately outside the project area boundary, which require survey to

determine whether the sites extend into the project area. Moreover, parts of the project area have a high potential for archaeological sites given the proximity of several streams and wetlands near or within the proposed buffer zone expansion project boundary. Thus, any disturbance, including tree removal, would not proceed until an archaeological survey has been conducted to locate and determine whether archaeological resources within the expansion buffer zone are eligible for the National Register of Historic Places (Stevenson 2005b).

The ATTA Range expansion is located within the highest (Type I) archaeological sensitivity zone. No archaeological resources have been recorded for this project area according to the SRARP site files database (SRARP 1989). However, the project area holds a high potential for archaeological sites. Thus, an archaeological survey consisting of subsurface testing to located cultural artifacts would be undertaken before proposed construction of the ATTA Range expansion can proceed (Stevenson 2005c).

Cultural resources at SRS are managed under the terms of a Programmatic Memorandum of Agreement among DOE, the South Carolina State Historic Preservation Officer, and the Advisory Council on Historic Preservation. DOE uses this Programmatic Memorandum of Agreement to identify cultural resources, assess these in terms of National Register eligibility, and develop mitigation plans for affected resources in consultation with the South Carolina State Historic Preservation Officer. DOE would comply with the stipulations of the Programmatic Memorandum of Agreement for all activities related to the proposed ATTA Range and K-Area expansion projects.

## 4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

### 4.1 Facilities Construction

The total undeveloped area that would be cleared for the proposed expansion projects at ATTA Range and K Area is approximately 227 acres. At present, 96 percent (185,325 acres) of SRS lands are undeveloped (Halverson et al. 1997). Therefore, the percent of site lands proposed for use by this action would be minimal. The areas to be cleared are presently occupied by planted pine forest habitat. At present, 69 percent (133,434 acres) of SRS is occupied by pine-dominated forested habitat (Workman and McLeod 1990). The project sites represent less than 0.02 percent of the site's pine stands. Further use of the location for timber management would be eliminated during the life of the proposed actions. The merchantable timber formerly standing on the proposed project sites would be sold by USFS-SR to an offsite commercial firm, harvested by that firm, and removed from SRS.

The clearing of the project sites would limit the use of the lands by wildlife species. Some of the small, less mobile species of mammals, reptiles and amphibians would possibly be physically harmed or killed by the logging and earth-moving equipment. However, most species of mammals and birds which inhabit or use the project area would

be largely displaced by the land clearing, but probably neither injured nor killed. Those animals displaced by construction into adjacent or marginal habitats may either die or experience reduced reproduction. The net result would be a lower quality habitat being available and therefore fewer individual animals being present.

No direct or indirect socioeconomic impacts would be expected to result from proposed safeguards and security upgrades construction workforce (i.e., 145 individuals) when compared to the present total SRS employment of approximately 9,000 people. The workforce would be derived from the existing ranks of onsite personnel including subcontractors.

Pursuant to Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, the impact of the proposed safeguards and security upgrades on migratory birds must be evaluated. The only aspect of the proposed scope that would affect such avian species would be forested habitat loss as a result of the proposed land clearing activities. However, given the percentage of this habitat type that the proposed projects represents on SRS (i.e., less than 0.03 percent of the total forested habitat of this type on SRS), the proposed projects would not be expected to have measurable impact on any migratory avian species.

Construction of the ATTA Range expansion project, the K-Area 25-acre fenced expansion and 210-acre buffer zone expansion would not impact wetlands or floodplains. At the ATTA Range, the nearest jurisdictional wetlands are well away from the berms around the proposed ranges and with appropriate erosion and sediment control implemented, no impacts on wetlands are expected (Nelson 2005a) (Figure 2-2). The K-Area security expansion project is not located in a floodplain and contains no jurisdictional wetlands (Nelson 2005b). Minor alterations to the boundary of the 210--acre perimeter would be made so that there would not be any potential impacts to wetlands due to construction and a Floodplain/Wetland Assessment would not be required (Nelson 2005c). No components of the proposed action would be constructed in either of these environmentally sensitive habitats.

A stormwater and erosion/sediment control plan would be developed and implemented for the proposed construction activities at the ATTA Range. The erosion or sedimentation impacts of any surface runoff resulting from extreme storm events during construction activities would be contained by silt fences and the berm formed for the ranges. In addition, best management practices and standard erosion/sedimentation control measures would be used during construction of the proposed facilities.

The primary health and safety concern during construction of the ATTA Range facilities would be possible emission of lead through fugitive dust particles from the use of construction equipment. Construction personnel would follow normal safety practices described in the WSRC 8Q Employee Safety Manual. To prevent exposure to potentially contaminated soil, the disturbed area would be sprayed with water before construction begins. Water would be applied as necessary to prevent dust emissions. Observers, not

directly involved with the construction activity would stay in the exclusion zone during construction.

No impacts to workers are expected from modifications to K-Area systems including ventilation modifications and authorization basis changes to allow K Area to handle 3013 containers outside of the 9975 shipping packages, and to support glove box operations.

Onsite shipments of hazardous material are performed in accordance with the requirements of WSRC Manual 19Q, Transportation Safety. This WSRC manual ensures that all applicable Department of Transportation regulations are followed and that the shipping package used by the shipper is sufficiently robust to withstand certain transportation events such as fires and vehicle impacts. Any other shipping containers used for transfer of sample materials, waste or materials for disposition would be maintained and used in accordance with their site guidance documents.

In addition to standard industrial waste (housekeeping materials, etc), some transuranic, low-level and possibly small quantities of mixed waste may be generated, including HEPA filters, radiological protection equipment (gloves, plastic suits, and respirators), and tools and parts (cutting wheels, welding tips, and drill bits). Their handling and disposal would be according the site guidance documents. The expected quantities of waste would be well within the treatment, storage and disposal capabilities of SRS.

## 4.2 Facilities Operation

The operation of the ATTA Range and K-Area expansions would employ a total of 20 workers drawn from onsite forces. No measurable socioeconomic impacts would be expected as a result from this portion of the proposed action.

No surface water or groundwater would be used during operation of the expanded ATTA Range or the expanded K-Area security zone. Erosion and sedimentation controls would be installed as necessary to minimize the amount of soil that may migrate from the site. Areas disturbed by clearing and excavation activities would be stabilized as soon as possible to minimize continuing erosion and sedimentation. No detention ponds would be used in the expanded ATTA Range in order to minimize the possibility of contaminants entering the food chain.

Training activities on 984-foot range would involve the use of lead ammunition while ammunition used on the 1,312-foot range would be mainly non-lead based. Consistent with current practice at the existing ATTA Range lead ammunition would be used when non-lead ammunition was not available for a particular weapon. No depleted uranium ammunition would be used. Erosion and sedimentation control measures (EPA 2001) would be used to prevent soil movement off the expanded range. Inspections would be conducted weekly and after greater than 0.5 inch rain events during construction and on a scheduled and as needed basis during operation. Training activities would be confined to the bermed ranges and are not expected to result in wildland fires. However, in instances where the training protocol or ammunition type presents a risk of fire, SRS Fire

Department fire suppression equipment would be placed on standby to provide assistance.

Because of the localized nature of each expansion project, no negative impacts would be expected to affect any environmentally sensitive areas or protected species. Although none are expected to be encountered, any cultural or archaeological resources discovered during operational activities would be reported to SRARP for evaluation and potential recovery.

During normal operations, no hazardous chemicals would be used at the proposed facilities. Any spills or leaks (e.g., fuel, hydraulic fluid, and coolant from vehicles) occurring during facility operations would be cleaned up in accordance with site procedures and protocols.

Lead would be introduced into the environment as a result of the operation of the expanded ATTA Range. However, DOE expects that the amount of additional lead discharged into the environment as a result of these expanded operations would be minimal. DOE would track lead deposition by a monthly count of ammunition expended, and on a yearly basis[1]. Yearly studies and reviews of the amount of lead deposition would be conducted by Wackenhut Services, Inc., DOE's security contractor, to monitor the potential impact to human health and the environment, and to assure appropriate protections are implemented should any human health or environmental risk be detected. DOE expects that the operation of the expanded ATTA Range would have a negligible impact on human health. As described previously efforts would be made to minimize the use of lead ammunition. The United States Fish and Wildlife Service (USFWS 1988) has summarized the effects of lead in the environment. The existing ATTA Range is listed in the SRS Federal Facilities Agreement (FFA), Appendix G.1 as a unit requiring environmental evaluation to determine if a Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act investigation is necessary[2]. Following completion of operations in the expanded ATTA Range, DOE, the Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control would conduct an evaluation (under the terms of the FFA) and determine if a closure would be necessary and if so, how it would be accomplished. Closure would minimize any long-term effects of lead at the expanded ATTA Range.

Air emissions from construction and operations would be generated by diesel-operated equipment (i.e., trucks, backhoes, bulldozers and portable generators). Emissions from these sources would be expected to have only minimal impacts to local air quality and

[1] DOE facilities that have firing ranges for their security personnel must report the firing of lead bullets under Section 313 of the Emergency Planning and Community Right-to-Know Act.

[2] Lead ammunition is not considered a hazardous waste under RCRA because it is being used for its intended purpose. When DOE completes operations at the expanded ATTA Range (or perhaps from time to time during operation), DOE anticipates that it would recover and recycle lead to the extent practicable; this action would also be excluded from RCRA under the Military Munitions Rule because it is an intrinsic part of range use and maintenance.

have already been accounted for from both a State regulatory and site-wide impacts perspective. A National Emission Standards for Hazardous Air Pollutants (NESHAP) evaluation demonstrated that both radiological and non-radiological constituents of the K-Area projects were well within established limits and an internal permit exemption was received for the furnace operation.

### 4.3 Accident Analysis and Human Health Impacts

The enhanced terrorist threat upgrade effort includes three groups of planned activities: (1) physical safeguards and security enhancements, (2) modified storage capability within K Area, and (3) surveillance and material packaging capabilities. The projects and planned modifications discussed would employ engineered active systems and passive design features to ensure public and worker safety. The enhanced terrorist threat upgrade for the ATTA Range has no radiological impact and no planned chemical usage.

#### 4.3.1 Physical Safeguards and Security Enhancements

The K-Area security enhancements are a combination of several modifications and improvements. While the modified storage, surveillance and repacking capabilities would be confined to certain spaces, the security modifications are facility wide. Consequently the entire nuclear material inventory of K Area has been reviewed. The individual security enhancements would be assessed for their individual and collective impact to the facility design basis and beyond design basis accidents. For example, the increase in security perimeter boundary could diminish the impact of wildland fires by increasing the distance to forested property coupled with ground maintenance. Similarly, some systems could increase the likelihood of lightning strikes, but a designed ground system would eliminate the potential impact.

#### 4.3.2 Modified Storage and Surveillance Capability Within K Area

The planned storage areas would take advantage of the existing facility footprint and robust structure capability to withstand external impacts and natural phenomena events. The modified storage areas are immediately adjacent to other material storage areas, which would facilitate intra-facility transfers and simplify transfer controls. Storage activities would be analyzed in accordance with site requirements. The scenario most likely to generate a significant release is the design basis fire. Facility safety basis documentation would posit a single event bounded by either the release of a single pressurized 9975 container with a non-3013 containing oxide or a single 3013 containing oxide. Safety features that would be expected to prevent or mitigate this, and other credible accidents, include building design, container qualification, filtered ventilation systems, and administrative systems for packaging and storage requirements, operational processes, and fire program requirements.

Implementing the surveillance program would require the loading and unloading of 9975 shipping packages, visual examination of a 3013 container, and the opening of 3013 containers. Opening the 3013 containers would be performed inside of a credited

glovebox, which would protect the worker from exposure to the plutonium bearing materials. Although the processing of the plutonium introduces the possibility of different accidents, such as criticality, the scenario most likely to generate a significant release is still the design basis fire. Safety features to prevent or mitigate this, and other credible accidents, include building design, engineered fire suppression and detection systems, filtered ventilation systems, and procedural controls to preclude mishandling of the material.

### 4.3.3 Consequence Analysis

As the authorization basis documentation for the proposed activity is in preliminary form, consequence analysis for the bounding event is estimated based on the mitigated release of five maximally loaded plutonium containers. The estimated mitigated dose to a maximally exposed individual at the Site boundary associated with a pressurized release of five plutonium containers is less than 1000 mrems (50 year Total Effective Dose Equivalent), which is a $5 \times 10^{-04}$ latent cancer fatality risk. The estimated doses associated with the design basis accidents for the proposed activity are small compared to the evaluation guideline for the maximally exposed individual of 25 rems (DOE 1994). Doses to the involved and/or co-located worker are not specifically established in this preliminary assessment and are difficult to estimate because more details may be required than could reasonably be predicted or modeled at this time. However, engineered and procedural controls such as monitoring, detection, and suppression systems would be installed to provide the highest degree of safety possible to the involved and co-located worker.

## 4.4 Routine Radiological Releases

### 4.4.1 Worker Exposure

Worker exposures to radiation under normal operations are required to be kept as low as reasonably achievable (ALARA). Federal regulations limit a worker's dose to no more than 5 rems per year. However, within the DOE complex, ALARA policies allow no more than 2 rems per year. Appropriate procedures and administrative controls (e.g., personnel training and work area barriers) would be in place prior to any proposed activities. Also, radiation worker exposure levels would be monitored (with personal dosimeters) during the proposed operational activities. DOE does not expect the dose to workers to increase above current exposure levels.

Worker dose is estimated for those workers located near the facility (i.e., non-involved workers), but not directly involved in the process. These non-radiation workers are assumed to be 328 feet from the release point and would receive a maximum dose of $2.1 \times 10^{-01}$ mrems/yr. This dose is well below the dose limit for members of the public (100 mrems/yr) (Simpkins 2005), and equates to a latent cancer fatality risk of $8.3 \times 10^{-08}$. Doses to the involved and/or co-located worker are not specifically established in this preliminary assessment. However, engineered and procedural controls such as

monitoring, detection, and suppression systems would be installed to provide the highest degree of safety possible to the involved and co-located worker.

### 4.4.2 Exposure to Members of the Public

Small amounts of radioactive material are expected to be released from the K-Area building as a result of the CSSC. The dose to the maximally-exposed individual (MEI) as a result of this atmospheric release is expected to be $4.7 \times 10^{-04}$ mrems/yr (Simpkins 2005). This incremental increase in dose to the MEI is small, is well below the Federal atmospheric emission limit of 10 mrems/yr, and equates to a latent cancer fatality risk of $2.3 \times 10^{-10}$. For 2004, the dose to the MEI, as a result of all SRS operations from all atmospheric releases, was 0.06 mrems.

## 4.5 Radiation Environment

A person residing in the Central Savannah River Area (within 50 miles of SRS) receives an average annual radiation dose of about 360 mrems; SRS contributes less than 0.05 percent of that total. Natural radiation sources contribute about 300 mrems, medical exposures contribute about 53 mrems, and consumer products contribute about 10 mrems. The most recent SRS annual environmental report (Mamatey 2004) contains more information on the radiation environment.

## 4.6 Human Health Effects

The Occupational Safety and Health Act (OSHA) regulations (29 CFR Part 1910) require that employers comply with safety and health standards set by the act to provide each employee with a worksite that is free from recognized hazards that are likely to cause death or serious injury. Personal protective clothing and equipment would be used as appropriate. Based on the information provided in Sections 4.4.1 and 4.4.2, human health risks would be no greater than those presently resulting from SRS operations activities for the worker or public with regard to routine plutonium work.

An evaluation of the human health risks and potential consequences of accidents (Section 4.3) showed the proposed action would employ fire suppression, filtered ventilation and procedure controls. Mitigation provided by these systems/processes would ensure that, even in a worst case accident scenario, radiological doses to the public would be less than 1000 mrems (50 year Total Effective Dose Equivalent). Therefore, human health impacts are expected to be minimal.

## 4.7 Environmental Consequences of the Alternatives

The no action alternative would result in SRS continuing to store plutonium in K and F Areas, without implementing the DOE-STD-3013 Criteria for surveillance, stabilization, and safe storage of DOE-owned plutonium-bearing materials. No action would preclude the installation of defense and monitoring systems required by DOE guidance to enhance the protection posture of SRS to store plutonium-bearing materials. DOE needs to

implement these actions to comply with the enhanced terrorist threat driven safeguards and security upgrades which significantly increase the ability and quantity of postulated adversaries that SRS is required to defend against. None of the potential environmental impacts associated with the construction and operation of the proposed K-Area expansion and ATTA Range expansion would be realized.

The alternative to maintain two storage facilities would result in significant additional security costs associated with implementation of enhanced terrorist threat upgrades at two locations and would reduce the tactical effectiveness and control of transport and surveillance of SNM offered by a single facility. Also, the F-Area building does not meet all of the current safety standards suitable for extended storage of plutonium without necessary upgrades.

The alternative to construct the two new ranges at alternate locations at the ATTA Range would place at least a portion of the ranges in wetland areas and would be too close to U.S. Highway 278 and known endangered RCW colonies. Co-located security training areas are both uneconomical and insufficient in terms of supporting the varied skills required for enhanced terrorist threat upgrades because concurrent operations would be restricted.

### 4.8 Cumulative Impacts

There would be no measurable impact on the local economy as a result of the proposed action and no environmental justice concerns. No adverse impacts to either site surface or groundwater quality would be expected. Any increases in site traffic accident and fatality rates would be minimal as a result of the proposed action. The proposed action would have no adverse impacts on threatened, endangered, or sensitive species, cultural resources, floodplains, or wetlands on SRS. Total tree removal from both the ATTA and K-Area complex represents less than 0.02 percent of the site's pine stands. Any disturbance, including tree removal, would not proceed until archeological surveys have been conducted and documented. Alterations to the boundary of the K-Area expansion perimeter would be made so that there would be no potential impacts on wetlands. Cumulative ambient air quality impacts would be negligible. Assuming that both protective clothing and adequate safety measures are utilized, the proposed action would not pose any additional potential problems for worker health or safety. The dose to the maximally-exposed individual as the result of expected radiological releases from the CSSC project in K Area is small and well below the DOE all pathways dose standard. The proposed action would not add measurably to the impacts that result from the operation of SRS and surrounding facilities and would enhance the safety and security of storage of plutonium-bearing materials at SRS.

## 5.0 REGULATORY AND PERMITTING PROVISIONS CONSIDERED

DOE policy is to carry out its operations in compliance with all applicable Federal, State, and local laws and regulations, as well as all DOE Orders. This section provides a

discussion of the major regulatory permit programs that might be applicable to the proposed action.

## 5.1 National Environmental Policy Act of 1969 as amended

This EA has been prepared in compliance with the NEPA of 1969, as amended, and the requirements of the CEQ Regulations for Implementing NEPA (40 CFR Parts 1500-1508), and DOE Regulations (10 CFR Part 1021), and DOE Order 451.1B. NEPA, as amended, requires "all agencies of the Federal Government" to prepare a detailed statement on the environmental effects of proposed "major Federal actions significantly affecting the quality of the human environment". This EA has been written to comply with NEPA and analyze the potential environmental impacts safeguards and security upgrades for storage of plutonium materials at SRS.

## 5.2 Stormwater Management and Sediment Reduction Regulations

The South Carolina Department of Health and Environmental Control (SCDHEC) regulation R.72-300, "South Carolina Standards for Stormwater Management and Sediment Reduction" requires that stormwater management and sediment control plans must be approved by the State prior to engaging in any land disturbing activity related to residential, commercial, industrial or institutional land use which are not specifically exempted or waived by these regulations. Land disturbing activity means any use of the land by any person that results in a change in the natural cover or topography that may cause erosion and contribute to sediment and alter the quality and quantity of stormwater runoff. The construction of the proposed ATTA Range modifications would be implemented in accordance with these regulations.

## 5.3 Air Emissions Regulations

Operation of the class of construction and equipment to be used in implementing the proposed action does not currently fall within the SCDHEC requirements for air permitting activities. The use of diesel generators during construction activities would be prescreened for permitting under Title V. A NESHAP evaluation was performed for both radiological and non-radiological constituents of the K Area projects which was approved and an internal permit exemption was received for the furnace operation.

# 6.0 AGENCIES AND PERSONS CONSULTED

Washington Safety Management Solutions, Inc., U.S. Fish and Wildlife Service, Savannah River National Laboratory, USFS-SR, and the University of South Carolina's SRARP were consulted during the preparation of this EA.

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# APPENDIX A

## Biological Evaluation for the Expansion of K-Area Perimeter and the Development of Additional ATTA Ranges at the Savannah River Site

Submitted by:

U. S. Forest Service-Savannah River

(July, 2005)

## INTRODUCTION

This biological evaluation (BE) evaluates the potential effects of; 1) the proposed construction and engineering activities associated with the development of two new ranges within the ATTA Range and; 2) the proposed expansion of the existing perimeter boundary of K Area. This evaluation determines if the proposed project would affect individuals, populations, and habitat conditions of threatened and endangered (T&E) species. Threatened and endangered species are plant and animal species which are designated by the U.S. Fish and Wildlife Service. These species are protected under the Endangered Species Act of 1973. Proposed taxa are those species proposed for listing as endangered or threatened. Threatened status includes taxa that are likely to become endangered within all or a significant portion of its range. Endangered refers to a taxon that is in danger of extinction through out all or a significant portion of its range.

The objectives of this biological evaluation are to:

1) Determine if the proposed project could contribute to loss of viability of any state-listed sensitive species or contribute to a trend toward Federal listing of any species. Comply with the requirements of the Endangered Species Act (1973) that states that actions of Federal agencies not jeopardize, or adversely modify critical habitat of Federally listed species.
2) Provide a process and standard by which to ensure that T&E species receive full consideration in the decision-making process.

### Project Description and Location

This project involves the removal and reclamation of existing forested, partially forested, and open meadow upland area for the construction of mission-necessary facilities. The projects would be conducted in two areas adjacent to the existing footprints of established facilities, these areas include: 1) ATTA Range, and 2) K-Area facility. The ATTA Range is located within Aiken County (compartment 30) and would involve 3 areas immediately adjacent to existing ranges; collectively these areas are approximately 20 acres. The project surrounding K Area (Barnwell County) would involve an expansion of the existing perimeter boundary and would involve approximately 210 acres. Both projects would effectively remove the existing vegetation and involve some modification of the existing contours. Portions of each of these projects would be adjacent to existing small natural streams or outflow streams.

### Methods of Survey and Material Review

Our evaluation is based on the most current information concerning the biology and status of listed T&E species (Imm and Moore, internal report). Information concerning population locale and SRS habitat conditions are based on published and unpublished information from Savannah River Ecology Laboratory and other outside contractors, as well as, surveys conducted by personnel of the natural resource management division of the U. S. Forest Service-Savannah River (USFS-SR).

On various dates in July 2005, Donald W. Imm, Ph.D (staff botanist/ecologist) surveyed both proposed activity areas to detect the presence of T&E species, as well as, conditions suitable for various T&E species. These surveys did not completely inventory all species over the entire area; the surveys primarily focused on identifying suitable habitat areas. As with any sampling method, a single individual plant, including T&E species, could be overlooked without a complete inventory of the entire area. Further, periodic visual surveys for T&E species are not always the most appropriate means of documenting their presence or absence. However, considering the location and current state of the survey area, it is unlikely that individual T&E species were over looked during the walk through.

**General Habitat Description**

Based on 1951 aerial photography, the majority of both areas were extensively farmed. Since the establishment of SRS, the project areas at both sites had been used for various activities and, where forested, periodically burnt and harvested.

Based on field review, the impacted habitat areas within the 210 acres of the K-Area expansion project include the following: managed grassy meadow, unmanaged meadow, clean-up sites in meadow areas, young longleaf pine stands, young loblolly pine stands, mid-rotation densely forested loblolly pine stands, and mature longleaf pine forest that transitions into mature pine-hardwood and hardwood-pine adjacent to a stream.

Based on field review, the impacted areas habitat areas associated with the ATTA Range expansion include an unmanaged meadow area, a young recently regenerated longleaf pine, a partially functioning wetland depression, a densely forested unhealthy mature mixed pine forest that transitions into an open recently burnt longleaf pine forest.

Beneath the pine (*Pinus taeda, P. palustrus*) canopies in both project areas (K Area, ATTA) the following species were also observed; patches of sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), sparkleberry (*Vaccinium arboreum*), deerberry (*Vaccinium stamineum*), blackberry (*Rubus cuniformis, R. argutus*), dewberries (*Rubus trivalis*), and wax myrtle (*Myrica cerifera*) were scattered through out the stands. Individual saplings and scattered patches of loblolly pine (*Pinus taeda*), longleaf pine (*Pinus palustrus*), sassafras (*Sassafras albinum*), blackgum (*Nyssa sylvatica*), winged sumac (*Rhus copallina*), hawthorns (*Crataegus* spp.), plums (*Prunus angustifolia, P. umbellata*), crab-apple (*Malus coriacea*), persimmon (*Diospyros virginiana*), American holly (*Ilex opaca*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), water oak (*Quercus nigra*), sand laurel oak (*Quercus hemisphaerica*), southern red oak (*Quercus falcata*), and mockernut hickory (*Carya alba*) are also present in most of the forested areas. Various woody vines are also present and include honeysuckles (*Lonicera japonica, L. sempervirens*), muscadine (*Vitis rotundifolia*), peppervine (*Ampelopsis arborea*), greenbriers (*Smilax* spp.), Virginia-creeper (*Parthenocissus quinquefolia*), cow-itch (*Campsis radicans*), and poison-ivy (*Toxidendron radicans*).

The forest floor has scattered early successional herbs and grasses such as ebony spleenwort (*Asplenium platyneuron*), broomsedge (*Andropogon virginicus*), bluestems (*Andropogon* spp.), little bluestem (*Schizachyrium scoparium*), witch grasses (*Dichanthelium* spp.), panic grasses (*Panicum* spp.), poverty grass (*Aristida tuberculosa*), blue-eyed grass (*Sisyrinchium angustifolia*), beggars-lice (*Bidens* spp.), camphor-weed (*Chrysopsis gossypina*), silkgrass (*Pityopsis graminifolia*), asters (*Aster* spp.), throughwort (*Eupatorium* spp.), dog-fennel (*Eupatorium capillifolium*), woodland coreopsis (*Coreopsis major*), green-eyes (*Berlandiera pumila*), goldenrods (*Solidago* spp.), dayflower (*Commelina communis*), pipsissiwa (*Chimaphila maculata)*, partridge-berry (*Mitchella repens*), butterfly-weed (*Asclepias tuberculosa*), partridge-pea (*Cassia fasciculata*), yellow false-indigo (*Baptisia tinctoria*), butterfly-pea (*Clitoria mariana*), *Centrosema virginiana*, partridge-pea (*Cassia fasiculata*), dollarleaf (*Rhynchosia* spp.), tick-trefoil (*Desmodium* spp.), beggars-ticks (*Desmodium* spp.), as well as native and non-native lespedeza's (*Lespedeza* spp.). Several of the stands surrounding K Area were too densely forested to support reasonable levels of plant species diversity, much of the forest floor was dominated by dense litter with scattered occurrences of the mentioned plant species.

Portions of the forest at both proposed project areas have drier sites, such as those planted in longleaf pine (*Pinus palustrus*) and mature longleaf pine forest have scattered mid-stories dominated by sand laurel oak, water oak, sparkleberry, black cherry, plum, sassafras, and persimmon. The understory is typically sparse with scattered shrubs, grasses, and forbs such as blackberry (*Rubus* spp.), deerberry (*Vaccinium stamineum*), elliotts blueberry (*Vaccinium elliottii*), prickly-pear cactus (*Opuntia* spp.), poison-oak (*Toxidendron* spp.), reindeer moss (*Cladium* spp.), dwarf huckleberry (*Gaylussacia dumosa*), bluestems, black-needle grass (*Stipa* spp.), poverty grass (*Aristida tuberculosa*), broomsedge (*Andropogon virginicus*), little bluestem (*Andropogon scoparium*), panic grasses (*Panicum* spp.), golden-aster (*Heterotheca subaxillaris*), silkgrass (*Pityopsis graminifolia*), dog-fennel (*Eupatorium capillifolium*), *Asclepias humistrata, Hypericum hypercoides, Solidago odora, Tragia urens, Panicum commutatum, Lespedeza hirta, Berlandiera pumila, Tephrosia virginiana, Aristida purpurescens, Cassia fasciculata, Rhynchosia spp.,* and bracken fern.

The managed and unmanaged meadow areas were dominated by varying degrees of grasses and other graminoids. Observed species include bahia grass, Bermuda grass, *Lespedeza cuneata, Carex spp., Andropogon spp., Rudbeckia hirta, Eupatorium* spp., and other permanent meadow grasses and forbs. These areas appear to be either too recently disturbed or too frequently mowed to support significant numbers of species associated with upland pine savannah.

The forested canopies of the small stream bottoms and transitional slopes adjacent to both project areas include uneven aged mixtures of loblolly pine, longleaf pine, sweetgum, southern red oak (*Quercus falcata*), water oak, white oak (*Quercus alba*), black oak (*Quercus velutina*), hickories (*Carya* spp.), flowering dogwood (*Cornus florida*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*), swamp tupelo (*Nyssa biflora*), sweetbay (*Magnolia virginiana*), laurel oak (*Quercus laurifolia*), tulip poplar (*Liriodendron tulipifera*), beech (*Fagus grandifolia*), hackberry (*Celtis* spp.), hornbeam (*Ostrya virgniana*), winged-elm (*Ulmus alata*), and American holly (*Ilex opaca*). Shrubs form a nearly continuous sub-canopy beneath these small stream bottom habitats and are more scattered in the transition zone. Common shrubs in these areas include: inkberry (*Ilex glabra*), swamp azalea (*Rhododendron viscosum*), southern pinxterbloom (*Rhododendron canescens*), fetterbush (*Lyonia lucida*), deciduous holly (*Ilex decidua*), chokeberry (*Aronia arbutifolia*), dog-hobble (*Leocothoe axillaris*), red bay (*Persea borbonea*), ironwood (*Carpinus caroliniana*), highbush blueberry (*Vaccinium corymbosum*), ), rusty blackhaw (*Viburnum rufidulum*), beautyberry (*Callicarpa americana*), sweetleaf (*Symplocos tinctoria*), and blackhaw (*Viburnum nudum*). The most common vine species are greenbriers, Carolina jassamine, honeysuckles, virginia-creeper, muscadine, summer grape (*Vitis aestivalis*), cross-vine (*Bignonia capeolata*), climbing hydrangea (*Hydrangea arborescens*), poison ivy (*Toxidendron radicans*), and rattan-vine (*Berchemia scandens*). Herbaceous ground covers are patchy in occurrence and include species such as sphagnum moss (*Spaghnum* spp.), jack-in-the pulpit (*Arisaema triphyllum*), indian cucumber root (*Medeola virginiana),* sedges (*Carex* spp.), horned rushes (*Rhynchospora* spp.), witch-grasses (*Dichanthelium* spp.), elephants-foot (*Elephantopus tomentosus, E. caroliniensis*), wood-sorrel (*Oxalis* spp.), tick-trefoil (*Desmodium* spp.), flowering spurge (*Euphorbia corollata*), violets (*Viola spp.),* skullcap (*Scuttellaria* spp.), little brow-jug (*Hexastylis arifolia*), cinnamon fern, chain fern, royal fern, rattlesnake fern (*Botrychium virginianum*), ebony spleenwort (*Asplenium platyneuron*), and southern lady fern (*Athyrium asplenoides*). The transitional areas also have bluestems (*Andropogon* spp.), additional witch-grasses (*Dichanthelium* spp.), throughwort (*Eupatorium* spp.), hairy hawkweed (*Hieracium gronovii*), partridge berry, spotted wintergreen, bloodroot (*Sanguinaria canadensis*), three-part violet (*Viola tripetala*), skullcap (*Scuttellaria* spp.), false-fox gloves (*Aureolaria* spp.), woodland coreopsis, rattlesnake-plantain (*Goodyera pubescens*), ladies-tresses (*Spiranthes spp.*), wild yam (*Dioscorea* spp.), and bellwort (*Uvularia perfoliata*),

## STATUS OF T&E SPECIES AND HABITAT IN PROJECT AREA

### Threatened and Endangered Species

Informal consultation with the South Carolina Department of Natural Resources Heritage Trust program (SCHT) and a review of the literature (Batson et al. 1985; Knox and Sharitz 1990; Kilgo and Blake 2005) and existing data and survey records did not indicate locations for any threatened or endangered species (as listed by the U.S. Fish and Wildlife Service).

Though the ATTA Range is part of the red-cockaded woodpeckers (*Picoides borealis)* (RCW) habitat management area (Edwards et al. 2000), there are no current colonies of RCW within the proposed activity area. In fact, the nearest RCW colony lies roughly 1.5 miles to the north near the northern boundary of the ATTA Range, thus it is unlikely that the proposed project area serves as foraging for the nearest RCW colonies. There are no RCW colonies near K Area, though K Area is within the supplemental RCW habitat management area (Edwards et al., 2000). The nearest RCW colonies to K Area are four miles to the east near Tennessee Road, which is the western terminus of the southern population. Again, the K-Area project area would be considered to be suitable for RCW foraging, but lies too far from existing colonies. Both areas have some marginally suitable areas for RCW, but no cavity starts or existing cavities were identified.

The smooth coneflower (*Echinacea laevigata*) does not exist within either of these areas. Further, suitable soils or nearby seed sources do not exist within or adjacent to the project areas. The bald eagle (*Haliaeetus leucocephalus*) and wood stork (*Mycteria americana*) are frequently associated with wetland areas; therefore may periodically use the wetlands near the K-Area expansion; however, the proposed activities are not expected to impact these wetlands. A single pondberry (*Lindera melissaefolia*) population exists south of Hwy. 125, near the Steel Creek drainage, which is near the K-Area expansion project area. This species is associated with swamp margins and margins of deeply flooded Carolina bays; therefore, this species would not be impacted by the proposed actions and was not noted in the wetland areas along streams adjacent to the project areas. The shortnose sturgeon (*Acipenser brevirostrum*) is associated with large rivers. However, both project areas are predominantly upland areas; thus, no wetland or water quality impacts are expected.

The American alligator has successfully recovered from its previously rare status and is no longer considered rare in most of the southeastern U.S. (including SC). However, due to its similarity in appearance to the American crocodile (an endangered species), the American alligator remains Federally-listed. The American alligator is a common inhabitant of wetlands on SRS, including those near and adjacent to K Area, and would not be impacted by the proposed management activities.

**Sensitive Species**

No sensitive biota have been reported or observed in the project areas. Several of the sensitive faunal species could occasionally use the area. These include three bat species: *Myotis austroriparius, Corynorhinus rafinesquii*, and *Myotis lucifugus*. All three species could forage in the adjacent forested areas as well as roost in offsite buildings or scattered trees. The eastern woodrat (*Neotoma floridana floridana*) and scarlet king snake (*Lampropeltis triangulum*) can be found in debris piles in a variety of pine-hardwood and hardwood habitats. These species are not expected to be impacted by the proposed projects.

Based on soil conditions some sections of the mature upland pine and longleaf pine-hardwood forest at the ATTA Range and K Area could support populations of lance-leaf indigo (*Baptisia lanceolata*), standing red-cypress (*Ipomopsis rubra)* American nailwort *(Paronychia americana),* and sandhill lily (*Nolina georgiana*). These species and their associates were not found. The southern hognose snake (*Heterodon simus*), pine snake (*Pituophis melanoleucus*), and eastern coral snake (*Micrurus fulvius*) are potential residents of these same sandy pine and pine-hardwood habitats. (Kilgo and Blake 2005). Because of the limited amount of area involved, none of the mentioned species should be adversely affected at the individual or population level by the planned activities.

The loggerhead shrike (*Lanius ludovicianus*) and Henslow's sparrow (*Ammodramus henslowii*) (primarily winter months), as well, as Bachman's sparrow (*Aimophila aestivalis*), and ground dove (*Columbina passerina*) are species likely to use the existing meadow habitats within and adjacent to the project areas. Again, relative the scale of the proposed projects, none of these species should be adversely affected at the individual or population level by the planned activities.

The green-fringed orchid (*Habenaria lacera*), Carolina birds-in-nest (*Macbridea caroliniana),* bog spicebush (*Lindera subcoriacea*), Indian-olive (*Nestronia umbellata*), oconee azalea (*Rhododendron flammeum*), wood thrush (*Hylocichla mustelina*), and Swainson's warbler (*Limnothlypis swainsonii*) are typically found in bottomland hardwood areas, particularly those with dense understories. Such habitat conditions exist immediately adjacent to the project areas; however, these species were not observed to be present. Even if these species were present, the limited scope and position of the project would not impact these T&E species.

**Potential Affects on T&E Species:**

The proposed project activities (ATTA Range expansion, K-Area perimeter expansion) are not expected to adversely impact populations or habitat conditions for potentially occurring T&E species.

**Determination of Effects Summary**

This summary addresses the impacts of the proposed project activities at the ATTA range and K Area. This evaluation is based on the best available information concerning the status of the species with the project area as well as the best available information concerning the biology and ecology of the species in question.

**Threatened and Endangered Species**:

No Effect: No effect is expected on smooth coneflower (*Echinacea laevigata*), pondberry (*Lindera melissaefolia*), red-cockaded woodpecker (*Picoides borealis*), bald eagle (*Haliaeetus leucocephalus*), American alligator (*Alligator mississippiensis*), shortnose sturgeon (*Acipenser brevirostrum*), or wood stork (*Mycteria americana*) population status within this area or at a site-wide level.

Not Likely to Adversely Affect (beneficial, insignificant, or discountable effects): NONE.

May Affect (adverse effects): NONE.

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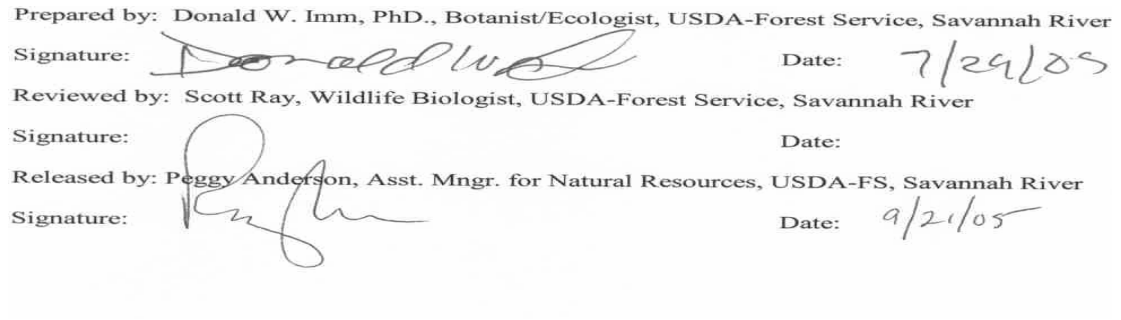
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Appendix A. Listing of Federal and State Endangered, Threatened, and Sensitive species known to occur on the Savannah River Site. Sensitive species are those with G-Rank or S-Rank values less than 3.

| STATUS | G-RANK | S-RANK | SCIENTIFIC NAME | COMMON NAME |
|---|---|---|---|---|
| **FEDERALLY ENDANGERED OR THREATENED ANIMAL SPECIES** | | | | |
| FE/SE | G4 | S1S2 | *MYCTERIA AMERICANA* | WOOD STORK |
| FT/SE | G4 | S2 | *HALIAEETUS LEUCOCEPHALUS* | BALD EAGLE |
| FE/SE | G3 | S2 | *PICOIDES BOREALIS* | RED-COCKADED WOODPECKER |
| FE/SE | G3 | S3 | *ACIPENSER BREVIROSTRUM* | SHORTNOSE STURGEON |
| FT | G5 | S5 | *ALLIGATOR MISSISSIPPIENSIS* | AMERICAN ALLIGATOR |
| **FEDERALLY ENDANGERED OR THREATENED PLANT SPECIES** | | | | |
| FE/SE | G2 | S2 | *ECHINACEA LAEVIGATA* | SMOOTH CONEFLOWER |
| FE/SE | | | *LINDERA MELISSAEFOLIA* | POND BERRY |
| STATE ENDANGERED OR THREATENED ANIMAL SPECIES (SE = STATE ENDANGERED, ST = STATE THREATENED) | | | | |
| ST | G5 | S2 | *PSEUDOBRANCHUS STRIATUS* | DWARF SIREN |
| ST | G4 | S2S3 | *HYLA ANDERSONII* | PINE BARRENS TREE FROG |
| ST | G3G4 | S1 | *RANA CAPITO* | CAROLINA GOPHER FROG |
| SE | G3 | S1 | *GOPHERUS POLYPHEMUS* | GOPHER TORTOISE |
| ST | G5 | S1 | *EUMECES ANTHRACINUS* | COAL SKINK |
| SE | G5 | S2 | *ELANOIDES FORFICATUS* | AMERICAN SWALLOW-TAILED KITE |
| ST | G5 | S2 | *COLUMBINA PASSERINA* | COMMON GROUND-DOVE |
| ST | G3G4 | S2S3 | *MYOTIS AUSTRORIPARIUS* | SOUTHEASTERN MYOTIS |
| SE | G3G4 | S2 | *CORYNORHINUS RAFINESQUII* | RAFINESQUE'S BIG-EARED BAT |
| SE | G1G2Q | S1 | *ELLIPTIO FRATERNA* | BROTHER SPIKE |

**SENSITIVE SPECIES LIST (SC = STATE CONCERN, RC = REGIONAL CONCERN, NC = NATIONAL CONCERN, PIF = PARTNERS IN FLIGHT, PARC = PARTNERS IN AMPHIBIAN AND REPTILE CONSERVATION)**

| | | | | |
|---|---|---|---|---|
| **Herptofauna** | | | | |
| PARC | G3 | S2? | *EURYCEA CHAMBERLAINI* | CHAMBERLAIN'S DWARF SALAMANDER |
| PARC | G5T5 | S2S3 | *AMBYSTOMA TIGRINUM TIGRINUM* | EASTERN TIGER SALAMANDER |
| SC/PARC | G2 | S? | *HETERODON SIMUS* | SOUTHERN HOGNOSE SNAKE |
| SC/PARC | G5 | S2 | *NERODIA FLORIDANA* | FLORIDA GREEN WATER SNAKE |
| SC/PARC | G4T4 | S3 | *PITUOPHIS MELANOLEUCUS MELANOLEUCUS* | NORTHERN PINE SNAKE |
| SC/PARC | G4T3? | S2 | *PITUOPHIS MELANOLEUCUS MUGITUS* | FLORIDA PINE SNAKE |
| SC/PARC | G5 | S2 | *MICRURUS FULVIUS* | EASTERN CORAL SNAKE |
| **BIRDS** | | | | |
| PIF | G5 | S3 | *HYLOCICHLA MUSTELINA* | WOOD THRUSH |
| SC/PIF | G5 | S3 | *LANIUS LUDOVICIANUS* | LOGGERHEAD SHRIKE |
| SC/PIF | G3 | S3 | *AIMOPHILA AESTIVALIS* | BACHMAN'S SPARROW |
| RC | G4 | S2 | *AMMODRAMUS HENSLOWII* | HENSLOW'S SPARROW |
| SC/PIF | G4 | S4? | *LIMNOTHLYPIS SWAINSONII* | SWAINSONS WARBLER |
| PIF | G4 | S4? | *PASSERINA CIRIS* | PAINTED BUNTING |
| **FISH** | | | | |
| SC | G3 | S3 | *ACIPENSER OXYRINCHUS* | ATLANTIC STURGEON |
| SC | G5 | S1 | *FUNDULUS DIAPHANUS* | BANDED KILLIFISH |
| SC | G2G3 | S? | *ELASSOMA OKATIE* | BLUEBARRED PYGMY SUNFISH |
| NC | G5 | S3S4 | *ANGUILLA ROSTRATA* | AMERICAN EEL |
| **MAMMALS** | | | | |
| SC | G5 | S3S4 | *SOREX HOYI* | PYGMY SHREW |
| SC | G5 | S3? | *CONDYLURA CRISTATA* | STAR-NOSED MOLE |
| SC | G5 | S3? | *MYOTIS LUCIFUGUS* | LITTLE BROWN MYOTIS |
| SC | G5 | S3 | *SYLVILAGUS AQUATICUS* | SWAMP RABBIT |
| SC | G5 | S3S4 | *NEOTOMA FLORIDANA* | EASTERN WOODRAT |
| SC | G5T4 | S2S3 | *CLETHRIONOMYS GAPPERI CAROLINENSIS* | CAROLINA RED-BACKED VOLE |
| **INSECTS** | | | | |
| SC | G3 | S? | *DOLANIA AMERICANA* | SAND BURROWING MAYFLY |
| SC | G3 | S? | *EPHERMERALLA INCONSTANS* | DRAGONFLY |
| SC | G3 | S? | *GOMPHUS DIMUTUS* | TWIN-STRIPED CLUBTAIL |
| SC | G3 | S? | *HESPERODIAPTOMUS AUGUSTAENSIS* | A COPEPOD |
| SC | G3 | S? | *LEUCTA MOHA* | A MAYFLY |
| SC | G3 | S? | *OPHIOGOMPHUS INCURVATUS* | APPALACHIAN SNAKETAIL |
| SC | G3 | S? | *PERIESTA FRISONI* | A MAYFLY |

**MOLLUSKS**

| | | | | |
|---|---|---|---|---|
| SC | G2 | S? | *ANODONTA TRIANGULATA* | SOUTHERN ELKTOE |
| SC | G4 | S3 | *ELLIPTIO CONGAREA* | CONGAREE ELLIPTIO |
| SC | G2G3 | S? | *ELLIPTIO FOLLICULATA* | POD LANCE |
| SC | G2G3 | S1 | *ELLIPTIO HEPATICA* | MILL CREEK ELLIPTIO |
| SC | G5 | S3 | *UTTERBACKIA IMBECILLUS* | PAPER PONDSHELL |
| SC | G3 | S? | *VILLOSA CONSTRICTA* | NOTCHED RAINBOW |
| SC | G3 | S? | *ALASMIDONTA VARICOSA* | BROOK FLOATER |
| SC | G4 | S2 | *ANODONTA COUPERIANA* | BARREL FLOATER |
| SC | G2G3 | S? | *ELLIPTIO LANCEOLATA* | YELLOW LANCE |
| SC | G3G4 | S? | *LAMPSILIS CARIOSA* | YELLOW LAMPMUSSEL |
| SC | G3 | S? | *LAMPSILIS SPLENDIDA* | RAYED PINK FATMUCKET |
| SC | G2 | S1S3 | *TOXOLASMA PULLUS* | SAVANNAH LILLIPUT |

**PLANTS**

| | | | | |
|---|---|---|---|---|
| NC | G3 | S1 | *AGRIMONIA INCISA* | INCISED GROOVEBUR |
| SC | G5 | S1 | *ARISTOLOCHIA TOMENTOSA* | WOOLLY DUTCHMAN'S-PIPE |
| SC | G4 | S2 | *ARNOGLOSSUM MUEHLENBERGII* | INDIAN PLANTAIN |
| SC | G3 | S1 | *ASTRAGALUS MICHAUXII* | SANDHILLS MILKVETCH |
| SC | G4 | S1 | *ASTRAGALUS VILLOSUS* | HAIRY MILK-VETCH |
| NC | G3 | S3 | *CAREX CHAPMANII* | CHAPMAN'S SEDGE |
| SC | G3 | S2 | *CAREX CHEROKEENSIS* | CHEROKEE SEDGE |
| SC | G4 | S2 | *CAREX COLLINSII* | COLLINS' SEDGE |
| SC | G3 | S2 | *CAREX DECOMPOSITA* | CYPRESS-KNEE SEDGE |
| SC | G4G5 | S1 | *CAREX FOLLICULATA* | LONG SEDGE |
| SC | G3 | S1 | *CAREX SOCIALIS* | A SEDGE |
| RC | G4 | S2 | *CARYA MYRISTICIFORMIS* | NUTMEG HICKORY |
| RC | G3 | S2 | *COREOPSIS ROSEA* | ROSE COREOPSIS |
| SC | G2G3 | S2 | *CROTON ELLIOTTII* | ELLIOTT'S CROTON |
| SC | G5 | S1 | *DELPHINIUM CAROLINIANUM* | CAROLINA LARKSPUR |
| SC | G4G5 | S2 | *FORESTIERA LIGUSTRINA* | UPLAND SWAMP PRIVET |
| SC | G? | S2 | *HALESIA PARVIFLORA* | SMALL-FLOWERED SILVERBELL-TREE |
| SC | G4G5 | S2 | *IPOMOPSIS RUBRA* | RED STANDING-CYPRESS |
| RC | G2 | S2 | *LINDERA SUBCORIACEA* | BOG SPICEBUSH |
| SC | G2G3 | S3 | *LOBELIA BOYKINII* | BOYKIN'S LOBELIA |
| SC | G3G4 | S3 | *LUDWIGIA SPATHULATA* | SPATULATE SEEDBOX |
| SC | G2G3 | S3 | *MACBRIDEA CAROLINIANA* | CAROLINA BIRD-IN-A-NEST |
| RC | G3 | S2 | *MYRIOPHYLLUM LAXUM* | PIEDMONT WATER-MILFOIL |
| SC | G3? | S1 | *PARONYCHIA AMERICANA* | AMERICAN NAILWORT |
| SC | G5 | S2 | *PLATANTHERA LACERA* | GREEN-FRINGE ORCHID |
| SC | G5 | S1 | *QUERCUS AUSTRINA* | BLUFF OAK |
| SC | G5 | S2 | *QUERCUS SINUATA* | DURAND'S WHITE OAK |
| SC | G3 | S3 | *RHEXIA ARISTOSA* | AWNED MEADOWBEAUTY |
| SC | G4G5 | S1 | *RHEXIA CUBENSIS* | WEST INDIAN MEADOW-BEAUTY |
| SC | G3 | S3 | *RHODODENDRON FLAMMEUM* | PIEDMONT AZALEA |
| SC | G3G4 | S3 | *RHYNCHOSPORA INUNDATA* | DROWNED HORNEDRUSH |
| SC | G3 | S3 | *SARRACENIA RUBRA* | SWEET PITCHER-PLANT |
| SC | G3G4 | S2 | *SCIRPUS ETUBERCULATUS* | CANBY BULRUSH |
| SC | G4 | S2 | *SCLERIA BALDWINII* | BALDWIN NUTRUSH |
| NC | G3T2 | S1 | *TRILLIUM PUSILLUM VAR PUSILLUM* | LEAST TRILLIUM |
| SC | G3G5 | S2 | *UTRICULARIA FLORIDANA* | FLORIDA BLADDERWORT |
| SC | G4 | S2 | *UTRICULARIA OLIVACEA* | PIEDMONT BLADDERWORT |
| SC | G5 | S1 | *VALLISNERIA AMERICANA* | EEL-GRASS |

## Appendix B
## Public Involvement

Comments on the Draft Environmental Assessment (EA) and Department of Energy (DOE) Responses

In accordance with DOE's NEPA regulations, 10 CFR 1021, DOE made the draft EA available to the States of Georgia and South Carolina on November 2, 2005. On November 7, 2005, DOE announced to the public, through the SRS Environmental Bulletin, that the draft EA was available for a 30-day comment period. DOE received no written, email, voicemail, or faxed comments on the draft EA from the States or members of the public.

DOE provided a briefing on the draft EA to the Savannah River Site Citizens Advisory Board (CAB) Facilities Disposition and Site Remediation Committee on November 8, 2005, in Aiken, South Carolina. On November 15, 2005, DOE gave the same briefing to the SRS CAB general meeting in North Charleston, South Carolina. At these meetings CAB members and members of the public asked several questions about the scope and content of the EA. These questions, and DOE responses, are given here.

Question 1: Does the EA address the impact of lead from Advanced Tactical Training Area (ATTA) activities?

DOE Response: Yes. The potential impacts of lead used at the ATTA range are described in section 4.2 of the EA. In the same section DOE discusses the regulatory requirements that DOE must abide by during ATTA operation and after ATTA operations are complete.

Question 2: Does the EA address the impacts of materials in the explosives that would be used at ATTA (e.g., perchlorate)?

DOE Response: Perchlorate is not a component of any of the explosives used or proposed for use at ATTA. A review of the relevant literature and of the Army Ammunition Data Sheets for the explosives indicates that no hazardous chemicals would be present once the explosives are detonated.

Question 3: Did DOE consider using lead-contaminated soil that already exists at ATTA to create the berms for the new ranges, in order to avoid creating more contaminated soil?

DOE Response: DOE did consider the use of contaminated soils to construct the new berms, and DOE would do so. This would not only avoid contaminating additional soil but would also be a cost saving factor because less new fill material would be needed to construct the berms.

Question 4: Will the Container Surveillance and Storage Capability (CSSC) and K-Area Interim Storage (KIS) projects conform to DOE's new seismic qualification standards?

DOE Response: DOE has evaluated the K-Area structure and safety-related systems to document their ability to withstand seismic events. As part of the safety analysis to support the proposed projects, safety related structures will be reanalyzed in accordance with current criteria. Analysis to date has revealed that there is a sufficient margin to accommodate proposed seismic qualification standards. A new evaluation would be performed for any new or revised criteria should they be put in place.

Question 5: Has the Defense Nuclear Facilities Safety Board (DNFSB) expressed concerns about plutonium storage in K Area because of seismic issues?

DOE Response: The DNFSB has not expressed concerns about plutonium storage in K Area due to seismic issues.

**Finding of No Significant Impact**
**for the**
**Safeguards and Security Upgrades for Storage of Plutonium Materials**
**at the**
**Savannah River Site**

Agency: U.S. Department of Energy

Action: Finding of No Significant Impact

**Summary:** The Department of Energy (DOE) has prepared an environmental assessment (EA) (DOE/EA-1538) to evaluate the potential environmental impacts associated with the implementation of proposed and alternative actions to enhance the safe and secure storage of plutonium-bearing materials at the Savannah River Site (SRS) to meet the enhanced terrorist threat. The draft EA was made available to the States of South Carolina and Georgia, and to the public, for a 30-day comment period. Based on the analyses in the EA, and after careful consideration of comments received, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement (EIS) is not required and DOE is issuing this finding of no significant impact (FONSI).

**Public Availability:** Copies of the EA and FONSI or further information on the DOE NEPA process are available from:

Andrew R. Grainger, NEPA Compliance Officer
U.S. Department of Energy, Savannah River Operations Office
Building 730-1B, Room 3150
Aiken, South Carolina 29808
Fax/telephone: 1-800-881-7292
e-mail: nepa@srs.gov

**Background:** In response to the terrorist attacks of September 11, 2001, DOE has reassessed its threat criteria relative to the protection of special nuclear materials. The reassessment resulted in a number of changes to the criteria, and to the postulated capabilities of those who might perpetrate acts of violence against DOE assets. Prior to this reassessment, DOE had intended to modify a building in F Area to implement the surveillance requirements of DOE Standard (STD)-3013, including the ability to re-stabilize and re-package any non-compliant plutonium-bearing materials. This was called the Container Surveillance and Storage Capability (CSSC) project. Concurrent with the CSSC project, DOE had also intended to continue storing plutonium-bearing materials in compliance with DOE-STD-3013 in the K-Area Material Storage (KAMS) facility. In order for SRS to maintain two plutonium storage facilities and implement the

required safeguards and security adequate to respond to the enhanced terrorist threat at both locations, the agency would have to provide for significant additional security costs.

**Purpose and Need for Agency Action**: The purpose of the proposed and alternative actions is to enhance physical safety and security for plutonium-bearing materials stored at SRS, and to ensure the safe storage of plutonium-bearing materials by providing the capability to comply with the material surveillance and stabilization requirements of DOE-STD-3013. DOE needs to implement these actions in order to meet DOE-STD-3013 surveillance and stabilization requirements and to provide the safeguards and security improvements necessary to respond to the enhanced terrorist threat.

**Proposed Action**: The proposed action is comprised of the following activities: (1) the de-inventory of plutonium-bearing materials from the F-Area facility and installation of modified storage capability in K Area, (2) the construction and operation of surveillance and stabilization capabilities in K Area, (3) K-Area interim surveillance, (4) the installation of physical security upgrades in K Area and (5) the modification and upgrade of the Advanced Tactical Training Area (ATTA) Range. A brief description of each activity follows:

F-Area Facility:

Plutonium-bearing materials currently stored in the F-Area facility would be removed and transported to an existing room in the K-Area complex for management and interim storage. Implementation of this action would require no facility modifications or construction-related activities in F Area.

K-Area Complex:

An existing room in the K-Area complex would be modified to accommodate the safe storage of additional plutonium-bearing material primarily from F Area in different packaging configurations than currently approved for storage in K Area. The CSSC project would be installed in K Area to facilitate the stabilization, packaging, storage, and monitoring of plutonium-bearing materials in accordance with DOE-STD-3013. This project would incorporate destructive and non-destructive technologies, possess un-packaging and re-packaging capabilities, and be able to safely stabilize non-compliant materials. The CSSC project is expected to go online in 2009. While the CSSC project is being constructed, DOE-STD-3013 surveillance requirements would be met by constructing and operating the K-Area Interim Surveillance (KIS) project. This project would be able to unload and reload 3013 containers from 9975 shipping packages and conduct the necessary non-destructive and destructive examinations. General building modifications and upgrades related to worker safety, habitability, and fire protection would also be implemented.

Physical security upgrades to meet the enhanced terrorist threat would also be implemented in K Area. These upgrades would include: (a) the clearing and grubbing of

approximately 210 acres of land beyond the existing K-Area restricted area, (b) adding security fence lines and barriers, (c) installing lighting with diesel generator backup power, and (d) installing new security features and systems inside of the K-Area complex.

ATTA Range

Two new multi-purpose training ranges (984 and 1,312 feet in length, respectively) would be constructed and operated at the existing ATTA Range facility. Implementation of this action would not necessitate expansion of the facility's Surface Danger Zone. The new ranges would be located in undeveloped areas to the west and south of the existing Known Distance Range. A ten-foot earthen berm would surround both ranges, effectively segregating them from the surrounding terrestrial environment. Construction of these two ranges would require the clearing of approximately 17.3 acres of existing forestland.

**Alternative Actions**: In accordance with NEPA regulations, DOE examined the following alternatives to the proposed action:

No Action Alternative

This alternative would involve the continued storage of plutonium in both K and F Areas without performing the surveillance and monitoring requirements of DOE-STD-3013 or implementing the safeguards and security upgrades required by the enhanced terrorist threat. Environmental permitting and monitoring programs in F Area would have to be updated and continued. Presently, the F-Area building does not meet all of the safety standards or possess the surveillance capabilities required for extended storage of plutonium. While plutonium stored in K Area would be in DOE-STD-3013 containers inside of 9975 shipping packages, there is no destructive analysis capability in K Area to ensure the continued safe storage of these materials or to re-stabilize and re-package them should an unsafe condition be identified. Implementation of the no action alternative therefore may increase the potential of a radiological release to the environment due to the lack of surveillance capability.

Alternative 1

This alternative would involve maintaining two facilities (in K and F Areas) to support current plutonium storage and nondestructive surveillance capabilities, without installing the ability to perform destructive examinations or restabilize and repackage noncompliant material. Security upgrades would be implemented at both locations at significant expense to DOE. Presently, the F-Area building does not meet all of the safety standards required for extended storage of plutonium and would require substantial upgrades. Also, environmental permitting and monitoring programs in F Area would have to be updated and continued. While plutonium stored in K Area would be in DOE-STD-3013 containers inside of 9975 shipping packages, there is presently no capability to conduct non-destructive and destructive examinations or restabilize and repackage noncompliant

plutonium materials in K Area. Therefore, existing surveillance capabilities in F Area would either have to be duplicated in K Area, or material would have to be transported between the two areas in order to access the necessary surveillance equipment. Either action would be extremely costly.

Alternative 2

This alternative would involve consolidating and supporting the plutonium storage, surveillance, and stabilization mission in K Area only, without upgrading physical security. DOE-STD-3013 storage and surveillance requirements would be met, including the capabilities to perform destructive analysis and to restabilize and repackage noncompliant plutonium material. This alternative would result in significant savings by consolidating the plutonium storage mission into one location. However, under this alternative, actions to address and defend against the increased terrorist threat would not be taken.

Alternative 3

This alternative would involve co-locating the proposed multi-purpose training ranges at alternate locations in the immediate vicinity of the existing ATTA Known Distance Range. Implementation of this alternative would place the new ranges too close to U.S. Highway 278 and could potentially impact known red-cockaded woodpecker (RCW) colonies.

**Environmental Impacts:**

The F-Area facility and K-Area complex are both located in previously developed, industrialized landscapes on SRS. The environmental impacts associated with removing plutonium-bearing material from the F-Area facility and transporting it to the K-Area complex would be negligible. The proposed CSSC and KIS projects in the K-Area complex would be installed in an existing facility. The associated construction-related activities (e.g., structural modifications and upgrades, installation of equipment) would be relatively short-lived, cause minimal disruption to facility and area operations, and be conducted using best management practices (BMPs). Air emissions associated with these construction activities (e.g., equipment emissions, fugitive dust) would be temporary, their impacts minimal, and not require permitting. Any leaks or spills occurring during project installation would be contained and cleaned up in accordance with site procedures and protocols. The potential for these construction-related activities to adversely impact the human environment (e.g., air, land, water, biotic resources) would be negligible.

The proposed expansion of the K-Area security buffer and modification and upgrade of the ATTA Range facility would require the clearing of approximately 227 acres of forestland. The associated land clearing and soil disturbing activities would be conducted using BMPs (e.g., soil erosion and stormwater control). Any leaks or spills (e.g., fuel, oil) occurring during construction would be cleaned up in accordance with site procedures and protocols. The impacts to area streams and wetland resources would be

negligible. There are no threatened or endangered species within the respective project areas. Air quality emissions resulting with construction-related activities (e.g., fugitive dust associated with soil disturbing activities, equipment emissions) would be temporary, their impacts minimal, and not require permitting. Both of the project areas have previously been subjected to extensive land alterations (e.g., timber harvesting, modern construction activities), so the potential for impacting archaeological or cultural resources would be negligible. The proposed clearing of approximately 227 acres would have a negligible impact on terrestrial ecology and productivity at SRS. The ATTA Range facility is within an RCW habitat management area and, in part, bordered by ecological setasides. However, there are no active RCW colonies in or near the project area and the proposed new training ranges would be configured so that ecologically sensitive areas (e.g., wetlands/floodplains) would not be impacted.

Implementation of the proposed action would be supported by existing SRS infrastructure and resources (e.g. waste management, power, potable water, roads, etc.). Any additional waste loads and resource utilization generated by the proposed action would easily be accommodated by existing site facilities and the associated environmental impacts would be negligible. DOE does not expect any increase in site traffic accidents and associated injury rates as a result of construction or operation activities. Radiological and non-radiological air emissions resulting from operation of the K-Area projects would be well within established regulatory limits and not adversely impact local air quality. Surface and groundwater resources would not be impacted. Any spills or leaks occurring during facility operations would be cleaned up in accordance with site procedures and protocols. Operation of the expanded ATTA Range facility would result in no chemical usage or radiological impact. Lead and explosive materials would be introduced into the environment as a result of training exercises at the expanded Range. However, DOE expects that the amount of additional lead discharged into the environment as a result of these expanded operations would be minimal. Yearly studies and reviews of the amount of lead deposition would be conducted by Wackenhut Services, Inc., DOE's security contractor, to monitor the potential impact to human health and the environment, and to assure appropriate protections are implemented should any human health or environmental risk be detected. Following completion of operations at the ATTA Range, DOE, the Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control will conduct an evaluation to determine if a site closure is necessary to mitigate any long-term environmental effects that could result from lead in the environment.

Workforce requirements and costs associated with implementation of the proposed action would be minimal compared to the total SRS budget and employment. Consequently, the potential for significant socioeconomic impacts within the SRS region-of-influence would be negligible. Any environmental impacts associated with the proposed action would be limited to specific geographic areas within SRS and not be evidenced beyond the site boundary. The potential for engendering environmental justice issues would therefore be negligible.

Impacts to worker health and safety would be negligible due to the use of appropriate safety practices, personal protective clothing and equipment, and enforcement of Occupational Safety and Health Administration (OSHA) compliant work conditions. The CSSC and KIS projects in K Area would employ engineered and procedural controls to ensure the protection of public and worker health and safety. Mitigation provided by these systems and processes would ensure that, even in a worst case accident scenario, radiological doses to the public would be less than 1000 mrem (50-year Total Effective Dose Equivalent), which is a $5 \times 10^{-04}$ latent cancer fatality risk. The dose to the maximally-exposed individual resulting from expected radiological releases from the CSSC and KIS projects would be well below the applicable DOE standard. Human health risks would be no greater than those presently resulting from SRS operations dealing with routine plutonium work. The potential for impacting human health and safety (both on and offsite) would be minimal.

Implementation of the proposed action is not expected to have a measurable impact on the human environment (e.g., socioeconomics, human health and safety, threatened and endangered species, wetlands, migratory avian species, air, land, and water resources). The proposed action would not add measurably to the cumulative environmental effect of other ongoing actions and operations within SRS and the surrounding area. Implementation of the proposed action would significantly enhance the safety and security of plutonium-bearing materials stored at SRS and therefore reduce the potential for adverse health and safety impacts from long-term storage of plutonium.

**Determination**. Based upon the information and analyses in the EA (DOE/EA-1538) and after careful consideration of all comments, DOE has determined that the proposed action to enhance safety and security for storage of plutonium-bearing materials at SRS does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an EIS is not required and DOE is issuing this FONSI.

Signed in Aiken, South Carolina, this 16th day of December 2005.

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