DOE/EIS-0387

Draft Site-Wide Environmental Impact Statement for the Y-12 National Security Complex

October 2009

National Nuclear Security Administration

U.S. Department of Energy
National Nuclear Security Administration
Y-12 Site Office

Summary

COVER SHEET

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Abstract: The NNSA, a separately organized agency within the DOE, has the responsibility to maintain the safety, reliability, and security of the U.S. nuclear weapons stockpile to meet national security requirements. NNSA manages nuclear weapons programs and facilities, including those at the Y-12 National Security Complex (Y-12) at Oak Ridge, Tennessee. This Draft Y-12 SWEIS analyzes the potential environmental impacts of reasonable alternatives for ongoing and foreseeable future operations, facilities, and activities at Y-12.

Five alternatives are analyzed in this Draft Y-12 SWEIS: (1) No Action Alternative (maintain the status quo); (2) Uranium Processing Facility (UPF) Alternative; (3) Upgrade-in-Place Alternative; (4) Capability-sized UPF Alternative; and (5) No Net Production/Capability-sized UPF Alternative. This document assesses the potential environmental impacts of operations on land uses and applicable plans, socioeconomic characteristics and environmental justice, prehistoric and historic cultural resources, visual resources, geology and soils, biological resources, water, air quality, noise, traffic and transportation, utilities and energy, waste management, human health and safety, intentional destructive acts, and accidents. The Capability-sized UPF Alternative is the preferred alternative.

Public Involvement: On November 28, 2005, NNSA published a Notice of Intent (NOI) in the *Federal Register* (70 FR 71270) announcing its intent to prepare this Y-12 SWEIS and starting the public scoping period. The scoping period continued through January 31, 2006. (Note: In the NOI, the public scoping comment period was scheduled to end on January 9, 2006; however, in response to public requests, the public scoping comment period was extended until January 31, 2006 (71 FR 927). NNSA invited the public to submit comments during the scoping period by postal mail, electronic mail, fax, and through written and verbal comments. Two public scoping meetings were held on December 15, 2005, in Oak Ridge, Tennessee. All comments

received during the scoping period were considered during the preparation of this Draft Y-12 SWEIS.

NNSA had originally planned to issue the Draft Y-12 SWEIS in late 2006; however, in October 2006, NNSA decided to prepare a supplemental programmatic environmental impact statement (SPEIS) related to transforming the nuclear weapons complex ("Complex Transformation SPEIS"). As a result, NNSA decided to delay the Draft Y-12 SWEIS until the programmatic decisions on the Complex Transformation SPEIS were made. On December 19, 2008, NNSA announced a Record of Decision related to the Complex Transformation SPEIS (73 FR 77644). In that decision, NNSA decided that the manufacturing, storage, and research and development missions involving uranium will remain at Y–12, and NNSA will construct and operate a Uranium Processing Facility at Y–12. This Draft Y-12 SWEIS assesses the potential environmental impacts of reasonable alternatives for implementing that programmatic decision at Y-12.

A 60-day comment period on this document begins with the publication of the Environmental Protection Agency's Notice of Availability in the *Federal Register*. NNSA will consider comments received after the 60-day period to the extent practicable. NNSA will hold public hearings to receive comments on this document at the times and locations to be announced in local media and the DOE Notice of Availability. Written comments may also be submitted by U.S. mail to Ms. Pam Gorman at the above address or electronically at www.y12sweis.com. This document and related information are available on the Internet at www.y12sweis.com.

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Prepared by:

U.S. Department of Energy
National Nuclear Security Administration
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ACRONYMS AND ABBREVIATIONS

ASER	Annual Site Environmental Report
B&W	Babcock & Wilcox Technical Services Y-12, LLC
CCC	Complex Command Center
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	United States Code of Federal Regulations
CWA	Clean Water Act
CX	categorical exclusion
D&D	decontamination and decommissioning
DOD	United States Department of Defense
DOE	United States Department of Energy
DP	Defense Programs
DU	depleted uranium
EA	Environmental Assessment
EFPC	East Fork Poplar Creek
EIS	Environmental Impact Statement
EM	Environmental Management
EOC	Emergency Operations Center
EO	Executive Order
EPA	United States Environmental Protection Agency
ETTP	East Tennessee Technology Park
EU	enriched uranium
FIRP	Facilities and Infrastructure Recapitalization Program
FONSI	Finding of No Significant Impact
FR	Federal Register
HAP	hazardous air pollutant
HEPA	high efficiency particulate air
HEU	highly enriched uranium
HEUMF	Highly Enriched Uranium Materials Facility
IFDP	Integrated Facilities Disposition Project
LCF	latent cancer fatality
LEP	Life Extension Program
LEU	low-enriched uranium
LLW	low-level radioactive waste
LOS	Level-of-Service
MAA	Material Access Area
MEI	maximally exposed individual
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NN	Nuclear Nonproliferation and National Security
NNSA	National Nuclear Security Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NPR	Nuclear Posture Review

NPT	Nuclear Nonproliferation Treaty
NSP	National Security Program
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PEIS	Programmatic Environmental Impact Statement
PIDAS	Perimeter Intrusion Detection and Assessment System
R&D	research and development
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	region of influence
SEAB	Secretary of Energy Advisory Board
SHPO	State Historic Preservation Officer
SIP	Security Improvements Project
SMC	Special Materials Complex
SNM	special nuclear material
SSM	Stockpile Stewardship and Management
SPEIS	Supplemental Programmatic Environmental Impact Statement
START	Strategic Arms Reduction Talks
SWEIS	Site-Wide Environmental Impact Statement
TDEC	Tennessee Department of Environment and Conservation
T&E	threatened and endangered
TYSP	Ten-Year Site Plan
UEFPC	Upper East Fork Poplar Creek
UPF	Uranium Processing Facility
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
Y-12	Y-12 National Security Complex
YSO	Y-12 Site Office

UNITS OF MEASURE AND ABBREVIATIONS

A-weighted decibel	dBA
cubic meters	m^3
cubic meters per year	m^3/yr
cubic yards	yd^3
decibel	dB
gallons per day	gal/day
gallons per year	gal/yr
kilowatt hour	kWh
kilowatt hours per year	kWh/yr
megawatt	MW
million	M
million gallons per day	M gal/day
million gallons per year	M gal/yr
millirem	mrem
millirem per year	mrem/yr
particulate matter of aerodynamic diameter less than 10 micrometers	PM_{10}
ppm	parts per million
rem per year	rem/yr
square feet/foot	ft^2
tons per year	tons/yr

CONVERSION CHART

TO CONVERT FROM U.S. CUSTOMARY INTO METRIC			TO CONVERT FROM METRIC INTO U.S. CUSTOMARY		
If you know	**Multiply by**	**To get**	**If you know**	**Multiply by**	**To get**
		Length			
inches	2.540	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.03281	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.6214	miles
		Area			
square inches	6.452	square centimeters	square centimeters	0.1550	square inches
square feet	0.09290	square meters	square meters	10.76	square feet
square yards	0.8361	square meters	square meters	1.196	square yards
acres	0.4047	hectares	hectares	2.471	acres
square miles	2.590	square kilometers	square kilometers	0.3861	square miles
		Volume			
fluid ounces	29.57	milliliters	milliliters	0.03381	fluid ounces
gallons	3.785	liters	liters	0.2642	gallons
cubic feet	0.02832	cubic meters	cubic meters	35.31	cubic feet
cubic yards	0.7646	cubic meters	cubic meters	1.308	cubic yards
		Weight			
ounces	28.35	grams	grams	0.03527	ounces
pounds	0.4536	kilograms	kilograms	2.205	pounds
short tons	0.9072	metric tons	metric tons	1.102	short tons
		Temperature			
Fahrenheit (^oF)	subtract 32, then multiply by 5/9	Celsius (^oC)	Celsius (^oC)	multiply by 9/5, then add 32	Fahrenheit (^oF)
Kelvin (K)	subtract 273.15	Celsius (^oC)	Celsius (^oC)	add 273.15	Kelvin (K)

Note: 1 sievert = 100 rem

S.1 INTRODUCTION

The National Nuclear Security Administration (NNSA), a separately organized agency within the U.S. Department of Energy (DOE), is the Federal agency responsible for maintaining and enhancing the safety, security, reliability, and performance of the U.S. nuclear weapons stockpile. This S*ite-Wide Environmental Impact Statement for the Y-12 National Security Complex* (Y-12 SWEIS) analyzes the potential environmental impacts of ongoing and future operations, facilities, and activities at the Y-12 National Security Complex (Y-12). The primary purpose of continuing to operate Y-12 is to provide support for the NNSA's national security missions.

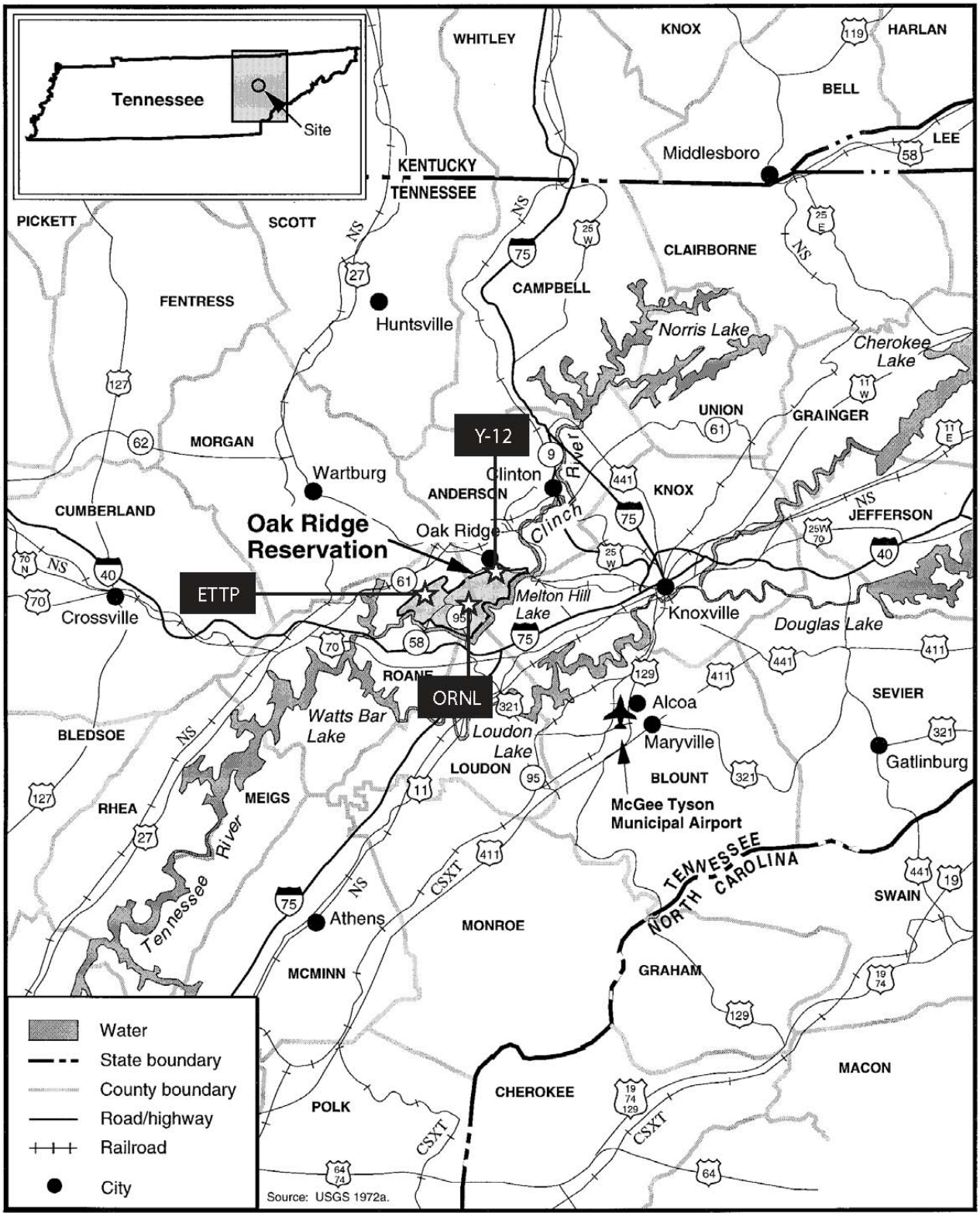
Secondaries and Cases

A secondary is a component of a nuclear weapon that contains elements needed to initiate the fusion reaction in a thermonuclear explosion. A case contains the secondary and other components.

Y-12 is one of three primary installations on the DOE Oak Ridge Reservation (ORR) in Oak Ridge, Tennessee (Figure S.1-1). The other installations are the Oak Ridge National Laboratory (ORNL) and the East Tennessee Technology Park (ETTP) (formerly the Oak Ridge K-25 Site). Construction of Y-12 started in 1943 as part of the World War II Manhattan Project. The early missions of the site included the separation of uranium-235 from natural uranium[1] by the electromagnetic separation process and the manufacture of nuclear weapons components from uranium and lithium. Today, as one of the NNSA major production facilities, Y-12 is the primary site for enriched uranium (EU) processing and storage, and one of the primary manufacturing facilities for maintaining the U.S. nuclear weapons stockpile. Y-12 is unique in that it is the only source of **secondaries,[2] cases**, and other nuclear weapons components within the NNSA nuclear security enterprise.[3] Y-12 also dismantles weapons components, safely and securely stores and manages special nuclear material (SNM),[4] supplies SNM for use in naval and research reactors, and dispositions surplus materials. Y-12 nuclear nonproliferation programs play a critical role in securing our nation and the globe by combating the spread of weapons of mass destruction by removing, securing, and dispositioning SNM.

Y-12 also conducts and/or supports nondefense-related activities including: environmental monitoring, remediation, and decontamination and decommissioning (D&D) activities of the DOE Environmental Management Program; management of waste materials from past and current operations; support for the production of medical isotopes; and development of highly specialized technologies to support the capabilities of the U.S. industrial base, and the down-blending of weapons-grade materials to non-weapons forms suitable for use in commercial reactors.

[1] Natural uranium is a mixture of uranium-238 (99.2739 percent), uranium-235 (0.7205 percent) and uranium-234 (0.0056 percent).
[2] Text boxes provide additional information on terms that are bold-faced.
[3] "Nuclear security enterprise" is a relatively new term that refers to the NNSA complex in its entirety. In the past, NNSA used the term "nuclear weapons complex". NNSA believes that "nuclear security enterprise" more accurately describes its basic mission as a "nuclear security" organization that addresses a broad range of nuclear security items (the stockpile, nuclear non-proliferation, nuclear counter-terrorism, incident response, emergency management, etc.).
[4] As defined in section 11 of the *Atomic Energy Act of 1954*, the term SNM means: (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Nuclear Regulatory Commission determines to be SNM, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material.



Source DOE 2001a.

Figure S.1-1. Location of Oak Ridge Reservation, Principal Facilities, and Surrounding Area.

S.1.1 Background

In the mid-1990s, DOE prepared several Programmatic EISs (PEISs) to inform decisionmakers and the public on the potential environmental impacts of alternatives for carrying out its national security missions. DOE then made a number of decisions related to the nuclear security enterprise operations at Y-12 and the long term storage and disposition of fissile material.[5] Specifically, DOE decided that the mission of Y-12 would not change, and Y-12 would continue to maintain the capability and capacity to fabricate nuclear weapons secondaries, cases, and limited-life components in support of the nuclear weapons stockpile, and store/process non-surplus, highly enriched uranium (HEU) long term and surplus HEU pending disposition. (See Section 1.7.1 for a discussion of these previous PEISs.)

Following the PEIS decisions, DOE/NNSA prepared the 2001 Y-12 SWEIS (DOE/EIS-0309) to evaluate alternatives for implementing the PEIS decisions (DOE 2001a). The Final Y-12 SWEIS, issued in September 2001, evaluated alternatives related to the operation of Y-12 for an approximate 10-year planning period. One of the primary goals of the 2001 Y-12 SWEIS was to provide an overall *National Environmental Policy Act* (NEPA) baseline for all DOE activities at Y-12, including an assessment of a Y-12 Modernization Program consistent with previous programmatic decisions. The purpose of the Modernization Program (see Section S.1.2) is to develop and implement a program to modernize Y-12's facilities to meet future stockpile needs.

In the 2001 Y-12 SWEIS, NNSA recognized and acknowledged that the Modernization Program would be implemented over a number of years so as to not interfere with Y-12 meeting required and planned mission activities. Although many potential modernization projects were identified in the 2001 Y-12 SWEIS, only two projects had reached the stage of development to have been included as proposals in that SWEIS. Alternatives for those two projects, the Highly Enriched Uranium Materials Facility (HEUMF) and the Special Materials Complex (SMC), were analyzed in the 2001 Y-12 SWEIS.

In the 2002 Record of Decision (ROD) for the 2001 Y-12 SWEIS (67 *Federal Register* [FR] 11296, March 13, 2002), NNSA announced its decision to continue operations at Y-12 and to construct and operate two new facilities: (1) the HEUMF and (2) the SMC. Construction of the HEUMF was completed in 2008 and the facility is scheduled to begin full-scale operations in 2010. In addition to being a significant contribution to modernization at Y-12, the 110,000 square-foot HEUMF will reduce the current storage footprint (by phasing out excess facilities), while improving security and lowering costs. The SMC was subsequently cancelled due to changing mission requirements and replaced by a smaller, single-function Purification Facility (*Supplement Analysis for Purification Facility, Site-Wide Environmental Impact Statement for the Y-12 National Security Complex*, DOE/EIS-0309/SA-1, August 2002 [NNSA 2002]), and the installation of new equipment in existing facilities.

Most recently, NNSA prepared the *Complex Transformation Supplemental PEIS* (SPEIS) (DOE/EIS-0236-S4) (NNSA 2008) to analyze potential environmental impacts of alternatives for transforming the nuclear weapons complex into a smaller, more efficient enterprise. (See Section 1.7.1 for a more detailed discussion of that SPEIS and its relevance to this Y-12

[5] Fissile materials are plutonium-239, uranium-233, uranium 235, or any material containing any of the foregoing.

SWEIS.) In the ROD for that SPEIS, NNSA affirmed that manufacturing and research and development (R&D) involving uranium will remain at Y-12 (73 FR 77644, December 19, 2008). NNSA also announced that it will construct and operate a Uranium Processing Facility (UPF) at Y-12 as a replacement for existing facilities that are more than 50 years old and face significant safety and maintenance challenges to their continued operation. The NNSA committed to evaluating the site-specific issues associated with continued production operations at Y-12 in this SWEIS, including issues related to construction and operation of a UPF, such as its location[6] and size. In this new Y-12 SWEIS, NNSA continues to assess alternatives for the modernization of Y-12, including implementation of the Complex Transformation SPEIS decisions.

S.1.2 Y-12 Today and the Vision for Tomorrow

Over the past approximate 15 years, Y-12 has been taking the first steps to modernize and transform its Cold War-era site and facilities into a modern, more cost-effective enterprise. Modernization and transformation envisions the eventual replacement or upgrade of select major production and support facilities with the goal to improve Y-12 capabilities by:

- Improving worker protection through the use of engineered controls;
- Improving safety, environmental, and security compliance through the use of modern facilities and advanced technologies;
- Supporting responsiveness to the science-based Stockpile Stewardship Program through increased flexibility and use of advanced technologies;
- Reducing costs and improving operating efficiencies.

To date, the following important actions have been completed:

- Construction of the HEUMF, Y-12's first major enriched uranium (EU) modernization project, was completed in 2008 and the facility is expected to begin full operations in 2010.
- Construction of two new technical/administrative facilities was completed in 2007. The Jack Case Center and the New Hope Center now house over 1,400 employees from Babcock & Wilcox Technical Services Y-12, LLC (B&W Y-12), the Management and Operating contractor for Y-12, and the NNSA Y-12 Site Office. Construction of these facilities facilitated the demolition of a number of excess facilities and the cancellation of several off-site leases.
- Approximately 135,469 square feet of excess floor space was demolished in 2008. Since 2002, Y-12's total footprint reduction is 1,035,076 square feet (NNSA 2008a).

Currently, the Y-12 workforce consists of approximately 6,500 people (DOE employees and multiple contractors and subcontractors) operating approximately 393 facilities with approximately 5.8 million square feet of NNSA-owned space and leased space. This represents

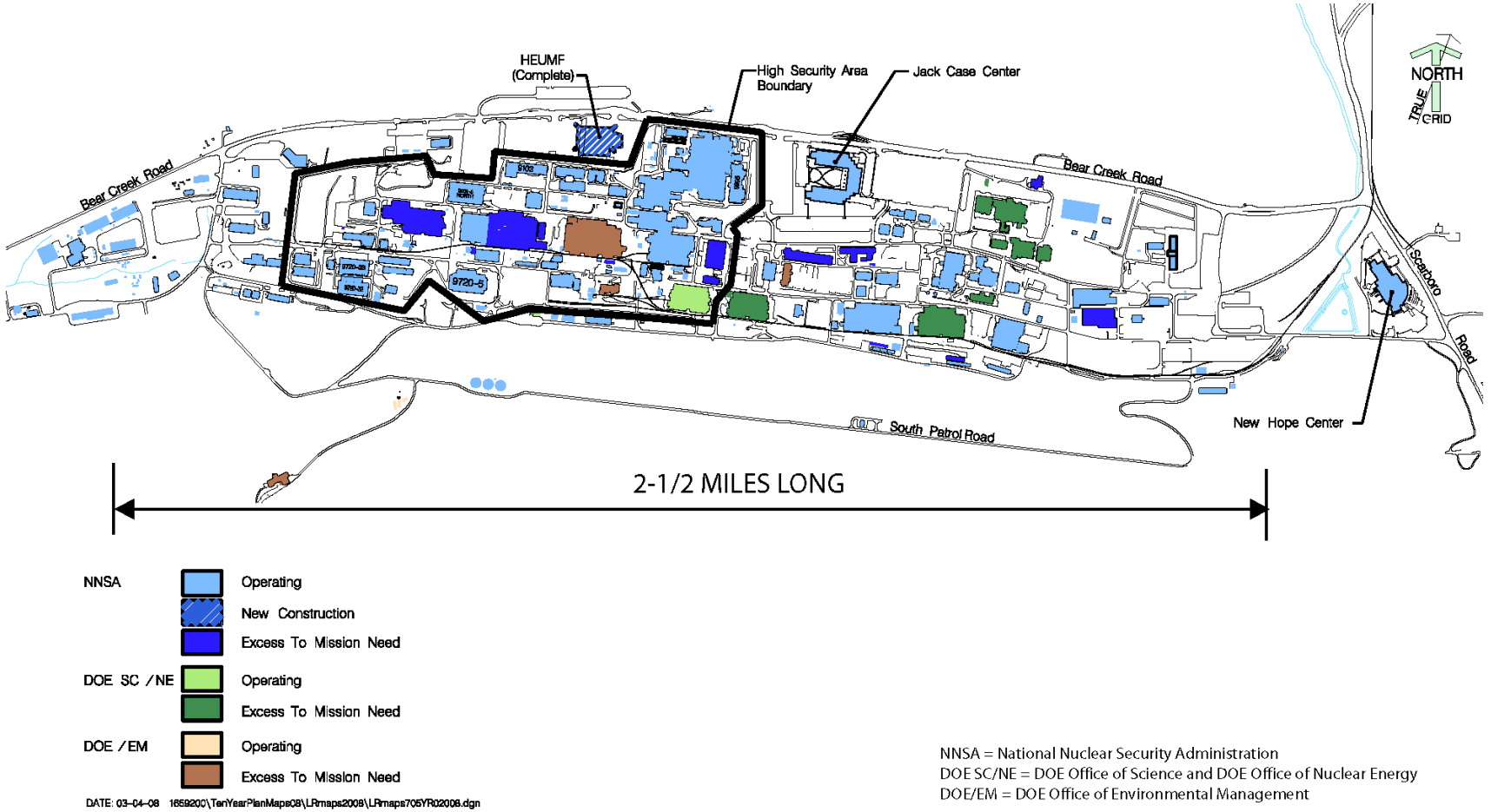
[6] As described in Section S.3.1.2.1 and shown in Figure S.3.1.2-2, the proposed UPF would be located adjacent to the HEUMF, at a site just west of the HEUMF. In the 2001 Y-12 SWEIS, DOE evaluated alternative locations for the HEUMF, and in the ROD DOE decided to construct the HEUMF at the Y-12 West Portal Parking Lot Site (67 FR 11296, March 13, 2002). Construction of the HEUMF was initiated in 2005 and completed in 2008. The facility is scheduled to start full-scale operations in 2010. Locating a UPF adjacent to the HEUMF is consistent with the analysis performed in support of the 2001 Y-12 SWEIS, the Complex Transformation SPEIS, RODs based on these documents, and the Y-12 Modernization Plan. Siting a UPF at a location other than adjacent to the HEUMF would not allow for certain operational efficiencies and reduced security footprint.

75 percent of the total Y-12 site footprint (NNSA 2008a). The DOE Office of Environmental Management, Office of Science, and Office of Nuclear Energy operate the remaining facilities at Y-12. Figure S.1.2-1 depicts the major operational facilities currently supporting the Y-12 missions, which are described in Chapter 2. As shown in that figure, there are numerous facilities located within an approximate 150-acre, high-security area.

While important modernization and transformation have already been accomplished, the overall vision will continue to be a work in progress. The NNSA has developed a long-range plan, which is updated annually, that reflects the Y-12 modernization plans. The current plan, dated August 2008, is referred to as the Ten- Year Site Plan (TYSP) for 2009-2018 (NNSA 2008a). The TYSP describes the missions, workload, technology, workforce, and corresponding facilities and infrastructure investment and management practices for Y-12. The TYSP also includes a long term vision of the infrastructure changes that NNSA wants to achieve at Y-12 over the next 20 years (see Figure S.1.2-2). That vision presents a layout of the major operational facilities that would be required to support future national security missions at Y-12. To fully appreciate the final end-state envisioned, comparing Figure S.1.2-1 against Figure S.1.2-2 provides a view of the amount of consolidation and elimination of excess facilities envisioned. As can be seen, Y-12 would look significantly different beyond the 2020s than it looks today. By then, Y-12 would have significantly fewer facilities and floorspace, and significantly more open space.

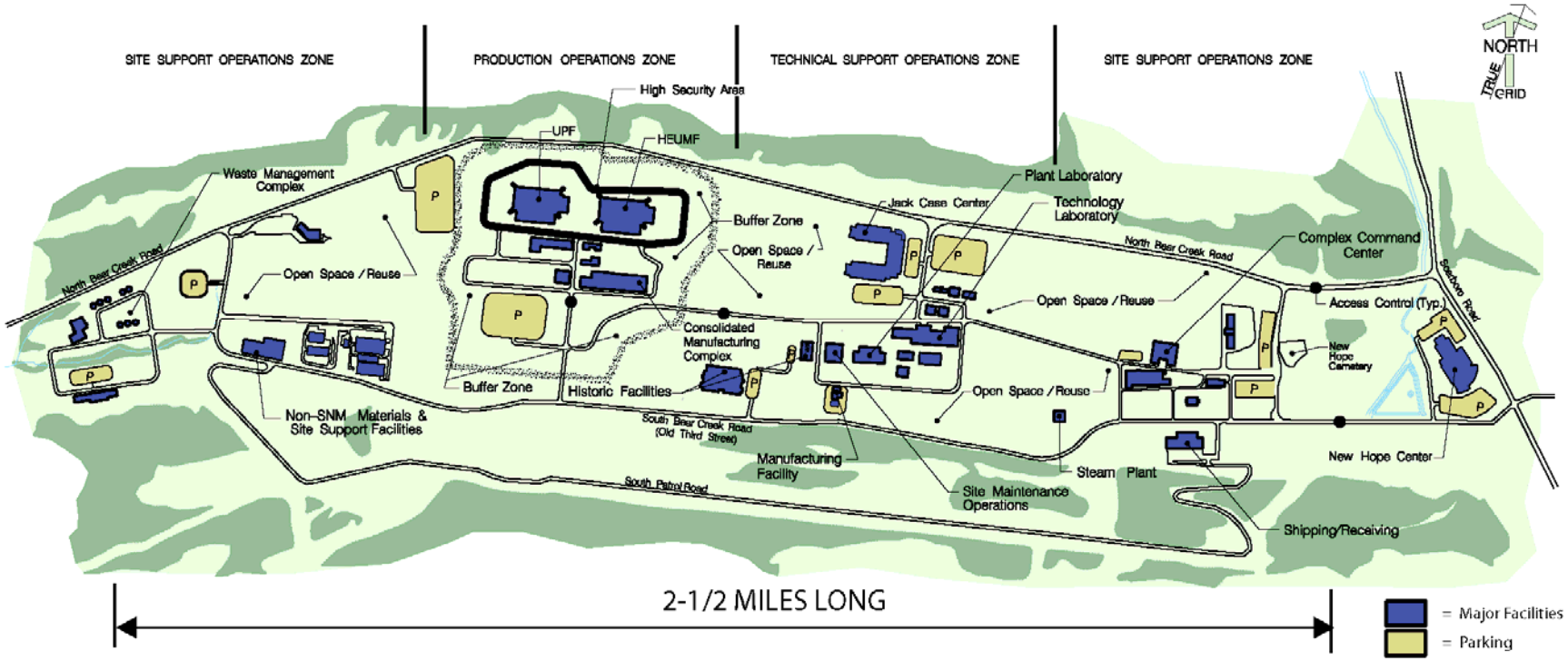
From a land-use planning perspective, NNSA envisions a site that would ultimately consist of three functional zones (Production Operations, Technical Support Operations, and Site Support Operations) with significant areas of open space. The three zones are described below. The overall configuration is indicative of a modernization-in-place, or brownfield, approach to redevelopment. The approach must incorporate realistic funding for new facilities and for the decontamination and decommissioning (D&D) of excess facilities that render areas of the plant usable for redevelopment within the zones while at the same time continuing to operate the existing plant. For these reasons, while the facility footprint of Y-12 would decline, the land area requirement would likely remain in support of safeguards and security requirements (NNSA 2008a).

The vision has incorporated the disposition of all buildings that would no longer be required to support the Y-12 missions. The total site footprint is envisioned to be around 3,000,000 square feet. While the locations of some buildings are shown on Figure S.1.2-2, it should be noted that some future facilities would be subject to change as more detailed master planning matures over time.



Source: NNSA 2008a.

Figure S.1.2-1. Major Operational Facilities Currently Supporting Y-12 Missions.



Source: NNSA 2008a.

Figure S.1.2-2. The Proposed End State for the Modernization of Y-12

Production Operations. This zone would be dominated by the consolidation of all EU operations into HEUMF (now constructed) and the UPF (currently in preliminary design, and analyzed in this SWEIS for siting, construction, and operation). By consolidating all EU into these two facilities, the high security area that now consists of approximately 150 acres could ultimately be reduced to about 15 acres—significantly reducing security costs. With the use of advanced security surveillance systems and a smaller security area, the EU protective force will be reduced by 40 to 60 percent. The first phase of this consolidation is under way with the completion of the HEUMF construction. The second facility, UPF, is in the preliminary design stage. UPF is planned for completion in 2016 and for operation in 2018. The production operations zone would also include a facility to consolidate lithium, depleted uranium (DU), special materials, and general manufacturing operations. Currently, these operations are dispersed in several Manhattan Project–era and/or pre-1960 facilities. While some facility upgrades, minor consolidations, and maintenance of these facilities would continue in the short term, NNSA envisions that a small complex, or possibly a Consolidated Manufacturing Complex (CMC), could be designed and engineered to consolidate these various operations.

Technical Support Operations. This zone is dominated by the Jack Case Center (completed in 2007) and several other existing structures. Today, this zone has over 20 major facilities, many of which are Manhattan Project–era structures not designed for their current use as office buildings. Transformation envisions a zone that will contain the Jack Case Center and retain several of the more permanently constructed buildings such as 9106, 9109, 9115, 9116, 9710-3, and 9733-5. The Jack Case Center, a leased facility, houses over 1000 people. Ongoing site planning activities are evaluating additional facilities in this zone, possibly through private sector investment. These include an R&D Center, Plant Laboratory, Maintenance facility, and warehousing.

Site Support Operations. These zones, located in the eastern and western portions of the existing Y-12 site, will contain various site support functions such as materials management, vehicle maintenance, fire station, and emergency management operations. Also included in this area of the complex is New Hope Center, completed in 2007. This facility contains functions that do not require a higher security level, such as information technology, the Y-12 visitor center, conference and training facilities, light laboratories, and offices. A new Steam Plant, funded by the Facilities and Infrastructure Recapitalization Program (FIRP) is under construction in this area and is expected to be completed in September 2010. Another FIRP-funded project, the Potable Water System Upgrades project, which is currently under construction and is expected to be completed in early 2010, will also make improvements in this area. The western site support operations zone also houses several onsite waste management facilities, including the West End Treatment Facility, tank farms, and tanker terminal. This land would continue to be used to support Y-12 operations and cleanup actions.

Open Space Reuse. As implied by the site vision, there will be a significant amount of real estate that can generally be described as open space. The space is generated as a result of legacy facility and material disposition and site cleanup over time. This land area will provide, as some of it does today, potential reuse or reindustrialization opportunities to support future programs.

Approximately 3.1 million square feet of facilities would be eliminated if the end-state is achieved. Overall, NNSA has established the following site-specific goals for Y-12:

- 90 percent reduction in the high security area;
- 60 percent reduction in the nuclear operations footprint;
- 50 percent reduction in the total building footprint (an approximate 3.1 million square foot reduction); and
- 20–30 percent reduction in the Defense Programs staff (NNSA 2008a).

Because of the long term nature of modernization and transformation, not all of the facilities/actions envisioned in the TYSP are analyzed within the alternatives considered in this SWEIS because not all of the facilities/actions are ripe for analysis. Some of these buildings are concept facilities with no established funding. Such potential future projects are described in Section 3.3 (Potential Future Y-12 Modernization Projects), based on current information. These future projects are also considered in the cumulative impacts chapter of this SWEIS (see Chapter 6). Further NEPA review would be required when these facilities are formally proposed and ripe for decision.

Additionally, some actions envisioned by the TYSP are not analyzed as proposals in this SWEIS because they are either addressed by other regulatory actions or have been analyzed in other NEPA documents. The Integrated Facilities Disposition Project (IFDP) is one such example. The IFDP is a strategic project for disposing of legacy materials and facilities at ORNL and Y-12 using an integrated approach that results in risk reduction, eliminates $70 to $90 million per year in cost of operations, provides surveillance and maintenance of excess facilities, and management of other legacy conditions. The IFDP includes both existing excess facilities and newly identified excess (or soon to be excess) facilities. Under the IFDP, the D&D of approximately 188 facilities at ORNL, 112 facilities at Y-12, and remediation of soil and groundwater contamination would occur over the next 30 to 40 years. The IFDP will be conducted as a remedial action under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA). Cleanup and D&D activities conducted under CERCLA are reviewed through the CERCLA process. Section S.1.4 discusses the scope of this SWEIS and the alternatives addressed.

S.1.3 Purpose and Need

Purpose and Need

The purpose and need for NNSA action is to support the Stockpile Stewardship Program and to meet the missions assigned to Y-12 in the Complex Transformation SPEIS ROD efficiently and safely.

The continued operation of Y-12 is critical to NNSA's **Stockpile Stewardship Program** and to preventing the spread and use of nuclear weapons worldwide. Y-12 is unique in that it is the only source of secondaries, cases, and other weapons components within the NNSA nuclear security enterprise. Y-12 also dismantles weapons components, safely and securely stores and manages SNM, supplies SNM for use in naval and research reactors, and dispositions surplus materials. Y-12's nuclear nonproliferation programs play a critical role in securing our Nation and the globe and in combating the spread of weapons of mass destruction. As explained in Section 1.5

of the SWEIS, the Y-12 missions are consistent with, and supportive of, national security policies and international treaties.

Stockpile Stewardship Program

The Stockpile Stewardship Program is designed to ensure the safety and reliability of the U.S. nuclear weapons stockpile without underground testing by using the appropriate balance of surveillance, experiments, and simulations.

Continued operation of Y-12 is made more difficult by the fact that most of the facilities at Y-12 are old, oversized, and inefficient. For example, more than 70 percent of all the floor space at Y-12 was constructed prior to 1950 as part of the Manhattan Project. Further, the total operating space estimated to perform the future NNSA missions and functions at Y-12 is significantly less than the current operating space. NNSA estimates that the future NNSA footprint should be approximately 2.2 million square feet of space versus the 5.3 million square feet today.[7] These old and oversized facilities are costly to maintain and have no inherent value for future missions. Continued long-range reliance on World War II-era facilities designed for enrichment, and on support facilities built to be temporary in some cases, would not meet NNSA's responsive infrastructure objectives, would not provide the level of security and safeguards required for the future, and would become more and more costly to operate. Over time, nearly all of Y-12 facilities would need to be replaced with structures designed for their intended use. Modernizing this old, over-sized, and inefficient infrastructure is a key strategic goal of Y-12 and is consistent with NNSA strategic planning initiatives and prior programmatic NEPA documents (NNSA 2007, NNSA 2008, NNSA 2008a).

Perimeter Intrusion Detection and Assessment System (PIDAS)

A PIDAS is a combination of barriers, clear zones, lighting, and electronic intrusion detection, assessment, and access control systems constituting the perimeter of the Protected Area and designed to detect, impede, control, or deny access to the Protected Area.

The existing EU operations require significant funding to address security, facility, and process equipment aging and other infrastructure issues. For example, existing EU operations are decentralized in several buildings that are not connected and require many inefficient transports of SNM. The resulting protected area within the **Perimeter Intrusion Detection and Assessment System (PIDAS)** is large, and operating costs are not optimized. Over time, an elaborate system of administrative controls has been put in place to adequately manage environmental compliance, worker safety, criticality safety, fire protection, and security. The maintenance of these administrative controls requires an increasingly large number of personnel to ensure compliance and operations. In addition, maintaining an effective safeguards and security posture for materials and processes in this patchwork of facilities is increasingly costly during a time when security threats are increasing (B&W 2004a).

The current SNM facilities at Y-12 have physical protection challenges with the amount and nature of material and the number and location of storage and operations areas. In addition, the physical infrastructure is a sprawling urban environment with many facilities located at less than the optimal distance to employee access roads. With SNM facilities dispersed within the site, the

[7] The 5.3 million square feet figure does not include approximately 550,000 square feet associated with the Jack Case and New Hope Centers which were completed in July 2007 and are leased by Babcock & Wilcox Technical Services Y-12, LLC (B&W).

existing Protected Area is large and needlessly encompasses most non-SNM production operations. With the new **graded security posture**, existing SNM facilities are very labor intensive to secure (B&W 2005b).

Graded Security Posture

The elements of a threat postulated for the purpose of establishing requirements for safeguards and security programs, systems, components, equipment, and information.

In this SWEIS, NNSA is considering alternatives that would support decisions regarding the modernization of Y-12. The goals and objectives of modernizing Y-12 are to accomplish the following:

- Improve the level of security and safeguards;
- Replace/upgrade end-of-life facilities and ensure a reliable EU processing capability to meet the mission of NNSA;
- Improve efficiency of operations and reduce operating costs by consolidating and modernizing equipment and operation;
- Reduce the size of the Protected Area by 90 percent and reduce the operational cost necessary to meet the security requirements;
- Improve worker protection with an emphasis on incorporating engineered controls; and
- Comply with modern building codes and environment, safety, and health standards (B&W 2004a).

S.1.4 Scope of this Y-12 SWEIS and Alternatives

This Y-12 SWEIS (DOE/EIS-0387) expands on and updates the analyses in the 2001 Y-12 SWEIS (DOE/EIS-0309)(DOE 2001a), and includes alternatives for proposed new actions and changes since the 2002 Y-12 SWEIS ROD (see Section S.3 for a more detailed discussion of these alternatives). The No Action Alternative for this SWEIS is the continued implementation of the 2002 ROD, as modified by decisions made following analysis in subsequent NEPA reviews.

Four action alternatives are considered in this SWEIS in addition to the No Action Alternative (Alternative 1). The four alternatives differ in that: Alternative 2 involves a new, fully modernized manufacturing facility (a UPF) optimized for safety, security and efficiency; Alternative 3 involves upgrading the existing facilities to attain the highest level of safety, security, and efficiency possible without constructing new facilities; and Alternatives 4 and 5 involve a reduction in the production capacity of Y-12 to support smaller stockpile requirements. A brief description of the alternatives follows. A more detailed description is contained in S.3.1.

S.1.4.1 *Alternative 1 – No Action Alternative*

The No Action Alternative reflects the current nuclear weapons program missions at Y-12 and includes the manufacture and assembly/disassembly of weapons components, the continued processing and storage of enriched uranium materials, the operation of the HEUMF and Purification Facility, disposition of excess materials, and Infrastructure Reduction, which will remove excess buildings and infrastructure. Construction of a UPF is not part of the No Action Alternative. The No Action Alternative would be capable of supporting a baseline throughput of

approximately 125 secondaries and cases per year. As part of the No Action Alternative, other construction projects are also underway or planned for the future. Some are refurbishments or upgrades to plant systems, such as those for potable water, which have been analyzed in separate NEPA documentation. Section 1.7.2 of the SWEIS identifies and describes these projects in more detail.

S.1.4.2 *Alternative 2 – New Uranium Processing Facility Alternative*

Under this alternative, NNSA would implement all actions in the No Action Alternative, and construct and operate a modern **UPF** (Section S.1.4.2.1) and a new Complex Command Center (CCC) (Section S.1.4.2.2).

UPF Project

The UPF would improve security and safety, reduce costs, and ensure that Y-12 maintains the capability to meet national security requirements for the foreseeable future.

S.1.4.2.1 Uranium Processing Facility

The UPF would consolidate EU operations into an integrated manufacturing operation sized to satisfy programmatic needs. The UPF is proposed to be sited adjacent to the HEUMF to allow the two facilities to function as one integrated operation. Transition of EU production operations to the UPF (Alternative 2) and transition of EU storage operations into HEUMF (No Action Alternative) would enable the creation of a new high-security area 90 percent smaller than the current high security protected area. Operations to be consolidated in the UPF are currently located in multiple facilities. After startup of UPF operations some of these facilities could be used to consolidate non-EU operations already existing in those facilities and others would undergo D&D. This alternative is referred to as the "UPF Alternative" throughout this SWEIS. The UPF Alternative would be capable of supporting a baseline throughput of approximately 125 secondaries and cases per year.

The UPF Alternative, which would involve a major capital investment, has been developed to continue with modernization efforts to correct the deficiencies described in Section S.1.3. For example, the UPF, if constructed, would consolidate current and future EU operations in approximately 388,000 square feet of floor space and free up approximately 633,000 square feet of space for eventual D&D. The consolidation of all **Category I and II (Cat I/II) SNM** into two facilities (the proposed UPF and the recently constructed HEUMF) would significantly improve physical protection and effectively meet the new graded security posture; optimize material accountability; enhance worker, public, and environmental safety; and consolidate operations to greatly reduce operational costs (B&W 2004a).

Categories of SNM

A designation determined by the quantity and type of SNM. NNSA uses a cost-effective, graded approach to providing SNM safeguards and security. SNM is categorized into security Categories I, II, III, and IV, with Categories I and II requiring the highest safeguards and security.

If a UPF is constructed, the existing non-nuclear processing facilities supporting a UPF would not be upgraded; instead, NNSA would pursue modernization of these facilities in the future if a CMC reaches a stage of development that is ripe for decisionmaking.

S.1.4.2.2 Complex Command Center

The CCC is proposed under all action alternatives (Alternatives 2-5). The CCC would comprise a new Emergency Services Complex for Y-12. The new facility would house equipment and personnel for the plant shift superintendent, Fire Department, and Emergency Operations Center (EOC). Approximately 50,000 square feet of enclosed facility space would be required to accommodate operational needs. The facility would include office space for 60 Fire Department personnel, 120 EOC personnel, and up to 12 plant shift superintendent personnel; 15,000 square feet of pull through garage space; redundant emergency power supply connections and/or supplemental dedicated emergency generators; records storage and processing areas; modern training and conference facilities; shower and changing facilities; specialized equipment storage; food service areas; janitorial closets; separate mechanical and electrical equipment rooms; and telecommunication rooms.

S.1.4.3 *Alternative 3 – Upgrade in-Place Alternative*

Under this alternative, NNSA would continue the No Action Alternative and upgrade the existing EU and nonnuclear processing facilities to contemporary environmental, safety, and security standards to the extent possible within the limitations of the existing structures and without prolonged interruptions of manufacturing operations. Under this alternative, there would be no UPF and parts of the current high-security area would not be downsized. Although existing production facilities would be modernized, it would not be possible to attain the combined level of safety, security and efficiency made possible by the UPF Alternative. The CCC, described above, would also be proposed under this alternative. This alternative is referred to as the "Upgrade in-Place Alternative" throughout this SWEIS. The Upgrade in-Place Alternative would be capable of supporting a baseline throughput of approximately 125 secondaries and cases per year.

Although an upgrade of existing facilities was not selected in the Complex Transformation SPEIS ROD, the Upgrade in-Place Alternative is included as a reasonable alternative because it would correct some of the facility deficiencies associated with the existing EU and nonnuclear processing facilities, and could potentially require smaller upfront capital expenditures than the UPF.

S.1.4.4 *Alternative 4 – Capability-sized UPF Alternative*

Although the size of the stockpile beyond 2012 is not known, the trend suggests a significantly smaller one. Consistent with this trend, NNSA developed Alternatives 4 and 5 to analyze the potential environmental impacts associated with a Complex that would support stockpiles smaller than those currently planned. NNSA has assumed that such a stockpile would be approximately 1,000 operationally deployed strategic nuclear warheads. This assumption is consistent with the Complex Transformation SPEIS Capability-Based Alternative (NNSA 2008). In addition, analysis of this alternative enhanced NNSA's understanding of the infrastructure that might be appropriate if the U.S. continues to reduce stockpile levels.

Under Alternative 4, NNSA would maintain a basic manufacturing capability to conduct surveillance and produce and dismantle secondaries and cases. To support this alternative, NNSA would build a smaller UPF (350,000 square feet) at Y-12 compared to the UPF described under Alternative 2 (388,000 square feet). A smaller UPF would maintain all capabilities for fabricating secondaries and cases, and capabilities for planned dismantlement, surveillance and uranium work for other NNSA and non-NNSA customers. This UPF would have a baseline throughput of approximately 50 to 80 secondaries and cases per year (compared to 125 secondaries and cases per year for the UPF Alternative). The CCC, described in Section S.1.4.2.2, would also be proposed under this alternative. This alternative also includes continued operations related to other National Security Programs, such as Nonproliferation, Global Threat Reduction Initiatives, and support to Naval Reactors (see Chapter 2). Additionally, there are many non-NNSA programs at Y-12 that would also continue under this alternative. Chapter 2 describes these programs.

S.1.4.5 *Alternative 5 – No Net Production/Capability-sized UPF Alternative*

Similar to Alternative 4, under a No Net Production/Capability-sized UPF Alternative, NNSA would maintain the capability to conduct surveillance and produce and dismantle secondaries and cases. NNSA would reduce the operational throughput of facilities to approximately 10 secondaries and cases per year, which would support surveillance operations and a limited Life Extension Program (LEP)[8] workload; however, this alternative would not support adding new types or increased numbers of secondaries to the stockpile. This alternative would involve an even further reduction of production throughput at Y-12 compared to Alternative 4. To support this alternative, NNSA would build a smaller UPF (approximately 350,000 square feet) compared to the UPF described under Alternative 2 (388,000 square feet). The CCC, described in Section S.1.4.2.2, would also be proposed under this alternative.

For either Alternative 4 or Alternative 5, although many of the current facilities at Y-12 would be operated at a reduced throughput, NNSA would need to maintain them in a "ready-to-use" state in the event changes were directed by the President. This means unused capacity would be exercised periodically and standard preventative maintenance and minimal corrective maintenance would be performed on all equipment that could be required for future needs. The related effects on other plant operations of this alternative would include a reduction in utility usage and waste generation, a reduction in staffing, and a steady security posture. Section S.1.4.6 provides a summary of the differences among the UPF capacity alternatives.

S.1.4.6 *Capacity Alternatives for the Uranium Processing Facility*

This SWEIS assesses three alternative sizes for the UPF:

- A nominal-sized UPF, described under Alternative 2, with a capacity of approximately 125 secondaries and cases per year. This alternative is described in Section S.3.1.2;

[8] An LEP is a systematic approach that consists of a coordinated effort by the design laboratories and production facilities to: 1) determine which components will need refurbishing to extend each weapon's life; 2) design and produce the necessary refurbished components; 3) install the components in the weapons; and 4) certify that the changes do not adversely affect the safety and reliability of the weapon.

- A capability-sized UPF, described under Alternative 4, that would maintain a basic manufacturing capability with a throughput of approximately 50 to 80 secondaries and cases per year. This alternative is described in Section S.3.1.4.
- A no net production/capability-sized UPF, described under Alternative 5, that would maintain a basic manufacturing throughput with a baseline capacity of approximately 10 secondaries and cases per year. This throughput could support surveillance operation and a limited LEP workload. This alternative is described in Section S.3.1.5.

From a square footage standpoint, any "capability"-sized UPF requires a "minimum" of 350,000 square feet to accommodate production equipment/glove boxes. Section S.3.1.6 provides more information regarding the differences among the UPF throughputs assessed in this SWEIS.

S.1.5 National Security Considerations

There are two principal national security policy overlays and related treaties that are potentially relevant to this SWEIS: (1) Nonproliferation and Treaty Compliance (Section S.1.5.1); and the (2) Nuclear Posture Review (Section S.1.5.2). Each of these is discussed below.

S.1.5.1 *Nonproliferation and Treaty Compliance*

NNSA's overarching mission is to contribute to U.S. security by providing the Nation with a safe and reliable nuclear weapons stockpile through the Stockpile Stewardship Program. NNSA intends to do this fully consistent with current treaty obligations. This mission requires NNSA to assess and certify the stockpile regardless of size, including replacements and repairs. The Stockpile Stewardship Program is fully consistent with and supports the U.S. commitment to the Nuclear Nonproliferation Treaty (NPT) and enables the U.S. to continue its 1992 moratorium on underground nuclear testing. Another benefit of the Stockpile Stewardship Program is that preventing the loss of credibility in the U.S. nuclear stockpile avoids creating an incentive within non-weapon states, whose security relies on the U.S. nuclear deterrent, to develop their own nuclear weapons (DOE 1996a).

Article VI of the NPT obligates the parties "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control" (NPT 1970). The NPT does not identify a specific date for achieving nuclear disarmament. U.S. compliance with its commitment under Article VI, however, has been outstanding. In 1995, when the NPT was indefinitely extended, the U.S. reiterated its commitment under Article VI to work toward the ultimate goal of eliminating nuclear weapons, and to general and complete disarmament (DOE 1996a). Over the past 20 years, significant progress has been made in fulfilling this commitment. The U.S. has been reducing its nuclear forces and nuclear weapons stockpile in a consistent fashion through both unilateral and bilateral initiatives, and working cooperatively with allies and partners to further reduce nuclear threats, as evidenced by the following examples:

- The 2001 Nuclear Posture Review articulated a reduced reliance on nuclear forces in achieving U.S. national security objectives;

- The *Moscow Treaty*, which entered into force in 2003, commits the U.S. and Russia to deep reductions (i.e., to a level of 1,675 operationally deployed strategic nuclear warheads by 2012). As of May 2009, the United States had cut its number of operationally deployed strategic nuclear warheads to 2,126, which meets the limits set by the Treaty for 2012;
- Under the *Strategic Arms Reduction Talks* (START) *Treaty* and the *Moscow Treaty*, the U.S. will have decommissioned, over the period of two decades, more than three-quarters of its strategic nuclear warheads attributed to its delivery vehicles;
- On December 18, 2007, the White House announced the President's decision to reduce the nuclear weapons stockpile by another 15 percent by 2012. This means the U.S. nuclear stockpile will be less than one-quarter its size at the end of the Cold War—the smallest stockpile in more than 50 years (D'Agostino 2008);
- On April 1, Presidents Obama and Medvedev agreed in London that American and Russian negotiators would begin work on a new, comprehensive, legally binding agreement on reducing and limiting strategic offensive arms to replace the START, which expires on December 5, 2009;
- On July 6, Presidents Obama and Medvedev signed a Joint Understanding to guide the remainder of the negotiations. The Joint Understanding commits the United States and Russia to reduce their strategic warheads to a range of 1500-1675, and their strategic delivery vehicles to a range of 500-1100. Under the expiring START and the Moscow Treaties the maximum allowable levels of warheads is 2200 and the maximum allowable level of launch vehicles is 1600 (White House 2009).

The nonproliferation and treaty compliance aspects of the Stockpile Stewardship Program were evaluated in Chapter 2 of the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236) (DOE 1996a). The SSM PEIS analyzed the nonproliferation aspects of the Stockpile Stewardship Program and concluded that implementation of the Stockpile Stewardship Program is fully consistent with the NPT while maintaining nuclear weapons competencies and capabilities (DOE 1996a). This evaluation included the operation of Y-12 and its responsibilities under the Stockpile Stewardship Program. These conclusions remain valid whether or not Y-12 modernization continues.

S.1.5.2 *Stockpile Stewardship Program*

In 2001, Congress directed the Department of Defense (DoD) to conduct a comprehensive Nuclear Posture Review to lay out the direction for the U.S. nuclear forces over the next 5 to 10 years. The centerpiece of the Nuclear Posture Review is the new triad, with flexible response capabilities (see Figure S.1.5.2-1). The new triad is composed of the three elements: (1) nuclear and non-nuclear offensive strike systems; (2) active and passive defenses; and (3) a revitalized defense infrastructure that will provide capabilities in a timely fashion to meet emerging threats.

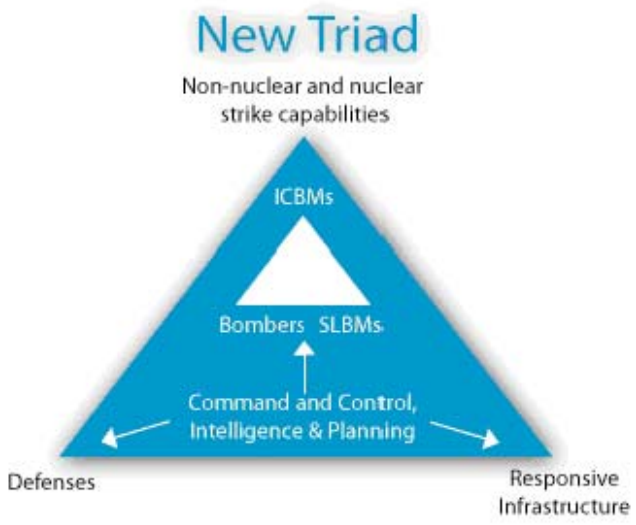


Figure S.1.5.2-1. The New Triad.

Of particular interest to DOE and NNSA is the third element of the new triad, which reflects a broad recognition of the importance of a robust and responsive nuclear weapons infrastructure in sustaining deterrence. In this respect, the Nuclear Posture Review notes that the flexibility to sustain the U.S. nuclear weapons stockpile depends on a robust stockpile stewardship program. The purpose of the stockpile stewardship program is to ensure that our nuclear weapons continue to serve their essential deterrence role by maintaining and enhancing the safety, security, and reliability of the U.S. nuclear weapons stockpile. In its Strategic Plan (NNSA 2004a), NNSA identifies several goals to achieve its missions in support of the Nuclear Posture Review. Achieving these goals requires the continued operation of a facility such as Y-12 to accomplish the following missions:

- Modification, repair, or replacement of uranium, lithium, and other components and radiation cases;
- Production of hardware to support design laboratory tests required for stockpile certification;
- Surveillance of weapons through disassembly, inspection, and electronic documentation of findings;
- Dismantlement, storage, and disposition of nuclear weapon materials and components returned from the stockpile;
- Management and secure storage of nuclear materials and other strategic assets designated for national security purposes and/or pending disposition;
- Supply of SNM for use in naval reactors;
- Processing of weapon materials—including chemical recovery, purification, and conversion to a form suitable for safe, secure, long term storage, disposition, and future use; and
- Management, technical, and applied technology expertise in support of nonproliferation, Homeland Security, and other programs of national importance (NNSA 2007).

While the long term exact size and configuration of the stockpile cannot be predicted with certainty, it is likely that nuclear weapons will continue to provide an element of our national security resources as long as other nations possess nuclear weapons that pose a threat to our national security.

S.1.5.3 *Potential Changes in National Security Requirements*

There are currently underway two important nuclear strategy reviews that will help inform Congress and the Administration on a path forward that clearly defines the future direction and role of nuclear weapons as an element of our national security resources: (1) a Bipartisan Congressional Commission on the United States Strategic Posture and (2) a new nuclear posture review. These two reviews are discussed below.

Congress, in 2008, established the Bipartisan Congressional Commission on the United States Strategic Posture to identify the basic principles for reestablishing a national consensus on strategic policy. The Commission is examining the role of deterrence in the 21st century, assessing the role of nuclear weapons in the U.S. national security strategy, and making recommendations as to the most appropriate strategic posture for the U.S. On May 6, 2009, an advance copy of the Commission's report was published (see "America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States," available at http://media.usip.org/reports/strat_posture_report.pdf). With respect to Complex Transformation, the Commission stated that, "The NNSA's plan has merit and should be seriously considered by the Congress." With respect to the state of existing facilities, the Commission stated that, "Existing facilities are genuinely decrepit and are maintained in a safe and secure manner only at high cost." Specific to the existing uranium facility at Y-12, the report further stated that, "The current facility was constructed as part of the Manhattan Project in World War II and the many problems and high cost of keeping it running are a testimonial to the failure over the years to make needed investments in the production complex." The report also offered the following suggestion: "If priority must be given, the Los Alamos plutonium facility should receive it. A delay in construction of the Y-12 uranium processing facility may also allow some redesign to tailor the plan to new arms control agreements and their implications for long term stockpile requirements. The time might also be used to find ways to minimize the facility's size and cost, and to learn more about secondary reuse." This SWEIS considers alternatives such as a smaller UPF that are consistent with the Committee's recommendations.

Congress, also in 2008, required the Secretary of Defense to conduct a comprehensive review of the nuclear posture of the U.S. for the next 5 to 10 years. The Secretary of Defense was directed to conduct the review in consultation with the Secretary of Energy and the Secretary of State. The nuclear posture review is to include the following elements:

(1) The role of nuclear forces in U.S. military strategy, planning, and programming.
(2) The policy requirements and objectives for the U.S. to maintain a safe, reliable, and credible nuclear deterrence posture.
(3) The relationship among U.S. nuclear deterrence policy, targeting strategy, and arms control objectives.
(4) The role that missile defense capabilities and conventional strike forces play in determining the role and size of nuclear forces.

(5) The levels and composition of the nuclear delivery systems that will be required for implementing the U.S. national and military strategy, including any plans for replacing or modifying existing systems.
(6) The nuclear weapons complex that will be required for implementing the U.S. national and military strategy, including any plans to modernize or modify the complex.
(7) The active and inactive nuclear weapons stockpile that will be required for implementing the U.S. national and military strategy, including any plans for replacing or modifying warheads.

This new nuclear posture review will be used by Congress and the President to establish requirements for nuclear weapons over the following 5 to 10 years.

S.1.6 Laws and Regulations and *National Environmental Policy Act* Compliance Strategy

NEPA and the regulations promulgated by the Council on Environmental Quality (CEQ) (40 *Code of Federal Regulations* [CFR] Parts 1500-1508) establish environmental policy, set goals, and provide a means for implementing the policy. The key provision of NEPA requires preparation of an environmental impact statement (EIS) for "major Federal actions significantly affecting the quality of the human environment" (40 CFR 1502.3). NEPA ensures that environmental information is available to public officials and citizens before decisions are made and actions are taken (40 CFR 1500.1[b]). This SWEIS has been prepared in accordance with Section 102(2)(c) of NEPA of 1969, as amended in the United States Code (42 *U.S. Code* [U.S.C.] § 4321), and regulations promulgated by the CEQ (40 CFR Parts 1500-1508) and DOE's regulations implementing NEPA (10 CFR Part 1021).

The purpose of a SWEIS is to (1) provide DOE and its stakeholders with an analysis of the potential individual and cumulative environmental impacts associated with ongoing and reasonably foreseeable new operations and facilities, (2) provide a basis for site-wide decision making, and (3) improve and coordinate agency plans, functions, programs, and resource utilization. Additionally, a SWEIS provides an overall NEPA baseline for a site that is useful as a reference when project-specific NEPA documents are prepared.

S.1.7 Public Involvement

On November 28, 2005, NNSA published a Notice of Intent (NOI) in the 70 *Federal Register* [FR] 71270, announcing its intent to prepare this Y-12 SWEIS. The public scoping period began on that day and continued through January 31, 2006 (Note: In the NOI, the public scoping comment period was scheduled to end on January 9, 2006; however, in response to public requests, the public scoping comment period was extended until January 31, 2006 [71 FR 927]). The NOI invited interested parties to attend two public scoping meetings on December 15, 2005, in Oak Ridge. The major comments received during the scoping process are discussed in this section.

During the Y-12 SWEIS scoping process, NNSA received 340 scoping comment documents from members of the public; interested groups; and Federal, state, and local officials. These included two transcripts from the public scoping meetings held in Oak Ridge, Tennessee. Of the 340 total comment documents received, approximately 290 of the documents were part of a letter writing campaign.[9] Table S.1.7-1 provides a summary of the scoping comment categories and the number of comments in each category. Approximately 3,794 comments were identified in the 340 scoping documents received.

Table S.1.7-1. Category Distribution of Scoping Comments.

Category	No. of Comments
Policy	870
Purpose and Need	290
Alternatives	875
Nonproliferation	580
Environmental Compliance	290
Water Quality	290
Air Quality	2
Land Use	1
Transportation	1
Mitigation Measures	1
Terrorism	290
Cost	290
Cumulative Impacts	3
NEPA Process	2
Y-12 Missions	1
Worker and Public Health and Safety	3
Out of Scope Comments	5
Total	**3,794**

Source: Original.

S.1.7.1 *Major Scoping Comments*

NNSA has considered all scoping comments in preparing the Draft Y-12 SWEIS. A Scoping Summary Report for the Y-12 SWEIS has been prepared and is part of the Administrative Record for this Y-12 SWEIS (NNSA 2006). The major issues identified during scoping centered on the Nation's nuclear weapon policies, the SWEIS Alternatives, water quality, and the health and safety of workers and the public. The major issues raised during scoping are discussed below. The text below also includes a discussion of NNSA's consideration of these scoping comments and describes how these affected the SWEIS scope and analysis.

- ***Shutdown of Y-12.*** *Many commentors opposed continuation of Y-12 operations associated with weapons production and stated that the production of nuclear weapons and materials should be halted immediately. Many of these same commentors expressed opposition to any proposed action, such as the UPF, that would modernize nuclear weapons production capabilities.*

  The decision to continue the weapons production mission at Y-12 was made by DOE in the SSM PEIS ROD in December 1996 and reaffirmed in the ROD for the Complex

[9] A letter writing campaign generally includes letters from many people with substantively similar comments.

Transformation SPEIS issued in December 2008. Shutting down Y-12 is not a reasonable alternative (see Section S.3.2). The need for nuclear weapons has been determined by the President and Congress, and is an issue beyond the scope of the Y-12 SWEIS. However, the SWEIS does include Alternatives 4 and 5, in which NNSA would reduce the operational capacity of production facilities to a much smaller annual throughput of secondaries and cases. The No Net Production/Capability-sized UPF Alternative would reduce the throughput to a limited number of secondaries and cases beyond those associated with supporting surveillance, but would not support adding new types or increased numbers of secondaries to the total stockpile. Alternatives 4 and 5 are included as reasonable alternatives in this SWEIS in order to provide the NNSA with the flexibility to reduce operations at Y-12 if future considerations warrant such reduction.

- ***Additional Alternatives.*** *Many commentors suggested that NNSA consider another reasonable alternative, which they described as the following:*

  - *Cease weapons production activities at Y-12 immediately;*
  - *Pursue long-neglected dismantlement and disposition mission and only those activities necessary to safely fulfill this mission;*
  - *Construct new, safeguarded, zero-emission facilities with built-in transparency for disassembly and dismantlement;*
  - *Undertake Manhattan Project 2, dedicated to finding solutions to long term contamination dilemmas;*
  - *Use Oak Ridge's long history of service to the nation, and the clear evidence of need, to leverage funds for thorough cleanup and responsible long term management of legacy wastes in Oak Ridge;*
  - *Utilize the expertise and resources of ORNL in Manhattan Project 2.*

  As explained above, the decision to continue the weapons production mission at Y-12 was made by DOE in the SSM PEIS ROD and affirmed in the Complex Transformation SPEIS ROD. Ceasing weapons production activities at Y-12 would not satisfy NNSA's purpose and need at this time. However, NNSA has added the Capability-Based Alternatives (Alternatives 4 and 5), which would reduce production capacity at Y-12. With respect to continuing the dismantlement and disposition mission, all alternatives in the SWEIS include continuation of those missions. With respect to "zero-emission" facilities, the proposed action to construct and operate the UPF is expected to reduce radiological emissions from EU operations at Y-12. With respect to cleanup of existing contamination, ORR has an aggressive program for continuing to accelerate the cleanup of the site and will continue to do so for the foreseeable future.

- ***Additional Alternatives.*** *Several commentors suggested that NNSA consider an alternative in which Y-12 would perform only interim upgrades or construction of new facilities with very short-term returns in terms of efficiency, effectiveness, or safety until decisions are made concerning a consolidated plutonium/uranium production plant, per the Nuclear Weapons Complex Infrastructure Task Force recommendation to the Secretary of Energy Advisory Board (SEAB) in 2005.*

The Complex Transformation SPEIS analyzed alternatives consistent with the Nuclear Weapons Complex Infrastructure Task Force recommendation to the SEAB (SEAB 2005). However, in the Complex Transformation SPEIS ROD, NNSA did not select any of the consolidated Complex alternatives. As such, the alternatives in this SWEIS are consistent with the Complex Transformation SPEIS ROD.

- ***Purpose and Need.*** *Many commentors stated that the "Purpose and Need" section of the SWEIS must consider U.S. commitments under the Nuclear Nonproliferation Treaty (NPT) in evaluating the impacts on the "whole of the human environment."*

  The purpose and need section for this SWEIS includes consideration of the NPT (see Section S.1.5.1). As discussed in that section, the operations and alternatives considered in this SWEIS are fully consistent with the NPT.

- ***Worker and Public Health and Safety.*** *Several commentors expressed concerns related to worker and public health and safety, and stated that the SWEIS should address EU, beryllium, and other radiological and hazardous materials.*

  The SWEIS analyzes potential worker and public health impacts associated with criteria pollutants, hazardous pollutants, including beryllium, and radiological pollutants such as enriched uranium, in Section 5.12 of the SWEIS.

- ***Contamination of the East Fork Poplar Creek.*** *Many commentors expressed concern regarding contamination of the East Fork Poplar Creek (EFPC), and stated that DOE must address the health risks of EFPC in the current EIS and explain to the public why, after 20 years and more than $1 billion spent on EFPC alone, levels of contaminants are actually rising.*

  Sections 4.7.2 and 5.7.1.2 of the SWEIS include updated information regarding the water quality of EFPC and an assessment of the potential impacts of the alternatives on the water quality of EFPC and other water resources. The SWEIS also addresses the impacts to health from water contamination (Section 5.12).

- ***Terrorism.*** *Many commentors expressed concern regarding terrorism, stating that the operations at Y-12 make the area a terrorist target. Some commentors wanted to know what the impacts of a terrorist attack at Y-12 would be.*

  NNSA has prepared a classified appendix to this SWEIS that evaluates the potential impacts of malevolent, terrorist, or intentional destructive acts. Substantive details of terrorist attack scenarios, security countermeasures, and potential impacts are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks. Appendix E (Section E.2.14) discusses the methodology used to evaluate potential impacts associated with a terrorist threat and the methodology by which NNSA assesses the vulnerability of its sites to terrorist threats and then designs its response systems.

- ***Costs.*** *Many commentors expressed concern about the costs associated with nuclear weapons activities and stated that the money would be better spent on environmental cleanup or social programs.*

  NNSA will consider the costs associated with the alternatives in the ROD process. With respect to comments about spending priorities, the budget used to support the nuclear weapons stockpile is determined by the Congress and the President.

S.2 OPERATIONS OVERVIEW OF Y-12 NATIONAL SECURITY COMPLEX

The following sections describe the major NNSA missions/work performed at Y-12, as well as complementary work performed for other Federal, state, and local entities, and for private sector companies. A map of the current Y-12 programmatic responsibilities is provided in Figure S.2-1.

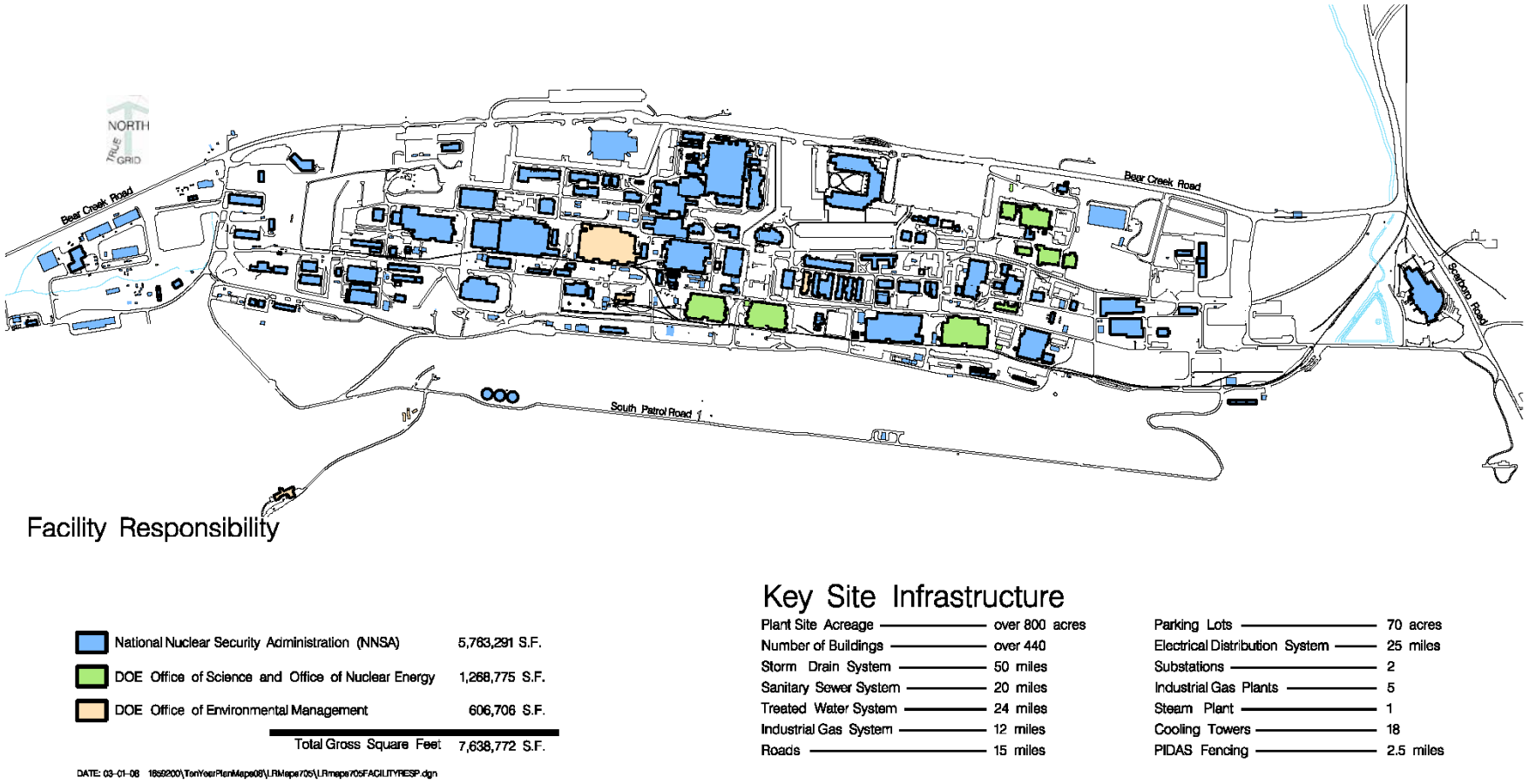
S.2.1 National Nuclear Security Administration Activities Supported by Y-12 National Security Complex

Y-12 plays an important role in U.S. national security and is a one-of-a-kind facility in the NNSA nuclear security enterprise. Y-12's role in support of the nuclear security enterprise includes the following activities:

- Manufacturing, dismantlement, disposition, and assessment of nuclear weapons secondaries, cases, and other weapons components;
- Safely and securely storing and managing SNM;
- Supplying SNM for use in naval reactors;
- Promoting international nuclear safety and nonproliferation; and
- Reducing global dangers from weapons of mass destruction (NNSA 2008a).

S.2.1.1 *Defense Programs*

The Defense Programs activities performed at Y-12 include maintaining the capability to produce secondaries and cases for nuclear weapons, storing and processing uranium and lithium materials and parts, dismantling nuclear weapons secondaries returned from the stockpile, and providing special production support to NNSA weapons laboratories and to other NNSA programs. To accomplish the storage mission, some processing of SNM is required to recover materials from returned secondaries. In addition, Y-12 performs stockpile surveillance activities on the components it produces.



Source: NNSA 2008a.

Figure S.2-1. Programmatic Responsibility for Y-12 Facilities.

The Defense Programs work structure at Y-12 includes the following missions:

- Weapons Dismantlement and Disposition;
- EU Operations;
- Life Extension Programs;
- Nuclear Materials (and Lithium)Management, Storage and Disposition;
- Quality Evaluation and Surveillance;
- Stockpile Evaluation and Maintenance;
- Materials Recycle and Recovery;
- Nuclear Packaging Systems;
- Campaigns;
- Modernization;
- Infrastructure Reduction; and
- Office of Secure Transportation.

S.2.1.2 *National Security Programs*

The National Security Program (NSP) is a program management organization that directs and oversees all mission work in support of the Office of Defense Nuclear Nonproliferation; the supply of SNM for use in naval reactors; and all work for other agencies that is complementary to other Y-12 missions, e.g., Homeland Security. Under the NSP, Y-12 focuses on Nonproliferation missions, Global Threat Reduction Initiatives, and supplying EU to Naval Reactors and Foreign Research Reactors. The following sections describe these missions in further detail.

S.2.1.2.1 Nonproliferation

With regard to nonproliferation, NSP develops and implements domestic and international programs and projects aimed at reducing threats, both internal and external, to the U.S. from weapons of mass destruction. The primary focus is reducing the threat posed by the proliferation of nuclear weapons, particularly EU weapons.

The components of these nonproliferation activities include managing the HEU Disposition Program Office located at Y-12, which provides programmatic support to the NNSA Office of Fissile Materials Disposition to ensure efficient disposition of the surplus EU stored at DOE sites across the country. The objective of the program is to make surplus EU unusable for weapons and to dispose of it in a safe, secure, and environmentally acceptable manner.

Another component of Y-12's nonproliferation program includes leading activities in the Reactor Supply Program, which supports nuclear nonproliferation by supporting the Reduced Enrichment Research and Test Reactor Program. This program provides low-enriched uranium produced by down blending surplus weapon-usable EU. Y-12 is a primary source of EU for use in research reactors and the primary supplier of EU and U-235 for the DOE Isotope Distribution Office. Other nuclear materials (such as depleted uranium and enriched lithium) are supplied to various customers from Y-12.

S.2.1.2.2 Global Threat Reduction Initiative

NNSA operations based at Y-12 are uniquely qualified to assist in removing, securing, and dispositioning special nuclear threats from the U.S. and around the globe. These Y-12 skills and assets can provide a comprehensive response to radiological and nuclear material vulnerabilities anywhere in the world on short notice. Resources from Y-12 have supported activities in Kazakhstan, Republic of Georgia, Russia, Libya and other countries. In addition to material removal and safeguards and security activities, NNSA has entered into low-enriched uranium supply contracts for research reactors in the U.S. and countries such as Argentina, Belgium, Canada, France, Japan, Romania, and South Korea.

S.2.1.2.3 Naval Reactors

The primary mission of the NNSA Office of Naval Reactors is to provide the U.S. Navy with safe, militarily effective nuclear propulsion plants and to ensure their continued safe and reliable operation. In supporting this critical NNSA mission, Y-12 is the base of operations to act as the supplier of EU feedstock and conduct limited development work for the Naval Nuclear Propulsion Program. Examples of this work include the following:

- Validating processes used to fabricate feedstock material;
- Conducting analysis on processed uranium to ascertain chemical purity;
- Developing packaging methods for shipping EU feedstock material.

Supporting the Naval Reactors Propulsion Program requires storage, processing, and shipping support from several Y-12 operational areas, primarily for EU. The Y-12 Analytical Laboratory also performs analytical chemistry work in support of these activities.

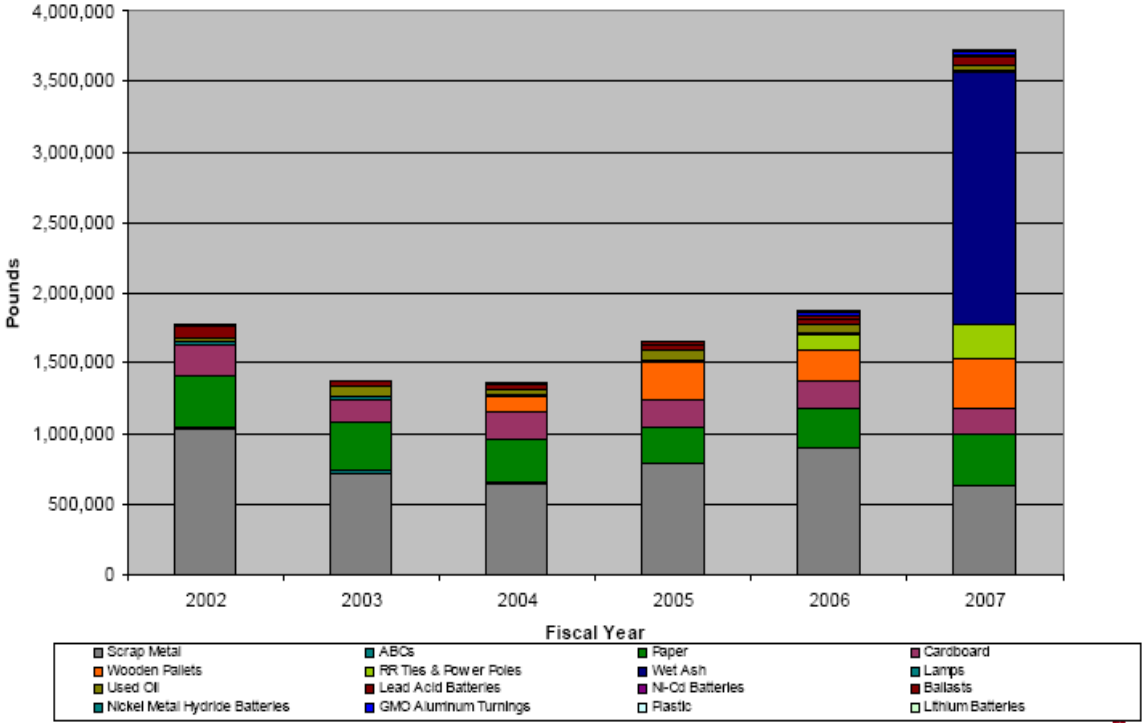
S.2.2 Non-NNSA Programs

Several non-NNSA Programs are conducted at Y-12. Among these non-NNSA Programs are the following: Work-for-Others Program, Environmental Management Programs, Nondefense Research and Development Program, and Technology Transfer Program. Detailed information on these programs can be found in Chapter 2 of the SWEIS.

S.2.3 Pollution Prevention, Conservation, and Recycling Programs

Y-12 has a demonstrated record of implementing programs to reduce waste, conserve energy, and clean-up legacy environmental contamination. Part of making Y-12 greener is the multitude of activities undertaken by the Waste Management group. Acting as an umbrella that encompasses recycling, pollution prevention, and source reduction, the Sustainability and Stewardship Program also aids environmental compliance by allowing for a successful Environmental Management System. Y-12's Clean Sweep Program has recycled unneeded resources, created a safer site, and improved storm water compliance. Since 1993, the Y-12 Complex has completed more than 802 pollution prevention projects including on-going recycling projects that resulted in the elimination of more than 1.87 billion pounds of waste at an estimated cost avoidance of more than $53 million (TDEC 2009). Y-12 has a strong recycling

program, and as can be seen from Figure S.2-2, Y-12 has greatly increased recycling activities over the past several years.



Source: Y-12 2008.

Figure S.2-2. Y-12 Recycling Activities.

The commitment of Y-12 to energy efficiency, pollution prevention, recycling and other such green practices is exemplified by the more than 40 external awards received since November 2000. Some of the more recent, prominent awards are as follows:

- 2006 White House Closing the Circle Award for Partnering in Recycling and Reuse;
- 2007 White House Closing the Circle Honorable Mention Award for Expanding the Use of Alternative Fuels;
- 2006 Tennessee Chamber of Commerce and Industry Environmental Award for Recycling;
- 2007 Tennessee Chamber of Commerce and Industry Environmental Award for Energy Efficiency;
- 2007 Environmental Protection Magazine Award for Environmental Achievement;
- 2009 Tennessee Department of Environmental and Conservation Tennessee Pollution Prevention (TP3) Green Flag for Demonstrated Achievement.

S.3 SWEIS ALTERNATIVES

This SWEIS has been prepared in accordance with the CEQ regulations (40 CFR Parts 1500–1508) and the DOE regulations implementing NEPA (10 CFR Part 1021). The SWEIS evaluates the proposed action and reasonable alternatives to the proposed action, as well as the No Action

Alternative. The term "reasonable" has been interpreted by CEQ to include alternatives that are practical or feasible from a common sense, technical, and economic standpoint (CEQ 1981).

The proposed action and reasonable alternatives for this SWEIS assume that the missions assigned to Y-12, which are described in Chapter 2 of the SWEIS, will continue for the foreseeable future. Alternative 1 is the No Action Alternative, and represents the baseline conditions; i.e., what is currently going on at the site, as well as any actions previously reviewed and approved by the NEPA process. Alternative 2 in the SWEIS (which is also the "proposed action") is to construct and operate a new UPF. Reasonable alternatives to this proposed action were developed by considering various capital investment scenarios. Alternative 3, the Upgrade in-Place Alternative, would require moderate capital investment and would utilize existing, but upgraded, facilities to accomplish the assigned missions. Alternatives 4 and 5 would involve a reduction in the production capacity of Y-12 to support smaller stockpile requirements. Section S.3.1 describes the alternatives in more detail.

S.3.1 Alternatives

S.3.1.1 *Alternative 1 – No Action Alternative*

The No Action Alternative means no change in current plans, including approved projects. Under the No Action Alternative, operations at Y-12 would continue to support the DOE and NNSA programs as described in Section S.2. Unless noted otherwise, these missions are expected to continue for the foreseeable future. Construction of a UPF is not part of the No Action Alternative.

The No Action Alternative includes the continued implementation of planned modernization actions announced in the 2002 ROD for the 2001 Y-12 SWEIS (67 FR 11296, March 13, 2002) as modified by subsequent actions, as well as new actions subsequent to the 2002 ROD that have undergone separate NEPA review. The following actions announced in the 2002 ROD, modifications to the actions of the 2002 ROD, and actions undertaken since the 2002 ROD are included in the No Action Alternative.

1. **Highly Enriched Uranium Materials Facility.** The new HEUMF (now constructed) will store HEU that is not being used in manufacturing activities. The HEUMF—completed in 2008 and expected to start full-scale operations in 2010—will reduce the current storage footprint, improve security and lower operating costs (DOE 2001a).

2. **Special Materials Complex (SMC).** This project was cancelled because it was no longer required by the reduced manufacturing requirements of the smaller stockpile. The project was replaced by a new Purification Facility and installation of new equipment within an existing facility to allow reuse of existing special material parts (*Final Supplement Analysis for Purification Facility, Site-Wide Environmental Impact Statement for the Y-12 National Security Complex*, DOE/EIS-0309/SA-1, August 2002) (NNSA 2002). That Supplement Analysis assessed whether the potential environmental impacts of the stand-alone Purification Facility, a component of the SMC analyzed in the Y-12 SWEIS, would require the preparation of a Supplemental SWEIS. The determination was made that proceeding with

the Purification Facility would either reduce or not affect the environmental impacts of the SMC identified in the Y-12 SWEIS, and therefore, no additional NEPA analysis was required.

3. **Infrastructure Reduction.** A series of individual NNSA-managed projects are underway to remove excess buildings and infrastructure, with a goal of reducing the active footprint at Y-12 by 50 percent during the next decade. A total of 149,357 square feet of floor space will have been demolished during 2008. Since 2002, NNSA has demolished over 1.2 million square feet of excess floor space at Y-12 (NNSA 2008a). Each demolition project was reviewed prior to initiation and found to be covered by the **Categorical Exclusion** established by 10 CFR Part 1021 Appendix B1.23 (Demolition and Subsequent Disposal of Buildings, Equipment, and Support Structures).

Categorical Exclusion

A Categorical Exclusion is a NEPA determination applied to an action that DOE has determined does not individually or cumulatively have a significant effect on the human environment

4. **Manufacturing Support and Public Interface facilities.** These facilities are technical, administrative, and engineering facilities built on Y-12 land. The managing and operating contractor of the Y-12 plant will lease these facilities. They were included in an Environmental Assessment (EA) and a subsequent Finding of No Significant Impact (FONSI) completed in January 2005 (*Alternate Financed Facility Modernization EA and FONSI*, DOE/EA-1510) (NNSA 2005d).

5. **Transportation of HEU from Foreign Locations to Y-12.** Subsequent to issuance of the 2002 Record of Decision (ROD) (67 FR 11296, March 13, 2002), the Y-12 site was given the additional mission of securing and storing small quantities of HEU transported from foreign locations to prevent proliferation of nuclear weapons and to minimize or eliminate the use of HEU in civilian reactors. Environmental Assessments were prepared and FONSI's issued for these actions (*Environmental Assessment for the Transportation of Highly Enriched Uranium from the Russian Federation to the Y-12 Security Complex* (DOE/EA-1471, January 2004) (DOE 2004d); and *Environmental Assessment for the Transportation of Unirradiated Uranium in Research Reactor Fuel from Argentina, Belgium, Japan and the Republic of Korea to the Y-12 National Security Complex* (DOE/EA-1529, June 2005) (DOE 2005h).

6. **Upgrade of Y-12 Potable Water System.** NNSA completed an EA to upgrade the potable water system at Y-12. Upgrades to the Y-12 potable water system would allow Y-12 to (1) meet regulatory requirements for safe drinking water by providing backflow protection for known cross connections and ensuring proper chlorine residual maintenance in the system; (2) provide Y-12 control and monitoring of water coming into the Y-12 distribution system to ensure adequate water flow and pressure to support current and future Y-12 operational needs; and (3) address deferred maintenance and ensure continued system reliability by inspecting, evaluating, and repairing or replacing deteriorated cast iron water mains and building feeds and obsolete fire hydrants. Based on the analysis in the EA, a FONSI was issued in March 2006 (DOE 2006a).

7. **Y-12 Steam Plant Replacement Project.** In August 2007, NNSA completed an EA to replace the existing Y-12 steam plant with a new centralized steam plant. The new centralized steam plant would use natural gas boilers to produce steam to support Y-12 operations. Reliable and cost-effective steam generation is vital to the operation of Y-12. It is the primary source of building heat for personnel comfort and it provides freeze protection for critical services that include fire protection systems and heat tracing of exterior above ground water systems. Steam is also necessary to support EU production operations. A Finding of No Significant Impact was signed on September 6, 2007 (YSO 2007). Currently, the steam plant is under construction and is scheduled to be completed in September 2010.

8. **Compressed Air Upgrades Categorical Exclusion.** The Compressed Air Upgrades Project (CAUP) corrects deficiencies related to reliability and efficiency by providing new compressed air capability to meet the current and long-range needs of Y-12. The project upgrades the compressed air system by replacing obsolete equipment with state-of-the-art technology equipment and controls. CAUP installed a new instrument/plant air system in reuse facility 9767-13. During the conceptual design phase, NEPA reviews were completed and a determination was made in January 2003 that CAUP work is covered by an existing **categorical exclusion** (CX).

9. **Security Improvements Project (SIP) Categorical Exclusion.** The purpose of the SIP is to replace the existing Y-12 security system with the NNSA preferred ARGUS security system, a special purpose, automated information system that will be continuously operating and monitored by Y-12 security personnel. The project would provide a comprehensive and integrated security system that performs the required security functions and meets applicable DOE Orders. The project directly supports the mission by maintaining the security capabilities of Y-12 to protect national security by applying advanced technology to the nation's defense. SIP's scope is limited to installing the ARGUS technology backbone in the existing Central and Secondary Alarm Stations, install software gateways to existing alarms, and install new ARGUS components in the HEUMF. During the conceptual design phase, NEPA reviews were completed and a determination was made in May 2007 that the SIP is covered by existing CXs.

10. **Nuclear Facility Risk Reduction (NFRR) Project Categorical Exclusion.** The NFRR line item project will directly contribute to the safety and reliability of Building 9212 and Building 9204-2E which are needed to continue NNSA current missions at Y-12. The NFRR Project will reduce risk of failure of infrastructure in these mission-essential Y-12 facilities by implementing practical, capital modifications determined prudent and necessary to ensure continued safe operations at existing levels. The project scope includes improving maintainability and reliability needed to address the risk of failure of selected, high priority, infrastructure utility systems, structures, and components through planned replacement of critical electrical control centers, switchgear, stacks, casting furnace vacuum system, and cooling tower and steam system pipes. Execution of this project will address the 2005 Defense Nuclear Facility Safety Board (DNFSB) risk review recommendations and backlogged deferred maintenance by replacing failing and obsolete equipment with new. During the conceptual design phase, NEPA reviews were completed and a determination was made in December 2008 that NFRR work is covered by existing CXs.

These projects are discussed in more detail in section 1.7 of the SWEIS. Additionally, as discussed in Section 1.7.3 of the SWEIS, DOE is currently preparing an EIS for long term management and storage of mercury (74 FR 31723). NNSA will continue to store mercury at Y-12 unless a decision is made to relocate the material.

The environmental conditions described in Chapter 4 of the SWEIS reflect the baseline operational impacts of these missions for the foreseeable future. Although mission workloads may vary in the future compared to these baselines, operational impacts should not vary appreciably from current baseline levels. To provide comprehensive baseline data from which operational levels could be projected, NNSA gathered the best available data for the current level of operation. In most instances, the data supporting the No Action Alternative are reflected by recent monitoring data (2006 and 2007) for the Y-12 Site as reported in the annual site environmental reports (ASER) issued in 2007 and 2008; however, data from previous years were used if 2006 and 2007 data were unavailable or if they provided a more conservative analysis.

S.3.1.2 *Alternative 2 – Uranium Processing Facility Alternative*

Under this alternative, NNSA would take all actions in the No Action Alternative, construct and operate a modern UPF sized to support the smaller nuclear stockpile of the future (Section S.3.1.2.1), and construct and operate a new Complex Command Center (CCC) (Section S.3.1.2.2)

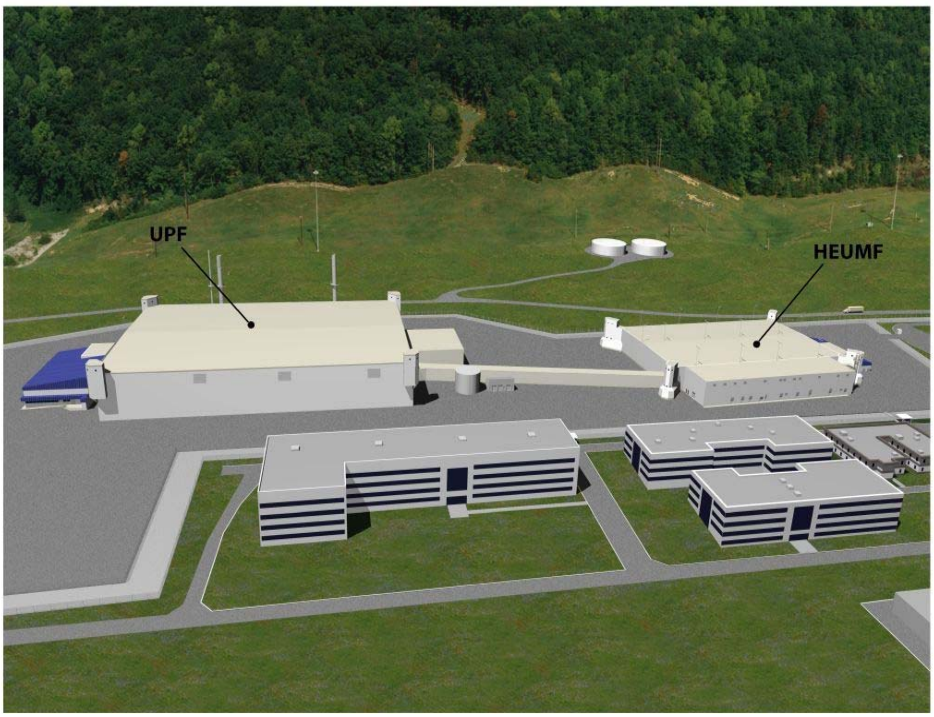
S.3.1.2.1 Uranium Processing Facility

The UPF would consolidate EU operations into an integrated manufacturing operation sized to satisfy all identified programmatic needs and would be sited adjacent to the HEUMF to allow the two facilities to function as one integrated operation. Transition of EU production operations to the UPF and transition of EU storage operations into HEUMF (No Action Alternative) would enable the creation of a new high security protected area 90 percent smaller than the current high security protected area.

The UPF Project, which is one of the cornerstones of Y-12's Modernization Program, would replace multiple existing EU and other processing facilities. The current operating and support areas occupy approximately 633,000 square feet in multiple buildings, while the consolidated UPF would result in approximately a 33 percent reduction, to approximately 388,000 square feet in one building. Once the UPF becomes operational, some of those existing facilities could be available for D&D, while other facilities could be used for non-EU processes. Figure S.3.1.2-1 shows an artist's rendering of the proposed UPF.

The proposed UPF would include EU and EU-containing component and subassembly processing and manufacturing operations. The proposed UPF site is west of the HEUMF in the area now used for parking. This site is outside of, but adjacent to, the existing PIDAS. Figure S.3.1.2-2 shows the location of the proposed UPF relative to other buildings at Y-12. The existing parking lots are close to the existing HEU processing complex, which provides cost and operational efficiencies for consolidating EU operations.

Conventional construction techniques would be used to build the UPF. Construction of the UPF would require approximately 35 acres of land, which includes land for a construction laydown area and temporary parking. Once constructed, the UPF facilities would occupy approximately 8 acres. The UPF would incorporate ARGUS technology for security protection. If a UPF is constructed, the existing non-nuclear processing facilities supporting a UPF would not be upgraded; instead, NNSA would pursue modernization of these facilities in the future if a CMC reaches a stage of development that is ripe for decisionmaking.



Source: NNSA 2007.

Figure S.3.1.2-1. Artist's Rendering of the Proposed UPF Adjacent to the HEUMF.

S.3.1.2.2 Complex Command Center

An additional action proposed under all of the action alternatives (Alternatives 2-5) is the CCC. The CCC would comprise a new Emergency Services Complex for Y-12. The new facility would house equipment and personnel for the plant shift superintendent, Fire Department, and EOC. Approximately 50,000 square feet of enclosed facility space would be required to accommodate operational needs. The facility would include office space for 60 Fire Department personnel, 120 EOC personnel, and up to 12 plant shift superintendent personnel; 15,000 square feet of pull through garage space; redundant emergency power supply connections and/or supplemental dedicated emergency generators; records storage and processing areas; modern training and conference facilities; shower and changing facilities; specialized equipment storage; food service areas; janitorial closets; separate mechanical and electrical equipment rooms; and telecommunication rooms. The facility would have a dedicated loading dock with automated dock leveler and electric motor actuated overhead rollup door access to the building, to safely support delivery of supplies, equipment, and material. The facility would be located on the east end of Y-12 as shown on Figure S.3.1.2-2.

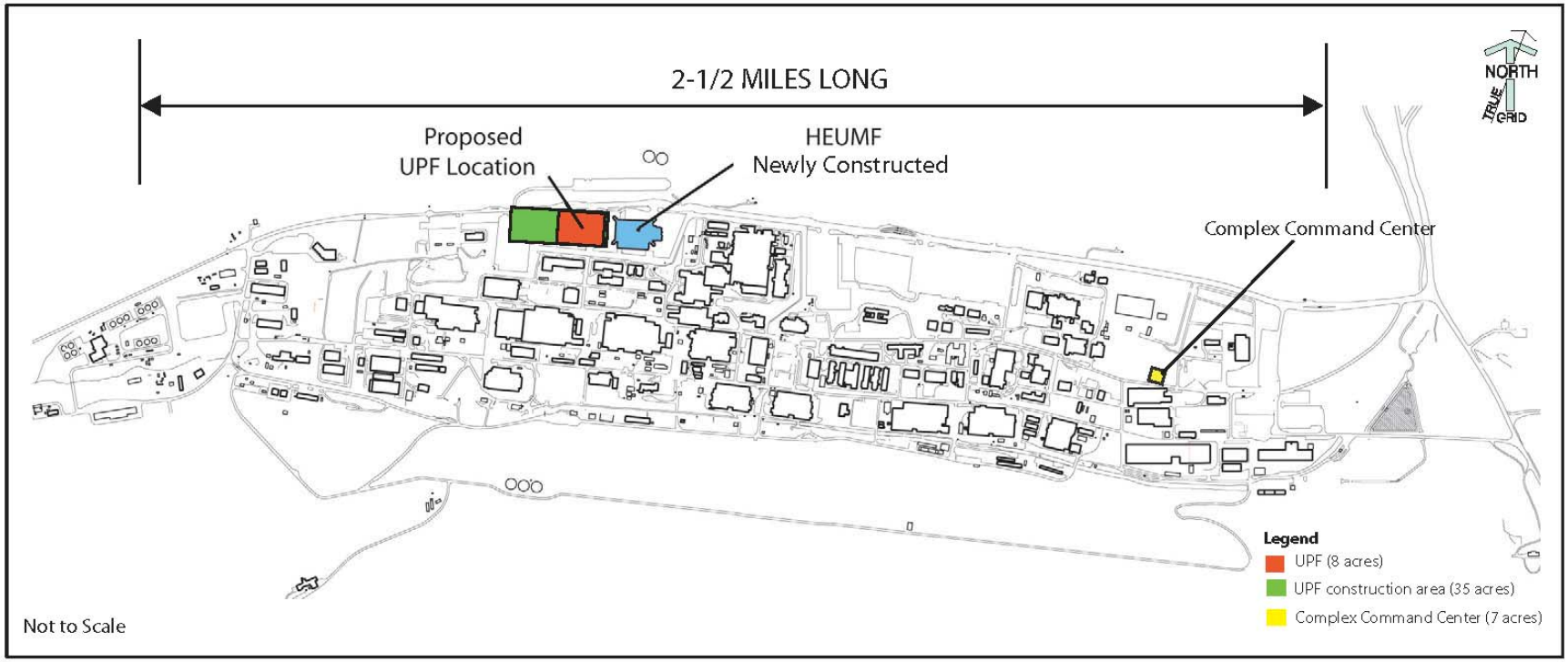
The CCC would be a one story structure that would be located in a previously developed area. Construction of the CCC is expected to employ approximately 50 construction workers. The project would require excavation within the Y-12 industrial area for utility/communication lines. Excavation locations would be selected such that known CERCLA remediation areas of concern are avoided. Approximately 7 acres of land would be disturbed for the CCC. Once operational, the facility would not increase water use or generate additional wastes at Y-12, as this facility would replace existing facilities that perform these functions.

S.3.1.3 *Alternative 3 – Upgrade in-Place Alternative*

Under this alternative, NNSA would continue the No Action Alternative and upgrade the existing EU and nonnuclear processing facilities to contemporary environmental, safety, and security standards to the extent possible within the limitations of the existing structures and without prolonged interruptions of manufacturing operations. Under this alternative there would be no UPF and the current high-security area would not be reduced. This alternative would, however, include construction of a new CCC (as discussed in Section S.3.1.2.2).

The upgrade projects proposed would be internal modifications to the existing facilities and would improve worker health and safety, enable the conversion of legacy SNM to long term storage forms, and marginally extend the life of existing facilities. For continued operations in the existing facilities, major investments will be required for roof replacements; structural upgrades; heating, ventilating, and air conditioning (HVAC) replacements; and fire protection system replacement/upgrades. The projects would improve airflow controls between clean, buffer, and contamination zones; upgrade internal electrical distribution systems; and upgrade a number of building structures to comply with current Natural Phenomena criteria (B&W 2004a).

For the purpose of this analysis, it is assumed that the upgrades would be performed over a 10-year construction period, following issuance of the SWEIS ROD. This would enable NNSA to spread out the capital costs associated with the upgrades, and minimize disruption of operations.



Source: NNSA 2007, modified.

Figure S.3.1.2-2. Location of the Proposed UPF and CCC Relative to Other Buildings at Y-12.

Conventional construction techniques would be used for upgrade projects. Under this alternative, a preliminary schedule for the project indicates that site preparation would begin in 2010, with upgrades complete in approximately 2020. Upgrade activities would be performed in a manner that assures protection of the environment during the construction phase. Techniques would be used to minimize the generation of debris that would require disposal. Disposal of debris would be made in accordance with waste management requirements in properly permitted disposal facilities. Throughout the upgrade construction process, stormwater management techniques, such as silt fences and runoff diversion ditches, would be used to prevent erosion and potential water pollutants from being washed from the construction site during rainfall events.

Natural Phenomena: Structural. The current authorization basis for many of the EU buildings has been designated as Performance Category[10] (PC) 2. An assessment of the structural adequacy of the buildings indicates the buildings do not meet current codes and standards related to natural phenomena (NP) events (e.g., tornados and earthquakes) required for a PC 2 designation. If the buildings are intended to operate an additional 50 years, they would require structural upgrades to bring the buildings into compliance (B&W 2004a).

Fire Protection. The existing fire protection systems for many of the EU buildings are primarily piping systems operating under the Code of Record in effect at the time of installation. These codes have changed significantly over the years, and if the life of a facility is intended to be extended any significant length of time, the systems may need to be upgraded to meet current codes and standards if exemptions for continued operations are denied. Upgrades would likely require total replacement of the current systems. Replacements would be required for sprinkler systems, riser replacements, and underground supply line upgrades (B&W 2004a).

Utilities Replacement/Upgrades: Mechanical Systems. HVAC systems have an expected life in the range of 25 to 30 years. Many of the systems serving the EU building are beyond or are approaching the end of their useful life and are in need of replacement. The majority of the high efficiency particulate air (HEPA) filters are located in antiquated systems. These systems also do not include test sections that allow the systems to be tested without removal of the prefilters. This arrangement subjects the filter change crews to added exposures compared to currently available filters with test sections. The continued long term operations of existing facilities would require these filter systems to be replaced (B&W 2004a).

Roofing. A majority of the existing roofs for the EU buildings would need to be replaced (B&W 2004a).

S.3.1.4 *Alternative 4 – Capability-sized UPF Alternative*

The nuclear weapons stockpile and the nuclear security enterprise have undergone profound changes since the end of the Cold War. Since that time, more than 12,000 United States nuclear weapons have been dismantled, no new-design weapons have been produced, three former

[10] Performance Categories (PC) classify the performance goals of a facility in terms of facility's structural ability to withstand natural phenomena hazards (i.e., earthquakes, winds, and floods). In general, facilities that are classified as: PC 0 do not consider safety, mission, or cost considerations; PC 1 must maintain occupant safety; PC 2 must maintain occupant safety and continued operations with minimum interruption; PC 3 must maintain occupant safety, continued operations, and hazard materials confinement; and PC 4 must meet occupant safety, continued operations, and confidence of hazard confinement.

nuclear weapons plants (Mound, Pinellas, and Rocky Flats) have been closed, nuclear material production plants (Hanford, K-25 at ORR, most of SRS, and Fernald) have stopped production and are being decontaminated, and the United States is observing a moratorium on nuclear testing.

In 2002, President Bush and President Putin signed the *Moscow Treaty*, which will reduce the number of operationally deployed U.S. strategic nuclear weapons to 1,700-2,200 by 2012. In 2004, President Bush issued a directive to cut the entire U.S. stockpile—both deployed and reserve warheads—in half by 2012. This goal was later accelerated and achieved 5 years ahead of schedule in 2007. As of the end of 2007, the total stockpile was almost 50 percent below what it was in 2001. On December 18, 2007, the White House announced the President's decision to reduce the nuclear weapons stockpile by another 15 percent by 2012. This means the U.S. nuclear stockpile will be less than one-quarter its size at the end of the Cold War—the smallest stockpile in more than 50 years (D'Agostino 2008). Further, as discussed in Section S.1.5.1, on July 6, 2009, Presidents Obama and Medvedev signed a Joint Understanding to reduce their strategic warheads to a range of 1500-1675, and their strategic delivery vehicles to a range of 500-1100 (White House 2009).

As these actions illustrate, the goal of the United States is to maintain a credible nuclear deterrent with the lowest possible number of nuclear warheads consistent with national security needs. NNSA's analyses in this SWEIS are based on current national policy regarding stockpile size (1,675 operationally deployed strategic nuclear warheads) with flexibility to respond to future Presidential direction to change the size. Maintaining a stockpile requires the ability to detect aging effects in weapons (a surveillance program), the ability to fix identified problems (the stockpile stewardship program), and the ability to produce replacement components and reassemble weapons (a fully capable set of production facilities). Currently, there are some elements of the nuclear security enterprise that are unable to safely or reliably perform their assigned production mission (e.g., Building 9212 at Y-12).

Although the size of the stockpile beyond 2012 is not known, the trend suggests a significantly smaller one. Consistent with this trend, NNSA developed Alternatives 4 and 5 to analyze the potential environmental impacts associated with operations at Y-12 that would support stockpiles smaller than those currently planned. NNSA assumed that such a stockpile would be approximately 1,000 operationally deployed strategic nuclear warheads.

Under Alternative 4, NNSA would maintain a basic manufacturing capability to conduct surveillance and produce and dismantle secondaries. NNSA would reduce the operational throughput of facilities to a throughput of approximately 50–80 secondaries and cases per year. To support this alternative, NNSA would build a smaller UPF (approximately 350,000 square feet) at Y-12 compared to the UPF described under Alternative 2 (388,000 square feet). This alternative would also include construction of a new CCC (as discussed in Section S.3.1.2.2).

The reduction in workload would reduce the number of employees, waste generation amounts, infrastructure needs, and the total worker dose. Safeguard and security expenditures would remain at current levels, and other operations conducted at Y-12, such as the storage of HEU and

dismantlement of secondaries, would remain at current levels, consistent with the expected levels described in the No Action Alternative in Section S.3.1.1.

S.3.1.5 *Alternative 5 – No Net Production/Capability-sized UPF Alternative*

Similar to Alternative 4, under a No Net Production/Capability-sized UPF Alternative, NNSA would maintain the capability to conduct surveillance and produce and dismantle secondaries and cases. NNSA would reduce the operational throughput of facilities to a throughput of approximately 10 secondaries and cases per year, which would support surveillance operations and a limited LEP workload; however this alternative would not support adding new types or increased numbers of secondaries and cases to the stockpile. This alternative would involve an even further reduction of production throughput at Y-12 compared to Alternative 4. To support this alternative, NNSA would build a smaller UPF (approximately 350,000 square feet) at Y-12 compared to the UPF described under Alternative 2 (388,000 square feet). Section S.3.1.6 provides a summary of the major differences among the UPF alternatives. This alternative would also include construction of a new CCC (as discussed in Section S.3.1.2.2).

For either Alternative 4 or Alternative 5, although many of the current facilities at Y-12 would be operated at a reduced throughput, NNSA would need to maintain them in a "ready-to-use" state in the event changes were directed by the President. This means unused capacity would be exercised periodically and standard preventative maintenance and minimal corrective maintenance would be performed on all equipment that could be required for future needs. The related effects on other plant operations of this alternative would include a reduction in utility usage and waste generation and a reduction in staffing.

S.3.1.6 *Capacity Alternatives for the Uranium Processing Facility*

Regardless of the ultimate capacity of a UPF, in order to maintain the basic capability to perform the enriched uranium missions, all of the required enriched uranium processes must be included in the facility. In many cases, installing the basic processes in the facility would allow the facility to support multiple units per year. Although the smaller, capability-sized UPFs could be physically smaller than the nominal-sized UPF, an assessment conducted by the UPF Project team at the request of the Nuclear Weapons Council (NWC) Integrating Committee in early 2008 identified only 15 pieces of duplicate equipment that could be eliminated by reducing capacity requirements (NNSA 2008). In terms of square footage of the facility constructed, there would only be a reduction of approximately 38,000 square feet compared to the approximately 388,000 square feet proposed for the nominal-sized UPF described under Alternative 2. Consequently, the capability-sized UPF described under Alternatives 4 and Alternative 5 would not be significantly smaller than the UPF described under Alternative 2. As such, construction requirements for the three UPF capacity alternatives would not vary significantly among the alternatives.

However, there would be notable differences among the three UPF capacity alternatives related to operations. Many of the environmental impacts resulting from operations would be directly affected by the number of components assumed to be produced. For example, operating a nominal-sized UPF to produce 125 secondaries and cases per year would require more electricity, water, and employees than a capability-sized UPF that produces 10 or 50–80

secondaries and cases per year. Similarly, operating a nominal-sized UPF to produce 125 secondaries and cases per year would emit more uranium to the atmosphere, increase the dose to workers, and produce greater quantities of wastes. However, any UPF option significantly reduces uranium atmospheric discharge, worker dose and waste quantities compared to the No Action or the Upgrade-in-Place alternatives. Table S.3.1.6-1 depicts the major operational differences among the UPF alternatives.

Table S.3.1.6-1. Operational Differences Among UPF Alternatives.

Requirements	No Action	Nominal-Sized UPF	Capability-Sized UPF	No Net Production/ Capability-Sized UPF
Electrical Energy Use (MWe)	360-480	360-480	220-290	200-260
Site-wide Water Use (million gallons/year)	2,000	1,300	1,200	1,080
Y-12 Site Employment (workers)	6,500	5,750	3,900	3,400
Steam Plant Generation (billion pounds)	1.5	1.0	0.9	0.8
Normal Radiological/Uranium Air Emissions (Curie)	0.01	0.007	0.006	0.005
Total No. of Y-12 Monitored Workers	2,400	2,050	1,825	1,600
Average Individual Worker Dose (mrem)	20.6	10.3	10.3	10.3
Collective Worker Dose (person-rem)	49.4	21.1	18.8	16.5
Waste Category				
Low-level Waste				
Liquid (gal)	713	476	428	403
Solid (yd^3)	9,405	5,943	5,643	5,314
Mixed Low-level Waste				
Liquid (gal)	1,096	679	640	619
Solid (yd^3)	126	81	76	71
Hazardous (tons)	12	12	7.2	7.2
Nonhazardous Sanitary (tons)	10,374	9,337	6,224	5,705

Source: NNSA 2008, B&W 2009a.

S.3.2 Alternatives Considered but Eliminated from Detailed Consideration

DOE/NNSA is the Federal agency responsible for providing the Nation with nuclear weapons and ensuring that those weapons remain safe, secure, and reliable. To do this, DOE/NNSA must maintain a nuclear weapons production, maintenance, and surveillance capacity consistent with national security requirements. For the SWEIS, the following alternatives were considered but eliminated from detailed study for the reasons stated.

Stop Weapons Activities/Transfer Y-12 Missions to Another Site/Clean-Up Y-12/Fund Social Programs. During the public scoping period for the SWEIS, many members of the public stated that NNSA should analyze shutting down all weapons activities at Y-12, transferring Y-12 missions to another site, clean-up the site, and/or use the money saved for other social programs. DOE/NNSA has considered these suggestions in previous programmatic NEPA documents, specifically the Complex Transformation SPEIS (NNSA 2008), SSM PEIS (DOE 1996a), and the *Storage and Disposition of Weapons-Usable Fissile Material PEIS* (DOE 1996b). NNSA recognizes that Y-12 has unique capabilities and diverse roles supporting a variety of national programs, and that there is an essential near-term need to manage and maintain the safety and stability of the existing nuclear materials inventory. In December 2008, NNSA affirmed the decision to maintain the uranium missions at Y-12. Until relieved of its mission to support the enduring nuclear weapons stockpile by the President and Congress, NNSA must maintain its national security operations at Y-12. Accordingly, to propose shutting down or transferring the Y-12 nuclear weapons activities within the timeframe of the SWEIS (i.e., next 10 years) would be highly unlikely and an unreasonable alternative.

Alternate Site Locations for the UPF. As described in Section S.3.1.2, and shown on Figure S.3.1.2-2, the proposed UPF would be located adjacent to the HEUMF, at a site just west of the HEUMF. In the 2001 Y-12 SWEIS, DOE evaluated alternative locations for the HEUMF, and in the ROD DOE decided to construct the HEUMF at the Y-12 West Portal Parking Lot Site (67 FR 11296, March 13, 2002). Construction of the HEUMF was initiated in 2005 and completed in 2008. The facility is scheduled to start full-scale operations in 2010. Locating a UPF adjacent to the HEUMF is consistent with the analysis performed in support of the 2001 Y-12 SWEIS, the Complex Transformation SPEIS, RODs based on these documents, and the Y-12 Modernization Plan. Siting a UPF at a location other than adjacent to the HEUMF would not allow for the operational efficiencies and reduced security footprint.

Alternative site locations were explored as part of the planning for the UPF. The main reasons why the UPF, if built, would be collocated with the HEUMF are as follows: (1) collocation maximizes the efficiency and minimizes the costs of feed and product material flows between the two facilities; (2) collocation improves the security posture by reducing the size of the Protected Area to 10 percent of the existing footprint and reduces the operational cost of the security force required to meet the latest graded security posture guidelines; and (3) collocation minimizes the number of employees who must enter the Protected Area, thus improving the productivity of workers assigned to non-SNM activities that are currently located in the Protected Area. As a result of these significant advantages, alternatives that would not result in the collocation of the proposed UPF and the HEUMF are not considered reasonable site alternatives for the UPF.

Consolidate ORNL Special Nuclear Material to Y-12. During the public scoping period for the SWEIS, a suggestion was made that DOE should consolidate all SNM from ORNL to Y-12. SNM from ORNL is not used at Y-12 and NNSA does not have programmatic responsibility for the SNM at ORNL. The scope of the Y-12 SWEIS is limited to alternatives related to operations at Y-12, for which NNSA has programmatic responsibility. There is no need to develop a proposal or assess an alternative to consolidate SNM from ORNL to Y-12. This issue is beyond the scope of this SWEIS.

Comprehensive Land Use Planning for ORR. During the public scoping period for the SWEIS, suggestions were made that DOE should develop a comprehensive land use plan for ORR, and that the SWEIS should include an analysis of land use for ORR, including alternatives that would transfer lands to the private sector. The scope of the Y-12 SWEIS is limited to alternatives related to operations at Y-12, for which NNSA has programmatic responsibility. The NNSA does not have programmatic responsibility for other areas of ORR and has no need to develop a proposal or assess any alternatives related to ORR land use planning or land transfers. These issues are beyond the scope of this SWEIS. With respect to lands associated with Y-12 specifically, as discussed in this SWEIS, the land requirements at Y-12 will generally remain unchanged. While some changes to land use will occur as a result of modernization projects, Y-12 will continue to require security and emergency response buffers that preclude release of any real estate for public use. Chapter 6 of the SWEIS addresses land use cumulative impacts.

Other Miscellaneous Out of Scope Suggestions. During the public scoping period for the SWEIS, various suggestions were made regarding alternatives and analyses that NNSA has determined were beyond the scope of the Y-12 SWEIS. Some of the suggested alternatives included replacing Y-12 with an auto plant, storing equipment for the Tennessee Valley Authority at Y-12, and replacing weapons with the Reliable Replacement Warhead. NNSA determined that these suggested alternatives would not meet the purpose and need for action and were beyond the scope of the Y-12 SWEIS. Some of the suggested analyses included a socioeconomic analysis of the cost to the community of hosting a weapons' manufacturing facility and an assessment of intentional destructive acts. Although a socioeconomic analysis of the cost to the community of hosting a weapons' manufacturing facility is beyond the scope of the SWEIS, NNSA has prepared a classified appendix to this SWEIS which analyzes intentional destructive acts (see Appendix E, Section E.2.1.4).

S.3.3 Comparison of Potential Environmental Impacts

This comparison of potential environmental impacts is based on the information in Chapter 4, Affected Environment, and analyses in Chapter 5, Environmental Consequences, of the SWEIS. Its purpose is to present the impacts of the alternatives in comparative form. Table S.3.3-1 (located at the end of this section) presents the comparison summary of the environmental impacts for construction and operation associated with the No Action Alternative and the action alternatives evaluated in the SWEIS. The following sections summarize the potential impacts by resource area.

S.3.3.1 *Land Use*

Construction. With the exception of land disturbance associated with projects that have been addressed in previous NEPA documents (e.g., *Alternate Financed Facility EA, Potable Water Supply Upgrade EA*), no new facilities or major upgrades to existing facilities would occur under the No Action Alternative and no new land disturbance would result. Construction of the UPF and CCC under the UPF Alternative would affect approximately 42 acres of previously disturbed land (35 acres for the UPF and 7 acres for the CCC). The Upgrade in-Place Alternative would consist of internal modifications to existing facilities and 7 acres for the CCC. Under both the Capability-sized UPF and No Net Production/Capability-sized UPF Alternatives, construction of

the UPF and CCC would affect about 39 acres of previously disturbed land (32 acres for the UPF and 7 acres for the CCC). Overall, there would be no appreciable land use impacts or changes beyond those described for the No Action Alternative. Impacts on land use adjacent to Y-12 are not expected.

Operation. While specific land usage within Y-12 may change, the overall industrial use classification would likely remain the same for all alternatives. Under the UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives, about 8 acres of previously disturbed land would be used for the UPF and 7 acres for the CCC. For the Upgrade in-Place Alternative, 7 acres would be used for the CCC. Because Y-12 would continue to require security and emergency response buffers, real estate associated with eliminating excess facilities would likely not be released for public use and there would be no local land use benefits. All of the alternatives would be consistent with current land use plans, classifications, and policies. Impacts on land use adjacent to Y-12 are not expected.

S.3.3.2 *Visual Resources*

Construction. Under all alternatives, although there would be some reduction in the density of industrial facilities, Y-12 would still remain a highly developed area with an industrial appearance, and there would be no change to the Visual Resource Management (VRM) Class IV, which is used to describe a highly developed area. Construction of the UPF (alternatives 2, 4, and 5) and CCC (alternatives 2, 3, 4, and 5) would use cranes that would create short-term visual impacts, but would not be out of character for an industrial site such as Y-12. The construction lay-down area, temporary parking, and temporary construction office trailers would also be typical for an industrial site. The Upgrade in-Place Alternative would consist mainly of internal modifications to existing facilities and construction of the CCC and would create short-term visual impacts, but would not be out of character for an industrial site such as Y-12.

Operation. Under all alternatives, Y-12 would remain a highly developed area with an industrial appearance, and no change to the VRM classification would be expected. All of the alternatives that include a UPF would allow the Protected Area at Y-12 to be reduced from approximately 150 acres to as little as 15 acres and would result in some reduction in industrial density.

S.3.3.3 *Site Infrastructure*

Construction. Construction activities under the No Action Alternative would cause minimal changes to the energy use and other infrastructure requirements (i.e., steam, industrial gases, etc) at the site. As Y-12 continues to downsize and become more efficient, trends indicate that energy usage and most other infrastructure requirements are decreasing by approximately 2 to 5 percent per year. This is expected to continue. During construction, the UPF Alternative or the minimum UPF would require a peak of approximately 2.2 megawatts (MW) per month of electric power, which is less than five percent of the current electrical energy usage at Y-12, and less than one percent of available capacity. Water requirements would be less than 1 percent of current site usage. Construction of either the Capability-sized UPF or No Net Production/Capability-sized UPF would require about 90 percent of the electrical power as construction of the full UPF. The peak electrical energy requirement is estimated to be 1.9 MW per month and water usage

3.6 million gallons. These would be less than 1 percent of current site usage. Construction activities associated with the Upgrade in-Place Alternative would have negligible energy and infrastructure requirements.

Operation. Under the No Action Alternative, Y-12 energy usage and other infrastructure requirements (i.e., steam, industrial gases, etc) should continue to decrease by approximately 2 to 5 percent per year as Y-12 continues to downsize and become more efficient. During operation, the UPF would require approximately 14,000 megawatt hour (MWh) per month of electric power, which is less than 5 percent of available capacity. Compared to the No Action Alternative, the UPF would decrease water demands by more efficient water usage. Steam usage would be reduced by 10 percent as inefficient facilities are closed. Operation of the CCC under any of the action alternatives would not increase water use. Operations associated with the Upgrade in-Place Alternative would not significantly change infrastructure demands beyond the demands of the No Action Alternative, although efficiency improvements associated with the upgrades should lead to some minor decreases in demand, albeit not on the same order as those that could be achieved with new construction. Under the Capability-sized UPF Alternative, electricity and water usage would be about 60 percent of present usage due to the reduced operations (relative to current) and smaller physical size of the facility. Implementation of the No Net Production/Capability-sized UPF Alternative would result in electricity and water usage being about 55 percent of present usage due to the reduced operations (relative to current) and smaller physical size of the facility. The reductions associated with the smaller-sized UPF would be in addition to the decreasing energy use and infrastructure demands at Y-12 under the No Action Alternative. The existing EU operations account for less than five percent of the energy and infrastructure usage at Y-12.

S.3.3.4 *Traffic and Transportation*

Construction. Construction activities under the No Action Alternative would not cause any significant change to the current workforce of approximately 6,500 workers. The Level-of-Service (LOS) on area roads would not change under the No Action Alternative. Under the UPF Alternative, construction-related traffic would add a maximum of 950 worker vehicles per day to support construction of the UPF and CCC during the peak year of construction. This increase would be similar to the increase that was experienced during construction of the HEUMF, which did not change the LOS on area roads. The Upgrade in-Place Alternative would add a maximum of 300 worker vehicles per day and would not change the LOS on area roads. Construction of either the Capability-sized UPF Alternative or the No Net Production/Capability-sized UPF Alternative would add a maximum of 850 worker vehicles per day to support construction during the peak year of construction. This increase would be less than the increase that resulted from the HEUMF construction, which did not change the LOS on area roads. There would be no radiological transportation impacts related to construction for any of the alternatives.

Operation. Under the No Action Alternative and the Upgrade in-Place Alternative, the Y-12 workforce is expected to remain relatively stable at approximately 6,500 workers. Consequently, the LOS on area roads would not change under the No Action Alternative. Operation of the UPF would result in a small decrease in workforce (approximately 11 percent) due to more efficient operations, and would not affect the LOS on area roads. Operation of the CCC, which is part of

all of the action alternatives, would not add any new workers to the site and would not affect traffic or transportation. The Capability-sized UPF and No Net Production/Capability-sized UPF alternatives would reduce traffic at Y-12 by approximately 40 to 48 percent based on potential reductions in the workforce. This reduction would have a minimally beneficial impact on traffic and transportation. During operations under all alternatives, transportation of radiological materials (EU, transuranic waste and low-level waste [LLW]) would occur, resulting in radiological impacts on transportation workers and the public. For all alternatives, the radiological impacts and potential risks of transportation would be small, e.g., less than one latent cancer fatality per year. Radiological materials and waste transportation impacts would include routine and accidental doses of radioactivity. The one-time relocation of HEU to a new UPF would result in less than one fatality. The Capability-sized UPF and No Net Production/Capability-sized UPF alternatives would reduce radiological impacts associated with transportation of materials by about 25 percent and 95 percent, respectively.

S.3.3.5 *Geology and Soils*

Construction. With the exception of land disturbance associated with projects that have been addressed in previous NEPA documents, no new facilities or major upgrades to existing facilities would occur under the No Action Alternative. No new land disturbance or impact to geology and soils would result. Potential land disturbance associated with the construction of the UPF and CCC would be approximately 42 acres of previously disturbed land. The Capability-sized UPF and No Net Production/Capability-sized UPF alternatives would result in disturbance of about 39 acres of previously disturbed land Construction of the new facilities would result in a potential increase in soil erosion from the lay-down area and new parking lot. Appropriate mitigation, including detention basins, runoff control ditches, silt fences, and protection of stockpiled soils would minimize soil erosion and impacts. No impacts on undisturbed geological resources are expected. The Upgrade in-Place Alternative would consist of internal modifications to existing facilities and would only affect previously disturbed geological resources or soils for construction of the CCC.

Operation. Under all alternatives, minor soil erosion impacts are expected, but detention basins, runoff control ditches, and cell design components would minimize impacts. Neither a UPF, under alternatives 2, 4 and 5, nor the CCC, under any of the action alternatives would impact geology or soils during operation because of site design and engineered control measures.

S.3.3.6 *Air Quality and Noise*

S.3.3.6.1 Air Quality

Construction. Under the No Action Alternative, there would be no significant new construction and no changes in air quality or noise are expected. All criteria pollutant concentrations are expected to remain below the national and Tennessee Department of Environment and Conservation (TDEC) standards, with the exception of the 8-hour ozone levels and fine particulate matter ($PM_{2.5}$), which exceed standards throughout the region. Construction of a UPF and CCC would result in temporary increases in air quality impacts from construction equipment, trucks, and employee vehicles. Exhaust emissions from these sources would result in

releases of sulfur dioxide, nitrogen oxide, particulate matter, total suspended particulates, diesel particulate emissions, and carbon monoxide. Additionally, construction of a UPF and CCC would result in small fugitive dust impacts in the construction area. Effective control measures commonly used to reduce fugitive dust emissions include wet suppression, wind speed reduction using barriers, reduced vehicle speed, and chemical stabilization. The temporary increases in pollutant emissions due to construction activities are too small to result in exceeding the National Ambient Air Quality Standards (NAAQS) or TDEC standards beyond the Y-12 boundary. Therefore, air quality impacts resulting from construction under the UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives would be small. The Upgrade in-Place Alternative, which would involve internal upgrades to existing facilities and construction of the CCC, would have minimal impact on air quality at Y-12. Temporary increases in impact on air quality from construction equipment, trucks, and employee vehicles would be much less than the UPF, Capability-sized UPF, or No Net Production/Capability-sized UPF alternatives, presented above, due to the significantly smaller workforce required for the Upgrades. There would be no radiological air impacts associated with construction under any of the action alternatives.

Operation. Under the No Action Alternative, emissions associated with the new steam plant are expected to be significantly lower for total particulate matter, sulfur dioxide, and nitrogen oxides. All criteria pollutant concentrations are expected to remain below the national and TDEC standards, with the exception of the 8-hour ozone levels and $PM_{2.5}$, which exceed standards throughout the region. For the UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives, no significant new quantities of criteria or toxic pollutants would be generated from the new facilities (UPF and CCC). The heating requirements for any of the UPF alternatives would reduce the level of emissions compared to the No Action or Upgrade in-Place Alternatives. Any releases of nitrogen and argon, that are used to maintain inert atmospheres for glovebox operations, would be less than current releases from existing operations. No new hazardous air emissions would result under any of the UPF alternatives. For the Upgrade in-Place Alternative, no change to air quality impacts beyond those presented for the No Action Alternative would result because there would be no significant change in the operating requirements of the facilities. For the Capability-sized UPF and No Net Production/Capability-sized UPF alternatives, operations would be reduced compared to the other alternatives, as would emissions from the Y-12 Steam Plant, but likely not significantly enough to have a meaningful positive effect on air quality, which would remain well within NAAQS for all criteria pollutants, with the exception of the 8-hour ozone levels and $PM_{2.5}$, which exceed standards throughout the region. Reduction in EU operations are also expected to result in the reduction of carcinogenic Hazardous Air Pollutants (HAPs); however, the maximum concentrations of these HAPs are small and do not have significant impacts.

With respect to greenhouse gas emissions, because of the reduced level of operations and reduction in size of the operational footprint at Y-12, the Capability-sized UPF and No Net Production/Capability-sized UPF alternatives would have significantly lower carbon dioxide (CO_2) emissions than the No Action, UPF, and Upgrade in-Place alternatives. However, even the highest levels of CO_2 emissions (No Action and Upgrade in-Place alternatives) would be relatively small (much less than one percent) compared to the state-wide CO_2 emissions in Tennessee.

Radiological air impacts under the No Action Alternative are expected to remain at or about current levels, i.e., 0.15 millirem per year to the maximally exposed individual (MEI), which is well below the annual dose limit of 10 millirem per year under the National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61 Subpart H). Statistically, an annual dose of 0.015 mrem would result in a latent cancer fatality (LCF) risk of 9.0×10^{-8}. Radiological air impacts from Y-12 would result in a dose of 1.5 person-rem to the population living within 50 miles of Y-12, which would result in 0.0009 LCFs annually. Under normal operations, radiological airborne emissions under the Upgrade in-Place Alternative would be no greater than radiological airborne emissions from the existing EU facilities, and would likely be less due to the incorporation of newer technology into the facility design; however, because of the unavailability of design data, they are assumed to be the same as those from the No Action Alternative.

NNSA has estimated that uranium emissions from the UPF would be reduced by approximately 30 percent compared to the No Action Alternative. Under the Capability-sized UPF Alternative and the No Net Production/Capability-sized UPF Alternative, activities that release radiological emissions would be reduced, resulting in lower emission levels relative to the No Action Alternative. NNSA estimates that uranium emissions would decrease by approximately 40 percent for the Capability-sized UPF Alternative and approximately 50 percent for the No Net Production/Capability-sized UPF Alternative.

S.3.3.6.2 Noise

Construction. Under the No Action Alternative, no significant construction would result and no change in noise impacts would be expected. For the UPF, Capability-sized UPF, No Net Production/Capability-sized UPF alternatives, the onsite and offsite acoustical environments at Y-12 may be impacted during construction. Construction activities would generate noise produced by heavy construction equipment, trucks, power tools, and percussion from pile drivers, hammers, and dropped objects. In addition, traffic and construction noise is expected to increase during construction onsite and along offsite local and regional transportation routes used to bring construction material and workers to the site. The levels of noise would be representative of levels at large-scale building sites. The proposed site for a UPF is approximately 1,700 feet from the Y-12 boundary, and peak attenuated noise levels from construction would be below background noise levels at off-site locations within the city of Oak Ridge. For the Upgrade in-Place Alternative, construction activities would cause less noise impacts than the UPF alternatives because construction would take place at the CCC site and within existing facilities, and the proposed CCC site and existing facilities are slightly farther from the site boundary than the proposed UPF site.

Operation. Major noise emission sources within Y-12 include various industrial facilities, equipment and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, paging systems, construction and materials-handling equipment, and vehicles). Most Y-12 industrial facilities are at a sufficient distance from the site boundary so noise levels at the boundary from these sources would not be distinguishable from background noise levels. Implementation of any alternative would not change these operational noise impacts.

S.3.3.7 *Water Resources*

S.3.3.7.1 Surface Water

Construction. Under the No Action Alternative, annual surface water usage at Y-12 would remain within the current range (about 2 billion gallons). A number of contaminants are present and monitored in EFPC. Levels of mercury do remain above ambient water quality criteria in the EFPC. Nickel levels were well below the Tennessee General Water Quality Criteria. The Upper East Fork Poplar Creek (UEFPC) contains most of the known and potential sources of surface water contamination. Surface water contaminants in UEFPC include metals (particularly mercury and uranium), organics, and radionuclides (especially uranium isotopes). Environmental restoration activities would continue to address surface water contamination sources and, over time, would be expected to improve the quality of water in both EFPC and Bear Creek, the two surface water bodies most directly impacted by activities at Y-12. Y-12 surface water withdrawals and discharges would not increase substantially during construction under any of the action alternatives. Construction water requirements are very small and would not substantially raise the average daily water use for Y-12. During construction, stormwater control and erosion control measures would be implemented to minimize soil erosion and transport to EFPC. Contaminated wastewater would be collected and disposed of in accordance with applicable regulations. The proposed UPF and CCC sites and the existing Uranium Facilities are not located within either the 100-year or 500-year floodplains.

Operation. Under the No Action and Upgrade in-Place alternatives, surface water usage at Y-12 would remain at approximately 2 billion gallons per year. The UPF Alternative would reduce water demands at the site to 1.3 billion gallons per year because EU operations would be phased out in the inefficient existing facilities once the UPF becomes operational and the CCC (under all of the action alternatives) would consolidate ongoing functions from numerous separate facilities. It is not anticipated that operations under the UPF or Upgrade in-Place alternatives would impact surface water quality beyond impacts described for the No Action Alternative. The reduced operations associated with the Capability-sized UPF Alternative would reduce water use at Y-12 to approximately 1.2 billion gallons per year. The reduced operations associated with the No Net Production/Capability-sized UPF Alternative would reduce water use at Y-12 to approximately 1.08 billion gallons per year.

Under the Capability-sized UPF and No Net Production/Capability-sized UPF alternatives, reduction of EU operations would reduce releases of uranium and other contaminants to surface waters. Under all alternatives, routine operations would be expected to result in no adverse impacts on surface water resources or surface water quality because all discharges would be maintained to comply with National Pollution Discharge Elimination System (NPDES) permit limits and minimized by appropriate mitigation measures.

S.3.3.7.2 Groundwater

Construction. Water for all of the alternatives would be taken from the Clinch River, with no plans for withdrawal from groundwater resources. All process, utility, and sanitary wastewater would be treated prior to discharge in accordance with applicable permits. All water for

construction of the UPF, Upgrade in-Place, Capability-sized UPF, or No Net Production/ Capability-sized UPF alternatives would be taken from the Clinch River as part of the normal water uses at Y-12. Some groundwater may be extracted during construction activities at the CCC and a UPF site to remove water from excavations. Appropriate construction techniques would be implemented to minimize the seepage of groundwater into excavation sites. No impact on groundwater (direction or flow rate) would be expected from constructing a UPF or the CCC. Based on the results of constructing the HEUMF, groundwater extracted from excavations at a UPF or the CCC site is not expected to be contaminated. Minimal impacts on groundwater quality are expected because extracted groundwater would be collected and treated in onsite treatment facilities to meet the discharge limits of the NPDES permit prior to release to surface water.

Operation. Under all of the alternatives, water for Y-12 operations would be taken from the Clinch River. All process, utility, and sanitary wastewater would be treated prior to discharge in accordance with applicable permits. No groundwater would be used for operations of facilities. No plans exist for routine withdrawal from groundwater resources.

S.3.3.8 *Ecological Resources*

Ecological resources at Y-12 include terrestrial and aquatic resources, threatened and endangered (T&E) species and other special status species, and floodplains and wetlands.

Construction. Under the No Action Alternative, no impacts on ecological resources are expected because any construction activities would occur in areas where site clearing and past construction have occurred. Construction of a UPF under alternatives 2, 4, or 5 would not impact ecological resources because a UPF would be sited on land that is currently used as a parking lot. Construction of the CCC would not affect ecological resources because the proposed site is in a previously disturbed industrial area. Mercury and PCB levels in EFPC fish have historically been elevated relative to those fish in uncontaminated reference streams. Fish are monitored regularly in EFPC for these contaminants. Appropriate stormwater management techniques would be used during construction activities under all of the action alternatives to prevent pollutants from entering local waterways. No impacts on ecological resources from the Upgrade in-Place Alternative are expected because modifications would be internal to existing facilities. Moreover, all areas associated with the Upgrade in-Place Alternative have been previously disturbed and do not contain habitat sufficient to support ecological resources.

Operation. Under the No Action Alternative, continued minor impacts on terrestrial resources are expected due to operation noise and human activities. Operation under the UPF, Upgrade in-Place, Capability-sized UPF, or No Net Production/Capability-sized UPF alternatives would not impact biological resources because these activities would be located in previously disturbed or heavily industrialized portions of Y-12 that do not contain habitat sufficient to support a biologically diverse species mix. Although the Capability-sized UPF and No Net Production/ Capability-sized UPF alternatives would reduce EU operations, Y-12 would continue to operate, the site would remain heavily industrialized, and no change to ecological resources would be expected. Although the gray bat (*Myotis grisescens*), a Federally-listed endangered animal species is known to occur at Oak Ridge Reservation, no critical habitat for threatened or

endangered species is known to exist at Y-12. NNSA will consult with the U.S. Fish and Wildlife Service, pursuant to Section 7 of the Endangered Species Act to ensure proposed actions would not impact Federally-listed threatened or endangered species.

S.3.3.9 *Cultural Resources*

Y-12 currently has no buildings in the National Register of Historic Places but does have a proposed historic district of buildings associated with the Manhattan Project. Preservation of cultural resources at Y-12, including the buildings in this proposed historic district, would continue under all alternatives. None of the alternatives would impact significant cultural resources at Y-12.

S.3.3.10 *Socioeconomics*

Construction. There would be no appreciable changes in the Region of Influence (ROI) socioeconomic characteristics over the 10-year planning period under the No Action Alternative. The construction of the UPF under Alternative 2 or a smaller UPF under the Capability-sized UPF or No Net Production/Capability-sized UPF alternatives would have a similar impact on the socioeconomic characteristics of Y-12 and the ROI as the recently-completed HEUMF construction. The UPF (under Alternative 2) and CCC would require approximately 950 workers during the peak year of construction. A total of 3,990 additional jobs (950 direct and 3,040 indirect) would be created in the ROI during the peak year of construction. The Capability-sized UPF Alternative or No Net Production/Capability-sized UPF Alternative (including the CCC) would require approximately 850 workers during the peak year of construction. A total of 3,570 jobs (850 direct and 2,720 indirect) would be created in the ROI during the peak year of construction. The total new jobs would represent an increase of less than 1 percent in ROI employment. The number of direct jobs at Y-12 could increase by approximately 14 percent during the peak year of construction. Overall, these changes would be temporary, lasting only the duration of the 3-year construction period of the CCC and 6-year construction period of a UPF. The Upgrade in-Place Alternative would have a peak construction workforce of 300 workers and generate a total of 1,560 jobs (300 direct and 1,260 indirect) in the ROI. The existing ROI labor force is sufficient to accommodate the labor requirements and no change to the level of community services provided in the ROI is expected.

Operation. Under the No Action Alternative and Upgrade in-Place Alternative, the operational workforce at Y-12 is expected to remain stable. Upon completion of the UPF construction (approximately 2016), the operational workforce for the UPF would be expected to be smaller than the existing EU workforce due to efficiencies associated with the new facility. NNSA estimates that the total number of EU workers should decrease to approximately 950, which is a reduction of approximately 350 workers compared to the current EU workforce. The consolidation of the Protected Area from 150 acres to 15 acres is also expected to reduce the security forces at Y-12 by approximately 400 workers. Coupled together, the total workforce reduction should be approximately 750 workers, which is approximately 11 percent of the total Y-12 workforce. These reductions are expected to be met through normal attrition/retirements, as about 50 percent of the work force at Y-12 is eligible to retire within the next 5 years. The change from baseline Y-12 employment would be minor and no noticeable impacts on ROI

employment, income, population, housing, or community services would be expected. Under the Upgrade in-Place Alternative, operation of facilities would not result in any change in workforce requirements since existing workers would staff the facilities. Under the Capability-sized Alternative, the workforce at Y-12 could decrease to approximately 3,900 jobs, a reduction of approximately 40 percent compared to the No Action Alternative baseline. Combined with the indirect jobs that would be lost (10,900), under the Capability-sized UPF Alternative the ROI employment would be reduced by about 4.6 to 5.5 percent. Under the No Net Production/Capability-sized UPF Alternative, NNSA estimates that the site employment would decrease to approximately 3,400 workers. This would represent a decrease of approximately 3,100 jobs; a reduction of approximately 48 percent compared to the No Action Alternative baseline. Combined with the indirect jobs that would be lost (13,020) the ROI employment would be reduced by approximately 5.5 percent. Under alternatives 4 and 5, although some EU operations would be reduced, the NNSA would continue to maintain the safety and security for nuclear materials or other hazardous materials. The reduction in the workforce would likely be met through normal attrition/retirements.

S.3.3.11 *Environmental Justice*

Construction. The short-term socioeconomic impacts during any construction activities would be positive and not result in any disproportionately high and adverse effects on minority populations, low-income, or American Indian populations. With respect to human health, occupational impacts during construction would be expected (see Health and Safety, Section 5.12 of the SWEIS), but would not be significant. Therefore, no disproportionately high and adverse effects on minority populations, low-income, or American Indian populations would be expected.

Operation. None of the proposed alternatives would pose significant health risks to the public, and radiological emissions would remain below the annual dose limit of 10 mrem (the maximum MEI dose is 0.4 millirem per year). Results from ORR ambient air monitoring program show that the hypothetical effective dose equivalent (EDE) received within the Scarboro Community (an urban minority community that is the closest community to an ORR boundary) is typically similar to, or lower than, other monitoring stations of Y-12. There are no special circumstances that would result in any greater impact on minority or low-income populations than the population as a whole.

S.3.3.12 *Health and Safety*

Construction. There are occupational hazards associated with any construction activity. During construction, the UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives would have the highest potential for occupational injuries due to the fact that construction of a UPF would require the largest construction workforce. For the total construction duration, approximately 2,900 worker-years would be required to construct the UPF or minimum UPF; statistically, approximately 49 recordable cases of injuries per year may be expected during the peak years of construction. All other alternatives would be expected to result in less than 75 recordable cases of injuries during the construction period. No radiological impacts are expected from construction activities for any of the alternatives.

Operation. During normal operations, radiological impacts on workers and the public would occur. Under the No Action Alternative, impacts are expected to be similar to the impacts that are currently occurring. All radiation doses from normal operations would be well below regulatory standards and would have no statistically significant impact on the health and safety of either workers or the public. Statistically, for all alternatives, radiological impacts would be expected to cause less than one LCF to the 50-mile population surrounding Y-12. The No Net Production/Capability-sized UPF Alternative would result in the lowest uranium releases to the environment, which would translate into the lowest dose to the public.

Under the No Action Alternative, worker dose would not change significantly. The Y-12 total worker dose in 2007 was approximately 49.4 person-rem, which equates to an average dose of 20.6 mrem for all Y-12 employees. This dose is well below regulatory limits and limits imposed by DOE Orders. For the UPF Alternative, the dose to workers would be reduced by about 60 percent to 21.1 person-rem. Under the Capability-sized Alternative, worker dose would be reduced to approximately 18.8 person-rem and under the No Net Production/Capability-sized UPF Alternative worker dose would be reduced to approximately 16.5 person-rem. Under all alternatives, less than one LCF to the workforce would be expected annually.

S.3.3.13 *Waste Management*

Under all alternatives, Y-12 would continue to generate and manage wastes, including low-level radioactive waste (LLW), mixed LLW, hazardous waste, and sanitary/industrial (nonhazardous) waste. During construction, the action alternatives would each result in small quantities of wastes being generated. These amounts of additional waste would be well within the capability of the existing Y-12 waste management processes and facilities to handle. Waste generation under the Upgrade in-Place Alternative would be the same as the No Action Alternative. The UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives would result in progressively lower generation of the volume of all classes of waste at Y-12. Under any of the alternatives, the waste management treatment and disposal capabilities at Y-12 would be adequate to handle wastes generated by operations.

S.3.3.14 *Facility Accidents*

Radiological. Potential impacts from accidents were estimated using computer modeling for a variety of initiating events, including fires, explosions, and earthquakes. For all alternatives, the accident with the highest potential consequences to the offsite population is the aircraft crash into the EU facilities. Approximately 0.4 LCFs in the offsite population could result from such an accident in the absence of mitigation. An MEI would receive a maximum dose of 0.3 rem. Statistically, this MEI would have a 2×10^{-4} chance of developing a LCF, or about 1 in 5,000. This accident has a probability of occurring approximately once every 100,000 years. When probabilities are taken into account, the accident with the highest risk is the design-basis fire for HEU storage. For this accident, the maximum LCF risk to the MEI would be 4.4×10^{-7}, or about 1 in 2.3 million. For the population, the LCF risk would be 4×10^{-4}, or about 1 in 2,500.

The UPF, Capability-sized UPF, and No Net Production/Capability-sized UPF alternatives would decrease the overall Y-12 facility accident risks discussed above. This is because many of

the operations and materials in the existing Y-12 nuclear facilities would be consolidated into a UPF, reducing the accident risks associated with those older facilities. However, detailed design descriptions for a UPF are not available. Without these detailed descriptions, the reduction in accident risks cannot be quantified. New facilities such as the UPF would be constructed to current building standards and would be designed and built to withstand anticipated seismic accelerations and thus would prevent any significant earthquake damage. These new facilities would not experience significant damage from earthquakes and other external initiators. Also, controls would be incorporated into the design of new Y-12 facilities to reduce the frequency and consequence of internally initiated accidents. Therefore, the risks presented above for the current Y-12 facilities (both individually and additive) would be conservative for a UPF.

Nonradiological. The impacts associated with the potential release of the most hazardous chemicals used at Y-12 were modeled to determine whether any impacts could extend beyond the site boundaries. Based upon those modeling results, it was determined that no chemical impacts would cause adverse health impacts beyond the site boundary. In any event, emergency preparedness procedures would be employed to minimize potential impacts.

Most of the accidents analyzed in this SWEIS do not vary by alternative because the same facilities are potentially involved in the accidents and subsequent consequences. However, the construction and use of a UPF under either Alternative 2, 4, or 5 would replace existing facilities that were originally designed for other purposes with facilities that incorporate modern features to prevent the occurrence of accidents, as well as mitigate any accident consequences. Due to the design and facility construction, a UPF is expected to reduce the likelihood and severity of many accidents associated with the EU mission; however, the decreased risk cannot be quantified until specific safety analysis documents are prepared. Such documents would be prepared during detailed design activities, if the decision is made to proceed with any one of the alternatives that include a UPF.

The Y-12 Emergency Management Program incorporates all the planning, preparedness, response, recovery, and readiness assurance elements necessary to protect onsite personnel, the public, the environment, and property in case of credible emergencies involving Y-12 facilities, activities, or operations. Provisions are in place for Y-12 personnel to interface and coordinate with Federal, state, and local agencies and with those organizations responsible for off-site emergency response. In the event of an emergency at Y-12, a number of resources are available for mitigation, re-entry, and recovery activities associated with the response.

S.3.3.15 *Intentional Destructive Acts*

NNSA has prepared a classified appendix to this SWEIS that evaluates the potential impacts of malevolent, terrorist, or intentional destructive acts. Substantive details of terrorist attack scenarios, security countermeasures, and potential impacts are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks. Appendix E (Section E.2.14) discusses the methodology used to evaluate potential impacts associated with a terrorist threat and the methodology by which NNSA assesses the vulnerability of its sites to terrorist threats and then designs its response systems. As discussed in that section, NNSA's strategy for the mitigation of environmental impacts resulting from extreme events, including

intentional destructive acts, has three distinct components: (1) prevent or deter successful attacks; (2) plan and provide timely and adequate response to emergency situations; and (3) progressive recovery through long term response in the form of monitoring, remediation, and support for affected communities and their environment.

The classified appendix evaluates several scenarios involving intentional destructive acts for alternatives at Y-12 and calculates consequences to the noninvolved worker, maximally exposed individual, and population in terms of physical injuries, radiation doses, and LCFs. In general, the potential consequences of intentional destructive acts are highly dependent upon distance to the site boundary and size of the surrounding population—the closer and higher the surrounding population, the higher the consequences. In addition, it is generally easier and more cost-effective to protect new facilities, as new security features can be incorporated into their design. In other words, protection forces needed to defend new facilities may be smaller due to the inherent security features of a new facility. New facilities can, as a result of design features, better prevent attacks and reduce the impacts of attacks.

S.3.4 Preferred Alternative

The CEQ regulations require an agency to identify its preferred alternative to fulfill its statutory mission, if one or more exists, in a Draft EIS (40 CFR Part 1502.14[e]). Based on considerations of environmental, economic, technical, and other factors, the preferred alternative is Alternative 4, the Capability-sized UPF Alternative.

The benefits of executing the Capability-sized UPF project include reliable, long term, consolidated EU processing capability for the nuclear security enterprise with modern technologies and facilities; improved security posture for SNM; improved health and safety for workers; and a highly attractive return on investment. While operational today, the reliability of the existing facilities will continue to erode because of aging facilities and equipment. The UPF would replace multiple aging facilities with a modern facility that would be synergistic with the new HEUMF to provide a robust SNM capability and improve responsiveness, agility, and efficiency of operations (B&W 2004a).

With the consolidation of SNM operations, incorporation of integral security systems, and the 90 percent reduction of the Protected Area, the security posture would be greatly improved under the Capability-sized UPF Alternative. The use of engineered controls to reduce reliance on administrative controls and personal protection equipment to protect workers would improve worker health and safety. In addition, use of new technologies and processes may eliminate the need for some hazardous materials, reduce emissions, and minimize wastes. Cost savings and cost avoidance as a result of the Capability-sized UPF would include the following:

- Savings from consolidation related to right-sizing of facilities/footprint, more efficient operations, and simplification of SNM movement;
- Operating and maintenance cost reductions of approximately 33 percent from current operations;
- Reducing the number of workers required to access the Protected Area, which would improve the productivity of workers assigned to non-SNM activities that are currently

located in the Protected Area. By reducing the size of the PIDAS, it is forecast that approximately 600 employees would not have to enter the PIDAS. It is conceivable that a 20 percent efficiency in non-SNM operations could be realized by not being encumbered with access requirements and restrictions of the PIDAS. Projects that support non-SNM operations would be less expensive because of improved productivity. The life cycle cost analysis predicts an average annual savings over the 50-year facility life of $205 million in fiscal year (FY) 2007 dollars;

- Reducing the footprint of the PIDAS protected area by 90 percent (from 150 acres to 15 acres), which would allow better concentration of the protective force over a smaller area. It is expected that the average annual security costs over the 50 year facility life could be reduced by $32 million in FY 2007 dollars (B&W 2004a).

Significant improvements in cost and operational efficiency would be expected from a new Capability-sized UPF. These improvements would include the expectation that new, reliable equipment would be installed, greatly reducing the need for major corrective maintenance (e.g., less than half of the existing casting furnaces are normally available because of reliability problems). In addition, security improvements would be an integral part of the new facility, reducing the number of redundant personnel (e.g., two-person rule) currently required and improving the mass limitation on the items worked in an area. New facilities built within the Material Access Areas (MAAs) such as lunchrooms, break rooms, and rest rooms, are expected to greatly increase efficiencies over the current practice of multiple entries and exits daily into the MAAs. It is also expected that the inventory cycle would be greatly reduced because of more effective means of real-time inventory controls. A more efficient facility layout is expected to decrease material handling steps, including structurally, physically, and operationally integrated material lock-up facilities (B&W 2004a).

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Land Use	Land uses at Y-12 would be compatible with surrounding areas and with land use plans. No change to existing land uses or total acreage of Y-12.	Potential land disturbance of approximately 42 acres of previously disturbed land during construction of the CCC and a UPF. Land uses at Y-12 would remain compatible with surrounding areas and with the land use plans. No impacts on off-site land use.	Upgrading existing EU facilities and construction of the CCC would not alter existing land uses at Y-12 nor affect off-site land use.	Potential land disturbance of approximately 39 acres of previously disturbed land during construction of the CCC and a UPF. Land uses at Y-12 would remain compatible with surrounding areas and with the land use plans. No impacts on off-site land use
Visual Resources	Y-12 would remain a highly developed area with an industrial appearance, with no change to VRM classification.	Cranes would create short-term visual impacts during construction of the CCC and the UPF. UPF would reduce Protected Area from 150 acres to 15 acres, resulting in minor industrial density reduction, but no change to VRM classification.	Construction of the CCC would result in temporary visual impacts due to use of cranes. Otherwise, the visual impacts would be the same as No Action Alternative	Cranes would create short-term visual impacts during construction of the CCC and a UPF. UPF would reduce Protected Area from 150 acres to 15 acres, resulting in minor industrial density reduction, but no change to VRM classification.
Site Infrastructure	As Y-12 continues to downsize, trends indicate that energy usage and most other infrastructure requirements will reduce by 2-5% per year.	No increased demand on site infrastructure. Would use less than 5% of available electrical capacity and less than 1% of current site water usage. Reduces steam usage by at least 10% as inefficient facilities are closed.	Same as No Action Alternative.	Under the Capability-sized UPF Alternative, electricity and water usage would be about 60% of present usage. Implementation of the No Net Production/ Capability-sized Alternative would result in electricity and water usage being about 55% of present.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Traffic and Transportation	No significant change to the current workforce of approximately 6,500 workers, therefore, Level-of-Service (LOS) on area roads would not change. The impacts associated with radiological transportation would be insignificant (i.e., much less than one latent cancer fatality [LCF] annually).	Construction-related traffic would add maximum of 950 worker vehicles per day. Increased traffic would be similar to the HEUMF construction, which has not changed LOS on area roads. Operational impact on Y-12 traffic would be a minor reduction but would not affect LOS on area roads. The impacts associated with radiological transportation would be insignificant (i.e., much less than one latent cancer fatality [LCF] annually).	Construction-related traffic would add maximum of 300 worker vehicles per day. Increased traffic would be less than HEUMF construction, which has not changed LOS on area roads. Operational impacts on Y-12 traffic would be the same as the No Action Alternative. The impacts associated with radiological transportation would be insignificant (i.e., much less than one latent cancer fatality [LCF] annually).	Construction-related traffic would add maximum of 850 worker vehicles per day. Increased traffic would be similar to the HEUMF construction, which has not changed LOS on area roads. Reduction of operational workforce by approximately 2,600-3,100 workers would not change LOS on area roads under either alternative. Impacts from transportation of radiological materials under the Capability-sized Alternative would be approximately one-fourth as much as the impacts from the No Action Alternative; and for the No Net Production/Capability-sized Alternative approximately one-twentieth as much.
Geology and Soils	No significant disturbance or impact to geology and soils.	Construction of the UPF and CCC would disturb approximately 42 acres of previously disturbed land. Appropriate mitigation measures would minimize soil erosion and impacts.	Construction of the CCC would disturb about 7 acres of previously disturbed land. Appropriate mitigation measures would minimize soil erosion and impacts.	Construction of the CCC and a UPF would disturb about 39 acres of previously disturbed land. Appropriate mitigation measures would minimize soil erosion and impacts.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Air Quality and Noise	All criteria pollutant concentrations would remain below national and TDEC standards, except 8-hour ozone and $PM_{2.5}$, which exceed standards throughout the region. Greenhouse gases would be less than 0.12 percent of the statewide CO_2 emissions in Tennessee. Radiological air impacts from Y-12 emissions are expected to remain at or about current levels, i.e., 0.15 millirem per year (mrem/yr) to the maximally exposed individual (MEI), which is well below the annual dose limit of 10 mrem/yr under the National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61 Subpart H). The dose to the population living within 50 miles of Y-12.would be 1.5 person-rem. **Noise:** Most Y-12 facilities at sufficient distance from the Site boundary so noise levels are not distinguishable from background noise levels.	Temporary increases in pollutants would result from construction equipment, trucks, and employee vehicles; emissions would be less than one-half of regulatory thresholds for all criteria pollutants. Reduces toxic pollutants generated during operations. Greenhouse gases would be less than 0.12 percent of the statewide CO_2 emissions in Tennessee. Reduces radiological air impacts compared to the No Action Alternative as follows: MEI: 0.1 mrem/yr; Population: 1.0 person-rem. **Noise:** Construction activities and additional traffic would generate temporary increase in noise; noise levels would be representative of large-scale building sites. Noise levels would be below background noise levels at off-site locations within the city of Oak Ridge.	During construction of the CCC, there would be some temporary increases in pollutants but these would be much less than similar emissions under the UPF Alternative. Operational emissions would be the same as the No Action Alternative. Greenhouse gases would be less than 0.12 percent of the statewide CO_2 emissions in Tennessee. Radiological air impacts are expected to be the same as the No Action Alternative. **Noise:** Minor additional noise impacts because construction would take place at the CCC site and within facilities that are slightly farther from site boundary than UPF site.	Temporary increases in pollutants would result from construction equipment, trucks, and employee vehicles; emissions would be less than one-half of regulatory thresholds for all criteria pollutants. No significant new quantities of criteria or toxic pollutants would be generated during operations. Greenhouse gases would be less than 0.07 percent of the statewide CO_2 emissions in Tennessee. Reduces radiological air impacts compared to the No Action Alternative as follows: MEI: 0.08-0.09 mrem/yr; Population: 0.8-1.0 person-rem. **Noise:** Construction activities and additional traffic associated with a UPF and the CCC would generate temporary increase in noise; noise levels would be representative of large-scale building sites. Noise levels would be below background noise levels at off-site locations within the city of Oak Ridge.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Water Resources	Water usage: 2 billion gallons/year. Discharges within NPDES requirements. Ongoing stormwater runoff and erosion control management. No impact to groundwater.	Same as No Action Alternative, plus increased water usage of approximately 4 million gallons per year during construction of the UPF.	Water requirements during construction would not raise the average annual water use for Y-12 or cause any appreciable water resource impacts or changes beyond those described for the No Action Alternative. Operations impacts would be the same as No Action Alternative.	Increased water usage of approximately 3.6 million gallons during construction of the Capability-sized UPF and CCC. Operational water use for the Y-12 Site is expected to be reduced to approximately 1.2 billion gallons per year under the Capability-sized UPF Alternative. Increased water usage of approximately 3.6 million gallons during construction of the No Net Production/Capability-sized UPF and the CCC. Operational water use for the Y-12 Site is expected to be reduced to approximately 1.08 billion gallons per year under the No Net Production/ Capability-sized UPF Alternative.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Ecological Resources	Site is highly developed, consisting mainly of disturbed habitat. Wildlife diversity is low (mostly species associated with areas of human development. Continued minor impacts on terrestrial resources due to operations and human activities. No federally-listed or state-listed threatened or endangered species are known to be present at Y-12 Site.	Construction of the UPF and CCC would not impact ecological resources because new facilities would be sited on previously disturbed land. Operations would not impact ecological resources because activities would be located in heavily industrialized portions of Y-12. No federally-listed or state-listed threatened or endangered species are known to be present at Y-12 Site.	No impacts on ecological resources because construction activities would consist mostly of internal building modifications and the CCC in areas previously disturbed that do not contain habitat sufficient to support ecological resources. No federally-listed or state-listed threatened or endangered species are known to be present at Y-12 Site.	Construction of a UPF and the CCC would not impact ecological resources because new facilities would be sited on previously disturbed land. Operations would not impact ecological resources because activities would be located in heavily industrialized portions of Y-12. No federally-listed or state-listed threatened or endangered species are known to be present at Y-12 Site.
Cultural Resources	Y-12 currently has a proposed National Register Historic District of historic buildings associated with the Manhattan Project that are eligible for listing in the National Register of Historic Places. Preservation of cultural resources at Y-12, including the buildings in this proposed historic district, would continue under all alternatives. None of the alternatives would impact significant cultural resources at Y-12.	Same as No Action Alternative.	Same as No Action Alternative.	Same as No Action Alternative.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Socioeconomics	Operational workforce at Y-12 expected to remain stable with no significant increase or decreases. No appreciable changes in the regional socioeconomic characteristics over the 10-year planning period.	950 workers would be employed during the peak year of construction. This would result in a total of 3,990 jobs (950 direct and 3,040 indirect) created in the ROI, which would increase employment less than 2%. There would be an expected 11% decrease in operational workforce due to more efficient operations in UPF and reduced security area. These decreases in employment are not expected to change the regional socioeconomic characteristics.	300 workers would be employed during the peak year of construction. Total of 1,560 jobs (300 direct and 1,260 indirect) would be created in the ROI, which would increase employment less than 1%. Impact of operations would be the same as No Action.	About 850 construction workers during peak year of construction of a UPF and the CCC. About 2,720 indirect jobs would be created. Operation of the Capability-sized UPF would result in a decrease of approximately 2,600 jobs (about 40% of current). About 10,900 indirect jobs would be lost, representing a 4.6% total job loss for the ROI. Operation of the No Net Production/Capability-sized UPF would result in a decrease of about 3,100 workers (48% of current workforce). ROI indirect employment would decrease by about 13,020 resulting in a 5.5% decrease in jobs in the ROE. These decreases in employment are not expected to change the regional socioeconomic characteristics.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Environmental Justice	No significant health risks to the public. Radiological dose to the MEI would remain well below the annual dose limit of 10 mrem. Results from the monitoring program and modeling show that the maximum exposed individual would not be located in a minority or low-income population area. No special circumstances that would result in greater impact on minority, low-income, or American Indian populations than population as a whole.	Reduced impacts compared to No Action. Accident risks would decrease compared to No Action because many of the operations and materials in the existing Y-12 nuclear facilities would be consolidated into the UPF, reducing the accident risks associated with those older facilities.	Same as No Action Alternative.	Reduced impacts compared to No Action Accident risks would decrease compared to No Action because many of the operations and materials in the existing Y-12 nuclear facilities would be consolidated into the UPF, reducing the accident risks associated with those older facilities.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Health and Safety	All radiation doses from normal operations would be below regulatory standards with no statistically significant impact on the health and safety of workers or public. Dose from air emissions: MEI: 0.15 mrem/yr (9.0×10^{-8} LCFs). Population: 1.5 person-rem/yr (0.0009 LCFs). Dose from liquid effluents: MEI: 0.006 mrem per year (4.0×10^{-9}LCFs) Population:6.3 person-rem/yr (0.004 LCFs). Dose to Workers : 49.4 person-rem/yr (0.03 LCFs).	All radiation doses from normal operations would be below regulatory standards with no statistically significant impact on the health and safety of workers or public. Dose from air emissions: MEI: 0.1 mrem/yr (6.0×10^{-8} LCFs). Population: 1.0 person-rem/yr (0.0006 LCFs). Dose from liquid effluents would be same as No Action Alternative. Dose to Workers : 21.1 person-rem/yr (0.013 LCFs).	Same as No Action Alternative.	All radiation doses from normal operations would be below regulatory standards with no statistically significant impact on the health and safety of workers or public. **Capability-sized UPF** Dose from air emissions: MEI: 0.09 mrem/yr (5.0×10^{-8} LCFs). Population: 1.0 person-rem/yr (0.0005 LCFs). Dose to Workers : 18.8 person-rem/yr (0.01 LCFs). **No Net Production/Capability-sized UPF** Dose from air emissions: MEI: 0.08 mrem/yr (4.0×10^{-8} LCFs). Population: 0.8 person-rem/yr (0.0005 LCFs). Dose to Workers : 16.5 person-rem/yr (0.009 LCFs) For both the Capability-sized UPF and the No Net Production/Capability-sized UPF, the dose from liquid effluents would be same as No Action Alternative.

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Waste Management (Operational Waste Volumes)	Expected volume of waste generation: LLW liquid: 713gal LLW solid: 9,405 yd^3 Mixed LLW liquid: 1,096 gal Mixed LLW solid: 126 yd^3 Hazardous: 12 tons Nonhazardous: 10,374 tons	Expected volume of waste generation: LLW liquid: 476 gal LLW solid: 5,943 yd^3 Mixed LLW liquid: 679 gal Mixed LLW solid: 81 yd^3 Hazardous: 12 tons Nonhazardous: 9,337 tons	Expected volume of waste generation: LLW liquid: 713 gal LLW solid: 9,405 yd^3 Mixed LLW liquid: 1,096 gal Mixed LLW solid: 126 yd^3 Hazardous: 12 tons Nonhazardous: 10,374 tons	Expected volume of waste generation: **Capability-sized UPF**: LLW liquid: 428 gal LLW solid: 5,643 yd^3 Mixed LLW liquid: 640 gal Mixed LLW solid: 76 yd^3 Hazardous: 7.2 tons Nonhazardous: 6,224 tons **No Net Production/Capability-sized UPF**: LLW liquid: 403 gal LLW solid: 5,314 yd^3 Mixed LLW liquid: 619 gal Mixed LLW solid: 71 yd^3 Hazardous: 7.2 tons Nonhazardous: 5,705 tons

Table S.3.3-1. Comparison of Environmental Impacts and Parameters Among No Action Alternative, UPF Alternative, Upgrade in-Place Alternative, Capability-sized UPF Alternative, and No Net Production/Capability-sized UPF Alternative *(continued)*.

Site / Environmental Component	No Action Alternative	UPF Alternative	Upgrade in-Place Alternative	Capability-sized and No Net Production/Capability-sized UPF Alternatives
Facility Accidents	The, bounding accident with the most severe consequences would be an aircraft crash into the EU facilities. Approximately 0.4 LCFs in the offsite population could result. MEI dose: 0.3 rem MEI LCF risk: $2x10^{-4}$ chance of developing a LCF, or about 1 in 5,000. When probabilities are taken into account, the accident with the highest risk is the design-basis fire for HEU storage. For this accident, the maximum LCF risk to the MEI would be $4.4x10^{-7}$, or about 1 in 2.3 million. For the population, the LCF risk would be $4x10^{-4}$, or about 1 in 2,500.	No greater impacts than the No Action Alternative. Accident risks would decrease compared to No Action because many of the operations and materials in the existing Y-12 nuclear facilities would be consolidated into the UPF, reducing the accident risks associated with those older facilities.	No greater impacts than the No Action Alternative. Accident risks would likely decrease compared to No Action because the existing EU facilities would be upgraded to contemporary environmental, safety, and security standards to the extent possible.	Accident risks would decrease compared to No Action because many of the operations and materials in the existing Y-12 nuclear facilities would be consolidated into the UPF, reducing the accident risks associated with those older facilities.

Note: The dose-to-LCF conversion factor is based on 6×10^{-4} LCFs per person-rem.

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