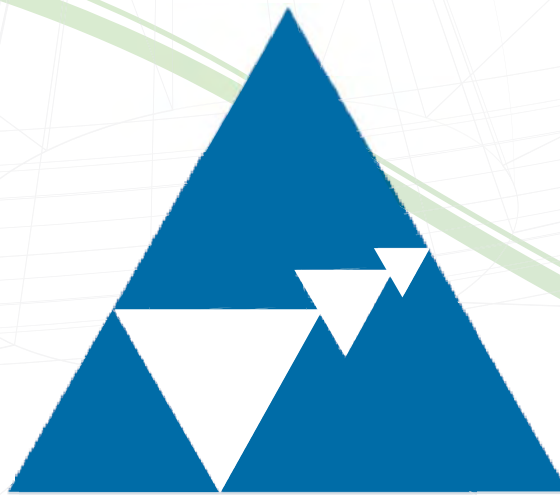




DOE/EIS-0236-S4

# Final Complex Transformation Supplemental Programmatic Environmental Impact Statement

## Summary



**COMPLEX**transformation

National Nuclear Security Administration  
U.S. Department of Energy

October 2008



## COVER SHEET

**RESPONSIBLE AGENCY:** U.S. Department of Energy, National Nuclear Security Administration

**TITLE:** Final Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS, DOE/EIS-0236-S4)

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**ABSTRACT:** The National Nuclear Security Administration (NNSA), an agency within the Department of Energy, has the responsibility to maintain the safety, security, and reliability of the United States' nuclear weapons stockpile. This Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS) analyzes the potential environmental impacts of reasonable alternatives to continue transformation of the nuclear weapons complex to be smaller, and more responsive, efficient, and secure in order to meet national security requirements. The current Complex consists of sites located in seven states (California, Missouri, Nevada, New Mexico, South Carolina, Tennessee, and Texas). This SPEIS evaluates alternatives that would restructure special nuclear materials manufacturing and research and development facilities; consolidate special nuclear materials throughout the Complex; consolidate, relocate, or eliminate duplicative facilities and programs and improve operating efficiencies; and identify one or more sites for conducting NNSA flight test operations.

**COOPERATING AGENCIES:** The Department of the Air Force and the U.S. Army Garrison White Sands are cooperating agencies in the preparation of this Complex Transformation SPEIS.

**PUBLIC COMMENTS:** The Draft Complex Transformation SPEIS was issued for public review and comment on January 11, 2008. Comments on the Draft SPEIS were requested during a period of 90 days following publication of the U.S. Environmental Protection Agency's (EPA's) Notice of Availability in the *Federal Register*. Twenty public hearings to solicit comments on the Draft SPEIS were held during the public comment period. Prior to the end of this comment period, NNSA extended the public comment period by 20 additional days, until April 30, 2008. All comments received during the comment period were considered during preparation of the Final SPEIS. Late comments were also considered, to the extent practicable.

The Final SPEIS contains revisions and new information based in part on comments received on the Draft SPEIS. Vertical change bars in the margins indicate the locations of these revisions and new information. Volume 3 contains the comments received during the public comment period on the Draft SPEIS and NNSA's responses to the comments. NNSA will use the analysis presented in this Final SPEIS, as well as other information, in preparing the Record(s) of Decision (RODs) regarding Complex Transformation. NNSA will issue one or more RODs no sooner than 30 days after the EPA publishes a Notice of Availability of this Final SPEIS in the *Federal Register*. This document and related information are available on the Internet at [www.ComplexTransformationSPEIS.com](http://www.ComplexTransformationSPEIS.com).

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Prepared by:

National Nuclear Security Administration  
U.S. Department of Energy





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## ACRONYMS AND ABBREVIATIONS

CMRR	Chemistry and Metallurgy Research Building Replacement Facility Chemistry and Metallurgy Research Building Replacement Facility-
CMRR-NF	Nuclear Facility
CFF	Contained Firing Facility
D&D	Decontamination and Decommissioning
DARHT	Dual-Axis Radiographic Hydrodynamic Test
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EPA	U. S. Environmental Protection Agency
FONSI	Finding of No Significant Impact
HEU	Highly Enriched Uranium
HEUMF	Highly Enriched Uranium Materials Facility
LANL	Los Alamos National Laboratory
LANL SWEIS	<i>Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory</i>
LCF	Latent Cancer Fatality
LLNL	Lawrence Livermore National Laboratory
LLW	Low Level Waste
MEI	Maximally Exposed Individual
NEPA	<i>National Environmental Policy Act</i>
NNSA	National Nuclear Security Administration
NOI	Notice of Intent
NPT	<i>Nuclear Non-proliferation Treaty</i>
NTS	Nevada Test Site
ORR	Oak Ridge Reservation
Pantex	Pantex Plant
R&D	Research and Development
ROD	Record of Decision
ROI	Region of Influence
RRW	Reliable Replacement Warhead
SEAB	Secretary of Energy Advisory Board
SNL/NM	Sandia National Laboratories/New Mexico
SNL/CA	Sandia National Laboratories/California
SNM	Special Nuclear Material(s)
SRS	Savannah River Site
SSM PEIS	<i>Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management</i>
SSP	Stockpile Stewardship Program
TA	Technical Area
TTR	Tonopah Test Range
WSMR	White Sands Missile Range

## CHEMICALS AND UNITS OF MEASURE

Ci	curie
ft	feet
ft <sup>2</sup>	square feet
gal	gallons
hr	hour
MGY	million gallons per year
mi	miles
mi <sup>2</sup>	square miles
mrem	millirem (one-thousandth of a rem)
MW	megawatt
MWe	megawatt electric
O <sub>3</sub>	ozone
t	metric tons
yd <sup>3</sup>	cubic yards
yr	year

# Summary

## S.1 INTRODUCTION

This *Complex Transformation Supplemental Programmatic Environmental Impact Statement*<sup>1</sup> (SPEIS) evaluates alternatives for transforming the nuclear weapons complex (Complex) into a smaller, more efficient enterprise that can respond to changing national security challenges. A more responsive enterprise would help ensure the long-term safety, security, and reliability of the nuclear weapons stockpile while reducing the possibility that the United States (U.S.) would need to resume nuclear testing. These changes would build upon decisions made in the 1990s following the end of the Cold War and the cessation of U.S. nuclear weapons testing.

National security policies require the U.S. Department of Energy (DOE), through the National Nuclear Security Administration (NNSA), to maintain the U.S. nuclear weapons stockpile,<sup>2</sup> as well as core competencies in nuclear weapons.<sup>3</sup> Since completion in 1996 of the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS, DOE 1996d) and associated Record of Decision (ROD), DOE has implemented these policies through the Stockpile Stewardship Program (SSP).<sup>4</sup> The SSP emphasizes development and application of greatly improved scientific and technical capabilities to assess the safety, security, and reliability of existing nuclear warheads without the use of nuclear testing. Throughout the 1990s, DOE also took steps to consolidate the Complex from 12 sites to its current configuration of three national laboratories (plus an associated flight test range), four industrial plants, and a nuclear test site, as shown in Figure S.1-1.

### National Nuclear Security Administration

Established by Congress in 2000, the National Nuclear Security Administration (NNSA) is a separately organized agency within the U.S. Department of Energy (DOE).

NNSA's primary mission is to provide the U.S. with safe, secure, and reliable nuclear weapons and to maintain core competencies in nuclear weapons. The NNSA needs a nuclear weapons enterprise with facilities capable of supporting this highly technical mission.

NNSA also has complementary missions in nuclear nonproliferation programs, excess fissile materials disposition, and provision of naval nuclear propulsion systems.

NNSA now proposes to continue the transformation of the Complex by further consolidating operations, which could result in the relocation of activities among sites. These changes, particularly alternatives that involve the construction or modification of major nuclear facilities, could have environmental impacts. These changes could also produce significant benefits, including improved safety, security, and environmental systems, reduced operating costs, and greater responsiveness to future changes in national

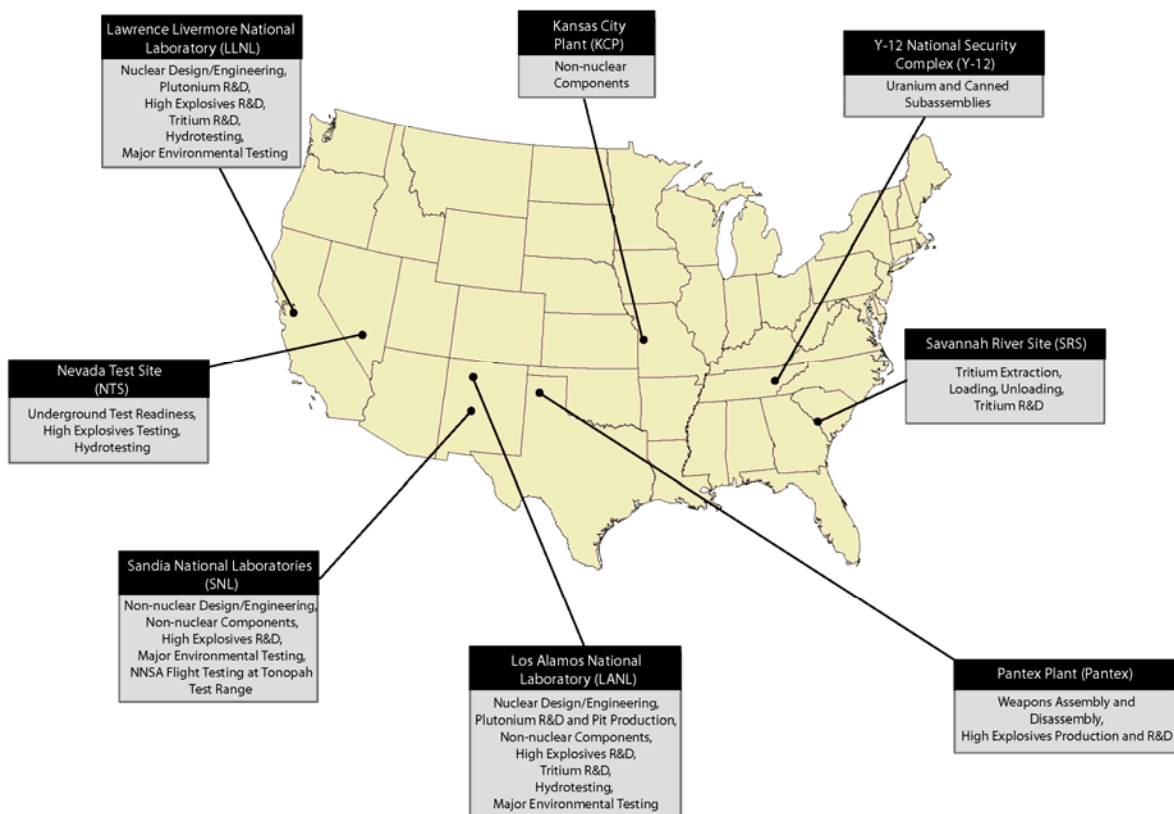
<sup>1</sup> In the Notice of Intent to prepare this SPEIS (71 FR 61731), NNSA's proposed action was referred to as "Complex 2030." NNSA now believes that the term Complex Transformation better reflects the proposed changes and alternatives evaluated, and has renamed this document the Complex Transformation SPEIS.

<sup>2</sup> The nuclear weapons stockpile consists of nuclear weapons that are both deployed to the military services ("operationally-deployed") and "reserve weapons" that could be used to augment the operationally-deployed weapons or to provide replacements for warheads that experience safety or reliability problems.

<sup>3</sup> Core competencies in nuclear weapons include research, design, development, and testing (including the ability to conduct nuclear testing); reliability assessment; certification; manufacturing; and surveillance capabilities.

<sup>4</sup> In 1996, the program was named the Stockpile Stewardship and Management Program. It is now called the Stockpile Stewardship Program. There has been no change in the content or purpose of the program.

security policy. NNSA's preferred alternatives (described in Section S.3.17) would achieve these benefits.



**Figure S.1-1—Nuclear Weapons Complex Sites and Current Major Responsibilities**

The alternatives analyzed in this SPEIS are divided into two categories: programmatic and project-specific. Programmatic alternatives involve the restructuring of facilities that use or store significant (i.e., Category I/II<sup>5</sup>) quantities of special nuclear material (SNM).<sup>6</sup> These facilities produce plutonium components (commonly called pits), produce highly-enriched uranium (HEU) components and canned subassemblies (CSAs), and assemble and disassemble nuclear weapons (including related high explosive component fabrication).

This SPEIS analyzes the potential environmental impacts of locating these facilities at up to three of five NNSA sites: Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico; Nevada Test Site (NTS) north of Las Vegas, Nevada; Pantex Plant (Pantex) in Amarillo, Texas;

<sup>5</sup> Special nuclear material is categorized into Security Categories I, II, III, and IV based on the type, attractiveness level, and quantity of material. Categories I and II require the highest level of security.

<sup>6</sup> As defined in section 11 of the *Atomic Energy Act of 1954*, SNM is: (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235; or (2) any material artificially enriched by any of the foregoing and any other material which the U.S. Nuclear Regulatory Commission determines to be special nuclear material.

Savannah River Site (SRS) in Aiken, South Carolina; and Y-12 National Security Complex (Y-12) in Oak Ridge, Tennessee. The programmatic alternatives include different configurations of facilities (consolidated or distributed) and different capacities (ranging from 200 units per year with multiple shifts to about 10 units per year). A minimum set of fundamental capabilities is required under all alternatives to meet national security requirements. In each of these programmatic action alternatives, NNSA also proposes to consolidate the storage of SNM currently at Pantex.

Based on this SPEIS and other information, NNSA expects to decide where facilities for plutonium, HEU, and assembly/disassembly activities would be located, whether to construct new or renovate existing facilities for these functions, and whether to further consolidate SNM storage. The programmatic alternatives are described in more detail in sections S.3.3 through S.3.7. Any programmatic decisions resulting from this SPEIS may require further project-specific *National Environmental Policy Act* (NEPA) review before implementation.

This SPEIS also analyzes project-specific alternatives to restructure research and development (R&D) and testing facilities. NNSA intends this SPEIS to provide sufficient analysis of potential environmental impacts to enable implementation of decisions related to these project-specific alternatives without further NEPA review. The decisions NNSA expects to make include:

- whether to eliminate or consolidate duplicative facilities for tritium and high explosives R&D, hydrodynamic testing, major environmental test facilities, and certain weapons support functions; where these facilities and operations would be located; and where construction activities might be required for future operations; and
- where to conduct NNSA flight test operations for gravity weapons.

The project-specific alternatives are described in sections S.3.8 through S.3.13.

The potential environmental impacts of each alternative are summarized in Section S.3.16 and discussed in detail in Chapter 5. NNSA has identified its preferred programmatic and project-specific alternatives in this Final SPEIS. These are described in Section S.3.17.

### **S.1.1 Relevant History**

In 1996, DOE prepared the SSM PEIS, which evaluated alternatives for maintaining the safety and reliability of the U.S. nuclear weapons stockpile and preserving competencies in nuclear weapons in the post-Cold War era. The SSM PEIS ROD (61 FR 68014) documented important decisions related to fulfilling these requirements without underground nuclear testing. Since issuing that ROD, NNSA has been implementing those decisions.

In the 1996 SSM PEIS, no new production facilities were proposed. The enduring types of weapons in the stockpile were at the mid-point of their anticipated design life of 20-25 years, and the life extension program plans for the enduring weapons were not yet fully developed. The weapons in the stockpile are now more than a decade older than when the SSM PEIS was prepared. Because the U.S. will maintain a nuclear deterrent in the form of a safe, secure, and

reliable stockpile with the smallest number of weapons possible, NNSA needs to preserve its core competencies in nuclear weapons, and invest in some replacement nuclear facilities for research and production. Because these major nuclear facilities are more than 50 years old, the ability to keep them safe, secure, and performing within realistic economic constraints is declining.

The 2001 Nuclear Posture Review<sup>7</sup> concluded that a nuclear deterrent relying on a balance of capabilities and a smaller deployed weapons stockpile would provide a credible deterrent in a future of uncertain and evolving threats. The Nuclear Posture Review was the foundation for the *Moscow Treaty*,<sup>8</sup> which was ratified by the U.S. and Russia in 2003. Implementation of the *Moscow Treaty* is cutting the U.S. nuclear weapons stockpile to about one-half the size in the *Strategic Arms Reduction Treaty II*, which was ratified by the U.S. in 1996 and Russia in 2000. To achieve the new balance between a responsive infrastructure and deployed stockpile size, one of the main purposes of the proposed actions in this SPEIS is to make the Complex more responsive. As discussed in Section S.2.1, responsiveness means the ability to successfully execute requirements of the national security mission on schedule and to efficiently react to new developments. A transformed Complex with demonstrated capabilities would ensure that the nation's nuclear deterrent would remain credible, and could support additional reductions in the stockpile, if directed by the President. A transformed Complex is also expected to be safer, more secure, and less costly to maintain.

### **S.1.2 Proposed Approach to Transformation of the Complex**

In 2006, NNSA developed a planning scenario for the future of the Complex (NNSA 2006). This was a continuation of NNSA's effort to establish a Complex that is more responsive to changing national security requirements, as determined by the President and Congress, and that is operated as efficiently as possible. Accordingly, NNSA developed the planning scenario after evaluating how significant economic and security benefits could be realized if the Complex were reduced in size, capacity, number of sites with Category I/II SNM (and locations of Category I/II SNM within sites), and redundant activities at facilities eliminated—in other words, whether and how the Complex could be made more secure and efficient.

NNSA's proposed approach to continuing transformation of the Complex builds on existing programs and management structures, so that transformation can be accomplished within currently projected funding levels as much as practicable. The cost and potential environmental impacts of the alternative actions in this SPEIS are primarily associated with the potential construction of replacement nuclear facilities. Thus, a wide range of alternative configurations for these nuclear facilities is being evaluated from an economic perspective. NNSA has completed economic studies of the alternatives (TechSource 2007a, 2007b, 2007c, 2007d, 2008a, 2008b, 2008c, 2008d, 2008e, 2008f, 2008g).

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<sup>7</sup> The Nuclear Posture Review is a classified report prepared by the Department of Defense that establishes the broad outline for future U.S. nuclear strategy, force levels, and infrastructure.

<sup>8</sup> Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions



### S.1.3 The Nuclear Weapons Complex Today

As shown on Figure S.1-1, the current Complex consists of eight sites located in seven states. The Complex enables NNSA to design, develop, manufacture, maintain, and work on nuclear weapons; certify their safety, security, and reliability; conduct surveillance on weapons in the stockpile; store Category I/II SNM; and dismantle and disposition retired weapons. Major sites within the Complex and their current primary responsibilities are described below.

**Y-12 National Security Complex (Y-12) (Oak Ridge, Tennessee)** – Y-12 manufactures uranium components for nuclear weapons, cases, and other nuclear weapons components comprising CSAs; evaluates and tests these components; maintains Category I/II quantities of highly-enriched uranium; conducts component dismantlement, storage, and disposition of their nuclear materials; and supplies highly-enriched uranium for use in naval reactors.

**Savannah River Site (SRS) (Aiken, South Carolina)** – SRS extracts tritium and performs loading, unloading, surveillance of tritium reservoirs, and conducts tritium R&D.<sup>9</sup> SRS does not maintain Category I/II quantities of SNM associated with NNSA weapons activities, but does maintain Category I/II quantities of SNM associated with other DOE activities.

**Pantex Plant (Pantex) (Amarillo, Texas)** – Pantex dismantles retired weapons; fabricates high-explosive (HE) components and performs HE R&D; assembles HE, nuclear, and non-nuclear components into nuclear weapons; work on and modifies weapons; performs non-intrusive pit modification;<sup>10</sup> and evaluates and performs surveillance of weapons. Pantex maintains Category I/II quantities of SNM for the weapons program and stores SNM in the form of surplus plutonium pits pending transfer to SRS for disposition.

**Kansas City Plant<sup>11</sup> (KCP) (Kansas City, Missouri)** – KCP manufactures and procures non-nuclear weapons components, and evaluates and tests these weapons components. KCP has no SNM.

**Los Alamos National Laboratory (LANL) (Los Alamos, New Mexico)** – LANL conducts research, design, and development of nuclear weapons; designs and tests advanced technology concepts; provides safety, security, and reliability assessments and certification of stockpile weapons; maintains production capabilities for limited quantities of plutonium components (i.e., pits) for delivery to the stockpile; manufactures nuclear weapon detonators for the stockpile; conducts plutonium and tritium R&D, hydrotesting, HE R&D, and environmental testing; and maintains Category I/II quantities of SNM.

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<sup>9</sup> Tritium is an isotope of hydrogen produced in nuclear reactors and used in nuclear weapons. Because of its short half-life, tritium must be replenished routinely. The Watts Bar Nuclear Power Plant (Spring City, Tennessee) is a commercial nuclear power plant owned and operated by the Tennessee Valley Authority (TVA) which produces tritium that is extracted from target rods at SRS. As a commercial power station, the Watts Bar Plant is not considered part of the nuclear weapons complex.

<sup>10</sup> A pit is the central core of a nuclear weapon, usually made of plutonium or enriched uranium. Non-intrusive pit modification is modification to the external surfaces and features of a pit.

<sup>11</sup>The General Services Administration (GSA), as the lead agency, and NNSA, as a cooperating agency, prepared an Environmental Assessment and Finding of No Significant Impact regarding the potential environmental impacts of moving the facilities and infrastructure for the non-nuclear production activities conducted at the KCP to a number of locations (GSA 2008). This SPEIS does not assess alternatives for the activities conducted at the KCP (see Section S.3.2.10 and Section 1.5.2.1).

**Lawrence Livermore National Laboratory (LLNL) (Livermore, California)** – LLNL conducts research, design, and development of nuclear weapons; designs and tests advanced technology concepts; provides safety, security, and reliability assessments and certification of stockpile weapons; conducts plutonium and tritium R&D, hydrotesting, HE R&D, and environmental testing; and maintains Category I/II quantities of SNM.

**Sandia National Laboratories (SNL) (Albuquerque, New Mexico; Livermore, California; and other locations)** – SNL conducts systems engineering of nuclear weapons; conducts research, design, and development of non-nuclear components; manufactures non-nuclear weapons components including neutron generators for the stockpile; provides safety, security, and reliability assessments of stockpile weapons; and conducts HE R&D and environmental testing. In 2008, SNL/NM completed removal of its Category I/II SNM. It no longer stores or uses Category I/II SNM on a permanent basis, although it may use Category I/II SNM for limited activities in the future. The principal laboratory is located in Albuquerque, New Mexico (SNL/NM); a division of the laboratory (SNL/CA) is located in Livermore, California. SNL also operates the Tonopah Test Range (TTR) near Tonopah, Nevada, for flight testing of gravity weapons. No Category I/II quantities of SNM are permanently maintained at the TTR, although some test operations have involved SNM.

**Nevada Test Site (NTS) (65 miles northwest of Las Vegas, Nevada)** – NTS maintains the capability to conduct underground nuclear testing; conducts high hazard experiments involving nuclear material and high explosives; provides the capability to disposition a damaged nuclear weapon or improvised nuclear device; conducts non-nuclear experiments; conducts hydrotesting and HE testing; conducts research and training on nuclear safeguards, criticality safety, and emergency response; and maintains Category I/II quantities of SNM.

#### **S.1.4 Public Participation**

The process of preparing an environmental impact statement provides opportunities for public involvement. These opportunities occur during the scoping process and the public comment period. The scoping process is required by 40 CFR 1501.7 and 10 CFR Part 311, while the public comment period is required by 40 CFR 1503.1 and 10 CFR Part 313. Section S.1.4.1 summarizes the scoping process, major comments received from the public during scoping, and changes made by NNSA in response to those comments. Section S.1.4.2 summarizes the public comment period process, the major comments raised by the public at that time, and NNSA's responses to these comments. Volume III, Parts 1 and 2 of the SPEIS (Comment Response Document) considers all of the comments that were submitted on the Draft SPEIS and NNSA's responses.

##### **S.1.4.1 Scoping Process**

The Council on Environmental Quality (CEQ) NEPA regulations require “an early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action” (40 CFR 1501.7). This is known as the public scoping process. The purpose of this scoping process is to: (1) inform the public about the

proposed action and the alternatives being considered, and (2) identify and clarify issues by soliciting public comments.

NNSA published a Notice of Intent (NOI) in the *Federal Register* on October 19, 2006 (71 FR 61731) and held public scoping meetings in November and December 2006 near all sites that might be affected and in Washington, D.C. In addition to the meetings, the public was encouraged to provide comments via mail, e-mail, and fax. All comments received during the 90-day scoping period, as well as late comments, were reviewed by NNSA in preparing the Draft Complex Transformation SPEIS.

More than 33,000 comment documents were received from individuals, interested groups, tribes, and Federal, State, and local officials during the public scoping period. A majority of the documents received were copies of 20 different form letters or e-mail campaigns. A summary of the major scoping comments is provided below and in more detail in Appendix D.

#### **S.1.4.1.1 Summary of Major Scoping Comments**

The majority of the comments received during scoping were related to nuclear weapon policies. Many commentors expressed opposition to the nuclear weapons program, stating that the United States is violating the *Nuclear Non-Proliferation Treaty* (NPT). Many of the comments stated that NNSA should assess an additional alternative—disarmament in compliance with the NPT—and not design or build new nuclear weapons. Commentors expressed opposition to any new nuclear facilities. There was specific opposition to expansion of pit production at LANL, as well as the proposed consolidated plutonium center (CPC). Commentors stated that the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (LANL SWEIS) should be issued after the Complex Transformation SPEIS. Many commentors stated that a reliable replacement warhead (RRW) was not needed and should not be pursued. Some commentors stated that NNSA should develop a fair and objective statement for the purpose and need that takes into account the broader missions of NNSA, including prevention of proliferation, implementation of the NPT, and development of strategies to ensure the peaceful denuclearization of the world. Some commentors asked why NNSA was not assessing a consolidated nuclear production center (CNPC) (one site for plutonium, enriched uranium, and weapons assembly/disassembly) as a reasonable alternative for transforming the Complex. Commentors also stated that pits will last up to 100 years and potentially longer; therefore, there is no need for new pit production capacity. Some commentors asked why KCP's activities were not being considered in this SPEIS and stated that NNSA was not representing the full cost of Complex Transformation by excluding alternatives involving activities currently performed there. Commentors requested an analysis of the risks and impacts of terrorist attacks on NNSA facilities. Support for the continuation of the NNSA flight test mission at TTR was received from the Tonopah community.

As a result of the scoping process, NNSA made the following significant changes to the scope of the SPEIS as originally described in the 2006 NOI:

- A Consolidated Centers of Excellence (CCE) Alternative was added as a reasonable alternative (Section 3.5). Under this alternative, NNSA would consolidate plutonium,

uranium, and weapon assembly/disassembly functions into a CNPC at one site or into Consolidated Nuclear Centers (CNCs) at two sites.

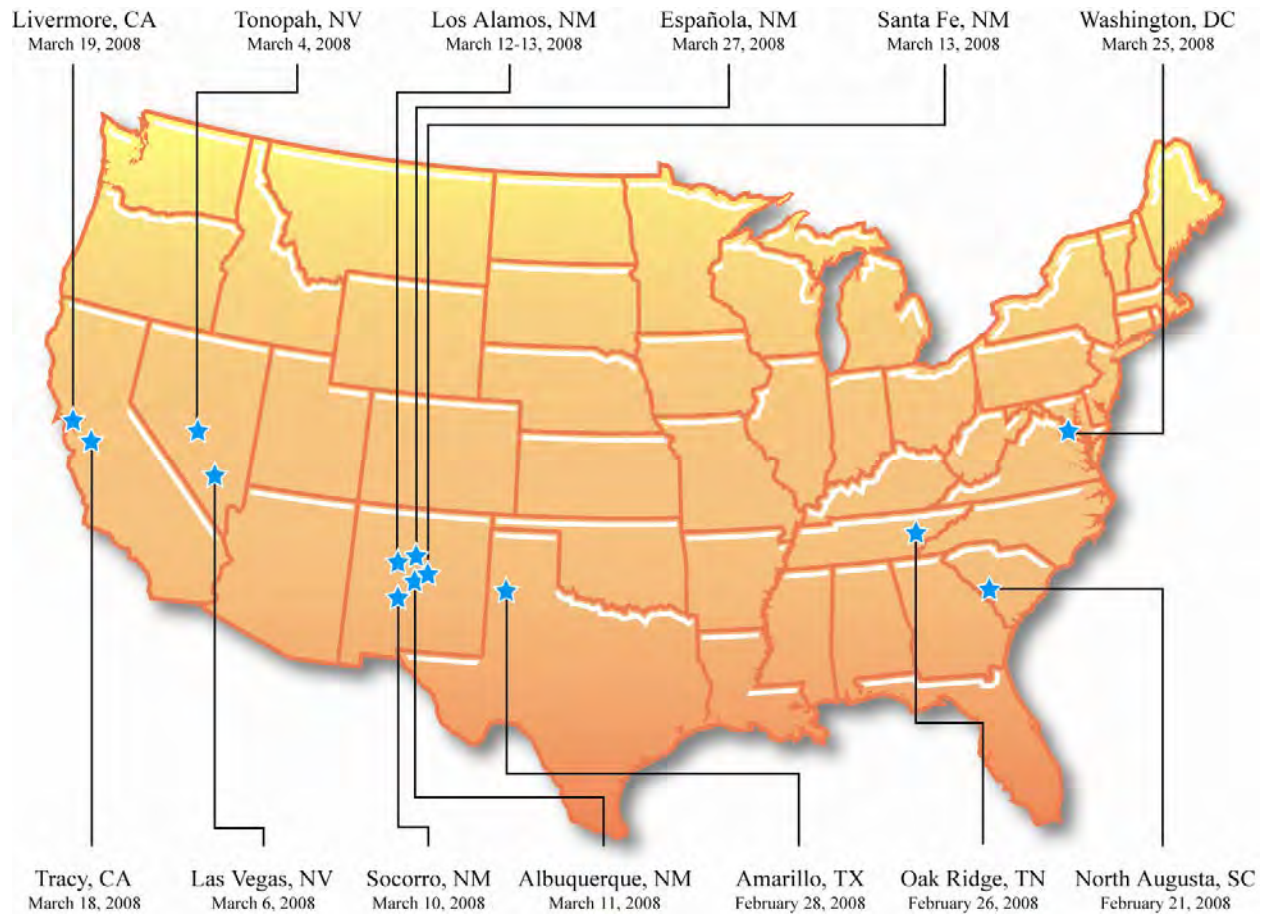
- A discussion was added of effects on the Complex of an even smaller nuclear weapons stockpile than the current level envisioned under the *Moscow Treaty* (Section 3.6.3).
- A discussion was added of an RRW's possible impact on the nuclear weapons stockpile and decisions about Complex Transformation. An analysis was added to determine what, if any, changes to the Complex would be required if an RRW were to be developed (Chapter 2).
- A more detailed analysis of the potential impacts of NNSA flight testing was added in order to inform the public and NNSA of the potential socioeconomic impacts on the Tonopah community from the alternatives (Section 5.15.4.2).
- An analysis of a smaller pit production capacity (50–80 pits per year) was added (Section 3.4.1.2).
- A more detailed explanation of why the KCP's operations are not included in this SPEIS was added (Section 1.5.2.1).

Each of these changes was included in the Draft SPEIS issued for public review

#### **S.1.4.2      *Public Comments on the Draft SPEIS***

Once a draft environmental impact statement is prepared, regulations require that it be issued to obtain public comments (40 CFR 1503.1). On January 11, 2008, NNSA announced a 90-day public comment period— twice the legal requirement —for the Draft Complex Transformation SPEIS beginning on January 11, 2008, and scheduled to end on April 10, 2008 (73 FR 2023). In response to public requests, on April 11, 2008, NNSA announced in the *Federal Register* that it was extending the comment period until April 30, 2008 (73 FR 19829). All comments received were considered.

During the comment period, NNSA held 20 public hearings in the following locations: North Augusta, SC (two hearings), Oak Ridge, TN (two hearings), Amarillo, TX (two hearings), Tonopah, NV (one hearing), Las Vegas, NV (two hearings), Socorro, NM (one hearing), Albuquerque, NM (two hearings), Los Alamos, NM (two hearings), Santa Fe, NM (one hearing), Tracy, CA (one hearing), Livermore, CA (two hearings), Washington, D.C. (one hearing), and Española, NM (one hearing). Figure S.1.4.2-1 shows the locations and dates of the hearings. In addition, NNSA encouraged the public to provide comments via mail, facsimile, or electronically via e-mail or the project Web site ([www.ComplexTransformationSPEIS.com](http://www.ComplexTransformationSPEIS.com)).



**Figure S.1.4.2-1—Public Hearing Locations and Dates**

#### S.1.4.2.1 Summary of Major Comments Received During the Public Comment Period on the Draft Complex Transformation SPEIS

NNSA received approximately 100,000 comment documents (including approximately 98,000 comment documents as part of 38 e-mail, letter, and postcard campaigns) from individuals, interested groups, tribal governments, and Federal, State, and local agencies during the comment period. Approximately 1,000 comment documents were received via e-mail, and approximately 625 commenters spoke at the public hearings. The majority of the comments focused on policy issues related to the appropriateness or the need for nuclear weapons:

- Many commenters oppose nuclear weapons and transformation of the nuclear weapons Complex. They state that:
  - The United States is not in compliance with Article VI of the NPT;
  - Nuclear weapons lead to nuclear weapons proliferation;
  - Nuclear weapons are immoral;
  - Nuclear weapon activities put NNSA sites and surrounding communities at risk of accidents and terrorist activities;

- Nuclear weapons take money away from the clean-up of sites already contaminated;
  - More nuclear weapon activities will produce contamination at NNSA sites; and
  - Nuclear weapon activities result in adverse health and safety impacts in communities surrounding NNSA sites.
- 
- Many commentors stated that the 2001 Nuclear Posture Review does not reflect the changed threat environment since September 11, 2001, and should not be used by NNSA in establishing or defining programmatic requirements. Commentors stated that Complex Transformation should not proceed before a new Nuclear Posture Review is completed in 2009 by the incoming Administration, as required by the Congress. NNSA's "transformation" proposal should be withdrawn until then.
  - Many commentors believe that there are better ways in which taxpayer money could be spent, such as: feeding the poor, providing better housing, improving energy efficiency, and cleaning up contaminated sites.
  - Many commentors stated that there was no need to build any nuclear weapons and NNSA failed to consider an alternative that would provide a nuclear weapons complex that would not manufacture them. Many commentors stated that NNSA should operate only those facilities needed for the safe, secure, and efficient dismantlement of nuclear weapons and the disposition of their parts. Many commentors stated that NNSA should include a No Production Alternative under which NNSA would pursue dismantlement and refrain from further weapons design and production.
  - Many commentors questioned the need for new pit production.
  - Many commentors oppose an RRW Program. Many commentors believe an RRW Program was just an excuse to develop new design nuclear weapons.
  - Many commentors stated that the activities at the Kansas City Plant (KCP) should be included in the SPEIS. Commentors stated that KCP is an integral part of the nuclear weapons complex and therefore alternatives for its modernization should be considered in the SPEIS rather than in a separate environmental assessment. By excluding alternatives for activities currently performed at KCP, commentors stated that NNSA was not accurately representing the impacts of the entire nuclear weapons complex.
  - Several Native American groups (the Santa Clara Pueblo, Pueblo de San Ildefonso, and the Western Shoshone National Council) submitted comments on the Draft SPEIS. Some of the major comments from these groups focused on the need for government-to-government consultations prior to the issuance of a ROD, and a more detailed analysis of environmental impacts on tribal lands that cannot be avoided. In addition, the Santa Clara Pueblo commented that the new Administration will be required to perform a new Nuclear Posture Review. The Santa Clara Pueblo also stated that the version of the CAP-88 computer model used to estimate human health impacts was dated, that the newest version should be used, and that even this model does not assess exposure pathways

unique to tribal members (see Section S.1.4.2.2). Other tribal comments stated that the Draft SPEIS ignored past contamination issues, that there is no waste disposal path for transuranic waste, and that impacts to specific tribal lands were not analyzed, especially with respect to rivers and other water resources. The Western Shoshone commented that their treaty claims had not been considered.

#### **S.1.4.2.2 Major Changes from the Draft Complex Transformation SPEIS**

In order to: (1) respond to comments received on the Draft Complex Transformation SPEIS; (2) include data not available when the Draft SPEIS was prepared; and (3) correct errors and omissions, NNSA made changes to the Draft SPEIS. The Summary and Volumes I and II of this Final Complex Transformation SPEIS contain changes, which are indicated by a vertical sidebar in the margin. A summary of the more significant changes is provided below.

- In response to numerous comments requesting a No Production Alternative, NNSA added a No Net Production/Capability-Based Alternative to Section 3.6 of the Final SPEIS. Chapter 5 of the SPEIS includes an analysis of the potential impacts of this alternative. Under this alternative, NNSA would maintain capabilities to continue surveillance of the weapons stockpile, produce limited life components, and continue dismantlement, but would not add new types or increased numbers of weapons to the total stockpile.
- Several commentors stated that the cumulative impacts of nuclear-related weapons activities at three sites within a few hundred miles of each other in New Mexico need to be considered, especially since the 50-mile radius analysis of impacts of LANL and SNL/NM overlap. In response to these comments, NNSA added a new section (Section 6.4) to provide more information on the potential cumulative impacts of nuclear activities in New Mexico. This analysis considers nuclear activities at LANL, SNL/NM, the WIPP near Carlsbad, and the National Enrichment Facility in Lea County.
- One commentor noted that NNSA used an outdated version of CAP-88, an atmospheric transport model designed by the U.S. Environmental Protection Agency (EPA), to estimate dose and risk from radionuclide air emissions as part of compliance with the *Clean Air Act*. The Draft SPEIS used EPA's 1992 version of the CAP-88 model (Version 1.0). According to EPA, users "may use any of the three versions of CAP-88 for enforcement purposes. To allow for updates and refinement of the software, Subpart H of 40 CFR Part 61 does not specify any version. However, because Version 3 incorporates the latest science and is more versatile than the older versions, it is recommended" (EPA 2008). In response to this comment, NNSA revised the dose calculations using the CAP-88, Version 3, software. As shown in Chapter 5, all doses from normal operations are expected to remain below regulatory standards.
- NNSA received many comments on the project-specific flight test alternatives. Many commentors stated that an earlier NNSA study indicated that a high-tech mobile option at Tonopah was at least \$20 million less expensive than a high-tech mobile option at the White Sands Missile Range (WSMR). Other commentors stated that NNSA's own business case report states that TTR is the most favorable alternative. Numerous

commentors stated that closure of TTR would result in economic disaster for the community of Tonopah as well as surrounding communities, which rely on the social and health amenities of Tonopah. In response to these comments, NNSA added additional socioeconomic information to Section 5.15.4.2.2, and updated the “Campaign Mode Operation of TTR” alternative. For this alternative, NNSA added several options that would maintain the flight test operations at TTR, but with reduced full-time employment that would be supplemented with staff from SNL/NM and upgraded equipment. Details about this alternative may be found in Section 3.10.3 of the Final SPEIS.

- NNSA received many comments stating that the water usage and quality data for LANL and SRS were outdated and unrepresentative. In response, NNSA revised the water usage and water quality sections at LANL and SRS (sections 4.1.5 and 4.8.5, respectively).
- Several commentors indicated that the presentation of the preferred alternative was confusing and did not provide sufficient specific discussion of the environmental impacts of the alternative compared to others. In response to these comments, NNSA also added Section 5.20, which provides more information on the impacts of the preferred alternative.
- Some commentors stated that tritium production activities should be included in the SPEIS in order to represent the impacts of the entire nuclear weapons complex. Commentors also stated that the Watts Bar reactors are part of the nuclear weapons complex. In response to these comments, NNSA added a summary of the environmental impacts of producing tritium in TVA reactors (Section 5.19).
- Some commentors stated that radiation exposure can also cause nonfatal cancers and genetic disorders, yet the Draft SPEIS only estimates potential fatal cancers. This SPEIS presents estimates of latent cancer fatalities (LCFs) because they are the principal metric for comparing the potential human health effects from low-dose radiation exposure. In response to these comments, NNSA added a discussion in Appendix C regarding nonfatal cancers and genetic effects.
- Several commentors stated that the cumulative impacts of activities at LLNL Site 300 must be analyzed in the Complex Transformation SPEIS. NNSA had filed (now since withdrawn) an application for an air permit with the San Joaquin Valley Air Pollution Control District for increased activities over current levels. Commentors stated that the environmental impacts of these activities, whether conducted by the U.S. Department of Defense (DoD) or the Department of Homeland Security, should be analyzed in the Complex Transformation SPEIS. Even though NNSA recently withdrew this permit application, NNSA added additional discussion of these potential cumulative impacts at LLNL Site 300 (Section 6.5).
- NNSA added an option of constructing a smaller underground storage facility in Zone 12 at Pantex (Section 3.7.3). NNSA would rely on continued storage of surplus pits in existing facilities in Zone 4 at Pantex until they are transferred to SRS for disposition.



- In the Draft SPEIS, a 9,000 square foot addition to the Chemistry and Metallurgy Research Replacement (CMRR) Facility was evaluated as a means to support consolidation of plutonium operations to LANL from LLNL, provide increased analytical chemistry support for increased pit production capacity, and ensure sufficient nuclear space as a contingency. Subsequent to that assessment, NNSA decided that the 9,000 additional square feet would be unnecessary for the consolidation of plutonium activities. Therefore, an addition of 9,000 square feet to the CMRR is no longer being pursued.
- The preferred alternatives are the same as the preferred alternatives identified in the Draft SPEIS, with the following exceptions:
  - For plutonium manufacturing and R&D, the Draft SPEIS identified a production capacity of up to 80 pits per year. In the Final SPEIS, NNSA has stated that until completion of a new Nuclear Posture Review in 2009 or later, the net production at Los Alamos would be limited to a maximum of 20 pits per year.
  - For plutonium manufacturing and R&D, the Draft SPEIS identified a production capacity of up to 80 pits per year. In the Final SPEIS, NNSA has stated that until completion of a new Nuclear Posture Review in 2009 or later, the net production at Los Alamos would be limited to a maximum of 20 pits per year.
  - For consolidation of Category I/II SNM, the Draft SPEIS stated that NNSA would phase-out Category I/II operations at LLNL Superblock by the end of 2012. Because that action is included in the No Action Alternative and would be carried out regardless of any decisions in the SPEIS, the Final SPEIS clarifies that NNSA's preferred alternative is to continue with the No Action Alternative.
  - For NNSA flight test operations, the Draft SPEIS stated that NNSA would cease operation of TTR in 2009 and conduct flight testing at a DoD facility. The Final SPEIS identifies the preferred alternative as Campaign Mode Operation of TTR (Option 3—Campaign under Reduced Footprint Permit).
  - For HE R&D, the Draft SPEIS stated that LLNL would be the HE R&D center for formulation, processing, and testing (less than 10 kg) HE at the High Explosives Application Facility (HEAF). In the Final SPEIS, NNSA has stated that formulation and processing of HE would be conducted either at a new HEAF Annex to be built adjacent to HEAF, or at existing Site 300 facilities.
  - For hydrodynamic testing, the preferred alternative identified in the Draft SPEIS was to close the Contained Firing Facility (CFF) at LLNL in approximately 2015, which would enable transfer or closure of Site 300. In the Final SPEIS, NNSA has stated that hydrotesting at CFF would be consolidated to a smaller footprint by 2015. The Final SPEIS no longer states that this would enable transfer or closure of Site 300.

- For the SNL/CA weapons support functions, the Draft SPEIS did not identify a preferred alternative. For these functions, NNSA has identified the No Action Alternative as preferred.

## **S.2 PURPOSE AND NEED FOR AGENCY ACTION**

NNSA maintains the safety, security, and reliability of the U.S. nuclear weapons stockpile through the Stockpile Stewardship Program (SSP). The SSP involves the integrated activities of three NNSA national laboratories, four industrial plants, and a nuclear test site. The SSP helps identify the changes in the Complex that may be required for NNSA to continue to meet its national security requirements as established by the President and funded by Congress. The purpose and need underlying the alternatives analyzed in this Complex Transformation SPEIS derive from changes in national security policy since the 1996 SSM PEIS ROD, as well as considerations of aging facilities at nuclear sites, aging weapons, and evolving safeguards and security requirements for Category I/II SNM. The underlying purpose and need addressed in this SPEIS is to:

- Maintain core competencies in nuclear weapons;
- Maintain a safe and reliable nuclear weapons stockpile; and
- Create a responsive nuclear weapons infrastructure that is cost-effective, and has adequate capacity to meet reasonably foreseeable national security requirements; and consolidate Category I/II SNM at fewer sites and locations within sites to reduce the risk and safeguards costs.

The fundamental principle underlying NNSA's evaluation of alternatives is that the SSP must continue to support existing and reasonably foreseeable national security policy. This is NNSA's obligation and responsibility under the *Atomic Energy Act* (42 USC. 2011 et seq.) and the *National Nuclear Security Administration Act* (Public Law 106-65, Title XXXII). This SPEIS does not analyze alternative U.S. national security policies. Rather, it examines the environmental effects of proposed actions and reasonable alternatives for execution of the program based on the existing policy and foreseeable changes in this policy.

This SPEIS discusses producing RRWs as compared to maintaining legacy warheads<sup>12</sup> with Life Extension Programs.<sup>13</sup> Transformation of the Complex infrastructure is required whether or not development of RRW proceeds. Section S.3.15 provides additional information relative to RRW.

### **S.2.1 Responsiveness of the Nuclear Weapons Complex Infrastructure**

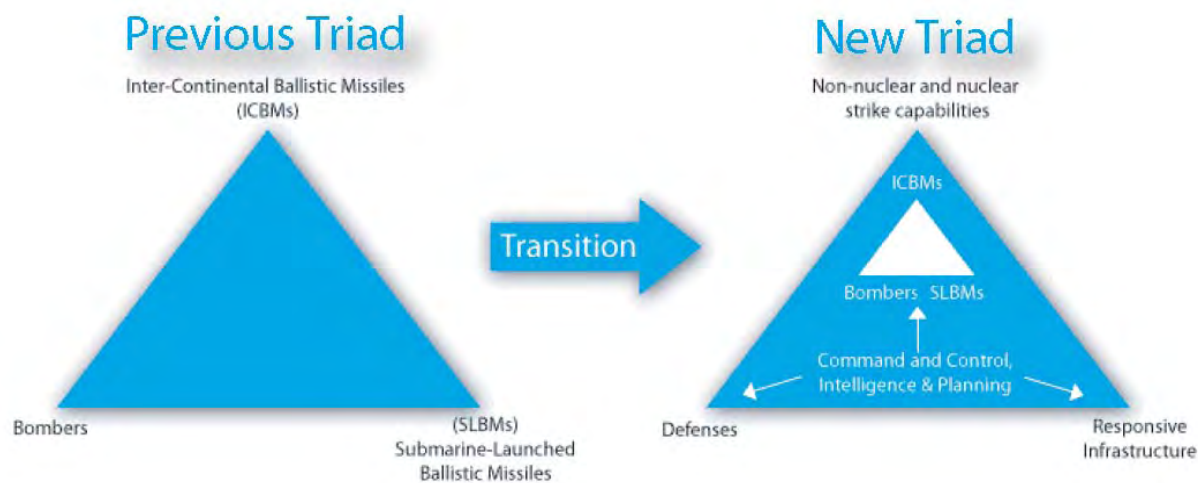
The current nuclear weapons production infrastructure is not sufficiently responsive or cost-effective. Responsiveness is the ability to quickly react to new developments and threats and

<sup>12</sup> A legacy warhead is a weapon in the current stockpile.

<sup>13</sup> NNSA has taken an aggressive approach to warhead refurbishment. Through enhanced surveillance and assessment efforts, NNSA has developed an improved understanding of the effects of aging on warhead safety, security, and reliability. Using this knowledge, NNSA is able to plan refurbishments to replace or fix components systematically, before aging-related changes jeopardize warhead safety or reliability. This is known as the Life Extension Program.

successfully execute SSP requirements. Lack of responsiveness is evidenced by difficulties in executing weapon production schedules in support of maintenance, retrofit and Life Extension Programs, and by the lack of a sufficient pit production capability.

A reliable and responsive infrastructure is a cornerstone of the new triad discussed in the 2001 Nuclear Posture Review (Figure S.2-1) and in Section 3111 of the *National Defense Authorization Act* for fiscal year (FY) 2006 (Public Law 109-163). The purpose of a reliable and responsive infrastructure is to deter adversaries from trying to seek advantage, i.e., an attempt to seek advantage would be detected and negated by a quick response. A more responsive infrastructure is expected to permit further reductions in the nuclear weapons stockpile. In the context of the SSP, this responsiveness could permit deeper reductions in the number of reserve weapons that support the deployed stockpile.



**Figure S.2-1—Transition to the New Triad**

### **S.2.2 Laboratory Technical and Industrial Base Capabilities**

The underlying purpose and need for the laboratory technical and industrial base capabilities of the SSP remain unchanged from that described in the 1996 SSM PEIS. National security policies still require the core competencies and capabilities of NNSA and its national laboratories, production plants, and the test site. They are basic needs that must be maintained for the foreseeable future in order for NNSA to meet its national security obligations.

### **S.2.3 Adequate Production Capacity for a Smaller Stockpile**

A precise prediction of the future production capacity needed to work on or replace aging legacy weapons cannot be made. Further, a capacity to produce components does not mean that those quantities of components would actually be produced. National security requirements will determine actual production. The Complex must be able to produce what is likely to be required.

For the nuclear production alternatives, this SPEIS assesses manufacturing capacity operated in a single shift, five days per week, to produce, depending upon the alternative, 10-125 weapons per year. The bounding case of producing up to 200 weapons per year assumes operations in multiple shifts and extended work weeks.

#### **S.2.4 A Smaller Infrastructure Footprint for More Cost-Effective Operations**

In 2005, a Secretary of Energy Advisory Board (SEAB) task force recommended that NNSA consider a smaller, modernized infrastructure footprint to improve responsiveness, cost effectiveness, and security for high-risk SNM (SEAB 2005).

#### **S.2.5 Enhanced Security for Special Nuclear Materials**

The attacks of September 11, 2001, altered security requirements in the NNSA Complex. As a result, security measures and their costs have increased significantly. Most of the effects on NNSA infrastructure are a result of changes to the Design Basis Threat (DBT). The DBT is a profile of the type, composition, and capabilities of a potential adversary. The DBT is used to design safeguards systems to protect against acts of sabotage and to prevent theft of high-risk (Category I/II) SNM. The details of the DBT, which DOE uses to establish its safeguards systems, are classified. However, the net effect of changes in the DBT has stimulated proposed actions and an examination of alternatives for consolidating Category I/II SNM at fewer sites and locations within sites to improve security and reduce costs.

### **S.3 ALTERNATIVES**

#### **S.3.1 Development of Reasonable Alternatives**

NNSA has been evaluating how to establish a more responsive nuclear weapons infrastructure since the Nuclear Posture Review was transmitted to Congress in early 2002. The Stockpile Stewardship Conference in 2003 (DoD 2003), the Department of Defense Strategic Capabilities Assessment in 2004 (DoD 2004), the recommendations of the SEAB Task Force on the Nuclear Weapons Complex Infrastructure in 2005 (SEAB 2005), and the Defense Science Board Task Force on Nuclear Capabilities in 2006 (DoD 2006) have provided information for NNSA's evaluation. In 2006, NNSA developed a planning scenario for the future of the Complex (NNSA 2006). As a result of these studies, NNSA developed alternatives that would reduce the size, capacity, number of sites with Category I/II SNM (and locations of Category I/II SNM within sites), and excess and redundant facilities.

##### **S.3.1.1 *Proposed Actions***

NNSA's proposed action is to restructure the nuclear weapons complex to make it smaller and more responsive, efficient and secure, while meeting national security requirements. Two basic types of proposed actions result from the needs identified for a more responsive NNSA Complex infrastructure:

- Restructure SNM Facilities (Programmatic Alternatives)

- Restructure R&D and Testing Facilities (Project-Specific Alternatives)

### S.3.1.1.1 Restructure SNM Facilities

The following functional capabilities are evaluated in this SPEIS:

- Plutonium operations, including pit manufacturing, Category I/II SNM storage, and related R&D;
- Enriched uranium operations, including canned subassembly<sup>14</sup> manufacturing, assembly, and disassembly; Category I/II SNM storage; and related R&D; and
- Weapons assembly and disassembly (A/D) and high explosives (HE) production.

To consolidate SNM facilities, which would be a long-term process carried out over a decade or more, the SPEIS alternatives address broad issues such as where to locate those facilities and whether to construct new or renovate existing facilities for these functions. As such, this SPEIS analysis is “programmatic” for the proposed action to restructure SNM facilities, meaning that tiered, project-specific NEPA documents could be needed to inform decisions on these facilities if existing site-wide EISs or other NEPA documents were insufficient.

As shown on Figure S.3.1-1, these “programmatic alternatives” are:

- **No Action Alternative.** As described in Section S.3.3, the No Action Alternative represents continuation of the status quo including implementation of past decisions. Under the No Action Alternative, NNSA would not make major changes to the SNM missions now assigned to NNSA sites. With respect to SNM consolidation, the actions to transfer Category I/II SNM from LLNL are included within the No Action Alternative.
- **Programmatic Alternative 1: Distributed Centers of Excellence (DCE).** As described in Section S.3.4, the DCE alternative would locate the three major SNM functional capabilities (plutonium operations, uranium operations, and weapon assembly/disassembly) involving Category I/II quantities of SNM at two or three separate Complex sites. This alternative would create a CPC for R&D, storage, processing, and manufacture of plutonium parts (pits) for the nuclear weapons stockpile. Production rates of up to 125 pits per year for single shift operations and 200 pits per year for multiple shifts and extended work weeks are assessed for a CPC.<sup>15</sup> A CPC could consist of new facilities, or modifications to existing facilities at one of the following sites: Los Alamos,<sup>16</sup> NTS, Pantex, SRS, or Y-12. This SPEIS also evaluates an alternative that would upgrade facilities at Los Alamos to produce up to 80 pits per year. Highly-enriched uranium and uranium storage, and uranium operations, would continue at Y-12. As part of this alternative, a new Uranium Processing Facility (UPF) and an upgrade to

<sup>14</sup> Canned subassembly – The component of a nuclear weapon which contains the secondary, including uranium and lithium components.

<sup>15</sup> See Section S.3.14 for a discussion of a new CPC with a smaller capacity.

<sup>16</sup> In general, when referring to the Los Alamos National Laboratory, this SPEIS refers to this site as “LANL.” The term “Los Alamos” is used to describe this site as an alternative location for a CPC or Consolidated Nuclear Production Center (CNPC).

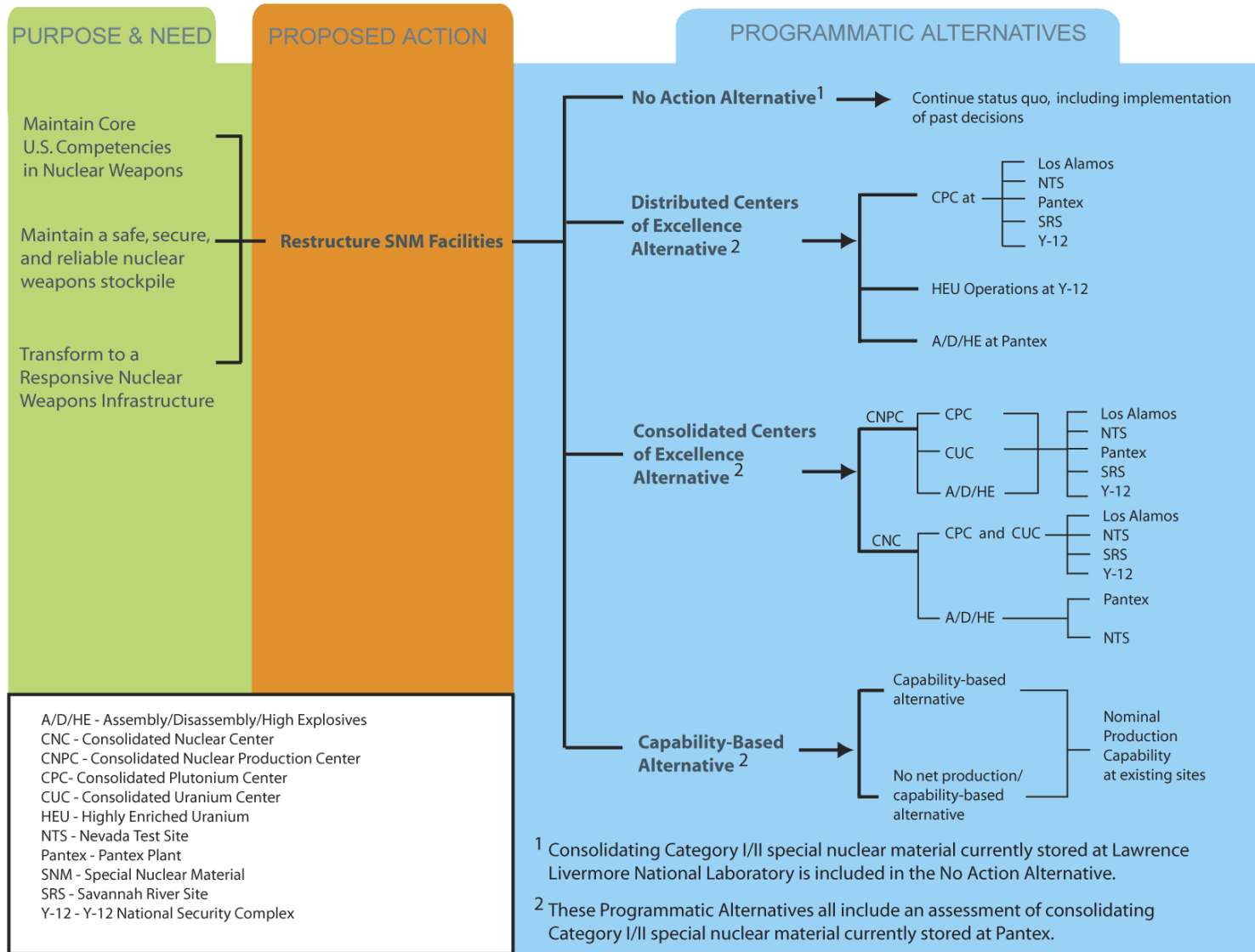
existing facilities at Y-12 are both analyzed. The weapons Assembly/Disassembly/High Explosives (A/D/HE) mission would remain at Pantex.

- **Programmatic Alternative 2: Consolidated Centers of Excellence (CCE).** As described in Section S.3.5, NNSA would consolidate the three major SNM functions (plutonium, uranium, and weapon assembly/disassembly) involving Category I/II quantities of SNM at one or two sites under this alternative. Two options are assessed: (1) the single site option (referred to as the consolidated nuclear production center [CNPC] option); and (2) the two-site option (referred to as the CNC option). The CCE Alternative assesses three major facilities: (1) a CPC; (2) a consolidated uranium center (CUC), which would be similar to the UPF but would also include HEU storage and non-nuclear support functions; and (3) an A/D/HE Center, which would assemble/disassemble nuclear weapons, and fabricate high explosives. Under the CNPC option, a new CNPC could be established at Los Alamos, NTS, Pantex, SRS, or Y-12. This SPEIS analyzes the impacts of each of these facilities separately and in combination. If Pantex or Y-12 were not selected for this option, weapons operations at Pantex, Y-12, or both would cease. Under the CNC option, the plutonium and uranium nuclear component manufacturing missions could be separate from the A/D/HE mission. The A/D/HE functions could remain at Pantex or be transferred to the NTS, while the plutonium and/or uranium missions could be located at sites different than the A/D/HE function. The CCE Alternative assumes production rates of up to 125 weapons per year for single shift operations and 200 weapons per year for multiple shifts and extended work weeks.<sup>17</sup>
- **Programmatic Alternative 3: Capability-Based Alternative.** As described in Section S.3.6, under this alternative, NNSA would maintain a basic capability for manufacturing components for all stockpile weapons, as well as laboratory and experimental capabilities to support stockpile decisions, but would reduce production capabilities to the extent that would allow NNSA to produce a nominal level of replacement components (approximately 50 components per year). Under this alternative, pit production capacity at LANL would not be expanded beyond the capability to produce 50 pits per year. Production capacities at Pantex, Y-12, and the SRS would be reduced to similar levels.<sup>18</sup> Within this alternative, NNSA also added a No Net Production/Capability-Based Alternative, in which NNSA would maintain capabilities to continue surveillance of the weapons stockpile, produce limited life components, and continue dismantlement. This alternative involves a minimum production (production of 10 sets of components or assembly of 10 weapons per year).

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<sup>17</sup> See Section S.3.14 for a discussion of a new CNPC with a smaller capacity.

<sup>18</sup> A capability-based capacity is defined as the capacity inherent in facilities and equipment required to manufacture up to 50 pits per year. In the Notice of Intent for this SPEIS, this capacity was referred to as a “nominal capacity.”



**Figure S.3.1-1—Programmatic Alternatives**

The DCE Alternative, CCE Alternative, and the Capability-Based Alternative all include proposals to consolidate Category I/II SNM involving LLNL<sup>19</sup> and Pantex. Those proposals are described in Section S.3.7.

### S.3.1.1.2 Restructure R&D and Testing Facilities

In pursuit of a more responsive and cost-effective infrastructure, NNSA is considering a restructuring of the R&D and testing facilities within the Complex. For this proposed action, the alternatives focus on near-term issues to consolidate, relocate, or eliminate facilities and programs and improve operating efficiencies. The following capabilities are being evaluated in this SPEIS:

- High Explosives R&D
- Tritium R&D
- Flight Test Operations
- Hydrodynamic Testing
- Major Environmental Testing

The analysis of alternatives for these capabilities is “project specific,” meaning that further NEPA review might not be needed to implement decisions consistent with the alternatives analyzed in this SPEIS. Restructuring of these facilities is expected to be pursued regardless of which programmatic alternative is selected for SNM facilities. NNSA developed the project-specific alternatives, shown on Figure S.3.1-2, to achieve significant benefits in making the Complex more secure and efficient. In addition to these project-specific alternatives for restructuring R&D and testing, this SPEIS also addresses alternatives related to non-nuclear component design and engineering work at SNL/California.

#### Project-Specific Analysis

A project-specific analysis is a detailed analysis of the environmental impacts of a proposed action and the reasonable alternatives. The project-specific analysis is intended to be sufficiently detailed to allow implementation of the selected alternative after NNSA makes a decision, without any additional NEPA analysis.

<sup>19</sup> The LLNL SWEIS (DOE 2005) assesses the environmental impacts of transporting SNM to and from LLNL and other NNSA sites, SRS, and WIPP. That analysis includes consideration of transportation activities involving greater quantities of SNM and more shipments than are proposed in this SPEIS. As such, the transportation activities associated with consolidating SNM from LLNL are included in the existing No Action Alternative and can proceed without additional NEPA analysis. For completeness, however, this SPEIS includes the environmental impacts associated with such actions.



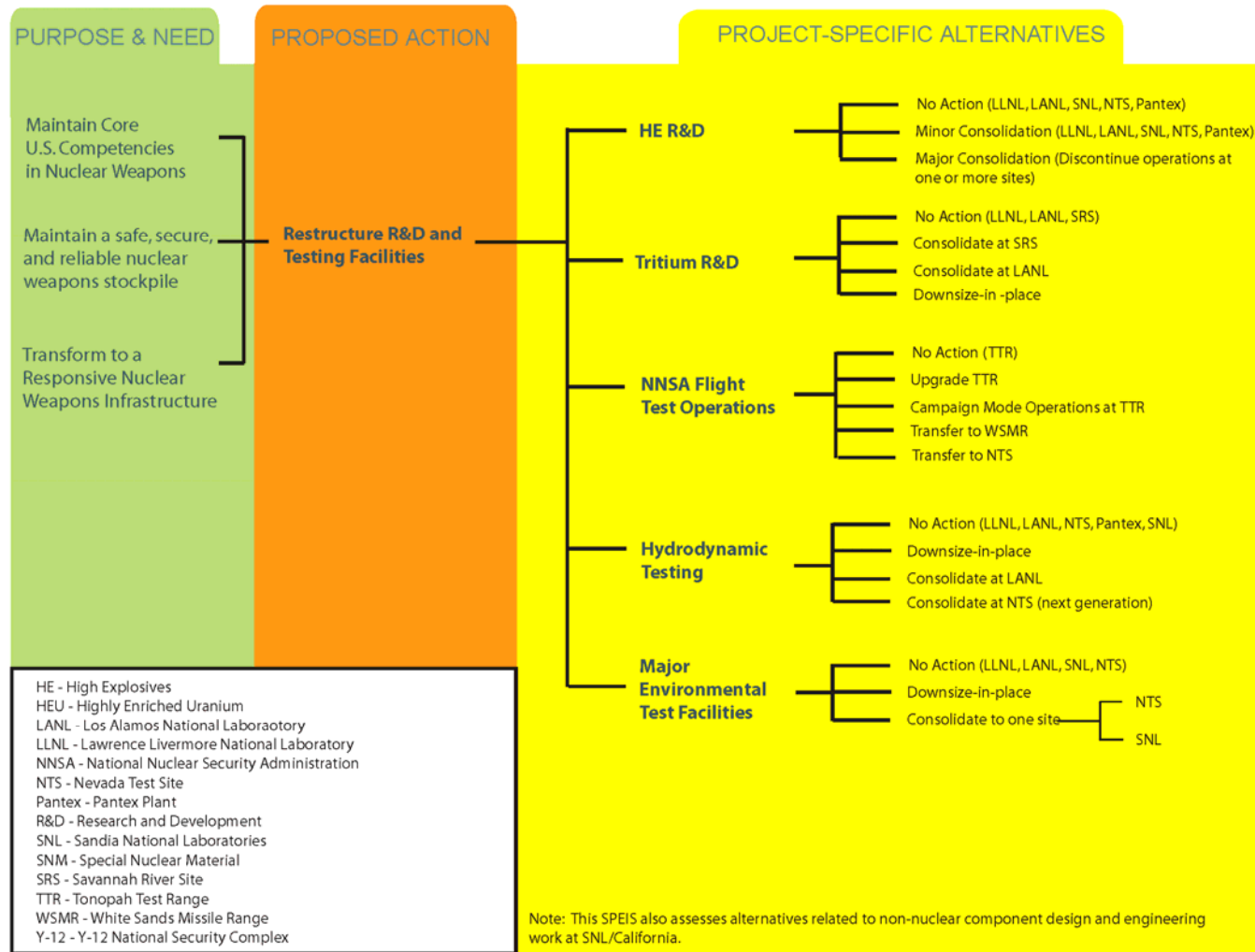


Figure S.3.1-2—Alternatives to Restructure R&D and Testing Facilities

### **S.3.2 Overview of NNSA Sites and Missions**

#### **S.3.2.1 *Los Alamos National Laboratory***

LANL was established as a nuclear weapons design laboratory in 1943. Its facilities are located on approximately 28,000 acres about 25 miles northwest of Santa Fe, New Mexico. LANL is a multidisciplinary research facility engaged in a variety of programs for NNSA, DOE, other Government agencies, and the private sector. Its primary mission is the implementation of the Stockpile Stewardship Program. Other missions involve emergency response, arms control, nonproliferation, and environmental activities. LANL conducts R&D activities in the basic sciences, mathematics, and computing, with application to these mission areas and to a broad range of programs including: non-nuclear defense; nuclear and non-nuclear energy; material science; atmospheric, space, and geosciences; bioscience and biotechnology; and the environment.

With regard to nuclear weapons, LANL is responsible for the design of the nuclear explosive package in certain U.S. weapons (LLNL has this responsibility for the other weapons).<sup>20</sup> LANL performs research, design, development, testing, surveillance, and assessment activities, and maintains certification capabilities in support of the SSP. In addition, LANL produces a small number of plutonium pits pursuant to a programmatic decision based on the SSM PEIS (61 FR 68014) and a site-specific decision based on the 1999 LANL SWEIS (64 FR 50797) to establish an interim production capability of up to 20 pits per year. LANL also conducts surveillance of pits and manufactures some non-nuclear components (e.g., detonators). NNSA completed a revised LANL SWEIS in 2008, but will not make any decisions related to pit production at LANL prior to the completion of this SPEIS.

NNSA issued a ROD for the continued operation of LANL on September 26, 2008. NNSA announced in the ROD its decision to continue the no action alternative with the addition of some elements of the expanded operations alternative that NNSA concluded needed to be implemented to support the safe and successful execution of the laboratory's mission. None of these decisions affect the alternatives considered in this SPEIS.<sup>21</sup>

#### **S.3.2.2 *Lawrence Livermore National Laboratory***

LLNL was established as a nuclear weapons design laboratory in 1952. LLNL's main site is located on approximately 821 acres in Livermore, California. LLNL also operates a 7,000-acre "Experimental Test Site" known as Site 300, which is located approximately 12 miles east of the

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<sup>20</sup> The general responsibilities assigned to LLNL and LANL for nuclear explosive packages are complementary. LANL and LLNL compete for assignment of the responsibility for design and development of the nuclear explosive package for a nuclear weapons system. In the early design definition phase, both laboratories perform systems studies, preliminary development work, and initial design definition. NNSA, in consultation with the DoD and the cognizant military service, then selects either LANL or LLNL to work with SNL to design and develop the new weapon system. LANL or LLNL designs and develops the nuclear physics package and associated support hardware; SNL designs and develops the arming, fuzing, and firing system, other warhead electronics, external cases and mounts, and performs systems integration to develop the complete weapon system. There are nuclear explosive packages in the current legacy stockpile that have been designed and developed by both LANL and LLNL.

<sup>21</sup> See ROD for the continued operation of the LANL for decisions from the expanded operations alternative (see 73 FR 55833).

main laboratory. Site 300 is used primarily for high explosives testing, hydrodynamic testing, and other experimentation, such as particle beam research.

LLNL is a multidisciplinary research facility engaged in a variety of programs for NNSA, DOE, other government agencies, and the private sector. Its primary mission is implementation of the SSP. Other missions involve related emergency response, arms control, and nonproliferation activities. LLNL conducts research and development activities in the basic sciences, mathematics, and computing, with application to these mission areas, and to a broad range of programs including: non-nuclear defense; nuclear and non-nuclear energy; high-energy density physics; atmospheric, space, and geosciences; bioscience and biotechnology; and the environment. With respect to nuclear weapons, LLNL is responsible for the design of the nuclear explosive package in certain weapons (LANL has this responsibility for the other weapons). LLNL maintains research, design, development, testing, surveillance, assessment, and certification capabilities in support of Stockpile Stewardship.

### **S.3.2.3**      *Nevada Test Site*

NTS occupies approximately 880,000 acres in the southeastern part of Nye County in southern Nevada. It is located about 65 miles northwest of Las Vegas. It is a remote, secure facility with restricted airspace that maintains the capability for conducting underground testing of nuclear weapons and evaluating the effects of nuclear weapons on military communications systems, electronics, satellites, sensors, and other materials. The first nuclear test at NTS was conducted in 1951. Since the signing of the *Threshold Test Ban Treaty* in 1974, it has been the only U.S. site used for nuclear weapons testing. The last nuclear test was conducted in 1992. Approximately one-third of the land (located in the eastern and northwestern portions of the site) has been used for nuclear weapons testing; one-third (located in the western portion of the site) is reserved for future missions, and one-third is reserved for R&D, nuclear device assembly, diagnostic canister assembly, and radioactive waste management. In addition, DOE has submitted an application to the Nuclear Regulatory Commission for authorization to construct and operate a repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain, an area on the southwestern boundary of the site.

A primary NNSA mission at NTS is the implementation of SSP, and includes maintaining the readiness and capability to conduct underground nuclear weapons tests and conducting such tests within 24-36 months if so directed by the President. Other aspects of stockpile stewardship at NTS include conventional HE tests, dynamic experiments, and hydrodynamic testing. The Search Augmentation Team maintains the readiness to respond to any type of nuclear emergency, including search and recovery for lost or stolen weapons, and conducts training exercises related to nuclear weapons and radiation dispersal threats. The Device Assembly Facility houses criticality machines and stores SNM in support of a range of NNSA missions.

### **S.3.2.4**      *Tonopah Test Range*

The Tonopah Test Range (TTR), managed and operated by SNL, is a 179,200-acre site located at the very northern end of the Nevada Test and Training Range, about 32 miles southeast of Tonopah, Nevada. TTR is used for NNSA flight testing of gravity-delivered nuclear weapons

(bombs). The actual flight tests are conducted with one or more denuclearized warheads, called joint test assemblies, which are dropped from DoD aircraft or simply flown over the test range. The primary purpose of evaluation activities is the timely detection and correction of problems in the hardware interfaces for gravity weapons, and to ensure that components conform to design and reliability requirements throughout their life. DoD also currently uses TTR for exercises and as an emergency divert base for aircraft.

### **S.3.2.5      *Pantex Plant***

Pantex is located approximately 17 miles northeast of Amarillo, Texas, on 15,997 acres. Its missions are research and development of chemical high explosives for nuclear weapons; fabrication of high-explosives components essential to nuclear weapon function; assembly, disassembly, maintenance, and surveillance of nuclear weapons in the stockpile; dismantlement of nuclear weapons being retired from the stockpile; and interim storage of plutonium components from dismantled weapons. Weapons activities involve the handling (but not processing) of uranium, plutonium, and tritium components, as well as a variety of non-radioactive hazardous or toxic chemicals.

Pantex's mission is to assemble, disassemble, and modify weapons as set forth in the ROD for the *Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components* that was issued on January 27, 1997 (62 FR 3880). Although the specifics of nuclear weapons operations at Pantex are classified, approximately one-half of the current and future Pantex workload involves dismantling nuclear weapons. Under all alternatives, dismantlement operations would continue and there are no proposals in this SPEIS to increase activity levels beyond those previously evaluated.<sup>22</sup>

### **S.3.2.6      *Sandia National Laboratories***

SNL was established as a non-nuclear design and engineering laboratory separate from LANL in 1949. The principal laboratory is located in Albuquerque, New Mexico (SNL/NM); a division of the laboratory (SNL/CA) is located in Livermore, California, near LLNL. Sandia Corporation (the contractor that operates SNL under contract with NNSA) also operates the TTR in Nevada.

SNL conducts multidisciplinary research and engineering activities in a variety of programs for NNSA, DOE, other Government agencies, and the private sector. Its primary missions for NNSA are implementation of the SSP and related systems engineering and non-nuclear component design and engineering, and system qualification testing for Stockpile-to-Target Sequence environments. Other missions involve arms control and nonproliferation activities. In addition, SNL conducts R&D activities in advanced manufacturing, electronics, information, pulsed power, energy, environment, transportation, and biomedical technologies.

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<sup>22</sup> In the Notice of Intent for this SPEIS, NNSA stated that the proposed action would accelerate nuclear weapons dismantlement activities; these activities are already occurring. For example, during fiscal year 2007, NNSA increased its rate of dismantling nuclear weapons by 146 percent over the previous year's rate (NNSA 2007a). This rate was well below the maximum number of weapon dismantlements analyzed in the Pantex SWEIS (DOE 1996c).

SNL is responsible for cradle-to-grave oversight and qualification testing of the non-nuclear components in nuclear weapons and is the system integrator for assuring the safety and reliability of the entire weapons system using computational methodologies combined with data from its test facilities. SNL maintains research, design, development, testing, surveillance, assessment, and certification capabilities in support of the SSP. In addition, SNL performs some non-nuclear manufacturing functions, including the fabrication of neutron generators and production of limited quantities of microelectronic parts.

### **S.3.2.7**      *White Sands Missile Range*<sup>23</sup>

WSMR, located in south central New Mexico, is the largest installation in the DoD. WSMR is a Major Range and Test Facility Base under the Department of the Army Test and Evaluation Command, Developmental Test Command, providing test and evaluation services to the Army, Air Force, Navy, other government agencies, and industry. The range covers more than 3,000 square miles of land and 10,026 square miles of contiguous restricted airspace fully managed, scheduled, and controlled by WSMR. Holloman Air Force Base is located adjacent to the range's east boundary and has capabilities for aircraft support and staging. WSMR has a full suite of flight test instrumentation including radar, telemetry, and optical equipment that would allow for complete coverage of a NNSA gravity weapons flight test. WSMR has extensive experience conducting flight tests with requirements and flight test scenarios similar to the NNSA flight test program.

### **S.3.2.8**      *Savannah River Site*

SRS is located in south-central South Carolina and occupies approximately 198,420 acres in Aiken, Barnwell, and Allendale Counties. The site was established in 1950 and is approximately 15 miles southeast of Augusta, Georgia, and 12 miles south of Aiken, South Carolina. The major nuclear facilities at SRS have included fuel and target fabrication facilities, nuclear material production reactors, chemical separation plants used for recovery of plutonium and uranium isotopes, a uranium fuel processing area, and the Savannah River National Laboratory, which provides technical support. The initial mission at SRS was production of heavy water and strategic radioactive isotopes (plutonium-239 and tritium) in support of national defense. Today, the main weapons mission at SRS is tritium supply management and R&D.

Tritium, an important component of nuclear weapons, decays and must be replaced periodically to meet weapons specifications. Tritium recycling facilities empty tritium from weapons reservoirs, purify it to eliminate the helium decay product, and fill replacement reservoirs with specification tritium for nuclear stockpile weapons. Filled reservoirs are delivered to Pantex for weapons assembly and to the DoD as replacements for weapons reservoirs. The Tritium Extraction Facility takes rods, which have been irradiated in a commercial light water reactor (Watts Bar reactor operated by the Tennessee Valley Authority), and extracts tritium for use in the nation's nuclear weapons. As an NNSA-managed activity separate from weapons activities,

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<sup>23</sup> WSMR is not currently part of the NNSA nuclear weapons complex. However, NNSA is considering WSMR as a location for NNSA Flight Testing.

a mixed oxide fuel fabrication facility is under construction and NNSA plans to build a pit disassembly and conversion facility at SRS to disposition surplus plutonium.

### **S.3.2.9**      *Y-12 Site*

Y-12 is one of three primary installations on the DOE Oak Ridge Reservation (ORR), which covers a total of approximately 35,000 acres in Oak Ridge, Tennessee. The other installations are the Oak Ridge National Laboratory (ORNL) and the East Tennessee Technology Park (formerly the Oak Ridge K-25 Site). Construction of Y-12 started in 1943 as part of the World War II Manhattan Project. Y-12 consists of approximately 800 acres. The early missions of the site included the separation of uranium-235 from natural uranium by electromagnetic separation and the manufacture of weapons components from uranium and lithium. Y-12 is the primary site for enriched uranium processing and storage, and one of the primary manufacturing facilities for maintaining the U.S. nuclear weapons stockpile. Y-12 is the source of secondaries, cases, and certain other weapons components that comprise CSAs. Y-12 also dismantles weapons components, stores and manages SNM, supplies SNM to naval and research reactors, and disposes surplus materials.

### **S.3.2.10**      *Kansas City Plant and Non-Nuclear Fabrication*

The bulk of the manufacturing of non-nuclear components for the stockpile is done at the KCP. This manufacturing consists of electrical, electronic, electromechanical, and mechanical components (plastics, metals, and composites), and assembly of arming, fuzing, and firing systems of a nuclear warhead. Some limited manufacturing of non-nuclear components also occurs at Y-12 (fabrication of large metal components), SNL (neutron generators and microelectronic parts), and LANL (detonators). Other than limited production of non-nuclear components at LANL, Y-12, and SNL, the remaining non-nuclear components are either acquired by or manufactured at the KCP. The KCP also performs surveillance inspection and testing of non-nuclear weapons components. For the reasons set forth below, this SPEIS does not evaluate alternatives for continuing the transformation of non-nuclear manufacturing activities.

In the 1990s, DOE prepared the Non-nuclear Consolidation Environmental Assessment (DOE 1993) for the purpose of better managing non-nuclear manufacturing activities within the Complex and decreasing the long-term operating costs of these activities. This Environmental Assessment proposed consolidating most non-nuclear manufacturing functions in existing facilities at the KCP; it also analyzed three alternatives in which the manufacture of electrical and mechanical components would be consolidated at sites other than the KCP. Based on the evaluations in this Environmental Assessment, DOE issued a Finding of No Significant Impact (FONSI) (58 FR 48043) on its proposal to consolidate non-nuclear component manufacturing and related activities, and decided to consolidate most non-nuclear operations at the KCP to improve efficiency. DOE explained its determination that the non-nuclear consolidation proposal could be separated from the Reconfiguration Programmatic Environmental Impact Statement (PEIS) (59 FR 17344) because decisions regarding the configuration and consolidation of facilities for the manufacture of non-nuclear components would not affect or

predetermine the outcome of alternatives or decisions regarding the configuration of the nuclear activities of the weapons complex.

In the SSM PEIS (1996), DOE considered additional alternatives with respect to non-nuclear operations, including relocating those capabilities to one or more of the national security laboratories. DOE decided (61 FR 68014) to retain the existing facilities at the KCP because this was the environmentally preferable alternative, posed the least technical risk, and was the lowest cost alternative. Because the non-nuclear operations at the KCP are essential and do not duplicate work at other sites, no proposal for combination or elimination of these missions was deemed reasonable for evaluation in this supplement to the SSM PEIS.

The KCP occupies a large and aging industrial complex in Kansas City located on a site with other facilities operated by the U.S. General Services Administration (GSA). The current KCP complex is much larger than is required by NNSA and, because of its age and size, is expensive to operate. GSA, as the lead agency, and NNSA, as a cooperating agency, issued a Final Environmental Assessment (GSA 2008) and FONSI on April 21, 2008 (73 FR 23244) on their proposal to procure the construction of a new facility to house NNSA's operations concerning non-nuclear components.

The selected alternative is for GSA to lease a new facility from a private developer on NNSA's behalf, and for NNSA to relocate its operations from the existing KCP at the Bannister Federal Complex in Kansas City to the new facility. The relocation would involve moving approximately two-thirds of the existing capital and process equipment to the new facility. The proposed facility would be at least 50 percent smaller than the existing facility and would be designed to allow for rapid reconfiguration to meet changing requirements. The new facility would reduce annual operating costs and improve responsiveness, facility utilization, and reliability in supplying non-nuclear components. In addition to these operating improvements, the new facility would reduce the environmental footprint of KCP operations, including improved energy efficiency, lower emissions, and less waste generation.

The selected alternative would continue the consolidation and reduction of the manufacture and maintenance of non-nuclear components that DOE began after completion of the Non-nuclear Consolidation EA in 1993 and continued after the SSM PEIS in 1996.

Because the non-nuclear operations at KCP are essential and do not duplicate work at other sites, no proposal to combine or eliminate these operations was formulated. Thus, NNSA is not proposing to relocate these activities to another geographic area. Nonetheless, NNSA did evaluate three alternatives that involved moving these operations to another geographic area. One alternative evaluated moving KCP's operations to SNL/NM, one alternative evaluated moving those operations to LLNL, and a third alternative evaluated moving those operations to LANL. In addition to the analysis in the EA, a recent analysis of transferring KCP operations to a site other than one within the immediate Kansas City area concluded that "no prospects for economic benefits are apparent" (SAIC 2008). This is primarily because of the longer move, the restart period that would be required, and the costly transfer or reconstitution of the skilled workforce in a new region, which would forfeit a potential savings of approximately \$100 million per year. In addition, relocation outside of the Kansas City area would require extending operation of the current facility in order to build the inventory that would be needed for a long

transition; this could result in additional loss of key personnel, require additional training, and result in other unnecessary management challenges. Moreover, because of the nature of KCP operations, constructing and operating a new facility in a different location from Kansas City is unlikely to offer any significant benefits. Because no significant environmental impacts were identified in the KCP EA, NNSA and GSA issued a FONSI and are moving forward with this project in order to achieve significant benefits, including cost savings, continuity of operations, and preservation of technical competence independent of other proposals for transformation of the Complex. Consequently, these non-nuclear operations would remain in the Kansas City area. This decision will neither affect nor be affected by the decisions regarding the alternatives evaluated in this SPEIS.

### **S.3.3 No Action Alternative**

Under the programmatic No Action Alternative, NNSA would continue operations to support national security requirements using the existing Complex. As shown on Figure S.1-1, the current Complex consists of multiple sites located in seven states. The Complex enables NNSA to design and manufacture nuclear weapons; conduct surveillance on nuclear weapons in the stockpile; and dismantle retired nuclear weapons. Under the No Action Alternative, NNSA sites would continue to perform the weapons functions identified in Section S.3.2. A summary of the functions, and the sites where these functions are performed, follows.

**Weapon Design and Certification.** Nuclear weapons are designed at three NNSA national laboratories; these laboratories also certify the weapons safety and reliability for inclusion in the stockpile. LLNL and LANL design and engineer the nuclear physics package for nuclear weapons. SNL/NM designs and engineers non-nuclear components and is responsible for systems engineering of nuclear weapons. SNL/CA conducts non-nuclear component design and engineering work. The laboratories provide the science and technology foundation for the SSP and rely on facilities across the Complex to support essential plutonium, uranium, non-nuclear materials, tritium, and high explosives research and development, as well as hydrodynamic, environmental, and flight testing.

**Plutonium Operations and Pit Manufacture.** Pits refer to the central nuclear core of the primary of a nuclear weapon, and typically contain Pu-239 and/or HEU. Subsequent to the 1996 SSM PEIS ROD, an interim pit manufacturing capability was established at LANL. In the 1999 LANL SWEIS ROD, DOE decided that LANL would produce up to 20 pits per year. In May 2008, NNSA issued the Final LANL SWEIS that evaluates an alternative to produce up to 80 pits per year in order to obtain 50 certified pits per year. LANL manufactures pits in the Plutonium Facility Complex, which consists of six primary buildings located in Technical Area-55 (TA-55). This activity is supported by numerous laboratory, storage facilities, administrative offices and waste management facilities, located throughout LANL. Both LANL and LLNL currently perform R&D on Category I/II quantities of plutonium.

**Uranium Operations and Secondary and Case Fabrication.** The energy released by the primary explosion of a weapon activates the secondary assembly. Secondary assemblies may contain HEU, lithium deuteride, and other materials. Implosion of the secondary assembly creates the thermonuclear explosion. Heavy metal cases surround the secondary assemblies. Uranium operations and secondary and case fabrication are generally performed at Y-12, where



they are combined into CSAs. Most highly-enriched uranium materials reserved for weapons are retained at Y-12. NNSA is currently constructing a Highly-Enriched Uranium Materials Facility (HEUMF) at Y-12 to consolidate highly-enriched uranium storage. LANL, LLNL, and NTS currently retain smaller Category I/II quantities of highly-enriched uranium for R&D. This activity requires high security facilities as well as support, laboratory, waste management, and administrative facilities.

**Weapons Assembly/Disassembly and High Explosives Production.** Weapons assembly and disassembly refers to the assembly, dismantlement, and reassembly of complete nuclear weapons. This activity is primarily conducted at Pantex, which is the principal facility in the Complex that handles complete nuclear weapons. Facilities include heavily fortified work areas, storage facilities, administrative buildings and support laboratories. Waste management facilities are also required. Pantex also produces and machines the high explosives that surround the nuclear components of nuclear weapons. Pantex is authorized to assemble, disassemble, and modify weapons in accordance with the ROD for the *Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components* (62 FR 3880). Although the specifics of nuclear weapons operations at Pantex are classified, approximately one-half of its current and future workload is associated with dismantling nuclear weapons.

**Category I/II SNM Storage.** Quantities of SNM are categorized into security Categories I, II, III, and IV based on the type, attractiveness level, and quantity of material. Category I/II SNM are the most attractive materials and require the most extensive and expensive security provisions. These facilities consist of heavily fortified storage or processing buildings surrounded by security fences with highly trained, heavily armed security personnel. Category I/II SNM storage facilities are currently located at LANL, LLNL, Pantex, SRS (not associated with NNSA weapons activities), Y-12, and NTS. In 2008, SNL/NM removed its Category I/II SNM, and no longer stores or uses Category I/II SNM quantities on a permanent basis. The potential transfer of LLNL's Category I/II SNM has previously been assessed in the LLNL SWEIS (DOE 2005) and is included in the No Action Alternative.

**Tritium Production and R&D.** Tritium is a short-lived radioactive isotope of hydrogen used to increase yield in nuclear weapons. The production of tritium is carried out in a Tennessee Valley Authority reactor. Tritium extraction, purification, and reservoir loading (which are collectively referred to as the "tritium supply management" missions) are carried out at SRS in the Tritium Extraction Facility, which became operational in late 2006, and the H-Area New Manufacturing Facility, which became operational in 1994. Tritium R&D is primarily performed at SRS and LANL (in the Weapons Engineering Tritium Facility). Very limited tritium operations are performed at LLNL in the Tritium Facility within Superblock<sup>24</sup> to support preparation of tritium targets for the National Ignition Facility, and at SNL/NM in the Neutron Generator Production Facility to support neutron generator production. Tritium operations require supporting laboratory, waste management, and administrative facilities.

**High Explosives R&D.** High explosives are used in the primary assembly of nuclear weapons. The development of safer, more stable and more energetic forms of this material is referred to as

<sup>24</sup> "Superblock," LLNL's defense plutonium research and development facilities.

high explosives R&D. The R&D work includes confined and unconfined detonation of experimental quantities of high explosives. High explosives R&D is conducted at LANL, LLNL, SNL/NM, Pantex, and NTS. This activity entails development laboratories, administrative buildings and test fire facilities. Waste management facilities are also required.

**Flight Test Operations.** Flight test operations assess how weapon systems function in realistic delivery conditions. Denuclearized test weapons<sup>25</sup> are assembled at Pantex. These denuclearized weapons are then subjected to realistic aircraft flight and release conditions. This program is conducted at the TTR for gravity weapons (bombs). Facilities include a drop zone, target facilities, observation and test equipment, and administrative buildings. Flight testing for ballistic and cruise missiles is conducted at existing DoD test ranges.

**Hydrodynamic Test Facilities.** Hydrodynamic testing refers to high-explosive experiments to study weapons physics and to assess the performance and safety of nuclear weapons. These activities are principally conducted at LLNL and LANL, with some supporting activities at NTS, SNL/NM and Pantex. High energy radiographic facilities support the hydrodynamic testing capabilities with dynamic radiography. This activity also entails laboratory and administrative office space.

**Major Environmental Test Facilities.** Environmental test facilities are used to assess the safety, reliability and performance of the nation's nuclear weapons systems through subjecting weapons to differing environmental conditions (shock, vibration, high temperatures, etc.). These facilities test complete (denuclearized) weapons or major weapons subsystems. Major environmental test facilities are located at SNL/NM, LLNL, LANL, and NTS. These facilities are supported by storage, support laboratory, and administrative office building space. Small environmental test laboratories and capabilities also exist at Pantex and SRS. These smaller test laboratories support component R&D and production, and are an integral part of the production/certification process.

### **S.3.3.1**      *Limitations of the Existing Complex*

The existing Complex is aging, too big, and maintains redundant capabilities that were required to sustain the Cold War stockpile. Many of the facilities are being operated beyond their useful life. In fact, parts of the Complex were built during the Manhattan Project of the 1940s and several production facilities still in use today date from that period. There are high costs to maintain this infrastructure. Reliance on aging facilities increases operating costs and in some instances subjects workers to unnecessary risk.

The liability and cost of aging infrastructure is an escalating problem throughout the NNSA Complex. In the past, preventive facility maintenance has been deferred for higher priorities. The current DOE budgeting process allocates 5 to 8 percent less for infrastructure and repair than the industrial average (LANL 2008). Over time, this practice has resulted in a backlog of repairs that

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<sup>25</sup> Denuclearized test weapons are designed to simulate the nuclear weapon in its operational configuration as much as possible, but do not contain the physics package with special nuclear materials. During flight tests, these test weapons are expected to operate as if they were an actual nuclear weapon, except for the lack of a nuclear detonation.

threatens to overtake NNSA's ability to effectively address these problems. Because the cost of operations and maintenance for aging facilities (many over 40 – 50 years old) is significant and growing, leaving this problem unaddressed would impact NNSA's ability to carry out its stockpile stewardship mission. Additionally, there are operational safety issues at some facilities that use Category I/II SNM that call into question their viability for use beyond the next five to ten years. One is the Chemistry and Metallurgy Research (CMR) facility at LANL, and another is the CSA production facility, Building 9212, at Y-12. The NNSA Administrator told the House Armed Services Subcommittee on July 17, 2008, "We cannot continue to do 21st Century national security business with a 50-year-old Cold War infrastructure. Take the 50-year-old Chemistry and Metallurgy Research (CMR) Facility at Los Alamos, for example. The [Defense Nuclear Facilities Safety Board] DNFSB has clearly stated that the CMR has significant safety issues which cannot be addressed in the existing structure. Similar issues exist at Y-12 with regards to Building 9212 which currently houses many of our legacy uranium processing operations" (D'Agostino 2008). The need to address these issues is an important factor in the development of NNSA's proposed actions regarding plutonium and uranium.

There are several thousand buildings in the Complex today, covering more than 35 million square feet of floor space, that support weapons activities. Maintaining this much space requires the expenditure of extensive resources for maintenance, safety, and security. In 2006, approximately 27,000 management and operating contractor personnel were employed at major NNSA sites to support weapons activities. NNSA is continuing to consolidate operations and reduce floor space, on a site-by-site basis, and these efforts would continue under the No Action Alternative.

### **S.3.4 Programmatic Alternative 1: Distributed Centers of Excellence**

Under this alternative, NNSA would transform the Complex by consolidating the major functions required to support the nuclear weapons stockpile to distributed centers of excellence (DCE). The major decisions regarding implementation of the DCE programmatic alternative would be setting the baseline plutonium production capacity and locating a facility for long-term plutonium component (pit) manufacturing and R&D. The facility for long-term plutonium operations is referred to as the consolidated plutonium center, or CPC. The CPC could either be a completely new configuration of buildings at Los Alamos, NTS, Pantex, SRS, or Y-12, or an upgrade of existing and planned facilities at Los Alamos (two alternatives, referred to as the "50/80" and "Upgrade") or planned facilities at SRS. For uranium operations, this alternative includes a new UPF or an upgrade to existing facilities at Y-12. No changes are envisioned for the A/D/HE mission at Pantex.

#### **S.3.4.1 Consolidated Plutonium Center (CPC)**

##### **CPC Requirements and Assumptions**

- A CPC would provide the facilities and equipment to perform pit manufacturing, pit surveillance, SNM storage to support production, and plutonium R&D.
- Stockpile requirements are based on national security requirements directed by the President based on joint recommendations from DOE and DoD. CPC capacity and

production output would be designed to meet the national security requirements, which could include production of new pits for maintenance of the legacy stockpile or replacement weapons (e.g., Reliable Replacement Warheads).

- A CPC would provide a manufacturing capacity of 125 pits per year (single shift) with a contingency of 200 pits per year through multiple shifts and extended work weeks.<sup>26</sup> A CPC would be capable of supporting the surveillance program at a rate of one pit being destructively evaluated per pit type in the stockpile per year. For Los Alamos, this SPEIS also assesses an alternative (referred to as the “50/80 Alternative”) that would result in a smaller pit production capacity (up to 80 pits per year), based on the use of the existing and planned plutonium infrastructure at that site.
- A new CPC would be constructed over a six-year period, and would be fully operational by approximately 2022. A CPC would be designed for a service life of at least 50 years.
- The NNSA sites being considered as potential locations for a CPC and consolidation of Category I/II SNM are Los Alamos, NTS, Pantex, SRS, and Y-12.
- A newly constructed CPC would consist of a central core area, surrounded by a Perimeter Intrusion Detection and Assessment System (PIDAS), which encloses all operations involving Category I/II quantities of SNM (Figure S.3.4.1-1). The area enclosed by the PIDAS would be approximately 40 acres. A buffer area would provide unobstructed view of the area surrounding the PIDAS. All administrative and non-SNM support buildings would be located outside of the buffer area. Approximate 110 acres would be required for all CPC facilities. Land requirements for the CPC Alternatives are shown in Table S.3.4-1.

**Table S.3.4-1—Land Requirements for CPC Alternatives**

Greenfield Alternative <sup>27</sup> (Los Alamos, NTS, Pantex, SRS, Y-12)	Construction (acres)	Operation (acres)	
	140	110*	
PIDAS		Non-PIDAS	
	40	70	
Upgrade Alternative (Los Alamos)	13	6.5 (All within PIDAS)	
50/80 Alternative (Los Alamos)	6.5	2.5 (All within PIDAS)	

\* Includes a buffer area that would provide unobstructed view of the area surrounding the PIDAS.

### S.3.4.1.1 Site Alternatives

Figures S.3.4.1-2 through S.3.4.1-6 identifies the reference locations for a CPC at the five alternative sites. NNSA would not make a decision as to a specific location at any site for a new

<sup>26</sup> If NNSA were to construct a new CPC to produce 80 pits per year, the reduction in square footage would be small compared to the square footage of a new facility designed for 125 pits per year. From a facility design perspective, a 125 pits per year plant is an optimal minimum, and no major cost savings can be achieved from designing a new facility with a capacity less than 125 pits per year. Section S.3.4.1.2 discusses smaller capacity pit production related to upgrades to facilities at LANL.

<sup>27</sup> The term “greenfield” is not meant to imply that the land upon which a CPC could be constructed has never been previously utilized by DOE/NNSA. Rather, in the context of this SPEIS, greenfield refers to a completely new facility that would not use existing facilities and therefore requires significantly more acreage.

CPC based on this SPEIS; specific locations would be evaluated in a future NEPA review for the site selected if required.<sup>28</sup> The reference locations were identified at each site to provide a basis to evaluate the potential environmental impacts of a CPC. The characterization of the affected environment in Chapter 4 of this SPEIS addresses the entire site and the affected region surrounding the site, which generally extends to a 50-mile radius.

Two of the sites under consideration for the pit production function (Los Alamos and SRS) have existing or planned facilities that could be used to support pit production activities, and which could influence the location of any new facilities. This SPEIS analyzes options that would use these facilities. Section S.3.4.1.2 discusses the Los Alamos options. At SRS, the reference location was selected to provide proximity to the planned Pit Disassembly and Conversion Facility (PDCF). This location would support either a new independent CPC or use the infrastructure associated with the PDCF to support a CPC.

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<sup>28</sup> Such a specific location at Los Alamos is evaluated in the LANL SWEIS recently completed.

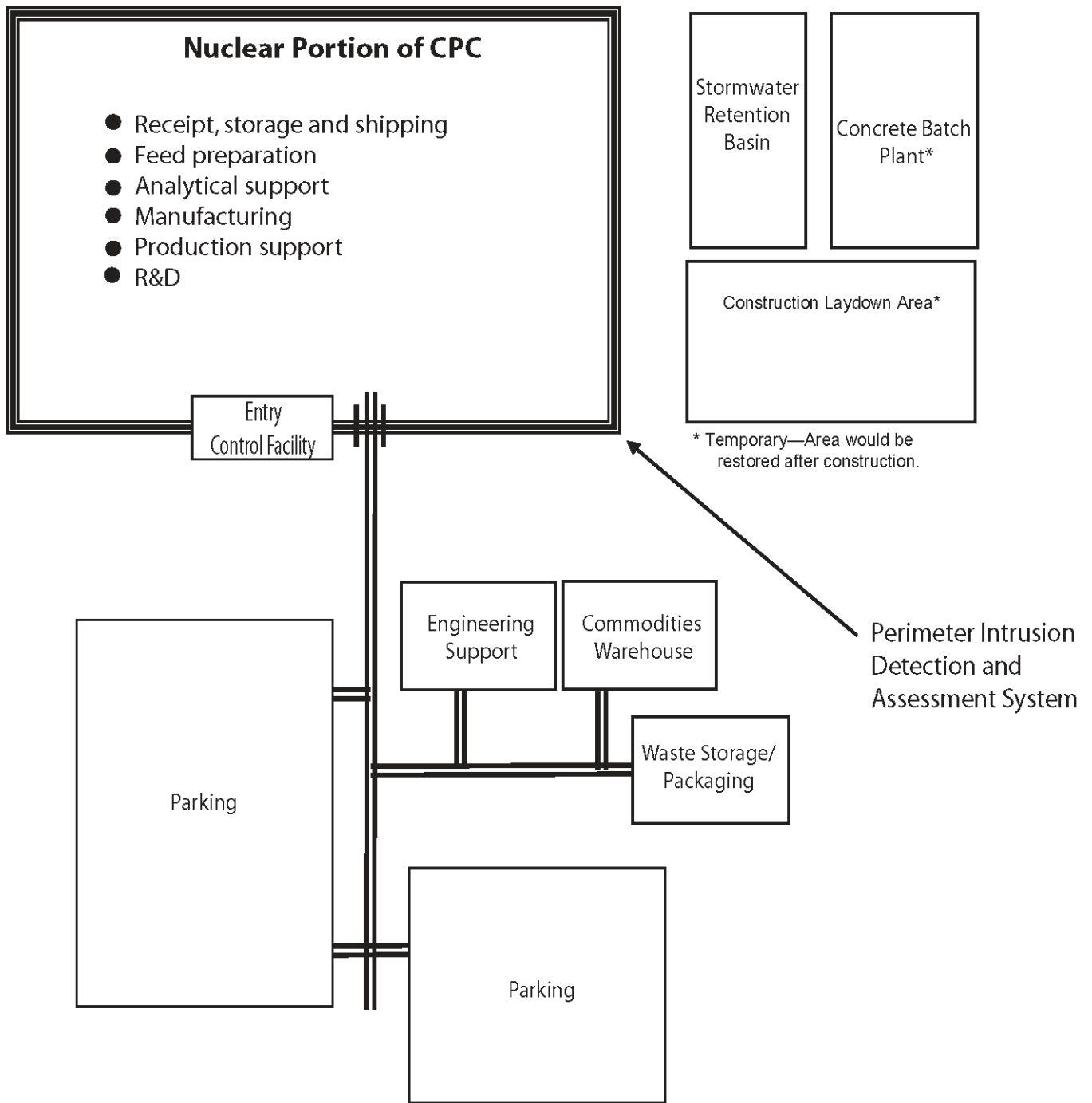


Figure S.3.4.1-1—Generic Layout of a CPC

Consolidated Plutonium Center Reference Location (TA-55)



Figure S.3.4.1-2—Los Alamos Consolidated Plutonium Center Reference Location

Consolidated Plutonium Center Reference Location

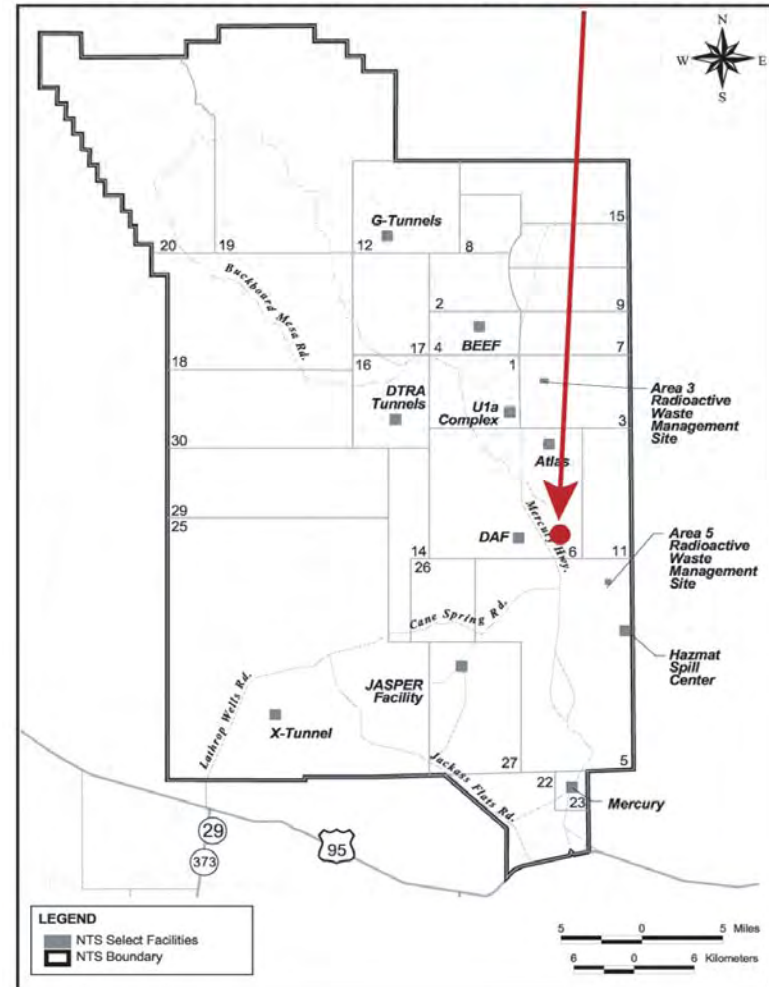
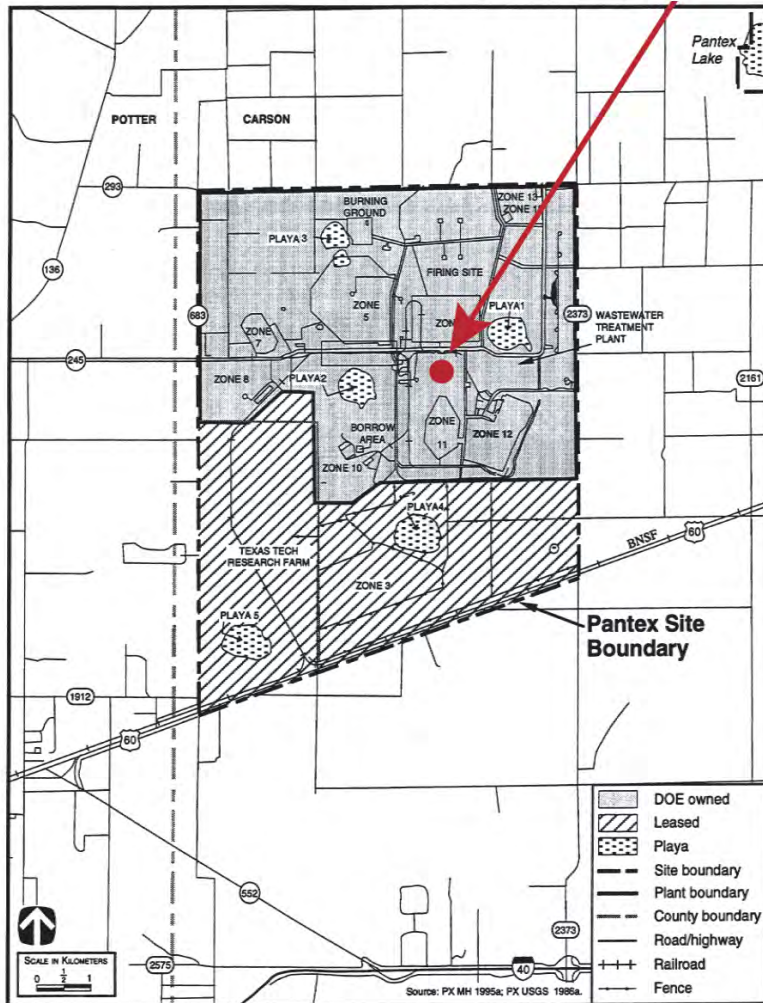
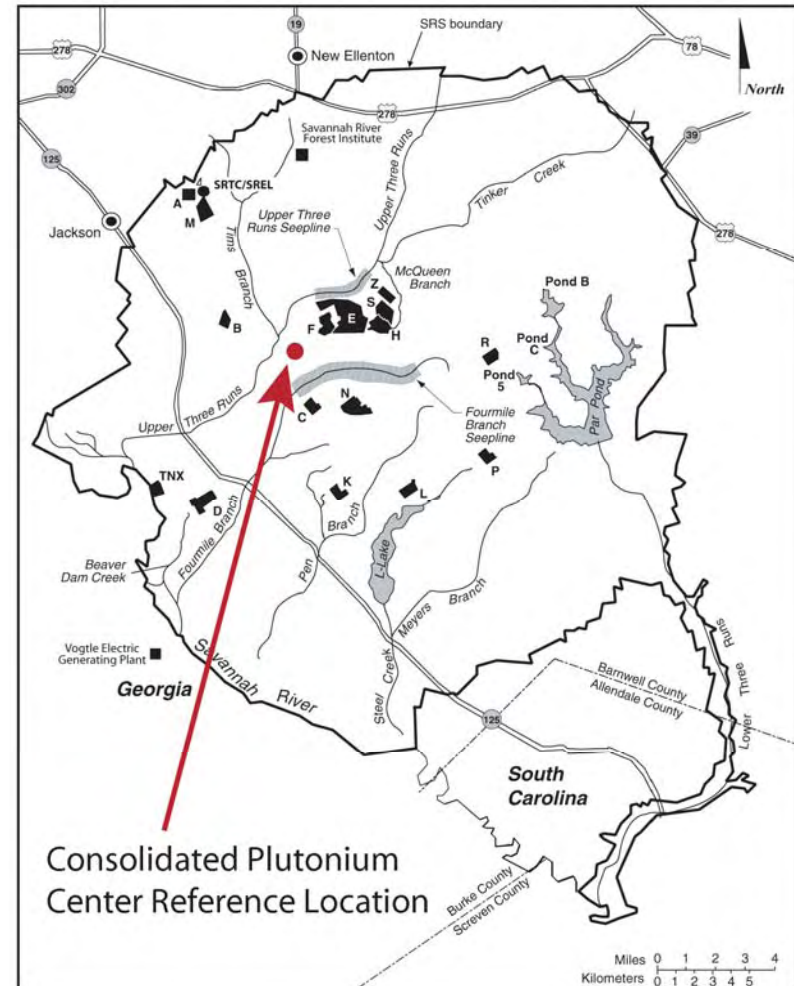


Figure S.3.4.1-3—NTS Consolidated Plutonium Center Reference Location

### Consolidated Plutonium Center Reference Location

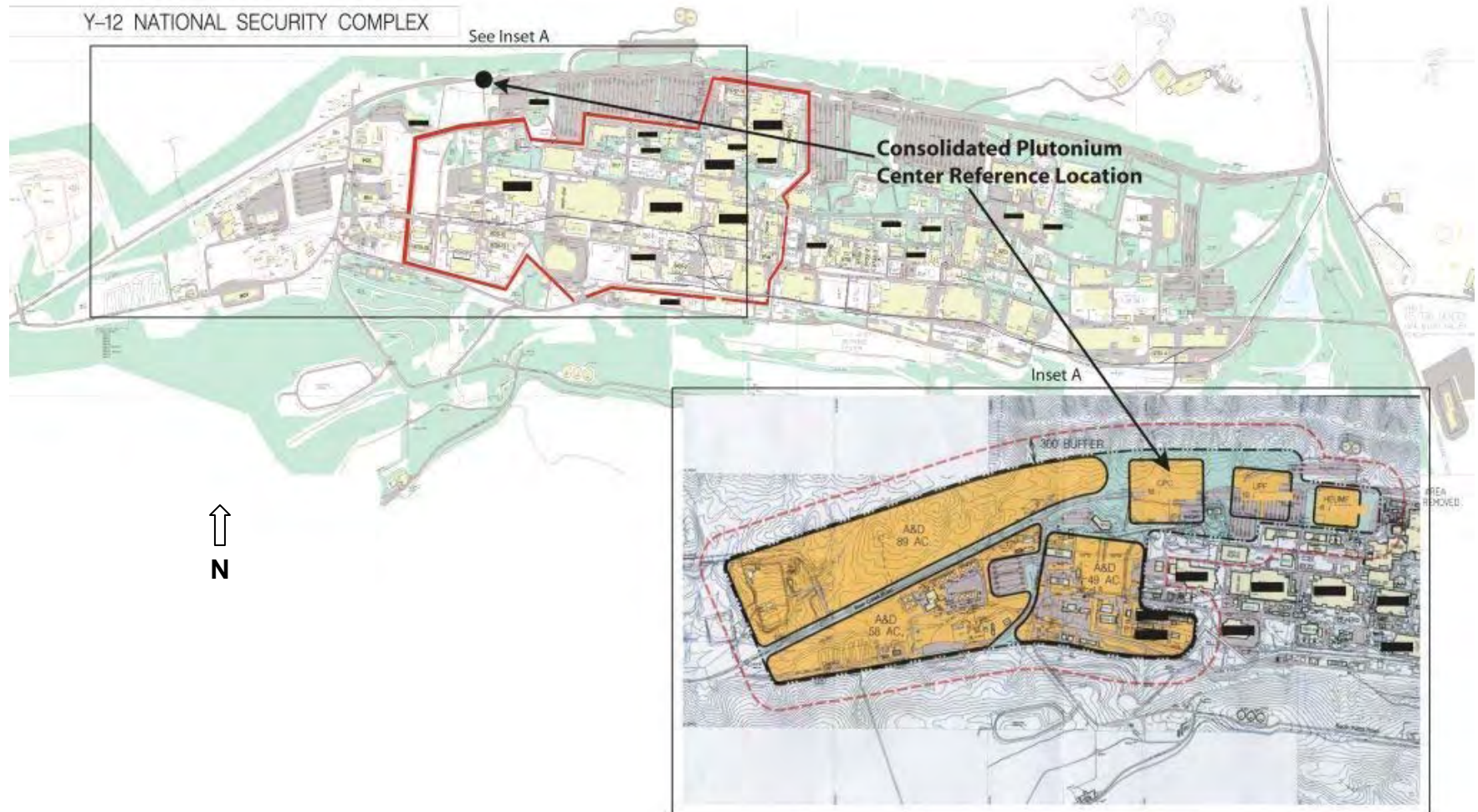


**Figure S.3.4.1-4—Pantex Consolidated Plutonium Center Reference Location**



**Figure S.3.4.1-5—SRS Consolidated Plutonium Center Reference Location**





**Figure S.3.4.1-6—Y-12 Consolidated Plutonium Center Reference Location**

### **S.3.4.1.2 Los Alamos CPC Alternatives**

For purposes of assessing a CPC at Los Alamos, this SPEIS evaluates three approaches: (1) a Greenfield CPC alternative (previously discussed in Section S.3.4.1), in which new nuclear facilities would be constructed to achieve consolidation of plutonium capabilities; (2) an alternative in which existing and planned facilities at Los Alamos are upgraded and augmented with new facilities to achieve a baseline of 125 pits per year (Upgrade Alternative); and (3) an upgrade to existing and planned facilities at Los Alamos to provide up to approximately 80 pits per year (50/80 Alternative<sup>29</sup>). These latter two approaches are addressed in this section.

#### **S.3.4.1.2.1 Los Alamos Upgrade Alternative**

Los Alamos could support pit production requirements using existing and/or new facilities at TA-55, which is the current site for the Plutonium Facility (PF-4). The planned CMRR Facility would be located in TA-55. In addition, LANL has several existing and planned facilities, all of which are included in the No Action Alternative, capable of supporting plutonium operations, including: the Radioactive Liquid Waste Treatment Facility, the solid waste characterization and disposal site (in TA-54), the Sigma Building (in TA-03), the Radiochemistry Facility (in TA-48), a new radiography facility (in TA-55), and a new solid-waste staging facility.

#### **Estimated Modifications to Support the Los Alamos Upgrade Alternative**

Using the existing and planned facilities in TA-55, pit production capacity could be increased to approximately 125 pits per year (single shift) by the following:

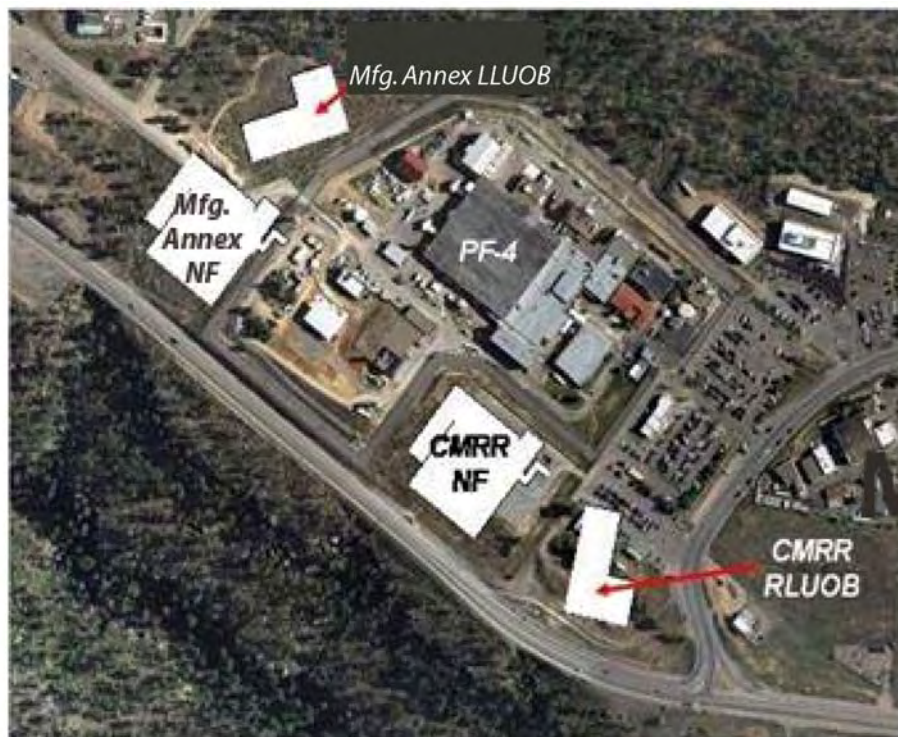
1. Expanding the scope and the size of the planned CMRR Facility; and/or
2. Constructing a new facility (known as the “Manufacturing Annex”) to augment existing pit-manufacturing capacity, the planned CMRR Facility, and related infrastructure capacity.

Both approaches would result in the addition of up to 400,000 square feet of additional space at TA-55, either as one or more stand-alone facilities (e.g., the Manufacturing Annex, which would be comprised of a Manufacturing Annex Nuclear Facility and a light laboratory/utility/office building) or as an addition to the CMRR. This SPEIS analyzes the environmental impacts of the addition of a Manufacturing Annex to provide the additional pit manufacturing, supply/recovery, and/or analytical chemistry support.

Based on prior planning information (NNSA 2007), the new Manufacturing Annex would be approximately the same size as the buildings in the current CMRR project (which would consist of the Chemistry and Metallurgy Research Replacement Nuclear Facility and a radiological laboratory/utility/office building). This annex would be located near the existing PF-4 structure to minimize the logistics of material and personnel movements between the facilities, which would take place through hardened tunnels. An overhead conceptual view of this configuration is shown in Figure S.3.4.1-7.

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<sup>29</sup> The name “50/80 Alternative” reflects the fact that this alternative would expand pit production capacity up to 80 pits per year.



RLUOB = Radiological Laboratory/Utility/Office Building  
CMRR NF = Chemistry and Metallurgy Research Replacement Nuclear Facility  
LLUOB = Light Laboratory/Utility/Office Building

**Figure S.3.4.1-7—TA-55 Site Plan Showing the Proposed  
CMRR and Manufacturing Annex Facilities**

#### **S.3.4.1.2.2 Los Alamos Upgrade Alternative to Provide Up To 80 Pits per Year (“50/80 Alternative”)**

The 50/80 Alternative is evaluated to allow NNSA to consider an alternative with a pit production capacity of less than 125 pits per year. Minor internal modifications to Building PF-4 and completion of the CMRR Facility would be needed to support production of up to 80 pits per year.<sup>30</sup> PF-4 at TA-55 is the only existing plutonium facility capable of being upgraded to support national security requirements at this level (50/80 pits per year) without major construction. Implementation of this 50/80 Alternative (if selected) would be planned to minimize disruption of LANL’s interim pit production activities.

The 50/80 Alternative differs from a Greenfield CPC in several important aspects. First, NNSA assumes this facility would produce up to approximately 80 pits per year; a CPC would produce

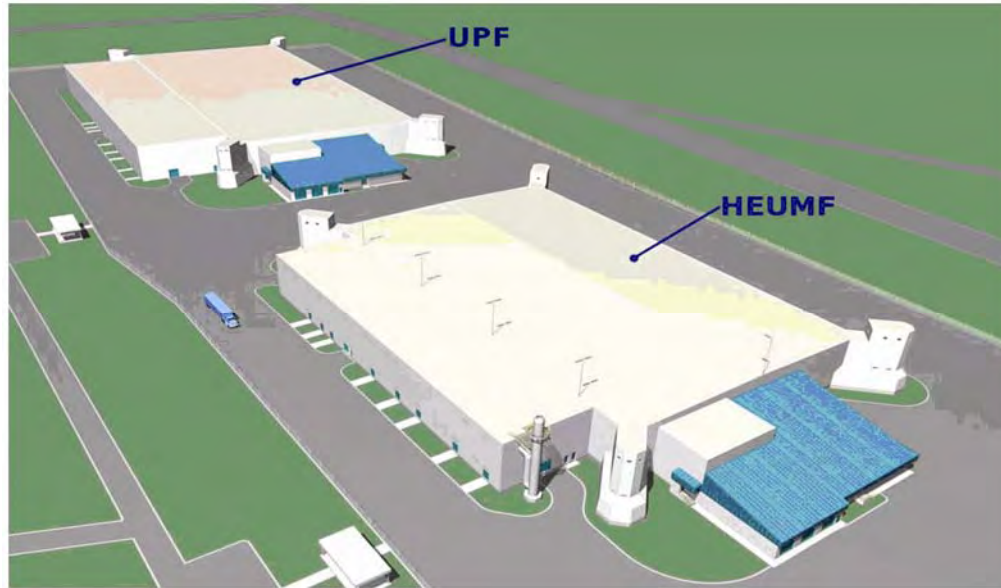
<sup>30</sup> In the Draft SPEIS, a 9,000 square foot addition to the CMRR was assessed as a means to support consolidation of plutonium operations from LLNL, provide increased analytical chemistry support for increased pit production capacity, and ensure sufficient nuclear space as a contingency. Subsequent to that assessment, NNSA concluded that the 9,000 additional square feet is unnecessary to support the consolidation of plutonium activities. Therefore, NNSA is no longer considering an addition of 9,000 square feet to the CMRR.

125 pits per year (single shift) and is assessed at the higher rate of 200 pits per year (multiple shifts and extended work weeks). Second, the upgraded facility may not have a design life of 50 years (the design life for a CPC) without additional upgrades because some parts of the existing facility have already operated about 40 years. Modifications would include major upgrades to the residue recovery/metal feed facilities in the 400 Area of PF-4. Many of the gloveboxes in this part of the facility would have to be replaced. Replacement of these older gloveboxes would be required to ensure that the recovery/feed process operations are adequate to supply plutonium metal to the manufacturing operations. There would also be significant glovebox decontamination/decommissioning/disposal operations as new process development and certification operations are moved into other areas of PF-4. In addition, various manufacturing equipment would be added to or replaced in the fabrication areas of PF-4 to increase capacity and reliability. Minor internal modifications to Building PF-4 could be required to accommodate additional workers employed in pit manufacturing. The construction of the CMRR Facility would disturb 6.5 acres during construction and add approximately 2.5 acres to the permanent TA-55 footprint.

#### **S.3.4.2      *Uranium Processing Facility at Y-12***

Y-12 manufactures nuclear weapons secondaries, cases, and other weapons components; evaluates and performs testing of these weapon components; maintains Category I/II quantities of HEU; conducts dismantlement, storage, and disposition of nuclear weapons materials; and supplies HEU for use in naval reactors. A proposed UPF would consolidate many of Y-12's operations into an integrated manufacturing facility sized to satisfy all identified programmatic needs. A UPF would be sited adjacent to the HEUMF (which recently completed construction) to allow the two facilities to function as one integrated operation. Transition of Y-12 operations to this configuration would enable the high security area to be reduced by 90 percent. This would significantly improve physical protection; optimize material accountability; enhance worker, public, and environmental, safety, and health protection; and consolidate operations to greatly reduce operational costs.

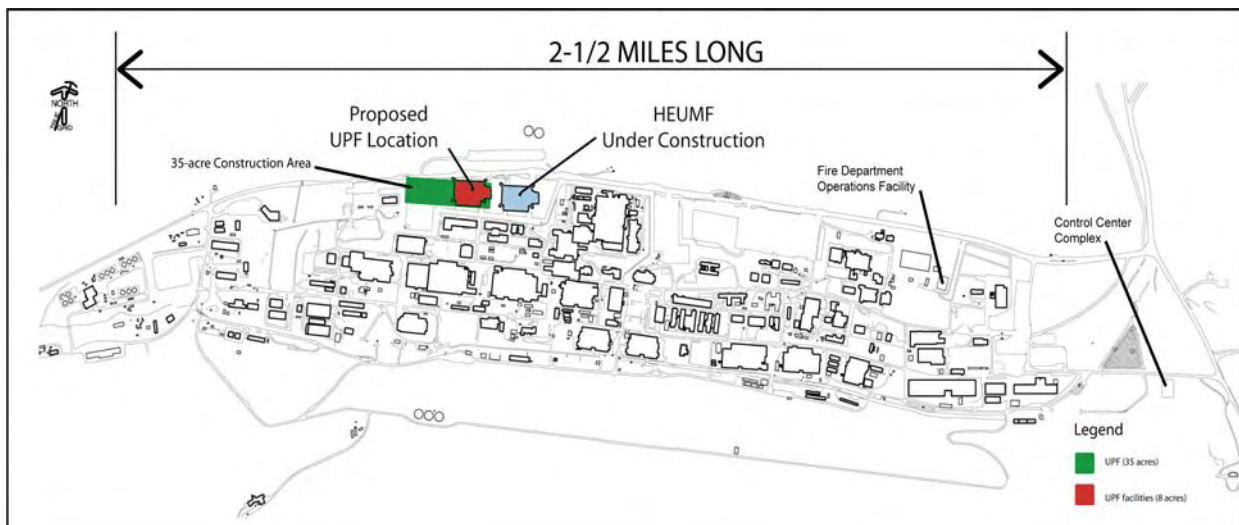
The proposed UPF would replace multiple existing enriched uranium and other processing facilities. The current operating and support areas occupy approximately 633,000 square feet in multiple buildings, while the UPF would result in approximately a 33 percent reduction, to approximately 400,000 square feet in one building. Figure S.3.4.2-1 shows an artist's rendering of the proposed UPF. Figure S.3.4.2-2 shows the proposed location of the UPF relative to other buildings at Y-12.



Source: NNSA 2005c.

**Figure S.3.4.2-1—Artist’s Rendering of the UPF Adjacent to the HEUMF**

The design service life of a UPF would be 50 years. The preliminary schedule for the project assumes that site preparation would begin in approximately 2010 should NNSA decide to construct this facility. Under this proposed schedule, a UPF would be completed by approximately 2016, and operations would begin by 2018. As shown on Figure S.3.4.2-2, construction of the UPF would require approximately 35 acres of land, which includes acreage for a construction laydown area and temporary parking. Once constructed, the UPF facilities would occupy approximately 8 acres.



Source: NNSA 2007.

**Figure S.3.4.2-2—Location of the UPF at Y-12**

### **S.3.4.3 Upgrade Existing Enriched Uranium Facilities at Y-12**

NNSA could upgrade the existing Y-12 enriched uranium (EU) facilities. In that case, there would be no UPF and the current high-security area would not be reduced. The upgrade projects would be internal modifications to the existing facilities and would improve worker health and safety and extend the life of existing facilities. If a UPF were not constructed at Y-12, major investments above and beyond normal maintenance would be required for continued operations in the existing facilities, including structural upgrades; heating, ventilating, and air conditioning 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 requirements (DOE-STD-1023-95).

### **S.3.5 Programmatic Alternative 2: Consolidated Centers of Excellence**

NNSA also evaluates an alternative in this SPEIS involving consolidated centers of excellence (CCE). The CCE alternative would consolidate the three major SNM functions (plutonium, uranium, and weapon assembly/disassembly) involving Category I/II quantities of SNM into a consolidated nuclear production center (CNPC) at one site or into consolidated nuclear centers (CNC) at two sites. The requirements and assumptions for the CCE are:

- A CCE alternative would be sized and configured to support the U.S. nuclear weapons stockpile projected to exist after full implementation of the *Moscow Treaty*. The upper bound of the capacities would support delivery of 125 weapon assemblies per year in five-day, single-shift operations. Multiple shift operation and extended work weeks would yield up to 200 weapon assemblies per year.
- The CCE alternative includes three major facilities: the CPC, consolidated uranium center (CUC), and the A/D/HE Center. As explained in Section S.3.5.2, there is an option to separate the weapon A/D/HE mission to allow NNSA to consider an alternative that locates the nuclear production facilities at a different site than the weapons A/D/HE mission.
- All Category I/II SNM required by NNSA would be stored at the CCE facilities to support future NNSA needs.
- CCE facilities would be designed to have a useful service life of at least 50 years without major facility renovation.
- CCE facilities could be located at one or more of the following sites: Los Alamos, Pantex, NTS, SRS, and Y-12.
- A modular arrangement of facilities (a campus) is assumed for the CCE options rather than separate operational wings in a single large facility. The facilities making up the CCE campus could be configured so that they can be constructed sequentially. A single building to house the CCE functions was not considered to be reasonable due to the need

to bring facilities on-line in a sequential manner and the fundamental differences in uranium, plutonium, and assembly/disassembly operations.<sup>31</sup> The assumed schedule for the CCE functional facilities is shown in Table S.3.5-0:

**Table S.3.5-0—Schedule for Consolidated Centers of Excellence Facilities**

Facility	Start Detailed Facility Design	Begin Operations
CUC	2009	2018
CPC	2012	2022
A/D/HE Center	2015	2025

- A CCE would consist of a central core area that includes all operations involving Category I/II quantities of SNM, as well as all support facilities that require lower levels of security protection. This core area would be surrounded by a perimeter intrusion detection and assessment system (PIDAS). A buffer area would provide an unobstructed view of the area surrounding the PIDAS. The land requirements for the operation of a CNPC and CNC are shown in Tables S.3.5-1 and S.3.5-2 respectively.

**Table S.3.5-1—Land Requirements to Operate a CNPC**

Operation (acres)	Total Area: 545 Acres*	
	PIDAS	Non-PIDAS
<b>Total: 235</b>	<b>Total: 310</b>	
<ul style="list-style-type: none"> <li>• CPC: 40</li> <li>• CUC: 15</li> <li>• A/D/Pu Storage: 180</li> </ul>	<ul style="list-style-type: none"> <li>• Non-SNM component production: 20</li> <li>• Administrative Support: 70</li> <li>• Explosives Area: 120</li> <li>• Buffer Area: 100</li> </ul>	

\*Total land area for CNPC at Y-12 would be reduced by approximately 27 acres due to existing uranium production facilities, including the HEUMF.

**Table S.3.5-2—Land Requirements to Operate a CNC**

Operation (acres)	Total Area: 195*	
	PIDAS	Non-PIDAS
<b>Total: 55</b>	<b>Total: 140</b>	
<ul style="list-style-type: none"> <li>• CPC: 40</li> <li>• CUC: 15</li> </ul>	<ul style="list-style-type: none"> <li>• Non-SNM component production: 20</li> <li>• Administrative Support: 70</li> <li>• Buffer Area: 50 acres</li> </ul>	

\*Total land area for CNC at Y-12 would be reduced by approximately 27 acres due to existing uranium production facilities, including the HEUMF.

<sup>31</sup> The facilities that would constitute a CCE would be separate buildings in a campus because they have different and unique safety and operational requirements, and it would not be technically feasible to make them part of a single large facility without having separate systems for the operation of the three facilities and other physical features (blast wall separation, etc.) to keep them separate. They would be built in sequence because they are very complex facilities and the potential realities of construction logistics, cash flow, and start-up management would not support a single facility. Building them in sequence reduces the construction management risk and allows lessons learned from one to benefit the others. The CUC would be first because the existing uranium facilities at Y-12 (except the HEUMF) are aging. The CPC would be built second because the LANL facilities can handle the immediate need for pits. The weapons A/D/HE facilities would be built last because there is less programmatic urgency than for the CUC and CPC.

### S.3.5.1 *Consolidated Nuclear Production Center (CNPC) Option*

This option would consolidate the three major SNM functions (plutonium, uranium, and weapon assembly/disassembly) involving Category I/II quantities of SNM into a single campus at one site. Depending on the site selected for the CNPC, this option could result in the cessation of NNSA weapons operations at Y-12 and/or Pantex. Under this option, NNSA would construct and operate a CNPC at SRS, Y-12, Pantex, NTS, or Los Alamos. The CNPC would comprise three major facilities: CPC, CUC, and the A/D/HE Center. The description of the CPC is contained in Section S.3.4.1 and is not repeated below. The sections below describe the other major CNPC facilities: the CUC (Section S.3.5.1.1) and the A/D/HE Center (Section S.3.5.1.2). In addition, Section S.3.5.1.3 describes the transport of plutonium and HEU to the CNPC. Finally, Section S.3.5.1.4 discusses site-specific characteristics of the candidate sites for a CNPC. These characteristics affect the manner in which a CNPC might be implemented. For example, a CNPC located at Pantex would not require the construction of the A/D/HE Center, as Pantex currently performs those missions in existing facilities that would not require major renovations in the reasonably foreseeable future. Section S.3.5.1.4 also identifies the reference locations for the CNPC at each site alternative. A generic layout of the CNPC is shown in Figure S.3.5.1-1.

#### S.3.5.1.1 **Consolidated Uranium Center**

The CUC would have a nuclear facility located within a PIDAS, and non-nuclear support facilities outside of it. The nuclear facility would consist of a UPF and a storage facility for HEU.<sup>32</sup> The nuclear facility would process HEU, produce nuclear weapon secondary components, provide the capability to perform HEU R&D in support of LANL and LLNL, and store HEU. The non-nuclear facilities would contain the production operations and support functions. The non-nuclear facilities would also contain the chemical processes, fabrication operations, support functions associated with the production of lithium-hydride and lithium-deuteride components, and general manufacturing capabilities. For this analysis, it is assumed that the CUC could be built at any of the sites on approximately the same timeframe that a UPF could be built at Y-12. The CUC would be constructed over a six year period, beginning in approximately 2010, with completion by approximately 2016, and operations beginning by approximately 2018. The land requirements for the CUC are shown in Table S.3.5-3.

**Table S.3.5-3—Land Requirements for CUC\***

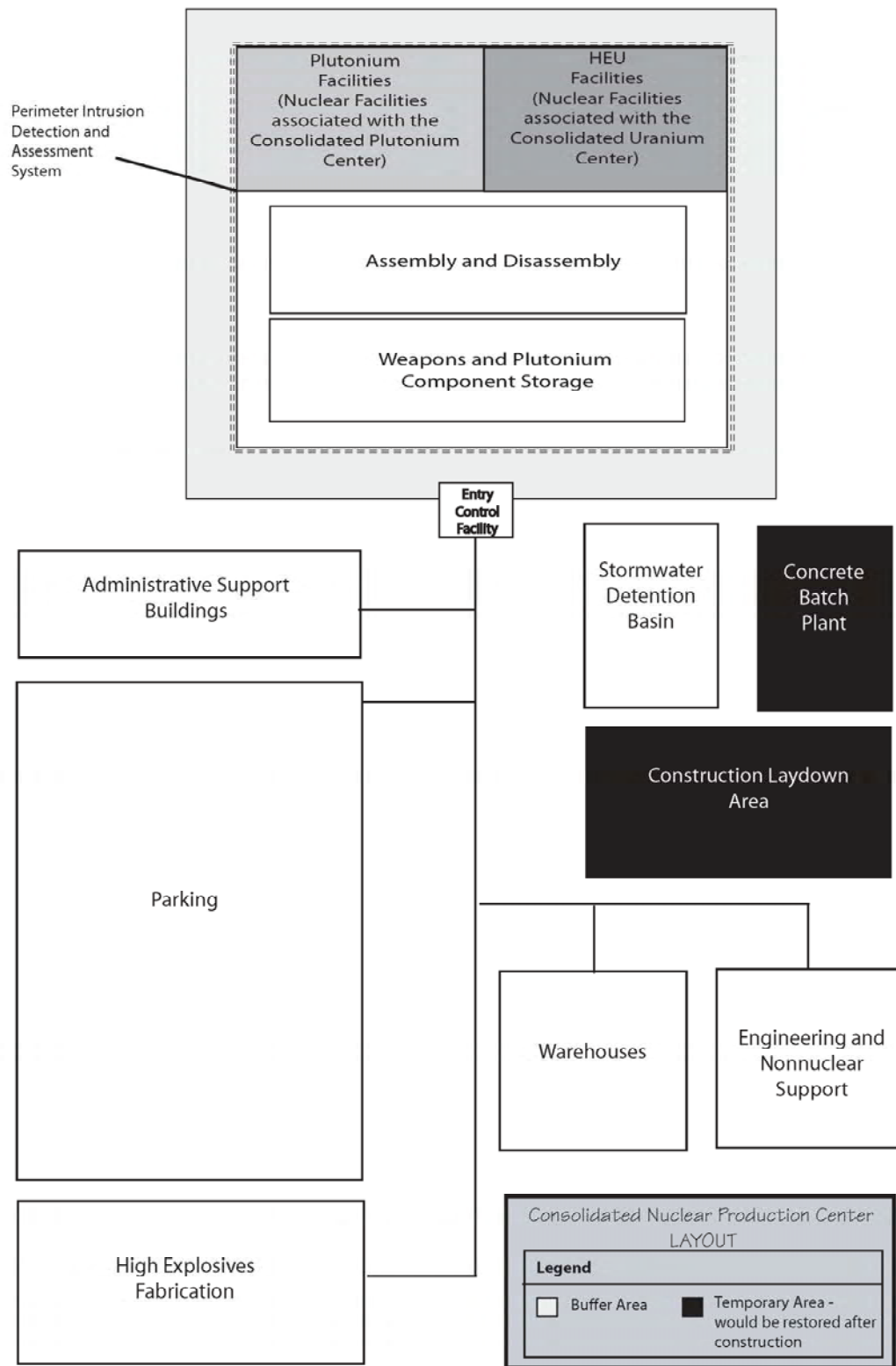
<b>Construction (acres)</b>	<b>50</b>	
<b>Operation (acres)</b>	<b>Total Area: 35**</b>	
	<b>PIDAS</b>	<b>Non-PIDAS</b>
	15	20

\* At Y-12, a UPF would be constructed (see Section S.3.4.2). The UPF would require a total area of 8 acres rather than the 35 acres for a CUC.

\*\* Includes a buffer area that would provide unobstructed view of the area surrounding the PIDAS.

<sup>32</sup> A CUC at Y-12 would not require construction of a new HEU storage facility because NNSA recently completed construction of a modern storage facility (the HEUMF) at that site.





**Figure S.3.5.1-1—Generic Layout of the Consolidated Nuclear Production Center**

### S.3.5.1.2 Assembly/Disassembly/High Explosives Center

The A/D/HE Center would carry out the following major missions:

- Assemble warheads;
- Dismantle weapons that are surplus to the strategic stockpile and sanitize,<sup>33</sup> store, or dispose of their components;
- Develop and fabricate explosive components; and
- Conduct surveillance related to certifying weapon safety and reliability.

The A/D/HE Center would contain nuclear facilities located within the PIDAS, and non-nuclear facilities outside the PIDAS. The nuclear facilities would contain the cells and bays in which maintenance, modification, disassembly, and assembly operations are conducted. The facilities would be designed to mitigate the effects of the unlikely accidental detonation of the weapon’s explosive components.

As shown in Table S.3.5-4, an area of 180 acres would be provided in the PIDAS for weapons assembly and disassembly facilities, and for weapons and component storage. Located outside the PIDAS would be a buffer zone and non-nuclear facilities for HE fabrication, administrative support, and disposal of explosive materials. This area would be approximately 120 acres. The A/D/HE Center would be constructed over a six-year period beginning in approximately 2020, with completion by approximately 2025, and operations beginning by approximately 2025.

**Table S.3.5-4—Land Requirements for A/D/HE Center\***

<b>Construction (acres)</b>	<b>300</b>	
<b>Operation (acres)</b>	<b>Total Area: 300**</b>	
	<b>PIDAS</b>	<b>Non-PIDAS</b>
	Weapons A/D/Pu Storage: 180	Administrative and High Explosives Area: 120

\* At NTS, an A/D/HE Center would require 200 acres, due to use of existing infrastructure.

\*\* Includes a buffer area that would provide unobstructed view of the area surrounding the PIDAS.

### S.3.5.1.3 Transport of Plutonium and HEU to a CNPC

If NNSA were to construct and operate a CNPC, plutonium and HEU would be consolidated at the CNPC. This would entail three potential movements of these materials: (1) transfer of LANL’s Category I/II plutonium to the CNPC, if LANL is not selected as the host site for the CNPC; (2) transfer of Pantex’s non-excess Category I/II plutonium to the CNPC, if Pantex is not selected as the host site for the CNPC; and (3) transfer of Y-12’s Category I/II HEU to the CNPC, if Y-12 is not selected as the host site for the CNPC. Each of these movements is discussed below.

- Transfer of LANL’s Category I/II inventories of nuclear material essential to the programmatic mission of NNSA would be transferred to the eventual CNPC Site. This would involve approximately 4 shipments of material.

<sup>33</sup> Sanitization involves the obliteration and demilitarization of classified weapons parts.

- Transfer of Pantex's non-excess Category I/II plutonium to the CNPC would involve:
  - Less than 60 metric tons of plutonium, mostly in pit form;
  - Approximately 470 shipments would be required, beginning in approximately 2025 and lasting 5 years.
  
- Transfer of Y-12's Category I/II HEU to the CNPC would involve:
  - Up to 252 metric tons of HEU;
  - Approximately 540 shipments would be required, beginning after approximately 2023 and lasting 5 years.

#### **S.3.5.1.4 Site-Specific Features Relevant to a CNPC**

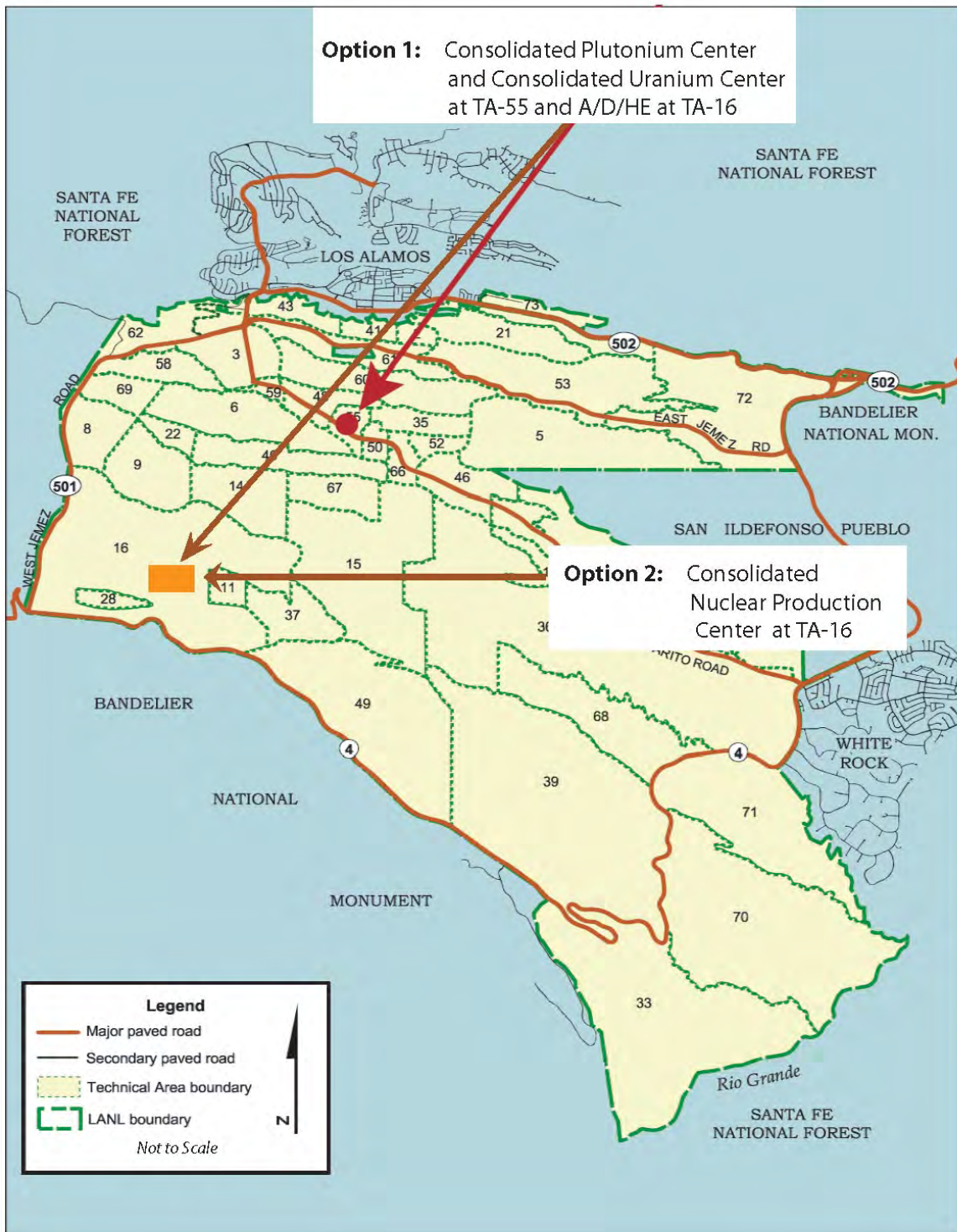
This section describes implementation of a CNPC at each candidate site. While the CNPC requirements would be the same at each site, the means of achieving them would vary depending upon the existing facilities and infrastructure at a site. This section also identifies the reference location for a CNPC at each site.

##### **S.3.5.1.4.1 Los Alamos**

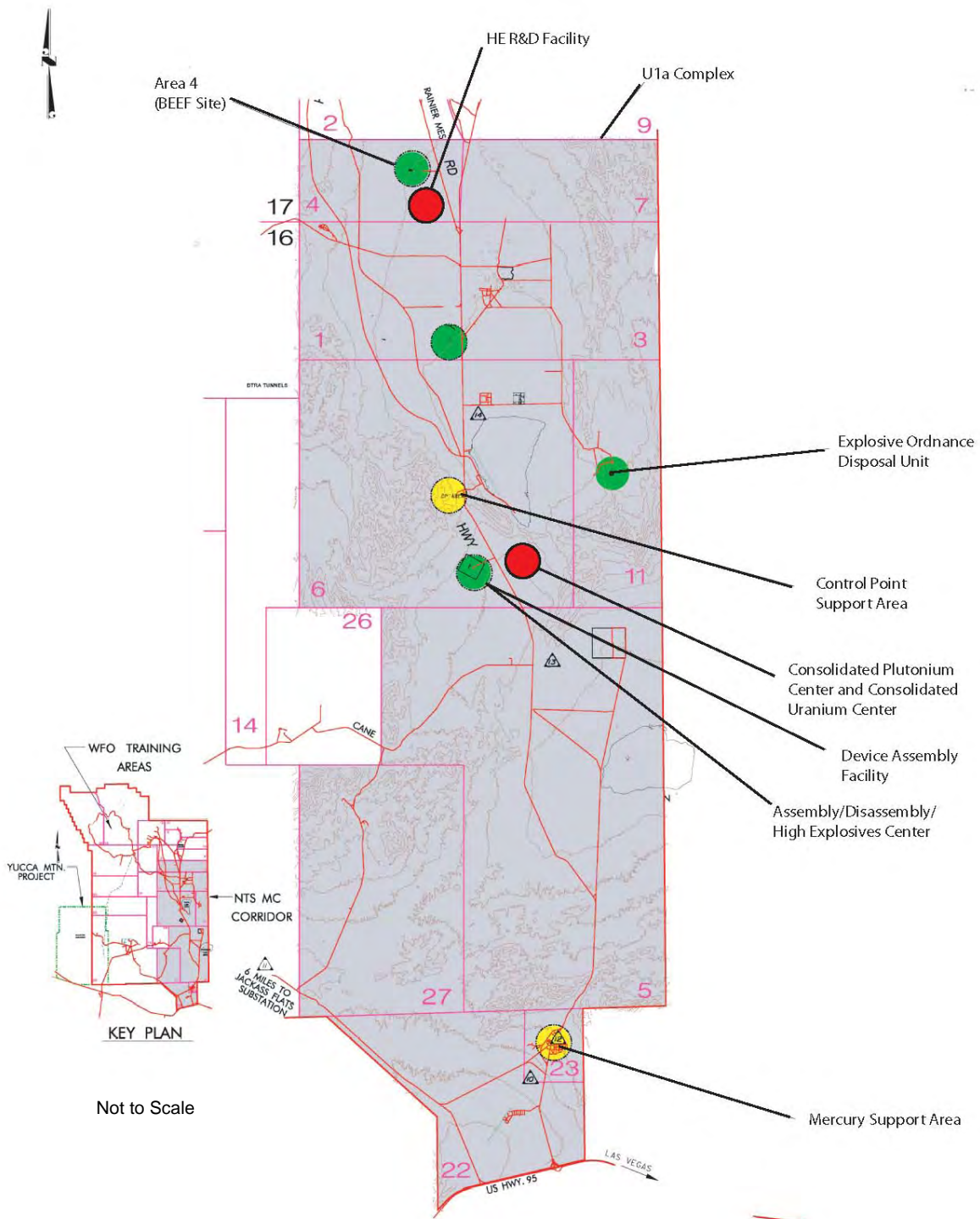
A CNPC located at Los Alamos would require the construction of a CPC (which could either be a "Greenfield CPC" or an upgrade to existing LANL facilities), a CUC, and an A/D/HE Center. There would not be enough acreage at TA-55 to locate an entire CNPC. Thus, a CNPC at LANL could be divided between two TAs (TA-55 [which could be the site for the CPC and the CUC], and TA-16 [A/D/HE Center]) or completely located at TA-16. Figure S.3.5.1-2 identifies the reference locations for the CPC, CUC, and the A/D/HE Center at LANL. Because the CPC, CUC, and A/D/HE Center would be constructed sequentially, construction requirements for these three facilities would not create simultaneous impacts and are analyzed as sequential actions in this SPEIS.

##### **S.3.5.1.4.2 NTS**

A CNPC located at NTS would require the construction of a CPC, a CUC, and an A/D/HE Center (which would be an upgrade to the existing Device Assembly Facility, as described in this section). Figure S.3.5.1-3 shows the reference locations for the CPC, CUC, and the A/D/HE Center at NTS.



**Figure S.3.5.1-2—Los Alamos Consolidated Nuclear Production Center Reference Locations**



**Figure S.3.5.1-3—NTS Consolidated Nuclear Production Center Reference Locations**

An A/D/HE Center could make use of the existing capabilities at NTS such that construction requirements would be reduced compared to an A/D/HE Center located at other sites (other than Pantex). An A/D/HE Center at NTS could maximize use of existing facilities at the Device Assembly Facility (DAF), the underground complex of tunnels at U1a, the Big Explosive Experimental Facility (BEEF), the Explosives Ordnance Disposal Unit, existing site infrastructure, and the support areas of Mercury, the Control Point, and Area 6 Construction (Figure S.3.5.1-3). By utilizing these existing assets, the need for additional construction would be minimized.

#### **S.3.5.1.4.3 Pantex**

A CNPC located at Pantex would not require the construction of an A/D/HE Center, as Pantex currently performs these missions in existing facilities. As such, a CNPC at Pantex would involve construction of a CPC and a CUC. Figure S.3.5.1-4 identifies the reference location for a CPC and CUC at Pantex.

#### **S.3.5.1.4.4 SRS**

A CNPC at SRS would require the construction of a CPC, a CUC, and an A/D/HE Center. Figure S.3.5.1-5 identifies the reference location for a CNPC at SRS.

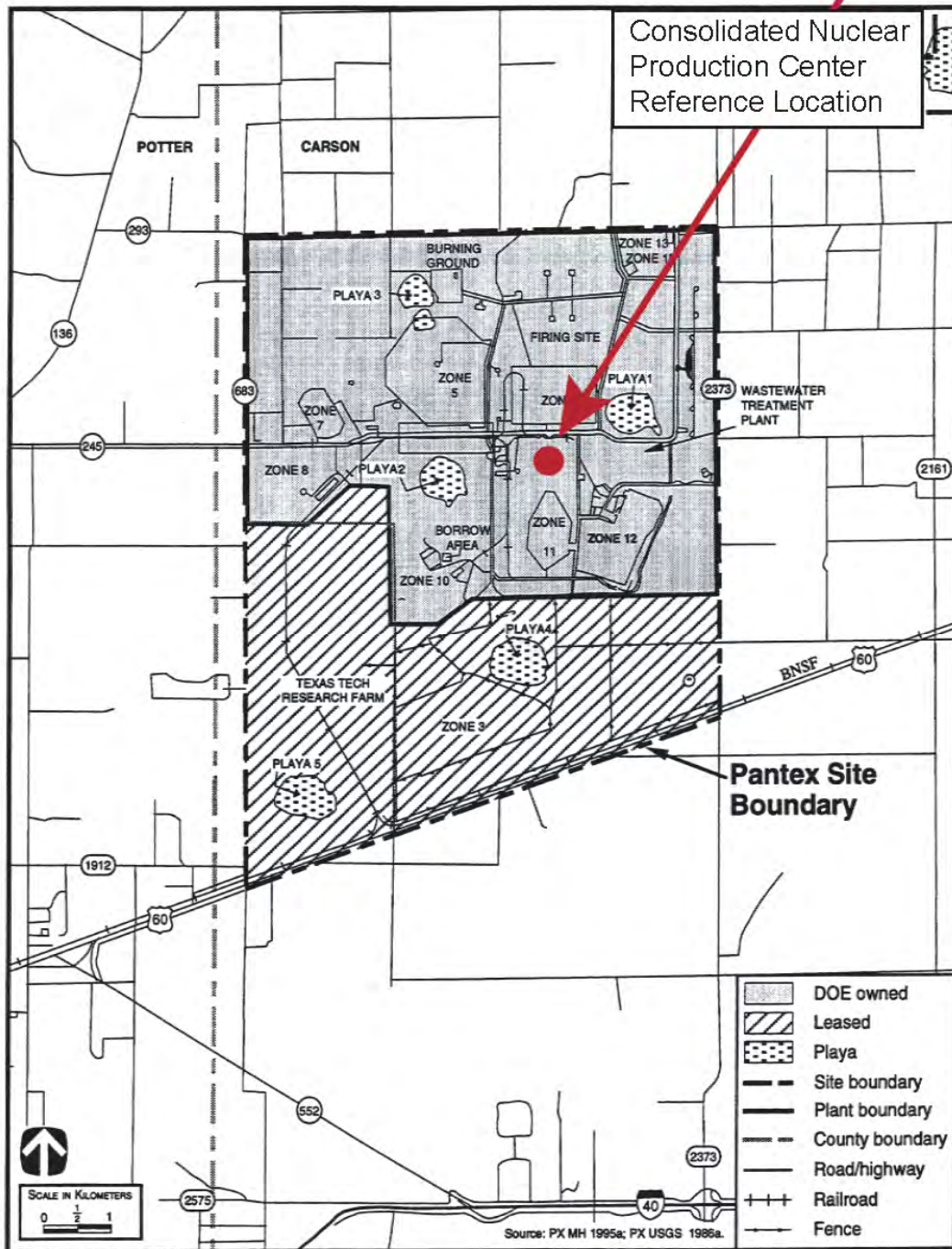


Figure S.3.5.1-4—Pantex CNPC Reference Location

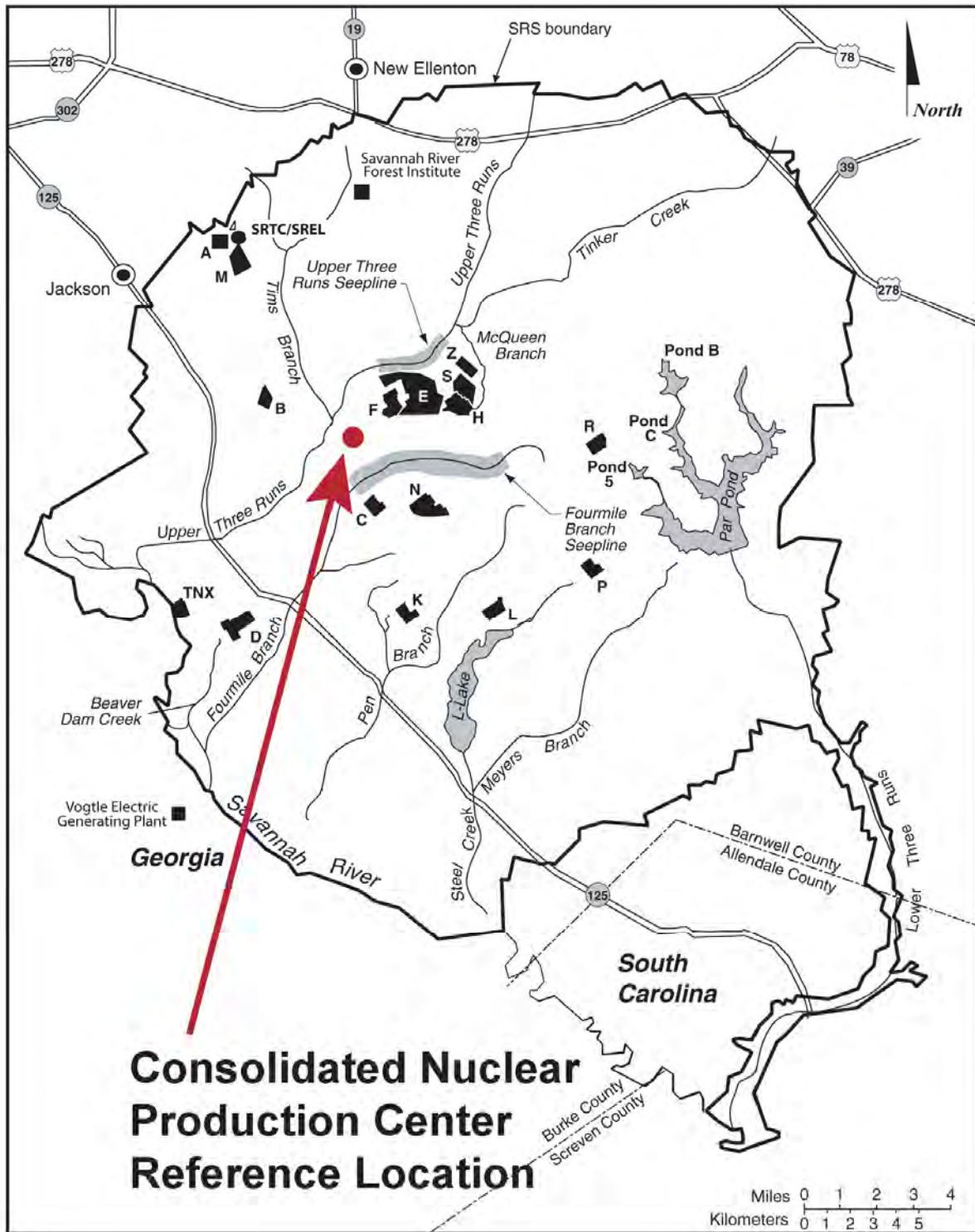
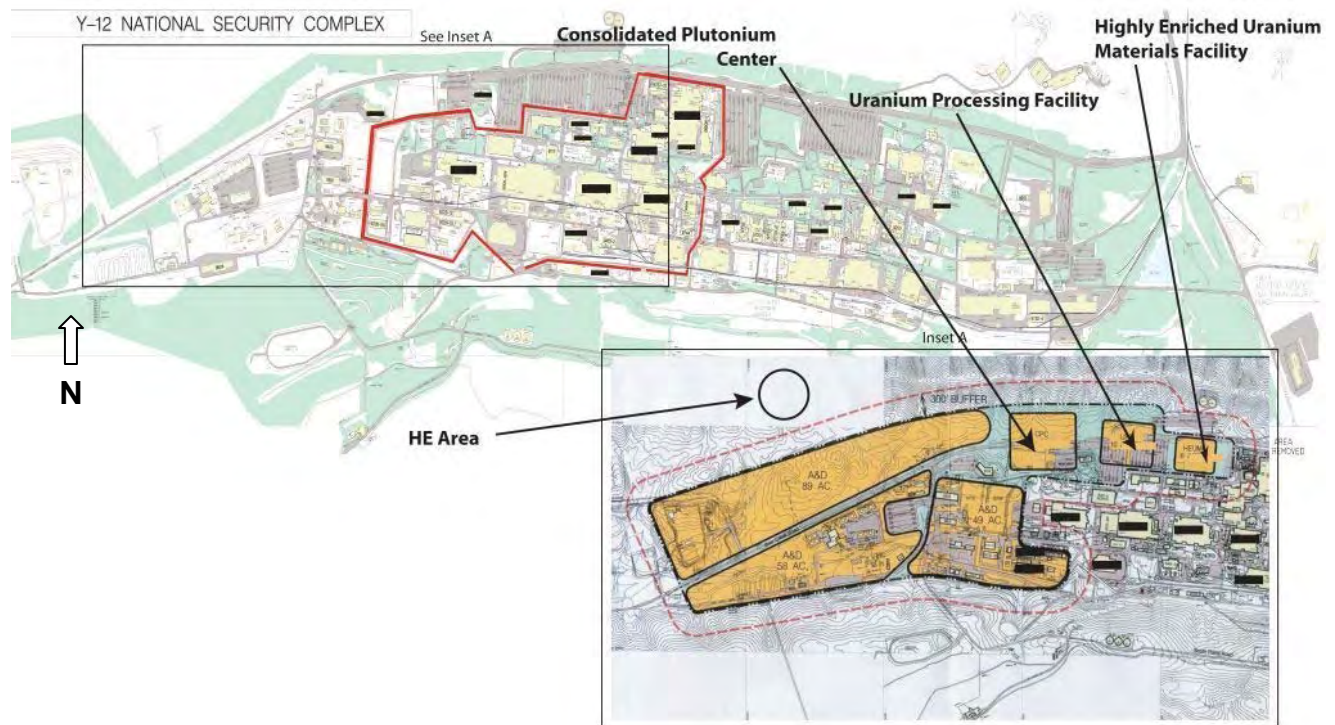


Figure S.3.5.1-5—SRS CNPC Reference Location



**S.3.5.1.4.5 Y-12**

A CNPC located at Y-12 would require the construction of a CPC, a UPF, and an A/D/HE Center. A CUC at Y-12 would not require construction of a new HEU storage facility because NNSA is already building a modern storage facility there (the HEUMF). Figure S.3.5.1-6 identifies the reference locations for a CPC, UPF, and the A/D/HE Center at Y-12. The HE component of the A/D/HE Center would be located on the ORR approximately 4.5 miles west of Y-12 due to buffer requirements and available real estate.

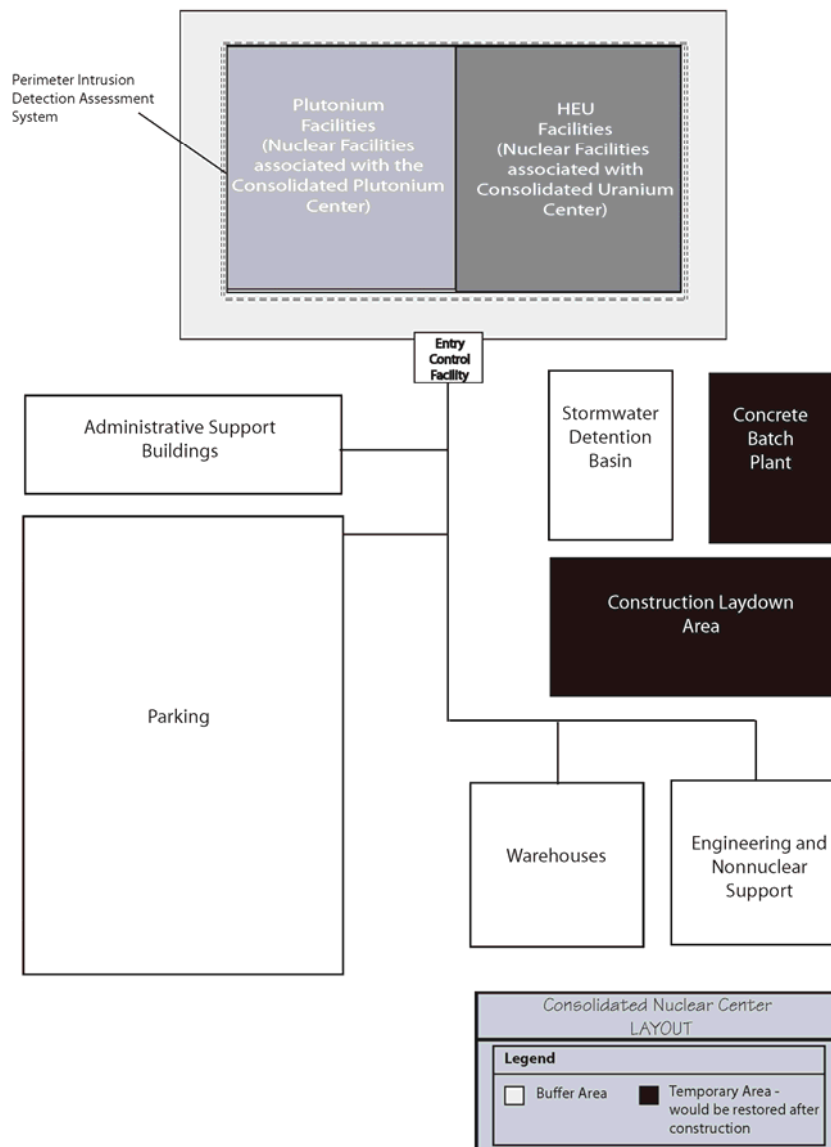


**Figure S.3.5.1-6—Y-12 CNPC Reference Location**

**S.3.5.2 Consolidated Nuclear Center Option**

This option would separate the weapon A/D/HE mission to allow NNSA to consider an alternative that locates the nuclear production facilities at a different site from the weapons A/D mission. Under this option, NNSA would construct and operate a CPC and CUC at one site and an A/D/HE Center at either Pantex or NTS. A generic layout of a CNC is shown in Figure S.3.5.2-1.

The descriptions of the facilities that constitute a CNC are contained in Section S.3.5.1. Operationally, the major difference between a CNPC and a CNC is the need for transportation between the nuclear production facilities and an A/D/HE Center. For example, once steady-state operations are achieved in a CNPC, all nuclear missions would occur at a single site and there would be virtually no radiological transportation within the Complex (with the exception of nuclear weapon and waste shipments).



**Figure S.3.5.2-1—Generic Layout of the Consolidated Nuclear Center**

Under a CNC option, radiological transportation would be required between the nuclear production facilities and the A/D/HE Center. This SPEIS assesses the radiological transportation impacts of the alternative configurations shown in Table S.3.5.2-1.

**Table S.3.5.2-1—Alternative Configurations of the CNC**

If A/D/HE Center is at:	Then CNC would be located at one of the following locations:			
	SRS	NTS	Los Alamos	Y-12
Pantex	X	X	X	X
NTS	X		X	X

### S.3.6 Programmatic Alternative 3: Capability-Based Alternative

The nuclear weapons stockpile and the Complex 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 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 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).

As these actions illustrate, the Administration's goal is to achieve a credible nuclear deterrent with the lowest possible number of nuclear warheads consistent with national security needs. NNSA's analyses in this SPEIS are based on current national policy regarding stockpile size (1,700-2,200 operationally deployed strategic nuclear warheads) with flexibility to respond to future Presidential direction to change the size. NNSA also assumes that it must continue to maintain an arsenal of some number of nuclear weapons. Maintaining a stockpile requires the ability to detect aging effects in weapons (a surveillance program), the ability to fix identified problems without nuclear testing (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 Complex that are unable to safely or reliably perform their assigned production mission (e.g., CMR at LANL and Building 9212 at Y-12). Therefore, new facilities are required to perform the essential production missions of these facilities.

Although the size of the stockpile beyond 2012 is not known, the trend suggests a significantly smaller one. Consistent with this trend, NNSA developed a programmatic alternative, referred to as the "Capability-Based Alternative," 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. The objective of this analysis is to identify the potential environmental impacts that are particularly sensitive to assumptions about the size of the future stockpile. In addition, analysis of this alternative enhances NNSA's understanding of the infrastructure that might be appropriate if the United States continues to reduce stockpile levels. Within the Capability-Based Alternative, NNSA has analyzed two options:

(1) A Capability-Based Alternative that would maintain a basic manufacturing capability to produce nuclear weapons, as well as laboratory and experimental capabilities to support the stockpile. It would reduce the operational capacity of production facilities to a throughput of

approximately 50 weapons per year. This alternative involves pit production at LANL of 50 pits per year and reductions of production capacities at Pantex, Y-12, and SRS. This alternative is described in detail in Section 3.6.1.

(2) A No Net Production/Capability-Based Alternative that would produce a limited number of components and assembly of weapons beyond those associated with supporting surveillance, but would not involve adding new types or increased numbers of weapons to the total stockpile. This alternative involves a minimum production (production of 10 sets of components or assembly of 10 weapons per year) to maintain capability and to support a limited Life Extension Program (LEP). This alternative, which NNSA added after considering public comments on the Draft SPEIS, is described in detail in Section 3.6.2.

The two options analyzed for the Capability-Based Alternative might not provide the optimum configuration of the Complex if the stockpile became much smaller. In such a situation, NNSA could make changes to the Complex beyond those described by the two options analyzed for the Capability-Based Alternative. Consequently, this SPEIS discusses further changes to the Complex that might be reasonable if the stockpile were reduced even further (to hundreds of weapons). That discussion focuses on how the programmatic alternatives considered in this SPEIS could be adapted to such a small stockpile. NNSA acknowledges, however, that any decision to reduce the stockpile to those levels could result in a need to reassess the transformation options for the Complex.

### **S.3.7           Category I/II SNM Consolidation Actions Included in the No Action Alternative or Common to All of the Programmatic Action Alternatives**

Category I/II quantities of SNM are stored at six NNSA sites: LLNL, LANL, NTS, Pantex, SRS (not associated with NNSA weapons activities), and Y-12. NNSA is seeking to reduce security costs and increase safety through SNM consolidation. As a result, the future complex is expected to have fewer sites and fewer locations within sites with Category I/II quantities of SNM. This section describes actions related to Category I/II SNM consolidation that are either included in the No Action Alternative or common to each of the programmatic action alternatives.

#### **S.3.7.1           *Transfer Category I/II SNM from LLNL to Other Sites and Phase-out Operations at Superblock Involving Category I/II Quantities of SNM***

NNSA is assessing the removal of Category I/II SNM from LLNL by approximately 2012, and the phase-out of operations at the Superblock involving Category I/II quantities of SNM. Although the exact quantities of Category I/II SNM are classified, the Category I/II SNM at LLNL can be divided up into three basic categories, in the percentages indicated, along with the receiver site for this material, and the number of trips required (see Table S.3.7-1).

**Table S.3.7-1—Category I/II SNM at LLNL**

Category I/II SNM Category	Percentage	Receiver Site	# Trips
SNM Excess to Programmatic Missions <sup>34</sup>	56	SRS	10
SNM Required for Programmatic Missions	28	LANL <sup>35</sup>	5
Waste	6	WIPP	3

Source: NNSA 2007.

The LLNL SWEIS (DOE 2005) assesses the environmental impacts of transporting SNM to and from LLNL and other DOE sites as part of the proposed action. The Record of Decision for the LLNL SWEIS (70 FR 71491) authorized operations for the Proposed Action Alternative, which allows approximately 538 shipments annually of hazardous and radioactive materials and wastes. As such, the transportation activities identified in Table S.3.7-1 are included in the existing No Action Alternative<sup>36</sup>. For completeness, however, this SPEIS assesses the environmental impacts associated with:

- Packaging and Unpackaging Category I/II SNM
- Transporting Category I/II SNM from LLNL to Receiver Sites
- Storage of Category I/II SNM at Receiver Sites
- Phasing out Category I/II SNM Operations from LLNL.

**S.3.7.2 *Transfer Category I/II SNM from Pantex Zone 4 to Zone 12***

Under this alternative, which could be carried out under any of the programmatic action alternatives, NNSA would transfer pits currently stored at Pantex in Zone 4 to Zone 12. There are two options under this alternative. Under option one, NNSA would transfer the more than 10,000 pits stored in Zone 4 to Zone 12. Because there is insufficient storage space in existing Zone 12 facilities, NNSA would need to build a new storage facility capable of storing approximately 60 metric tons (MT) of plutonium. Transfer of the pits from Zone 4 to Zone 12 would enable all Category I/II SNM at Pantex to be consolidated at a central location, close to the assembly, modification, and disassembly operations. This new facility would permit the storage of all surplus and non-surplus pits in Zone 12 in the event there is a delay in the completion of the Pit Disposition and Conversion Facility (PDCF) at SRS. This would reduce the area at Pantex requiring a high level of security. Under option two, NNSA would transfer only

<sup>34</sup> In 2007, DOE prepared a Supplement Analysis (SA) that evaluated the potential environmental impacts of consolidation at SRS of surplus, non-pit, weapons-usable plutonium from Hanford, LLNL and LANL. The SA concluded that this consolidation would not produce a significant change to the potential environmental impacts identified in previous NEPA reviews (DOE 2007b). Subsequently, DOE decided to transfer surplus non-pit weapons-usable plutonium from LLNL to SRS for consolidated storage. Nonetheless, for completeness, this SPEIS includes an analysis of the transportation impacts associated with disposition of all surplus plutonium from LLNL to SRS.

<sup>35</sup> This analysis also evaluates NTS as an interim storage location for the LLNL Category I/II SNM required for programmatic missions. Under this option, NNSA would transfer the material to NTS for interim storage in the Device Assembly Facility until eventual transfer to LANL.

<sup>36</sup> The LLNL SWEIS (DOE 2005) assesses the environmental impacts of transporting SNM to and from LLNL and other NNSA sites, SRS, and WIPP. That analysis includes consideration of transportation activities involving greater quantities of SNM and more shipments than are proposed in this SPEIS. As such, the transportation activities associated with consolidating SNM from LLNL are included in the existing No Action Alternative and can proceed without additional NEPA analysis. For completeness, however, this SPEIS includes the environmental impacts associated with such actions.

the non-surplus pits from Zone 4 to Zone 12. The surplus pits would be shipped directly to SRS from Zone 4 for processing in the PDCF, which is to be constructed SRS and is currently projected to be operational in 2019. Because there is insufficient storage space in existing Zone 12 facilities for even this reduced quantity, NNSA would need to build a new smaller storage facility to store approximately 30 MT of plutonium.

## ALTERNATIVES to RESTRUCTURE R&D and TESTING FACILITIES

### S.3.8 High Explosives R&D

Energetic materials (high explosives [HE], propellant and pyrotechnic powders) provide specific quantities of energy needed for a nuclear weapon to function. Stewardship of the stockpile requires a broad spectrum of energetic material R&D. In the nuclear portion of a weapon system, HE is used for the main charge and associated triggering systems. More specifically, HE R&D is required to assure stability and dependability of HE in nuclear weapons. HE R&D is conducted at LLNL, LANL, SNL/NM, NTS, and Pantex. The project-specific alternatives for HE R&D are shown in Table S.3.8-1.

**Table S.3.8-1—High Explosives R&D Alternatives**

- **No Action** — continue operations at LLNL, LANL, SNL/NM, NTS, and Pantex
- **Minor Consolidation** — multiple options to consolidate or transfer some operations, but operations would continue at all sites
- **Major Consolidation** — multiple options to consolidate or transfer operations to fewer sites, and discontinue operations at sites that transfer missions

### S.3.9 Tritium R&D

Tritium, a radioactive isotope of hydrogen, is an essential component (used to increase the yield) of every warhead in the current and projected U.S. nuclear weapons stockpile. Because warheads depend on tritium to perform as designed, an understanding of the properties of tritium is essential, and there is a need for tritium R&D. Within the Complex, tritium R&D involves activities such as: storage, purification, separation, engineering and physics performance, aging, analysis of surveillance data, diagnostics, enhanced surveillance, modeling and simulation, and compatibility testing. Over the past 15 years there has been substantial consolidation of tritium facilities. However, there are still opportunities for further reductions and/or consolidations. The alternatives for tritium R&D are shown in Table S.3.9-1.

**Table S.3.9-1—Tritium R&D Alternatives**

- **No Action** — continue operations at LLNL, LANL, SRS, and SNL/NM<sup>1</sup>
- **Consolidate Tritium R&D at SRS** — move gas transfer system R&D support from LLNL<sup>2</sup> and LANL to SRS
- **Consolidate Tritium R&D at LANL** — move gas transfer system R&D support from LLNL to LANL
- **Reduce Tritium R&D In Place** — LLNL, LANL, and SRS would reduce operations

<sup>1</sup>Tritium Operations at SNL/NM are primarily associated with the Neutron Generator Production Facility, which would be unaffected under all alternatives.

<sup>2</sup>Does not include National Ignition Facility (NIF) target R&D and filling NIF targets. Those operations would remain at LLNL under all alternatives.

### S.3.10 NNSA Flight Test Operations for Gravity Weapons

SNL manages Flight Test Operations for gravity weapons (bombs) to assure compatibility of the hardware necessary for the interface between the weapon and the delivery system, and to assess weapon system functions in realistic delivery conditions. The actual flight tests are conducted

with both the B83 and B61 weapons, which are pulled from the stockpile and converted into units called Joint Test Assemblies (JTAs). These tests are presently conducted at the TTR, a 280 square-mile site, located about 140 air-miles northwest of Las Vegas, Nevada. NNSA operates this facility under the terms of a land use agreement with the United States Air Force. This agreement expires in 2019.

Conversion of nuclear weapons into JTAs is a multi-step operation. Pantex denuclearizes nuclear weapons that become JTAs. These JTAs are not capable of producing nuclear yield. They may then be further modified at SNL. JTAs are then dropped from aircraft at various altitudes and velocities. Depleted uranium may be present in JTAs, but because there is no explosive event, the depleted uranium is contained within the weapon case and completely recovered after each test. There is no contamination of the soil as the result of a JTA flight test. In some cases, JTAs are flown at velocities and altitudes of interest and not dropped. In this case, the aircraft returns to its base with the JTA on-board. In an average year, 10 JTAs are tested at TTR.

The alternatives for NNSA flight testing are shown in Table S.3.10-1. The selection of any of the alternatives for flight test operations is unconnected to, and will not impact, the continuation of ongoing DOE environmental restoration activities and responsibilities at TTR resulting from past testing by the Atomic Energy Commission.

**Table S.3.10-1—NNSA Flight Test Operations Alternatives**

- **No Action.** Continue operations at TTR
- **Upgrade Alternative.** Continue operations at TTR and upgrade equipment with state-of-the-art mobile technology
- **Campaign Mode Operations.** Continue operations at TTR but reduce permanent staff and conduct tests with DOE employees from other sites. Three options are assessed:
  - Option 1—Campaign from NTS: Reduce mission staff and relocate remaining Sandia staff to NTS; Operation and Management (O&M) and Security taken over by NTS. Additional contract for technical support of equipment is needed for maintenance and upgrade.
  - Option 2—Campaign Under Existing Permit: Reduce mission staff at TTR; campaign additional staff for each test series; retain O&M responsibilities; permit would be retained in current form; security responsibilities would be transferred to the U.S. Air Force (USAF).
  - Option 3—Campaign Under Reduced Footprint Permit: Reduce mission staff at TTR; campaign additional staff for each test series; retain O&M responsibilities; permit would be potentially reduced to less than 1 square mile; security, emergency services, power line and road maintenance responsibilities transferred to the USAF.
- **Transfer to WSMR.** Move NNSA Flight Testing from TTR to WSMR
- **Transfer to NTS.** Move NNSA Flight Testing from TTR to NTS

### S.3.11 Hydrodynamic Testing

Hydrodynamic testing (hydrotesting) consists of high-explosive experiments to assess the performance and safety of nuclear weapons. Hydrodynamic tests (except for some underground sub-critical experiments at the NTS) do not normally employ fissile materials. Data from experiments including hydrotesting, coupled with modeling and simulation using high performance computers, is used to certify the safety, reliability, and performance of the nuclear physics package of nuclear weapons without nuclear testing. Hydrotesting is conducted at



LLNL, LANL, NTS, Pantex, and SNL/NM. The alternatives for hydrotesting are shown in Table S.3.11-1.

**Table S.3.11-1—Hydrodynamic Testing Alternatives**

- **No Action** – continue hydrotesting at LLNL, LANL, NTS, Pantex, and SNL/NM
- **Downsize in Place**
  - Consolidate LLNL hydrotesting at Contained Firing Facility (CFF)
  - Consolidate LANL hydrotesting at Dual Axis Radiographic Hydrodynamic Test (DARHT) facility
  - Consolidate NTS hydrotesting at single confined and single open-air sites
  - Discontinue hydrotesting at Pantex and SNL/NM
- **Consolidate at LANL**
  - Integrate hydrotesting program at LANL
  - Construct new CFF-like facility at LANL
  - Discontinue hydrotesting at LLNL once CFF-like facility is operational
  - Maintain BEEF at NTS
  - Discontinue hydrotesting at Pantex and SNL/NM
- **Consolidate at NTS<sup>1</sup>**
  - Integrate hydrotesting program at NTS
  - Construct new DARHT-like facility at NTS
  - Construct new CFF-like facility at NTS
  - Discontinue hydrotesting at LLNL, LANL, Pantex, and SNL/NM

<sup>1</sup>The NTS Alternative is considered a “next generation” alternative because NNSA is not proposing these changes at this time.

### S.3.12 Major Environmental Test Facilities

Environmental testing supports a primary NNSA mission of maintaining and demonstrating the safety, reliability, and performance of the nation’s nuclear weapons systems. The environmental testing facilities (ETFs) are divided into two categories – base ETFs and system ETFs. The base ETFs are those facilities and laboratory scale (or “table-top”) items used to evaluate components or subassemblies in the environments defined by the Stockpile-to-Target Sequence (STS) and the Military Characteristics requirements for each nuclear weapon type in the stockpile. Every laboratory within the NNSA complex has some base capability essential for day-to-day operations. The system ETFs are those facilities used to test full-scale weapons systems (with or without SNM) or those unique major facilities that are used for development and certification of components, cases, accessories, subsystems, and systems. This SPEIS focuses on a subset of base and system ETFs, referred to as “major” ETFs that are costly to maintain or have potentially significant environmental impacts. Major ETFs are located at SNL/NM, LANL, LLNL, and NTS. The alternatives for major ETFs are shown in Table S.3.12-1.

**Table S.3.12-1—Major ETF Alternatives**

- **No Action** — Maintain status quo at each site. All facilities would be maintained, or upgraded to meet current safety and security standards.
- **Downsize-in-Place** — No duplication of capability within a given site, but there may be duplication from site to site - phase out aging and unused facilities.
- **Consolidate ETF Capabilities at One Site (NTS or SNL/NM)** — Entails construction of new facilities at consolidation site. This alternative also includes an option to move LLNL Building 334 and the LLNL Site 300 Building 834 Complex ETF capabilities to Pantex.

### **S.3.13 Sandia National Laboratories, California (SNL/CA), Weapons Support Functions**

Facilities at SNL/CA are used to perform non-nuclear component design and engineering work. The SNL/CA facilities at Livermore consist of 72 buildings including laboratory and offices. Major NNSA facilities include Building 910, Building 914, Building 916, Building 927, the Micro and Nano Technologies Laboratory (MANTL), the Distributed Information Systems Laboratory (DISL), and other weapon system engineering and support buildings. The alternatives for continuing the SNL/CA weapons support functions are shown in Table S.3.13-1. Acceptance of these activities at SNL/NM would be accommodated in existing facilities.

**Table S.3.13-1—SNL/CA Weapons Support Functions Alternatives**

- |  |
|--|
| <ul style="list-style-type: none"><li>• No Action — Maintain current non-nuclear component design and engineering work at SNL/CA with SNL personnel</li><li>• Consolidate SNL/CA non-nuclear component design and engineering work to SNL/NM</li></ul> |
|--|

### **S.3.14 Alternatives Considered But Eliminated from Detailed Study**

NNSA considered alternatives other than those presented in Sections S.3.3 through S.3.13. NNSA concluded, however, that these alternatives were not reasonable and eliminated them from detailed analysis. This section identifies the alternatives that were considered but eliminated from detailed study, and discusses the reasons why they were eliminated.

**Consolidate the three nuclear weapons laboratories (LLNL, LANL and SNL).** The three weapons laboratories possess most of the nation's core intellectual and technical competencies in nuclear weapons. The laboratories perform the basic research, design, engineering, testing, and certification of weapon performance. Two of the laboratories (LANL and LLNL) focus on the weapons physics package and the third (SNL) focuses on non-nuclear components and systems engineering. In 1995, President Clinton concluded that the continued vitality of all three laboratories was essential to the nation's ability to fulfill the requirements of stockpile stewardship in the absence of underground testing (White House 1995). More recently, the Secretary of Energy Advisory Board Task Force on the Nuclear Weapons Complex of the Future (SEAB 2005) affirmed that three design laboratories are currently needed to certify nuclear weapons without underground testing. As a result of the continuing challenges of certification without underground testing, the need for robust peer review, benefits of intellectual diversity from competing physics design laboratories, and uncertainty over the details future stockpiles, NNSA does not consider it reasonable to evaluate laboratory consolidation at this time. While this conclusion has not changed, NNSA continues to make the laboratories more efficient and effective, as indicated by the alternatives to consolidate, relocate, or eliminate duplicative facilities and programs.

**Pursue dismantlement and refrain from designing and building new nuclear weapons.** Dismantlement coupled with no capabilities to design and build new nuclear weapons was not evaluated because it is not consistent with maintaining a safe, secure, and reliable nuclear weapons stockpile over the long-term. This SPEIS assesses reasonable alternatives for maintaining a nuclear weapons stockpile. The alternatives include actions to continue dismantlement consistent with Presidential direction to reduce the nuclear weapons stockpile.

However, all of the alternatives would maintain weapons design, R&D, and manufacturing capabilities because these are necessary to maintain the stockpile.

This SPEIS includes two options for a Capability-Based Alternative (Sections 3.6.1 and 3.6.2) that would support a stockpile much smaller than currently planned, and a discussion of how the reasonable alternatives might be adapted if the President were to direct even further reductions in the stockpile (Section 3.6.3). The No Net Production/Capability-Based Alternative (Section 3.6.2) would require the production of a limited number of components and assembly of weapons beyond those associated with supporting surveillance, but would not result in the addition of new types or increased numbers of weapons to the total stockpile.

**Curatorship Alternative.** This programmatic alternative was proposed during public scoping meetings and later public meetings on the Draft SPEIS. Under this proposed approach, NNSA would rely upon the surveillance and non-nuclear testing program to determine when work on nuclear weapons is necessary. Only if there is compelling evidence that components have degraded, or will soon degrade, and could cause a significant loss of safety or reliability, would NNSA replace the affected parts with new ones that would be remanufactured as closely to their original design as possible. A core assumption of this approach is that absent detectable changes, the well designed and thoroughly tested warheads in the stockpile would remain as safe and reliable as the laboratories have certified them to be today. The No Net Production/Capability-Based Alternative includes many facets of a Curatorship Alternative, namely: (1) not adding new types or increased numbers of weapons to the total stockpile; (2) state-of-the-art testing and engineering capabilities to examine components and detect and appraise problems; and (3) the capability to replace components, as needed. While NNSA acknowledges that aspects of curatorship are an accurate description of how the SSP works, NNSA eliminated curatorship from detailed study as a stand-alone alternative because it does not define a programmatic alternative distinctly different from the range of alternatives analyzed in this SPEIS.

**Smaller CNPC/CUC/CNC/A/D/HE Alternative.** The SPEIS includes an analysis of Capability-Based Alternatives (Section 3.6) that would produce as few as 10-50 components and assemble 10-50 weapons per year to maintain capability and to support a limited life extension program. Additionally, for both the Distributed Centers of Excellence Alternative and Consolidated Centers of Excellence Alternative, the SPEIS considers production of as few as 80 pits per year. Similarly, NNSA also considered whether to assess a smaller CUC, CNC, or CNPC. In determining whether to assess a smaller CUC/CNC/CNPC alternative, NNSA considered three different perspectives — programmatic risk, cost effectiveness, and environmental impacts. That analysis (NNSA 2007) concluded that, among other reasons, the cost and environmental impacts of the CUC/CNC/CNPC would not be highly sensitive to capacity at these low production rates. Chapter 3, Section 3.15 presents a summary of that NNSA 2007 analysis.

Relative to the CPC, NNSA identified the following potential alternatives, but eliminated them from detailed study for the reasons set forth below:

**New CPC with a Smaller Capacity.** NNSA considered whether it would be reasonable to build a new CPC with a capacity of fewer than 125 pits per year (single shift). In a detailed report

published in September 2007 (NNSA 2007), NNSA concluded that if it constructed a new pit facility with a capacity to produce 80 pits per year, the reduction in square footage would be small (less than a few percent) compared to a new facility designed for 125 pits per year (single shift). The reason for this is that the reduction in the number of equipment processing stations is only 6 stations from the total estimated requirement of 132 major processing stations. Reductions in the processing stations based on a lower production requirement only decreases a small amount of equipment that would be needed to provide production assurances in the capacity increase from 80 pits per year to 125 pits per year (single shift). From a design perspective for a new facility, a 125 pits per year plant is an optimal minimum. The expected environmental impacts of construction and operation of a new CPC at 125 pits per year would not be significantly different from 80 pits per year and the larger capacity provides better assurance of meeting the purpose and need for production of pits. This conclusion would also be true for the Capability-Based Alternatives, which evaluates impacts for pit production at capacities of 10-50 pits per year.

**Purchase Pits.** While there is no national policy that prohibits purchase of defense materials such as pits from foreign sources, NNSA has determined that the uncertainties associated with obtaining them from foreign sources render this alternative unreasonable for an assured long-term supply.

**Upgrade Building 332 at Lawrence Livermore National Laboratory.** Building 332 at LLNL is located in what is known as the “Superblock”. This building is a plutonium R&D facility containing a wide variety of plutonium processing and fabrication technologies but offering minimal production capabilities. Activities in Building 332 include developing and demonstrating improved technologies for plutonium metal preparation, casting, fabrication, and assembly; fabrication of components for subcritical tests; surveillance of LLNL pits; support for LANL pit surveillance and specimen fabrication; and fundamental and applied research in plutonium metallurgy. Building 332 does not have a pit manufacturing mission and is small in comparison to the production facilities at LANL. Additionally, because of the significant population around LLNL, an upgrade alternative at LLNL is undesirable.

**Consider Other Sites for the CPC.** In order to determine the reasonable site alternatives for a CPC, all existing, major DOE sites were initially considered as a location for a CPC. Because one of NNSA’s main purposes is to consolidate Category I/II SNM, sites that do not maintain Category I/II SNM were eliminated from consideration. Likewise, NNSA eliminated sites that do not conduct major NNSA program activities, as these sites would further expand the NNSA Complex. Other NNSA sites were not considered reasonable locations because they do not satisfy certain criteria such as low surrounding population, mission compatibility, or synergy with the site’s existing mission. The NOI To Prepare a Supplement to the Stockpile Stewardship and Management Programmatic Environmental Impact Statement—Complex 2030 stated that Los Alamos, NTS, Pantex, SRS, and Y-12 would constitute the range of reasonable site alternatives for a CPC (71 FR 61731).

**Redesign Weapons to Require Less or No Plutonium.** The pits in the enduring nuclear weapons stockpile were designed and built with plutonium, and in an era when nuclear testing was being conducted to verify these designs. Replacing these pits with new ones that would use

little or no plutonium (i.e., using HEU instead) for the sole reason of not building a long-term, assured plutonium pit production facility would not be reasonable. Nuclear testing would likely be required to verify performance of a design that uses uranium instead of plutonium. In addition, these new pits would require costly changes in the weapon delivery systems.

**Do Not Produce New Pits.** The latest studies on plutonium aging indicate that the pits currently in the stockpile may be viable for more than 85 years. However, it may become necessary to manufacture new pits for a number of reasons including: consequences of an aging phenomena not previously considered, new weapon design, or a change in other components in the weapon (for example a change in the HE to be used or unavailability of certain materials or components). Prudent management of NNSA's mission dictates that it has the capability to produce all components necessary for the stockpile. However, NNSA has considered a No Net Production/Capability-Based Alternative (Section 3.6.2) that would produce as few as 10 pits per year, which would be the minimum production needed to maintain capability and to support a limited LEP workload.

**NNSA Flight Testing.** In addition to WSMR, NNSA considered other existing DoD flight test ranges, including Eglin Air Force Base, the U.S. Navy's China Lake testing and training range, and the Utah Test and Training Range (UTTR). A team of NNSA officials visited these sites, discussed their availability and assets with the technical staff and management of these facilities, and evaluated their ability to conduct NNSA flight test operations. Although Eglin has many desirable assets, it was eliminated from further consideration because of the available terrain, geological features, and the short depth to groundwater. With respect to China Lake, although the technical assets were sufficient to support NNSA flight test operations, the geology and soils are not considered adequate. At UTTR, the existing assets, such as optical systems, radar, and communications are all dated and its management has no plans for upgrading or replacing them. Additionally, soil composition is moist and soft over the entire range and is not suitable.

Additionally, in response to public comments on the Draft SPEIS, NNSA considered additional alternatives that would not relocate NNSA's flight test operations from TTR, but would conduct tests at TTR on a campaign basis. This led to the development of three options that are presented in Section 3.10.3.

**Tritium R&D.** NNSA considered changes to the tritium missions at SNL/NM (related to neutron generator production), at SRS (for tritium production), and at LLNL (for NIF target loading), but determined that there were no reasonable alternatives for changing these missions (see Chapter 3, Section 3.15).

### **S.3.15 Considerations Related to a Reliable Replacement Warhead (RRW)**

The current status of the RRW program is that a feasibility study has been completed, a design competition has been concluded, and the joint DoD/DOE Nuclear Weapons Council has selected a design concept. If authorized and funded by Congress, the design concept would undergo further study and refinement over the coming years and cost estimates would be prepared by the DoD and the NNSA. The RRW would not have a different military requirement than the warhead it would replace.

The possibility that NNSA might be directed to develop an RRW does not have significant ramifications on the alternatives analyzed or their potential impacts. Pit production and other production activities would be allocated between legacy weapons and RRWs – production capacity would not be increased if NNSA is directed to develop an RRW. Development of an RRW would not require significant changes to the activities and proposed facilities that are analyzed as part of the alternatives evaluated in this SPEIS. If an RRW were developed and produced, it is likely that this production would be in lieu of maintenance and production activities for legacy weapons.

#### **S.3.15.1 *RRW and the Proposed Actions and Alternatives***

Consideration of an RRW would assist NNSA in making informed decisions on the capabilities that might be required in select facilities if a decision is made to proceed with an RRW. However, an RRW would not affect the SNM consolidation efforts or the action alternatives related to restructuring SNM facilities, nor the action alternatives related to the restructuring of R&D and testing facilities, nor Complex transformation in general.

- **Restructure SNM Facilities:** The proposed action is based on the current site configuration that houses a very large inventory of SNM that needs to be consolidated in more modern facilities independent of whether an RRW is developed.
- **Restructure R&D and Testing Facilities:** Tritium R&D, high-explosives R&D, hydrodynamic, environmental, and flight test facilities are needed to support the maintenance of the safety, security, and reliability of the existing stockpile as well as potential RRW warheads. The R&D and flight test facilities retained will be those necessary to support either a future legacy stockpile or an RRW-based stockpile.

#### **S.3.15.2 *RRW and Complex Transformation***

One of the objectives of the RRW program was to simplify component and subassembly fabrication and warhead assembly/disassembly processes. In general, simplifying designs to ones with fewer, less complex parts would reduce production operations in the Complex. Coordination and cooperation between the design laboratories and production plants to achieve this objective were encouraged by NNSA in the design competition for RRW. However, the fact that more weight and volume are available to RRW designers provides greater flexibility to simplify the manufacture, assembly, disassembly, and maintenance of weapons. In addition to the potential benefits to the Complex of a design that would be easier to produce, the proposed reduction of hazardous and problematic materials in RRW designs could reduce environmental impacts from operation of the Complex. The proposed increase in safety (e.g., elimination of conventional high explosives for the main charge) and security features in RRW designs could reduce the cost of normal operations and severity of accidents.

#### **S.3.15.3 *RRW and the Use of Radioactive and Hazardous Materials***

The environmental impacts of the action alternatives in this SPEIS are based on the manufacturing materials and processes needed to support legacy weapons with life extension

programs. An RRW is only in the feasibility study stage. However, the RRW design objectives are directed at reducing the use of radioactive and hazardous materials compared to legacy weapons. Because the environmental impacts in this SPEIS are based on legacy weapons, these impacts should be larger than the potential impacts of an RRW if it were to go into production.

### **S.3.16 Comparison of Impacts**

This comparison of potential environmental impacts is based on the information in Chapter 4, Affected Environment, and analyses in Chapter 5, Environmental Impacts. Table S.3.16-1 presents a comparison of the environmental impacts for construction and operation associated with the No Action Alternative, DCE Alternative, CCE Alternative, and Capability-Based Alternative. The No Action Alternative is also presented in Table S.3.16-1 as a benchmark for comparison of the impacts associated with the action alternatives. Table S.3.16-1 focuses on those resources for which there is the greatest potential for significant environmental impact. For a more complete discussion of the impacts of the alternatives, the reader is directed to Chapter 3 (Table 3.16-1) and Chapter 5 of this SPEIS. With respect to the Category I/II SNM consolidation proposals that are common to the programmatic action alternatives, Table S.3.16-2 presents a summary comparison of the potential impacts associated with alternatives for Category I/II SNM Consolidation for LLNL and Table S.3.16-3 presents a summary comparison of impacts associated with Category I/II SNM Consolidation at Pantex.

In addition to the comparisons presented in Table S.3.16-1, Table S.3.16-2, and Table S.3.16-3, this section presents an overview of the major environmental impacts associated with the programmatic alternatives presented in the SPEIS. This presentation focuses on the major discriminators between the programmatic alternatives with respect to land use, employment, transportation, and accidents. A detailed analysis of the environmental impacts associated with all alternatives (by specific site) is presented in Chapter 5, Sections 5.1 through 5.9. A detailed transportation analysis is presented in Section 5.10.

A detailed analysis of the project-specific alternatives is contained in Section 5.13 (HE R&D), Section 5.14 (Tritium R&D), Section 5.15 (Flight Testing), Section 5.16 (Hydrodynamic Testing), Section 5.17 (Major Environmental Test Facilities), and Section 5.18 (Non-Nuclear Weapons Support Functions at SNL/CA). Tables S.3.16-3 through S.3.16-8 summarizes the differences in impacts for the project-specific alternatives.

#### **S.3.16.1 *Land Use for Programmatic Alternatives***

For land use, both the No Action Alternative and the Capability-Based Alternative have the least impacts, in that the total area of the seven Complex sites analyzed in this SPEIS (LANL, LLNL, NTS, Pantex, SNL, SRS, and Y-12) remains the same at approximately 1,000,000 total acres.

For the DCE Alternative, the Complex would remain the same size, but a CPC would be constructed at one of five site alternatives. This would disturb an area of approximately 140 acres during construction, resulting in a 110-acre facility within the existing boundaries of one of these sites. For Los Alamos, the disturbed land area could be smaller because an alternative to use existing and planned facilities is being considered along with a Greenfield CPC alternative.

At Y-12, if the UPF were constructed, consolidation from existing facilities could ultimately reduce the areas associated with nuclear production activities requiring the highest levels of security from 150 acres to approximately 15 acres.

Under the CCE Alternative, the Complex's size could be reduced. Depending upon the option (Consolidated Nuclear Production Center [CNPC] or Consolidated Nuclear Centers [CNC]), this alternative would involve the construction of facilities at one or two sites, and could result in a 545-acre facility at one of five candidate sites. If Los Alamos, NTS, or SRS were selected as the site for CCE facilities, both Pantex and Y-12 could be closed. This would reduce the size of the Complex by 16,777 acres. If Pantex (but not Y-12) were selected for CCE facilities, Y-12 could close and the size of the Complex reduced by approximately 800 acres. If Y-12 (but not Pantex) were selected for CCE facilities, Pantex could close and the Complex would be reduced by 15,977 acres.

### **S.3.16.2      *Impacts on Complex Facilities for Programmatic Alternatives***

Under the No Action Alternative, NNSA would continue the trend of closing, replacing, and upgrading older facilities, consistent with decisions based on previous NEPA analyses and applicable regulatory requirements. Surplus facilities with no inherent value to DOE, NNSA, or the community would ultimately be dispositioned or undergo decontamination and decommissioning (D&D) consistent with overall modernization plans. For example, at Y-12, excess buildings and infrastructure have been closed over the past decade, and approximately 244 buildings, with more than 1.1 million square feet, have been demolished or removed. In the future, as part of the environmental cleanup strategic planning, DOE and NNSA are developing an Integrated Facility Disposition Project (IFDP). The IFDP is a strategic plan for disposing of legacy materials and facilities at Oak Ridge National Laboratory and Y-12 that uses an integrated approach. Under the IFDP, the D&D of approximately 188 facilities at Oak Ridge National Laboratory and 19 facilities at Y-12, as well as the remediation of soil and groundwater contamination, would occur over the next decade. The IFDP will be conducted as a remedial action under the *Comprehensive Environmental Response, Compensation, and Liability Act*. Similar activities at other NNSA sites are ongoing. For instance, at LLNL, approximately 20 facilities with a combined floor space of 234,443 square feet are being deactivated.

With respect to the Programmatic Alternatives, if a site other than Pantex and Y-12 is selected for a CNPC, Pantex and Y-12 could be closed. At Pantex, this would involve closing approximately 400 buildings totaling 1.8 million square feet. At Y-12, approximately 5.3 million square feet of floor space and approximately 390 facilities would be closed. For each of the programmatic action alternatives, moving plutonium storage to Zone 12 at Pantex would result in closing more than 74,200 square feet of storage facilities in Zone 4.

### **S.3.16.3      *Impacts on Complex Facilities for Project-Specific Alternatives***

With respect to potential cumulative impacts, project-specific actions could also affect the total number of facilities and square footage devoted to NNSA weapons activities. This could result in additional facility closures or transfer of facilities from the NNSA to another user. For example, if flight testing were moved from TTR, approximately 195 buildings and structures,



covering approximately 180,000 square feet, could be closed or transferred to another user. For the Hydrodynamic Testing Consolidation-in-Place Alternative, 29 facilities at LANL, LLNL, and SNL/NM, with a combined floor space of 56,475 square feet could be closed or transferred. For alternatives that move HE R&D from LLNL Site 300, up to 35,000 square feet of floor space could be closed or transferred. If NNSA were to ultimately close Site 300, up to 115 buildings with a floor space of approximately 340,000 square feet could be closed or transferred.

#### **S.3.16.4      *Employment under the Programmatic Alternatives***

For employment, the No Action Alternative would have the least impacts with the workforce remaining at the current level of approximately 27,000 management and operating contractors supporting weapons activities at the major sites analyzed in this SPEIS.

For the DCE Alternative, a new CPC could be constructed at Los Alamos, NTS, Pantex, SRS, or Y-12. If constructed, approximately 850 construction jobs and an operational workforce of approximately 1,780 could be employed at the CPC. If Los Alamos is not selected for a new CPC, Los Alamos would lose about 610 jobs.

The CCE Alternative has the greatest potential for employment impacts. The construction of CCE facilities could require more than 4,000 construction jobs and an operational workforce of approximately 4,500 could be added to the selected site(s). If Pantex is not selected for CCE facilities, Pantex could be closed, resulting in a loss of approximately 1,650 jobs. If CCE facilities are not located at Y-12, Y-12 could be closed with a loss of approximately 6,500 jobs.

For the Capability-Based Alternative, the reduced level of production would entail the loss of approximately 3,000 jobs (400 at Pantex, 15 at SRS, and 2,600 at Y-12).

#### **S.3.16.5      *Transportation under the Programmatic Alternatives***

For the No Action Alternative, there would be no impacts to the existing transportation requirements of the Complex. Pits would continue to be transported from LANL to Pantex, CSAs would continue to be transported from Y-12 to Pantex, tritium reservoirs would continue to be transported between SRS and Pantex, and other required parts and materials would be transported among various NNSA sites.

For the DCE Alternative, transportation related to pit production could increase if a CPC were located at a site other than Pantex. If the CPC were located at Pantex, no off-site transportation related to pit production would be required.

For the CCE Alternative, if facilities were located at sites other than Y-12 and Pantex, less than 60 tons of plutonium, mostly in pit form, presently being stored at Pantex would be transported to the CNPC, and up to 252 tons of HEU would be transported from Y-12 to the CNPC. For the CNPC option, annual transportation related to nuclear production would cease once the CNPC becomes operational. For the CNC option, there would be annual transportation related to pits and CSAs between the CPC, CUC, and an A/D/HE Center.

For the Capability-Based Alternative, transportation requirements would be the same as for the No Action Alternative, except that only 25 percent of the existing number of CSAs would need to be transported from Y-12 to Pantex, and tritium shipments could be reduced by approximately 50 percent.

### **S.3.16.6      *Accidents and Malicious Acts in Programmatic Alternatives***

For the No Action Alternative and the Capability-Based Alternative, accident risks and consequences would remain the same. For the DCE and CCE Alternatives, the construction of new facilities would, in general, tend to reduce the risks and consequences of accidents due to advances in building design features. In general, if missions were moved to locations with populations lower than the populations at the sites where those missions are currently conducted, potential consequences would likely decrease. For example, if a CNPC were located at NTS, potential consequences associated with the A/D/HE mission, the CUC mission, and the CPC mission would be reduced compared to the No Action Alternative because of the greater distance to the site boundary and the smaller population within the surrounding area.

NNSA has prepared a classified appendix to this SPEIS 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 B (Section B.12.3) 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.

Depending on the intentional destructive acts, impacts would be similar to or exceed the impacts of accidents analyzed in the SPEIS. These analyses provide NNSA with information upon which to base, in part, decisions regarding transformation of the Complex. The classified appendix evaluates several scenarios involving intentional destructive acts for alternatives at the following sites (LANL, LLNL, NTS, SRS, Pantex, and Y-12) and calculates consequences to the noninvolved worker, maximally exposed individual, and population in terms of physical injuries, radiation doses, and LCFs. Although the results of the analyses cannot be disclosed, the following general conclusion can be drawn: 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. Impacts from intentional destructive acts would be much lower for the project-specific

alternatives than for the programmatic alternatives due to the fact that the programmatic alternatives involve significant quantities of special nuclear materials.

### **S.3.16.7**      *Infrastructure Demands for the Programmatic Alternatives*

**Electricity.** Under the No Action Alternative, all sites have an adequate existing electrical infrastructure to support current and planned activities.

LANL has adequate electricity to support all of the alternatives.

At NTS, the existing infrastructure would be adequate to support all construction requirements. However, to support operations for a CUC, CNC, or CNPC, NTS would need to procure additional power.

At Pantex, the existing infrastructure would be adequate to support all construction requirements. However, to support operations for a CUC or CNPC, Pantex would need to procure additional power.

At SRS and Y-12, the existing infrastructure would be adequate to support the construction and operation of all alternatives. Construction and operation would have a negligible impact on current site infrastructure.

**Water.** Under the No Action Alternative, all sites have an adequate existing water infrastructure to support current and planned activities.

LANL has adequate water rights to support a CPC, CUC, or A/D/HE Center. However, operation of multiple new facilities (CNPC) would exceed the current LANL water rights.

At NTS, the sustainable site capacity for water would be adequate to support the construction and operation of all alternatives.

At Pantex, the existing wellfield capacity would be adequate to support the construction and operation of all alternatives.

At SRS and Y-12, the existing water infrastructure would be adequate to support the construction and operation of all alternatives.

### S.3.17 *Preferred Alternatives*

CEQ regulations require an agency to identify the alternative it prefers for achieving its purpose in a Final EIS (40 CFR 1502.14(e)). NNSA's preferred alternative is described below. It is based on NNSA's consideration of environmental impacts described in this Final SPEIS, as well as other factors such as mission and infrastructure compatibility, economic analyses, safety, safeguards and security, and workforce training and retention. **The preferred alternative described below reflects NNSA's current preference, but it is not a decision. NNSA will announce any decisions in one or more Records of Decision and may select an alternative other than the preferred alternative identified below.**

#### S.3.17.1 *Preferred Alternatives for Restructuring SNM Facilities*

- **Plutonium manufacturing and R&D:** Los Alamos would provide a consolidated plutonium research, development, and manufacturing capability within TA-55 enabled by construction and operation of the Chemistry and Metallurgy Research Replacement—Nuclear Facility (CMRR-NF). The CMRR-NF is needed to replace the existing Chemistry and Metallurgy Research (CMR) Facility (a 50-year old facility that has significant safety issues that cannot be addressed in the existing structure), to support movement of plutonium R&D and Category I/II quantities of SNM from LLNL, and consolidate weapons-related plutonium operations at Los Alamos. Until completion of a new Nuclear Posture Review in 2009 or later, the net production at Los Alamos would be limited to a maximum of 20 pits per year. Other national security actinide needs and missions would continue to be supported at TA-55 on a priority basis (e.g., emergency response, material disposition, nuclear energy).
- **Uranium manufacturing and R&D:** Y-12 would continue as the uranium center producing components and canned subassemblies, and conducting surveillance and dismantlement. NNSA has completed construction of the HEUMF and will consolidate HEU storage in that facility.<sup>37</sup> NNSA would build a Uranium Processing Facility (UPF) at Y-12 in order to provide a smaller and modern highly-enriched uranium production capability to replace existing 50-year old facilities. The site-specific impacts and candidate locations for a UPF will be analyzed in a new SWEIS for Y-12 that NNSA is currently preparing.
- **Assembly/disassembly/high explosives production and manufacturing:** Pantex would remain the Assembly/Disassembly/High Explosives production and manufacturing center. NNSA would consolidate non-destructive surveillance operations at Pantex.
- **Consolidation of Category I/II SNM:** NNSA would continue to transfer Category I/II SNM from LLNL under the No Action Alternative and phase out Category I/II operations at LLNL Superblock by the end of 2012. NNSA would consolidate Category I/II SNM at Pantex within Zone 12, and close Zone 4.

<sup>37</sup> The environmental impacts at HEUMF and its alternatives are analyzed in the 2001 Y-12 SWEIS (DOE 2001a).

### S.3.17.2 *Preferred Alternatives for Restructuring R&D and Testing Facilities*

**HE R&D.** NNSA would reduce the footprint of its HE production and R&D related to nuclear weapons; and reduce the number of firing sites. Use of energetic materials (greater than 1 kg) for environmental testing conducted at SNL/NM would continue (e.g., acceleration or sled tracks, shock loading, or in explosive tubes) and is not included in HE R&D. NNSA would consolidate weapons HE R&D and testing within the following locations, without constraining transfer and operation of weapons programs firing sites to other NNSA, DoD, and national security sponsors, as follows

- Pantex would remain the HE production (formulation, processing, and testing) and machining center. All HE production and machining to develop nuclear explosive packages would continue at Pantex. HE experiments up to 22 kg HE would remain at Pantex;
- NTS would remain the testing center for large quantities of HE (greater than 10 kg);
- LLNL would be the HE R&D center for formulation, processing, and testing (processing capability to handle up to 15 kg and testing less than 10 kg) HE at the High Explosives Applications Facility (HEAF); formulation and processing of HE would be conducted either at a new HEAF Annex built adjacent to HEAF, or at existing Site 300 facilities (but using less space than currently used for these activities);
- SNL/NM would remain the HE R&D center for non-nuclear explosive package components (less than 1 kg of HE) at the Explosive Components Facility (ECF); and
- LANL would produce war reserve main charge detonators, conduct HE R&D experimentation and support activities, and move towards contained HE R&D experimentation.
- Each site would maintain one weapons program open-burn and one open-detonation area for safety and treatment purposes.

**Tritium R&D.** NNSA would consolidate tritium R&D at SRS. SRS would remain the site for tritium supply management and provide R&D support to production operations and gas transfer system development. Neutron generator target loading at SNL/NM and production of National Ignition Facility targets at LLNL, which involve small quantities of tritium, would continue and would not be included in this consolidation. NNSA would move bulk quantities of tritium from LANL to SRS by 2009; and remove tritium materials above the 30 gram level from the Weapons Engineering Tritium Facility (WETF) at LANL by 2014.

**NNSA flight test operations.** Campaign Mode Operation of Tonopah Test Range (TTR) (Option 3—Campaign under Reduced Footprint Permit). NNSA would reduce the footprint of TTR, upgrade equipment with mobile capability, and operate in campaign mode. NNSA expects it would not use Category I/II SNM in future flight tests.

**Major Hydrodynamic Testing.** By the end of fiscal year 2008, NNSA would contain the hydrodynamic testing (consisting of Integrated Weapons Experiments and Focused Experiments) at LLNL at the Contained Firing Facility (CFF) and at LANL at the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility. At LANL, firing site operations for weapon programs

required by NNSA's hydrodynamic test program would be moved to contained firing. In addition:

- Hydrotesting at LLNL Site 300 would be consolidated to a smaller footprint by 2015.
- The goal is to minimize open-air testing at LANL. Open-air hydrotests at LANL's DARHT, excluding SNM, would only occur if needed to meet national security requirements.
- NNSA would allow open-air firing at LANL TA-36 until adequate radiographic capabilities and associated supporting infrastructure are available for open-air firing at NTS.

**Major Environmental Test Facilities.** NNSA would consolidate major environmental testing at SNL/NM and, infrequently conduct operations requiring Category I/II SNM in security campaign mode there. NNSA would close LANL's and LLNL's major environmental testing facilities by 2010 (except those in LLNL Building 334 and the Building 834 Complex). NNSA would move environmental testing of nuclear explosive packages and other functions currently performed in LLNL Buildings 334 and 834 to Pantex by 2012.

**Sandia National Laboratories, California Weapons Support Functions.** NNSA would continue operations under the No Action Alternative.

As to any other programmatic and project-specific alternatives not mentioned above, NNSA's preferred alternative at this time is to continue with the No Action Alternatives. Section 5.20 of this Final SPEIS provides a summary of the environmental impacts of the preferred alternatives.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
<b>Land Use</b>							
<b>LANL</b>	Current and planned activities would continue as required to accomplish assigned missions. LANL has approximately 2,000 structures with approximately 8.6 million square feet under roof, spread over an area of approximately 25,600 acres.	<i>Greenfield CPC:</i> Potential disturbance of 140 acres for construction and 110 acres for operation. <i>Upgrade:</i> Potential disturbance of 13 acres for construction and 6.5 acres for operation. <i>50/80:</i> Potential disturbance of 6.5 acres for construction and 2.5 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of LANL total land area.	Potential disturbance of 50 acres for construction and 35 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of LANL total land area.	Potential disturbance of 300 acres from construction and 300 acres from operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be approximately 1.2% of LANL total land area.	195 acres (includes 50 acre buffer area) needed to operate CNC. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be approximately 1% of LANL total land area.	545 acres (includes 100-acre buffer area) needed to operate CNPC. Land uses would remain compatible with surrounding areas and with land use plans. Two non-contiguous TAs would be used for the CNPC. Land required would be approximately 2.3% of LANL total land area.  Y-12 and Pantex would close, reducing the size of the Complex by 16,777 acres.	Potential disturbance of 6.5 acres. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of LANL total land area.
<b>NTS</b>	Current and planned activities would continue as required to accomplish assigned missions. Approximately 45 percent of NTS is currently unused or provides buffer zones for ongoing programs or projects, while about 7-10 percent (60,000 – 86,500 acres) of the site has been disturbed.	Potential disturbance of 140 acres for construction and 110 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of NTS total land area.	Potential disturbance of 50 acres for construction and 35 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of NTS total land area.	Because NTS would use existing capabilities at the DAF, potential land disturbance for construction and operation would be approximately 200 acres. Land required would be less than 1% of NTS total land area.	195 acres (includes 50-acre buffer area) needed to operate CNC. Land uses would remain compatible with surrounding areas and with land use plans.	445 acres (includes 100-acre buffer area) needed to operate CNPC. Land uses would remain compatible with surrounding areas and with land use plans.  Y-12 and Pantex would close, reducing the size of the Complex by 16,777 acres.	NTS would be unaffected by the Capability Based Alternative.
<b>Pantex</b>	Preferred Alternative: Current and planned activities would continue on the 15,977- acre site as required to accomplish assigned missions. No new land disturbance expected.	Potential disturbance of 140 acres for construction and 110 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of Pantex total land area.	Potential disturbance of 50 acres for construction and 35 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of Pantex total land area.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	545 acres (includes 100-acre buffer area) needed to operate CNPC. Land uses would remain compatible with surrounding areas and with land use plans.  Y-12 would close, reducing the size of the Complex by approximately 800 acres.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
SRS	Current and planned activities would continue on the 198,420-acre site as required to accomplish assigned missions. Approximately 77 acres of additional land would be disturbed by construction of the Mixed-Oxide (MOX) Fuel Fabrication Facility which broke ground August 2007 and the Pit Disassembly and Conversion Facility (PDCF) scheduled to break ground in 2010.	Potential disturbance of 140 acres for construction and 110 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of SRS total land area.	Potential disturbance of 50 acres for construction and 35 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of SRS total land area.	Potential disturbance of 300 acres from construction and 300 acres from operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be less than 1% of SRS total land area.	195 acres (includes 50 acre buffer area) needed to operate CNC. Land uses would remain compatible with surrounding areas and with land use plans.	545 acres (includes 100 acre buffer area) needed to operate CNPC. Land uses would remain compatible with surrounding areas and with land use plans.  Y-12 and Pantex would close, reducing the size of the Complex by 16,777 acres.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
Y-12	Current and planned activities would continue on the 800-acre site located on the 35,000-acre Oak Ridge Reservation as required to accomplish assigned missions.	Potential disturbance of 140 acres for construction and 110 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be approximately 17.5% of Y-12 total land area.	Preferred Alternative: UPF could disturb approximately 35 acres for construction and 8 acres for operation at Y-12. Land uses would remain compatible with surrounding areas and with land use plans. UPF would enable protected area to be reduced by 90%.	Potential disturbance of 300 acres for construction and 300 acres for operation. Land uses would remain compatible with surrounding areas and with land use plans. Land required would be approximately 37.5% of Y-12 total land area.	Y-12 performs the CUC mission; therefore the impact of a CNC at this site is identical to the CPC impact.	518 acres (includes 100 acre buffer area) needed to operate CNPC. Land uses would remain compatible with surrounding areas and with land use plans.  Pantex would close, reducing the size of the Complex by 15,977 acres.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Visual Resources</b>							
LANL	Current and planned activities would continue as required resulting in no additional impacts.	Short-term, temporary visual impacts from construction. New facilities would be visible from higher elevations beyond LANL boundary; however, change would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. New facilities would be visible from higher elevations beyond LANL boundary; however, change would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. New facilities would be visible from higher elevations beyond LANL boundary; however, change would be consistent with currently developed areas. No change to VRM Classification.	New facilities would be visible from higher elevations beyond LANL boundary; however, change would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. New facilities would be visible from higher elevations beyond LANL boundary; however, change would be consistent with currently developed areas. No change to VRM Classification.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
NTS	Current and planned activities would continue as required resulting in no additional impacts.	Short-term, temporary visual impacts from construction. New facilities would not be visible outside of NTS boundary. No change to VRM Classification.	Construction activities would create short-term, temporary visual impacts. No change to VRM Classification.	Short-term, temporary visual impacts from construction. New facilities would not be visible outside of NTS boundary. No change to VRM Classification.	New facilities would not be visible outside of NTS boundary; change would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. New facilities would not be visible outside of NTS boundary. No change to VRM Classification.	NTS would be unaffected by the Capability Based Alternative.



**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
Pantex	Current and planned activities would continue as required resulting in no additional impacts.	Short-term, temporary visual impacts from construction. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Construction activities would create short-term, temporary visual impacts. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	New facilities would be obstructed from off-site view. Change would be consistent with currently developed areas. No change to VRM Classification.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
SRS	Current and planned activities would continue with short-term impacts to visual resources resulting from construction of the MOX/PDCF facilities in the F-Area. Changes would be consistent with existing structures of the area and no change to VRM classification would be required.	Short-term, temporary visual impacts from construction. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Construction activities would create short-term, temporary visual impacts. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	New facilities would be obstructed from off-site view. Change would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. The reference location is obstructed from off-site view. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
Y-12	Current and planned activities would continue as required resulting in no additional impacts.	Short-term, temporary visual impacts from construction. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Short-term, temporary visual impacts from construction. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	Short-term, temporary visual impacts from construction. Changes to visual appearance would be consistent with currently developed areas. No change to VRM Classification.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Site Infrastructure</b>							
LANL	Current and planned activities would continue as required resulting in no additional impacts. The current power pool peak power capacity is 150 megawatts-electric [MWe]). The available site capacity is 63 MWe.	Under all approaches, existing infrastructure would be adequate to support construction and operation requirements. Operation of a CPC would have the potential to use approximately 17.5% of the peak power capacity that is available.	Existing infrastructure would be adequate to support construction and operation requirements. Operation of a CUC would have the potential to use approximately 29.2% of the peak power capacity that is available.	Operation of A/D/HE Center would have the potential to use approximately 18.9% of the peak power capacity that is available.	Operation of a CNC would have the potential to use approximately 45.1% of the peak power capacity that is available.	Operation of a CNPC would have the potential to use approximately 65.6% of the peak power capacity that is available.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
NTS	Current and planned activities would continue as required resulting in no additional impacts. NTS would be	Existing infrastructure would be adequate to support construction and operation requirements. Power	Existing infrastructure would be adequate to support construction requirements. Power	Existing infrastructure would be adequate to support construction. Power requirements	Power requirements would be 288% of available site electrical energy capacity. For operations, NTS would	Power requirements would be 357% of available site electrical energy capacity. For operations, NTS would	NTS would be unaffected by the Capability Based Alternative.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	expected to continue using 101,377 MWh of electricity per year. Electrical usage is below current site capacity.	requirements would be 64% of available site electrical energy capacity.	requirements would be 224% of available site electrical energy capacity. For operations, NTS would need to procure additional power.	would be 69% of available site electrical energy capacity.	need to procure additional power.	need to procure additional power.	
<b>Pantex</b>	Current and planned activities would continue as required resulting in no additional impacts to site infrastructure. Pantex would be expected to continue using about 81,850 MWh of electricity per year.	Existing infrastructure would be adequate to support construction and operation requirements. Power requirements would be 40% of available site electrical capacity.	Existing infrastructure would be adequate to support construction requirements. During operations, power requirements would be 140% of available site electrical energy capacity. To support a CUC, Pantex would have to procure additional power.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	During operations, power requirements would be 148% of available site electrical energy capacity. To support a CNPC, Pantex would have to procure additional power.	Planned activities would continue as required to support smaller stockpile requirements. Infrastructure needs would be reduced.
<b>SRS</b>	Current and planned activities would continue, with the increased electrical usage from the MOX/PDCF facilities for a electrical use of 405,000 MWh/yr (370,000 MWh/yr existing plus 35,000 MWh/yr for the MOX/PDCF facilities)	Existing infrastructure would be adequate to support construction and operation requirements. Construction and operation requirements would have a negligible impact on current site infrastructure.	Existing infrastructure would be adequate to support construction requirements. Construction and operation requirements would have a negligible impact on current site infrastructure.	Existing infrastructure would be adequate to support construction requirements. Construction and operation requirements would have a negligible impact on current site infrastructure.	Existing infrastructure would be adequate to support operation requirements. Operation would require 15% of available electrical site capacity. Operation requirements would have a negligible impact on current site infrastructure.	Existing infrastructure would be adequate to support construction requirements. Operation requirements would have a negligible impact on current site infrastructure.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Y-12</b>	Current and planned activities would continue as required resulting in no additional impacts to site infrastructure. Y-12 would be expected to continue using about 350,000 MWh of electricity per year.	Existing infrastructure would be adequate to support construction and operation requirements. During operations, power requirements would be <1% of available site electrical capacity.	Existing infrastructure would be adequate to support construction and operation requirements. During operations, power requirements would be <1% of available site electrical capacity.	Existing infrastructure would be adequate to support construction requirements. During operations, power requirements would be 1.5% of available site electrical capacity.	By definition, there is no CNC at Y-12.	Existing infrastructure would be adequate to support operation requirements. During operations, power requirements would be 7.1% of available site electrical capacity.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Air Quality</b>							
<b>LANL</b>	Current and planned activities would continue as required resulting in no additional impacts. The area encompassing LANL and Los Alamos County is classified as an attainment area for all six criteria pollutants. Simultaneous operation of	Construction activities would create temporary increase in air quality impacts, but would not result in violations of the National Ambient Air Quality Standards (NAAQS).  Operations would result in incremental increases less	Construction activities would create temporary increased in air quality impacts similar to CPC. For operations, CUC contribution to nonradiological emissions would not cause any standard or guideline to be	Construction activities would create temporary increase in air quality impacts that could result in exceeding PM <sub>10</sub> regulatory limits.  Operations could have the potential to exceed the 24-	Operations would result in incremental increases less than 5% of baseline for most pollutants. The greatest increase would occur for total suspended particulates (TSP), which could increase by approximately 28%.	Operations could have the potential to exceed the 24-hour standard for nitrogen dioxide and the 24-hour standard for TSP.	The higher level of pit production would result in the annual emission of an additional 0.000019 curies per year of plutonium from the Plutonium Facility Complex.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	LANL's air emission sources at maximum capacity, as described in the Title V permit application, would not exceed any state or Federal ambient air quality standards.	than 5% of baseline for most pollutants. The greatest increase would occur for total suspended particulates (TSP), which could increase by approximately 28%.	exceeded.	hour standard for nitrogen dioxide and the 24-hour standard for TSP.			
NTS	Current and planned activities would continue as required resulting in no additional impacts. No emission limits for any criteria air pollutants or HAPS have been exceeded. Measured concentration of nonradiological criteria pollutants are below regulatory requirements. The estimated annual dose to the public from radiological emissions from current and past NTS activities is well below the 10 millirem per year dose limit.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	NTS would be unaffected by the Capability Based Alternative.
Pantex	Current and planned activities would continue as required resulting in no additional impacts. Pantex is in compliance with all National Ambient Air Quality standards.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
SRS	Emissions from current and planned MOX/PDCF facilities would result in no additional impacts. SRS is in compliance with all National Ambient Air Quality standards.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for construction and operation. No NAAQS exceeded.	Negligible impacts to air quality for operations. No NAAQS exceeded.	Negligible impacts to air quality for operations. No NAAQS exceeded.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
Y-12	Current and planned activities would continue, resulting in no additional impacts. Y-12 is designated non-attainment area for 8-hour ozone and is in compliance with all other National Ambient Air Quality standards.	Temporary increases in pollutant emissions due to construction activities are too small to result in violations of the NAAQS beyond the Y-12 site boundary, with the exception of PM-2.5 and PM-10 concentrations (which could be mitigated using dust	Temporary increases in pollutant emissions due to construction activities are too small to result in violations of the NAAQS beyond the Y-12 site boundary, with the exception of PM-2.5 and PM-10 concentrations	Temporary increases in pollutant emissions due to construction activities are too small to result in violations of the NAAQS beyond the Y-12 site boundary, with the exception of PM-2.5 and PM-10 concentrations	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC plus UPF impact.	Potential to exceed PM-10 and ozone levels due to high background levels.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
		suppression), and the 8-hour ozone concentration. The 8-hour ozone concentration exceedance is not a result of Y-12-specific activities. No new hazardous air emissions would result from the facility operation. Additionally, 90 percent of emissions at Y-12 are from operation of the steam plant, which would be relatively unaffected by CPC operations.	(which could be mitigated using dust suppression), and the 8-hour ozone concentration. The 8-hour ozone concentration exceedance is not a result of Y-12-specific activities. No new hazardous air emissions would result from the facility operation. Additionally, 90 percent of emissions at Y-12 are from operation of the steam plant, which would be relatively unaffected by UPF operations.	(which could be mitigated using dust suppression), and the 8-hour ozone concentration. The 8-hour ozone concentration exceedance is not a result of Y-12-specific activities. No new hazardous air emissions would result from the facility operation. Additionally, 90 percent of emissions at Y-12 are from operation of the steam plant, which would be relatively unaffected by A/D/HE Center operations.			
<b>Water Resources</b>							
<b>LANL</b>	Current and planned activities would continue as required resulting in no additional impacts. Approximately 380 million gallons of groundwater are used at LANL. Discharges were in compliance with discharge permits.	For construction and operation of the Greenfield CPC, annual groundwater use would increase by approximately 21%. However, LANL water use would remain within water rights.	For construction and operation, the increase in groundwater consumption would be approximately 27.6%. LANL water use would remain within water rights.	For construction and operation, annual groundwater use would increase by approximately 34.2%. LANL water use would be within water rights.	Annual groundwater use would increase by approximately 48.6%. LANL groundwater use would exceed water rights by approximately 23 million gallons/year.	Annual groundwater use would increase by approximately 104%. LANL groundwater use would exceed water rights by approximately 233 million gallons/year.	Same a No Action Alternative.
<b>NTS</b>	Current and planned activities would continue with an expected demand for groundwater of 634 million gallons per year. The annual maximum production capacity of site potable supply wells is approximately 2.1 billion gallons per year while the sustainable site capacity is estimated to be approximately 1.36 billion gallons per year	For construction and operation, annual groundwater use would require approximately 7% of sustainable site water capacity. No impact on groundwater availability or quality is anticipated.	For construction and operation, annual groundwater use would require less than 8% of sustainable water capacity. No impact on groundwater availability or quality is anticipated.	For construction and operation, annual groundwater use would require approximately 10% of sustainable water capacity. No impact on groundwater availability or quality is anticipated.	Operation of the CNC would use approximately 14.2% of the sustainable site water capacity. No impact on groundwater availability or quality is anticipated.	Operation of the CNPC would use approximately 23.7% of the sustainable site water capacity. No impact on groundwater availability or quality is anticipated.	NTS would be unaffected by the Capability Based Alternative.
<b>Pantex</b>	Current and planned activities would continue as required with an expected demand for water of 130,000 million gallons per year. Pantex	For construction and operation, annual groundwater use would increase by 68% compared to existing use. No impact on	For construction and operation, annual groundwater use would increase by approximately 81% compared to existing	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC	CNPC operations would increase groundwater use by approximately 150% compared to existing use. CNPC would require total	Planned activities would continue as required to support smaller stockpile requirements

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	obtains its water from the City of Amarillo, which obtains water from the Ogallala aquifer.	groundwater availability or quality is anticipated from construction activities. Pantex’s total contribution to the depletion of the Ogallala Aquifer from operation of the CPC would be approximately 0.0003 percent of the estimated annual total depletion.	use. No impact on groundwater availability or quality is anticipated from construction activities. Pantex’s total contribution to the depletion of the Ogallala Aquifer from operation of the CUC would be approximately 0.0004 percent of the estimated annual total depletion.		Operation in next column.	of approximately 315.5 million gallons/year. The Pantex wellfield has a water capacity of approximately 422.7 million gallons/ year. Pantex’s total contribution to the depletion of the Ogallala Aquifer from operation of the CNPC would be less than 1 percent of the estimated annual total depletion.	resulting in no additional impacts.
SRS	Current and planned activities would continue as required with an expected demand for water (groundwater and surface water) of 3.5 billion gallons/yr plus a small increase for the operation of the MOX/PDCF facilities.	For construction and operation, annual water use would increase by approximately 2% compared to existing use.	For construction and operation, annual water use by 3% compared to existing use.	For construction and operation, annual water use would increase by approximately 4% compared to existing use.	Operation of CNC would increase water use by approximately 5% compared to existing use.	Operation of CNPC would increase water use by 9% compared to existing use.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
Y-12	Current and planned activities would continue as required with an expected demand for water of approximately 2,000 million gallons per year.	For construction and operation, annual water use would increase by approximately 4% compared to existing use.	For construction and operation, annual water use would increase by approximately 5% compared to existing use.	For construction and operation, annual water use would increase by approximately 7% compared to existing use.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	Operation of CNPC would increase water use by approximately 20% compared to existing use.	Planned activities would continue as required to support smaller stockpile requirements.
<b>Biological Resources</b>							
LANL	Current and planned activities would continue as required resulting in no additional impacts.	TA-55 contains core and buffer areas of environmental interest for the Mexican Spotted Owl. Potential impacts would be within previously and substantially developed areas.	TA-55 contains core and buffer areas of environmental interest for the Mexican Spotted Owl. Potential impacts would be within previously and substantially developed areas.	Potential impacts at TA-16 would be within previously and substantially developed areas.	Potential impacts would be within previously and substantially developed areas.	Same as CNC.	Same a No Action Alternative.
NTS	Current and planned activities would continue as required resulting in no additional impacts.	Construction would not impact biological resources because new facilities would be sited on previously disturbed land. Operations would not impact biological resources because activities would be located in previously disturbed or	Construction would not impact biological resources because new facilities would be sited on previously disturbed land.	Same as CUC.	Reference location is in highly developed area, impacts would be minimal.	Same as CNC.	NTS would be unaffected by the Capability Based Alternative.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
		heavily industrialized portions that do not contain habitat sufficient to support biologically diverse species mix.					
<b>Pantex</b>	Current and planned activities would continue as required resulting in no additional impacts.	Construction would not impact biological resources because new facilities would be sited on previously disturbed land. Operations would not impact biological resources because activities would be located in previously disturbed or heavily industrialized portions that do not contain habitat sufficient to support biologically diverse species mix.	Construction would not impact biological resources because new facilities would be sited on previously disturbed land.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	Reference location is in highly developed area, impacts would be minimal.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>SRS</b>	Some animals and birds could be temporarily displaced by construction of the MAX/PDCF facilities, but this would be small due to the areas existing partial development.	Construction would not impact biological resources because new facilities would be sited on previously disturbed land. Operations would not impact biological resources because activities would be located in previously disturbed or heavily industrialized portions that do not contain habitat sufficient to support biologically diverse species mix.	Construction would not impact biological resources because new facilities would be sited on previously disturbed land.	Same as CUC.	Operations would not impact biological resources because activities would be located in previously disturbed or heavily industrialized portions that do not contain habitat sufficient to support biologically diverse species mix.	Same as CNC.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Y-12</b>	Current and planned activities would continue as required resulting in no additional impacts.	Short-term impacts could occur during construction activities. Facilities would be sited on previously disturbed land. Operations would not impact biological resources because activities would be located in previously disturbed or heavily industrialized portions that do not contain	Same as CPC.	Short-term impacts could occur during construction activities. Facilities would be sited on previously disturbed land.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	Reference location is in highly developed and previously disturbed area, therefore there would be no impacts to biological resources.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
		habitat sufficient to support biologically diverse species mix.					
<b>Socioeconomic Resources</b>							
<b>LANL</b>	Current and planned activities would continue as required resulting in no additional impacts. Employment at LANL is expected to continue to rise due to both increased pit production and increased remediation and D&D activities. If LANL's employment rate were to continue increasing at the same level experienced from 1996 through 2005 (2.2 percent annually), approximately 15,400 individuals could be employed at LANL by the end of 2011.	<i>Greenfield CPC:</i> 770 workers during the peak year of construction. Total of 2,650 jobs. 1,780 operational workers, total of 3,667 jobs <i>Upgrade 125:</i> 300 workers during peak year of construction. Total of 618 jobs. 1,780 operational workers, total of 3,667 jobs. <i>50/80:</i> 190 workers during peak year of construction. Total of 391 jobs 680 operational workers, total of 1,401 jobs. Under all approaches there would be no appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,678 jobs. No appreciable changes to regional socioeconomic characteristics expected.	3,820 jobs during peak year of construction. Total 7,869 jobs. No appreciable changes to regional socioeconomic characteristics expected.	2,715 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	4,500 operational workers. No appreciable changes to regional socioeconomic characteristics expected.  Pantex and Y-12 could be closed, resulting in a loss of approximately 8,150 jobs.	Employment at LANL is expected to continue to rise due to increased pit production.
<b>LANL Plutonium Phaseout:</b> If LANL is not selected as the site for the CPC or CNPC, NNSA proposes to phase-out NNSA plutonium operations and remove Category I/II SNM from LANL by approximately 2022. Phasing out the plutonium operations from TA-55 would result in a loss of approximately 610 jobs representing a decrease of 4.5 % of the workforce. The total loss of jobs in the economic area would be 1,260.							
<b>NTS</b>	Current level of NTS employment is expected to continue. Current and planned activities would continue as required resulting in no additional impacts.	850 workers during the peak year of construction. Total of 1,676 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,563 jobs. 935 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	525 jobs during peak year of construction. Total 1,560 jobs. 1,285 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	2,715 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	4,500 operational workers. No appreciable changes to regional socioeconomic characteristics expected.  Pantex and Y-12 could be closed, resulting in a loss of approximately 8,150 jobs.	NTS would be unaffected by the Capability Based Alternative.
<b>Pantex</b>	Pantex is expected to continue present operations with an employment level of about 3,800 employees.	850 workers during the peak year of construction. Total of 1,527 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,336 jobs. 935 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	2,715 operational workers. Total of 5,319 jobs. No appreciable changes to regional socioeconomic characteristics expected.  Y-12 could be closed,	Reduced operations would reduce the workforce from 1,644 to 1,230. This workforce, which currently represents

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
						resulting in a loss of approximately 6,500 jobs.	approximately 1.3% of area employment, would fall to 1.2%. No major impact would occur.
<b>SRS</b>	The current level of employment at SRS is about 15,000, which is expected to be increased by the construction of the MOX/PDCF facilities which would add an additional 1,968 construction workers and once operational an additional 1,120 employees.	850 workers during the peak year of construction. Total of 1,461 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,234 jobs. 935 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	3,820 workers during the peak year of construction. Total of 6,561 jobs. 1,785 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	2,715 operational workers. No appreciable changes to regional socioeconomic characteristics expected	4,165 operational workers. No appreciable changes to regional socioeconomic characteristics expected.  Pantex and Y-12 could be closed, resulting in a loss of approximately 8,150 jobs.	Reduced operations would reduce the workforce by approximately 25 workers. This reduction would be inconsequential relative to the total site workforce.
<b>Y-12</b>	Y-12 is expected to continue present operations with an employment level of about 6,500 employees.	850 workers during the peak year of CPC construction. During operations, CPC would employ 1,780. No appreciable changes to regional socioeconomic characteristics expected.	Construction of UPF would require approximately 900 workers during the peak year of construction. During operations, UPF would employ 600. No appreciable changes to regional socioeconomic characteristics expected.	3,820 workers during the peak year of construction. Total of 19,864 jobs. 1,285 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	4,500 operational workers. No appreciable changes to regional socioeconomic characteristics expected.  Pantex could be closed, resulting in a loss of approximately 1,650 jobs.	Reduced operations would reduce the workforce from 6,500 to 3,900 workers. The loss of 2,600 direct jobs could result in the loss of up to 10,920 indirect jobs for a total of 13,520 jobs lost. This would represent 6.5 percent of the total ROI employment.
<b>Environmental Justice</b>							
<b>LANL</b>	Current and planned activities would continue as required resulting in no additional impacts.	Minority population: 57 percent within the census tracts containing LANL Low-Income population: 9.3 percent of ROI Construction or operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Construction or operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Same as CUC.	Operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Same as CNC.	Same a No Action Alternative.
<b>NTS</b>	Current and planned activities	Minority population: 50	Construction activities	Same as CUC.	Operation activities would	Same as CNC.	NTS would be



**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	would continue as required resulting in no additional impacts.	percent of ROI Low-Income population: 11 percent of ROI Construction or operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	would not result in any disproportionately high or adverse effects on minority or low-income populations.		not result in any disproportionately high or adverse effects on minority or low-income populations.		unaffected by the Capability Based Alternative.
<b>Pantex</b>	Current and planned activities would continue resulting in no disproportionate impacts to the 21% minority population or the 44,312 individuals living near the Pantex Plant identified as living below the Federal poverty level.	Minority population: 30.1 percent of ROI Low-Income population: 14 percent of ROI Construction or operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Construction activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	Operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>SRS</b>	Current activities and the construction and operation of the MOX/PDCF facilities are not expected to disproportionately impact the minority groups or 109,296 identified as living below the Federal poverty threshold living near SRS.	Minority population: 40.1 percent of ROI Low-Income population: 9 percent of ROI Construction or operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Construction activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Same as CUC.	Operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Same as CNC.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Y-12</b>	Current and planned activities would continue resulting in no disproportionate impacts to the 7% minority population or the 122,216 individuals living near Y-12 identified as living below the Federal poverty level.	Minority population: 11.1 percent of ROI Low-Income population: 12 percent of ROI Construction and operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Same as CPC.	Construction activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	Operation activities would not result in any disproportionately high or adverse effects on minority or low-income populations.	Planned activities would continue as required to support smaller stockpile requirements resulting in no additional impacts.
<b>Health and Safety</b>							
<b>LANL</b>	Current and planned activities would continue as required resulting in no additional impacts. SRS operations expected to cause total dose	<i>Greenfield CPC</i> : Potential worker fatalities during construction: 0.6 <i>Upgrade</i> : 0.2 <i>50/80</i> : 0.1	Potential worker fatalities during construction: 0.9.  Collective dose to population during	Potential fatalities during construction: 2.6.  Collective dose to population during	Collective dose to population during operations: 0.23 person-rem; $1 \times 10^4$ LCFs annually	Collective dose to population during operations: 0.23 person-rem; $1 \times 10^4$ LCFs annually	Collective dose to population during operations: $2.5 \times 10^8$ person-rem; $1 \times 10^{11}$ LCFs.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	to the offsite MEI of 1.7 mrem/yr.  Worker dose from pit production at TA-55 would be approximately 90 person-rem per year.	<p><i>Greenfield CPC and Upgrade:</i> Collective dose to population during operations: <math>6.0 \times 10^{-4}</math> person-rem; <math>4 \times 10^{-7}</math> latent cancer fatalities (LCFs)</p> <p>MEI dose: <math>1.5 \times 10^{-4}</math> mrem; <math>9 \times 10^{-11}</math> LCFs annually.</p> <p>Worker dose: 333 person-rem; 0.20 LCFs annually.</p> <p><i>50/80:</i> Collective dose to population during operations: <math>3.2 \times 10^{-5}</math> person-rem; <math>2 \times 10^{-8}</math> LCFs</p> <p>MEI dose: <math>7.7 \times 10^{-6}</math> mrem; <math>5 \times 10^{-12}</math> LCFs annually</p> <p>Worker dose: 154 person-rem; 0.09 LCFs annually.</p>	<p>operations: 0.23 person-rem; <math>1 \times 10^{-4}</math> LCFs annually</p> <p>MEI dose: 0.077 mrem; <math>5 \times 10^{-5}</math> LCFs annually</p> <p>Worker dose: 11 person-rem; 0.006 LCFs annually.</p>	<p>operations: <math>1.3 \times 10^{-4}</math> person-rem; <math>7.8 \times 10^{-8}</math> LCFs annually</p> <p>MEI dose: <math>5.8 \times 10^{-5}</math> mrem; <math>3.5 \times 10^{-11}</math> LCFs annually</p> <p>A/D/HE Center worker dose: 42 person-rem; 0.24 LCFs annually.</p>	<p>MEI dose: 0.077 mrem; <math>5 \times 10^{-5}</math> LCFs annually</p> <p>Worker dose: 344 person-rem; 0.21 LCFs annually.</p>	<p>MEI dose: 0.077 mrem; <math>5 \times 10^{-5}</math> LCFs annually</p> <p>Worker dose: 386 person-rem; 0.23 LCFs annually.</p>	Worker dose from increased pit production at TA-55 would increase from 90 person-rem per year to 220 person-rem per year
<p><b>LANL Plutonium Phaseout:</b> If LANL is not selected as the site for the CPC or CNPC, NNSA proposes to phase-out NNSA plutonium operations and remove Category I/II SNM from LANL by approximately 2022. Phasing out the plutonium operations from TA-55 would result in a decrease in the potential health impacts to LANL employees and the population surrounding LANL. Radiation doses to workers would be expected to decrease by approximately 220 person-rem. Plutonium emissions would decrease by approximately 0.00084 Curies.</p>							
NTS	Current and planned activities would continue as required resulting in no additional impacts. NTS operations expected to produce MEI dose of approximately 0.2 mrem/yr.	<p>Potential worker fatalities during construction: 0.7.</p> <p>Collective dose to population during operations: <math>2.4 \times 10^{-5}</math> person-rem; <math>1 \times 10^{-8}</math> LCFs.</p> <p>MEI dose: <math>1.1 \times 10^{-5}</math> mrem; <math>6 \times 10^{-12}</math> LCFs annually.</p> <p>Worker dose: 333 person-rem; 0.20 LCFs annually.</p>	<p>Potential worker fatalities during construction: 0.9.</p> <p>Collective dose to population during operations: <math>9.5 \times 10^{-3}</math> person-rem; <math>6 \times 10^{-6}</math> LCFs.</p> <p>MEI dose: <math>4.1 \times 10^{-3}</math> mrem; <math>2 \times 10^{-9}</math> LCFs annually.</p> <p>Worker dose: 11 person-rem; 0.006 LCFs annually.</p>	<p>Potential worker fatalities during construction: 0.2.</p> <p>Collective dose to population during operations: <math>7.3 \times 10^{-6}</math> person-rem; <math>4.0 \times 10^{-9}</math> LCFs annually</p> <p>MEI dose: <math>3.1 \times 10^{-6}</math> mrem; <math>1.9 \times 10^{-12}</math> LCFs annually</p> <p>Worker dose: 42 person-rem; 0.24 LCFs annually.</p>	<p>Collective dose to population during operations: <math>9.5 \times 10^{-3}</math> person-rem; <math>6 \times 10^{-6}</math> LCFs.</p> <p>MEI dose: <math>4.1 \times 10^{-3}</math> mrem; <math>2 \times 10^{-9}</math> LCFs annually</p> <p>Worker dose: 344 person-rem; 0.21 LCFs annually.</p>	<p>Collective dose to population during operations: <math>9.5 \times 10^{-3}</math> person-rem; <math>6 \times 10^{-6}</math> LCFs.</p> <p>MEI dose: <math>4.1 \times 10^{-3}</math> mrem; <math>2 \times 10^{-9}</math> LCFs annually</p> <p>Worker dose: 386 person-rem; 0.23 LCFs annually.</p>	NTS would be unaffected by the Capability-Based Alternative.
Pantex	Current and planned activities	Potential worker fatalities	Potential worker fatalities	No A/D/HE Center is	Pantex performs the	Collective dose to	Reduced operations

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	would result in a dose to the MEI of $4.28 \times 10^{-9}$ person-rem per year.	during construction: 0.7.  Collective dose to population during operations: $8.1 \times 10^{-5}$ person-rem; $5 \times 10^{-8}$ LCFs.  MEI dose: $4.1 \times 10^{-5}$ mrem; $2 \times 10^{-11}$ LCFs annually.  Worker dose: 333 person-rem; 0.20 LCFs annually.	during construction: 0.9  Collective dose to population during operations: 0.033 person-rem; $2 \times 10^{-5}$ LCFs.  MEI dose: 0.016 mrem; $1 \times 10^{-8}$ LCFs annually.  Worker dose: 11 person-rem; 0.006 LCFs annually.	proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.	A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	population during operations: 0.033 person-rem; $2 \times 10^{-5}$ LCFs.  MEI dose: 0.016 mrem; $1 \times 10^{-8}$ LCFs annually.  Worker dose: 386 person-rem; 0.23 LCFs annually.	would reduce the number of workers involved in radiological operations from approximately 334 to 250. Total worker dose reduced from 44.1 person-rem to 33 person-rem. Statistically, LCFs would be reduced from $2.6 \times 10^{-2}$ to $2.0 \times 10^{-2}$ .
SRS	Current dose to the MEI from SRS operations is approximately 0.05 mrem/yr. Operation of the MOX/PDCF facilities is expected to add less than 1.8 person-rem to the 50 mile population surrounding SRS.	Potential worker fatalities during construction: 0.7.  Collective dose to population during operations: $1.5 \times 10^{-4}$ person-rem; $9 \times 10^{-7}$ LCFs.  MEI dose: $2.0 \times 10^{-6}$ mrem; $1 \times 10^{-12}$ LCFs annually  Worker dose: 333 person-rem; 0.20 LCFs annually.	Potential worker fatalities during construction: 0.9.  Collective dose to population during operations: 0.06 person-rem; $4 \times 10^{-5}$ LCFs.  MEI dose: $8.2 \times 10^{-4}$ mrem; $5 \times 10^{-10}$ LCFs annually.  Worker dose: 11 person-rem; 0.006 LCFs annually.	Potential worker fatalities during construction: 2.6.  Collective dose to population during operations: $4.5 \times 10^{-5}$ person-rem; $2.7 \times 10^{-8}$ LCFs.  MEI dose: $6.2 \times 10^{-7}$ mrem; $3.7 \times 10^{-12}$ LCFs annually.  Worker dose: 42 person-rem; 0.24 LCFs annually.	Collective dose to population during operations: 0.06 person-rem; $4 \times 10^{-5}$ LCFs.  MEI dose: $8.2 \times 10^{-4}$ mrem; $5 \times 10^{-10}$ LCFs annually  Worker dose: 344 person-rem; 0.21 LCFs annually	Collective dose to population during operations: 0.06 person-rem; $4 \times 10^{-5}$ LCFs.  MEI dose: $8.2 \times 10^{-4}$ mrem; $5 \times 10^{-10}$ LCFs annually  Worker dose: 386 person-rem; 0.23 LCFs annually.	Reduced tritium operations would reduce the total tritium worker dose from 4.1 person-rem to 3.1 person-rem. Statistically, the number of LCFs would be reduced from $2.5 \times 10^{-3}$ to $1.9 \times 10^{-3}$ .
Y-12	Current and planned activities are expected to result in a dose to the MEI of about 0.4 mrem/yr.	Potential worker fatalities during construction of CPC: 0.6  Collective dose to population during CPC operations: $3.2 \times 10^{-3}$ person-rem; $2 \times 10^{-6}$ LCFs.  MEI dose: $4.5 \times 10^{-4}$ mrem; $3 \times 10^{-10}$ LCFs annually.  Worker dose: 333 person-	Potential worker fatalities during construction of UPF: 0.7.  Collective dose to population during UPF operations: 1.2 person-rem; $7 \times 10^{-4}$ LCFs.  MEI dose: 0.2 mrem; $1 \times 10^{-7}$ LCFs annually.  UPF worker dose: 12.6	Potential worker fatalities during construction: 0.2.  Collective dose to population during A/D/HE Center operations: $9.2 \times 10^{-4}$ person-rem; $6 \times 10^{-7}$ LCFs.  MEI dose: $1.3 \times 10^{-4}$ mrem; $8 \times 10^{-10}$ LCFs annually  Worker dose: 42 person-	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	Collective dose to population during operations: 1.2 person-rem; $7 \times 10^{-4}$ LCFs.  MEI dose: 0.2 mrem; $1 \times 10^{-7}$ LCFs annually.  Worker dose: 386 person-rem; 0.23 LCFs annually.	Reduced operations would reduce the number of workers involved in radiological operation from approximately 839 to 500, reducing the total worker dose from 32. person-rem to 19.1 person-rem. Statistically, the number of LCFs would be reduced

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
		rem; 0.20 LCFs annually.	person-rem; 0.008 LCFs annually.	rem; 0.24 LCFs annually.			from $1.9 \times 10^{-2}$ to $1.1 \times 10^{-2}$ .
<b>Facility Accidents</b>							
LANL	Current and planned activities would continue as required resulting in no additional impacts. Under all alternatives analyzed in the LANL SWEIS, the facility accident with the highest radiological risk to the offsite population would be a lightning strike fire at the Radioassay and Nondestructive Testing Facility located in TA-54. If this accident were to occur, there could be 6 additional LCFs in the offsite population.	Accident with the highest consequences to the offsite population is the beyond evaluation basis earthquake and fire. Approximately 26 LCFs in the offsite population could result from such an accident. Offsite maximally exposed individual (MEI) would receive a dose of 87.5 rem. Statistically, MEI would have 1 chance in 19 of LCF. When probabilities are taken into account, the accident with the highest risk is the explosion in a feed casting furnace. For this accident, the LCF risk to the MEI would be approximately $9 \times 10^{-4}$ , or approximately 1 in 1,000. For the population, the LCF risk would be 0.19, or approximately 1 in 5.	Accident with the highest consequences to the offsite population is the fire in the EU warehouse. Approximately 0.06 LCFs in the offsite population could result from such an accident. Offsite MEI individual would receive a maximum dose of 0.249 rem. Statistically, the MEI would have 1 chance in 7,000 of an LCF. 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 approximately $1.6 \times 10^{-7}$ , or less than one in a million. For the population, the LCF risk would be $7.2 \times 10^{-5}$ , or approximately 1 in 10,000.	Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal event. Approximately 3 LCFs in the offsite population could result from such an accident. Offsite MEI would receive a dose of 73.8 rem. Statistically, this MEI would have 1 chance in 23 of an LCF. When probabilities are taken into account for this accident, the LCF risk to the MEI would be approximately $9 \times 10^{-6}$ , or approximately 1 in 100,000. For the population, the LCF risk would be $3 \times 10^{-4}$ , meaning that an LCF would statistically occur once every 3,000 years in the population.	See CPC and CUC.	See CPC and CUC and A/D/HE.	Same as No Action Alternative.
<p><b>LANL Plutonium Phaseout:</b> If LANL is not selected as the site for the CPC or CNPC, NNSA proposes to phase-out NNSA plutonium operations and remove Category I/II SNM from LANL by approximately 2022. Phasing out the plutonium operations from TA-55 would result in a decrease in the potential accident impacts to LANL employees and the population surrounding LANL.</p>							
NTS	Current and planned activities would continue as required resulting in no additional impacts. The maximum reasonably foreseeable accident at the NTS would be a non-nuclear explosion	Accident with the highest consequences to the offsite population is the beyond evaluation basis earthquake and fire. Approximately 0.5 LCFs in the offsite population could result from such an	Accident with the highest consequences to the offsite population is fire in the EU warehouse. Approximately 0.0008 LCFs in the offsite population could result from such an accident. An	Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal event. Approximately	See CPC and CUC.	See CPC and CUC and A/D/HE.	NTS would be unaffected by the Capability Based Alternative.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives					CAPABILITY BASED ALTERNATIVE*
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation	CNPC Operation	
	involving high explosives in a storage bunker, which has a probability of occurrence of 1 in 10,000,000. The following consequences are estimated if such an accident occurs: MEI dose of 34 rem, which would result in a 0.02 probability of an LCF; population dose of 5,800 to 110,000 person-rem, which would result in 3-55 LCFs.	<p>accident. An offsite MEI would receive a dose of approximately 2 rem. Statistically, the MEI would have a 0.001 chance of developing a LCF (i.e., about 1 chance in 1,000 of an LCF).</p> <p>When probabilities are taken into account, the accident with the highest risk to the MEI is the explosion in a feed casting furnace. For this accident, the LCF risk to the MEI would be <math>6 \times 10^{-6}</math>, or approximately 1 in 150,000. For the population, the LCF risk would be approximately <math>2 \times 10^{-3}</math>, meaning that an LCF would statistically occur once every 400 years in the population.</p>	<p>offsite MEI would receive a maximum dose of 0.0037 rem. Statistically, the LCF risk to the MEI would be approximately <math>2 \times 10^{-6}</math>, or about 1 in half a million.</p> <p>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 approximately <math>2 \times 10^{-9}</math>, or about 1 in half a billion. For the population, the LCF risk would be approximately <math>9 \times 10^{-7}</math>, or about 1 in a million.</p>	<p>0.06 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of 0.29 rem. Statistically, this MEI would have a <math>2 \times 10^{-4}</math> chance of developing a LCF (i.e., about 1 chance in 57,000 of an LCF).</p> <p>When probabilities are taken into account for this accident, the LCF risk to the MEI would be approximately <math>2 \times 10^{-8}</math>, or less than 1 chance in a million. For the population, the LCF risk would be approximately <math>7 \times 10^{-6}</math>, or approximately 1 in 150,000.</p>			
<b>Pantex</b>	Current and planned activities would continue as required resulting in no additional impacts. Potential accident scenarios and impacts for the No Action Alternative would be the same as presented in the A/D/HE facility column.	<p>Accident with the highest consequences to the offsite population is the beyond evaluation basis earthquake and fire. Approximately 5.9 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of 23.1 rem. Statistically, the MEI would have a 0.01 chance of developing a LCF (i.e., about 1 chance in 100 of an LCF).</p> <p>When probabilities are taken into account, the accident with the highest risk to the MEI is the explosion in a feed casting furnace. For this accident, the LCF risk to the MEI would be approximately <math>8 \times 10^{-5}</math>, or approximately one</p>	<p>Accident with the highest consequences to the offsite population is the aircraft crash into the EU facilities. Approximately 0.02 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a maximum dose of 0.07 rem. Statistically, this MEI would have a 0.00004 chance of developing a LCF, or about 1 in 25,000.</p> <p>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</p>	<p>Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal event. Approximately 0.9 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of 3.6 rem. Statistically, this MEI would have a 0.002 chance of developing a LCF (i.e., about 1 chance in 500 of an LCF).</p> <p>When probabilities are taken into account for this accident, the LCF risk to the MEI would be <math>2 \times 10^{-7}</math>,</p>	Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.	See CPC and CUC and A/D/HE.	Planned activities would continue as required to support smaller stockpile requirements. It is anticipated that performing an operation less frequently would have a linear reduction in the overall probability that an accident would occur.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
		in 10,000. For the population, the LCF risk would be $3 \times 10^{-2}$ , meaning that an LCF would statistically occur once every 31 years in the population.	be approximately $3 \times 10^{-8}$ , or approximately 1 in 33 million. For the population, the LCF risk would be $1 \times 10^{-5}$ , or approximately 1 in 100,000.	or approximately 1 in 5 million. For the population, the LCF risk would be approximately $9 \times 10^{-5}$ , or approximately 1 in 10,000.  <b>Note: the accidents described above are for the existing A/D/HE mission. No A/D/HE Center is proposed at Pantex because Pantex currently conducts this mission.</b>			
SRS	Current and planned activities would continue as required resulting in no additional impacts. The bounding accident at SRS, which is associated with the plutonium disposition program, would cause an MEI dose of approximately 8.8 rem. The maximum population dose was 21,000 rem, which would equate to approximately 12.6 LCFs.	<p>Accident with the highest consequences to the offsite population is the beyond evaluation basis earthquake and fire. Approximately 10.5 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of approximately 3 rem. Statistically, the MEI would have a 0.002 chance of developing a LCF, or about 1 in 500.</p> <p>When probabilities are taken into account, the accident with the highest risk to the MEI is the explosion in a feed casting furnace. For this accident, the LCF risk to the MEI would be <math>1 \times 10^{-5}</math>, or approximately 1 in 100,000. For the population, the LCF risk would be approximately <math>6 \times 10^{-2}</math>, meaning that an LCF would statistically occur once every 18 years in the population.</p>	<p>Accident with the highest consequences to the offsite population is the aircraft crash into the EU facilities. Approximately 0.03 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a maximum dose of 0.01 rem. Statistically, this MEI would have a <math>7 \times 10^{-6}</math> chance of developing a LCF, or about 1 in 150,000.</p> <p>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 <math>4 \times 10^{-9}</math>, or approximately 1 in 250 million. For the population, the LCF risk would be <math>2 \times 10^{-5}</math>, or approximately 1 in 50,000.</p>	<p>Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal event. Approximately 1.49 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of 0.5 rem. Statistically, this MEI would have a 0.0003 chance of developing a LCF, or about 1 in 3,300.</p> <p>When probabilities are taken into account for this accident, the LCF risk to the MEI would be <math>3 \times 10^{-8}</math>, or approximately 1 in 33 million. For the population, the LCF risk would be <math>1 \times 10^{-4}</math>, or approximately 1 in 6,500.</p>	See CPC and CUC	See CPC and CUC and A/D/HE	Planned activities would continue as required to support smaller stockpile requirements. It is anticipated that performing an operation less frequently would have a linear reduction in the overall probability that an accident would occur.

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
Y-12	Current and planned activities would continue as required resulting in no additional impacts. Potential accident scenarios and impacts for the No Action Alternative would be the same as presented in the UPF facility column.	<p>Accident with the highest consequences to the offsite population is the beyond evaluation basis earthquake and fire. Approximately 177 LCFs in the offsite population could result from this accident. An offsite MEI would receive a dose of 219 rem. Statistically, the MEI would have a 0.1 chance of developing a LCF, or about 1 in 10.</p> <p>When probabilities are taken into account, the accident with the highest risk to the MEI is the explosion in a feed casting furnace. For this accident, the LCF risk to the MEI would be <math>2 \times 10^{-3}</math>, or approximately 1 in 500. For the population, the LCF risk would be 1.07, meaning that approximately 1 LCF would statistically occur once every year in the population.</p>	<p>Accident with the highest consequences to the offsite population is the fire in the UPF warehouse. Approximately 0.4 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a maximum dose of 0.7 rem. Statistically, this MEI would have a <math>4 \times 10^{-4}</math> chance of developing a LCF, or about 1 in 2,400.</p> <p>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 <math>4 \times 10^{-7}</math>, or about 1 in 2.5 million. For the population, the LCF risk would be <math>4 \times 10^{-4}</math>, or about 1 in 2,500.</p> <p><b>Note: the accidents described above are for the UPF. No CUC is proposed at Y-12 because Y-12 currently conducts this mission.</b></p>	<p>Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal event. Approximately 28.9 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a dose of 55 rem. Statistically, this MEI would have a 0.03 chance of developing a LCF, or about 1 in 30.</p> <p>When probabilities are taken into account for this accident, the LCF risk to the MEI would be <math>7 \times 10^{-6}</math>, or about 1 in 150,000. For the population, the LCF risk would be <math>3 \times 10^{-3}</math>, or about 1 in 350.</p>	<p>Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.</p>	<p>See CPC and UPF and A/D/HE</p>	<p>Planned activities would continue as required to support smaller stockpile requirements. It is anticipated that performing an operation less frequently would have a linear reduction in the overall probability that an accident would occur.</p>
<b>Waste Management</b>							
LANL	<p>Current and planned activities would continue as required resulting in no additional impacts.</p> <p>Wastes in 2005 were as</p>	<p><b>Construction (Greenfield/Upgrade/50/80 Upgrade)</b>                      TRU solid (yd<sup>3</sup>): 0/200/0                      LLW solid (yd<sup>3</sup>): 0/200/0                      Hazardous (yd<sup>3</sup>): 6.5/4/4</p>	<p><b>Construction</b>                      TRU solid (yd<sup>3</sup>): 0                      LLW solid (yd<sup>3</sup>): 70                      Mixed TRU solid (yd<sup>3</sup>): 0                      Hazardous (tons): 6                      Non-hazardous solid (tons):</p>	<p><b>Construction</b>                      TRU solid (yd<sup>3</sup>): 0                      LLW solid (yd<sup>3</sup>): 9,900                      Mixed TRU solid (yd<sup>3</sup>): 0                      Hazardous (tons): 0                      Non-hazardous solid</p>	<p>TRU solid (yd<sup>3</sup>): 850                      LLW liquid (gal): 8,925                      LLW solid (yd<sup>3</sup>): 11,640                      Mixed LLW liquid (gal): 3,622.4                      Mixed LLW solid (yd<sup>3</sup>):</p>	<p>Same a No Action Alternative.</p>	

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
	<p>follows:</p> <p>LLW (yd<sup>3</sup>): 7,080 Mixed LLW (yd<sup>3</sup>): 90 TRU Waste(yd<sup>3</sup>): 100 Mixed TRU(yd<sup>3</sup>): 130 Hazardous (lbs.): 43,400</p> <p>Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.</p>	<p><b>Operation (Greenfield/Upgrade/50/80 Upgrade)</b> TRU solid (yd<sup>3</sup>): 850/850/575 Mixed TRU(yd<sup>3</sup>):310/310/2.6 LLW solid (yd<sup>3</sup>): 3,500/3,500/1,850 LLW liquid (yd<sup>3</sup>): 0/0/19.5 Non-hazardous solid (yd<sup>3</sup>): 7,400/7,400/700 Non-hazardous liquid (yd<sup>3</sup>): 69,500/69,500/16,000</p>	<p>1,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 0 LLW liquid (gal):3,515 LLW solid (yd<sup>3</sup>): 8,100 Mixed LLW liquid (gal): 3,616 Mixed LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous solid (tons): 15 Hazardous liquid (tons): 0 Non-hazardous solid (yd<sup>3</sup>): 7,500 Non-hazardous liquid (gal): 50,000</p>	<p>(tons): 7,100 Non-hazardous liquid (gal): 40,000</p> <p><b>Operation</b> Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd<sup>3</sup>): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (yd<sup>3</sup>): 1,350 Hazardous waste liquid (gal): 8,850 Non-hazardous Solid Waste (yd<sup>3</sup>): 15,000 Non-hazardous Liquid Waste (gal):46,000</p>	<p>72.3 Mixed TRU solid (yd<sup>3</sup>): 310 Hazardous solid (yd<sup>3</sup>): 1,368.6 Hazardous liquid (gal): 8,850.5 Non-hazardous solid (yd<sup>3</sup>): 29,900 Non-hazardous liquid (gal): 165,500</p>		
NTS	<p>Current and planned activities would continue as required resulting in no additional impacts.</p> <p>Wastes from 2001</p> <p>LLW (yd<sup>3</sup>): 0 Hazardous (tons): 4.86 Sanitary (tons): 4,550</p> <p>Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 0 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 7 Non-hazardous solid (yd<sup>3</sup>): 10,900 Non-hazardous liquid (gal): 56,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 950 LLW liquid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 3,900 Mixed LLW liquid (yd<sup>3</sup>): 0.4 Mixed LLW solid (yd<sup>3</sup>): 2.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd<sup>3</sup>): 8,100 Non-hazardous liquid (gal): 75,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 0 LLW liquid (gal):3,515 LLW solid (yd<sup>3</sup>): 8,100 Mixed LLW liquid (yd<sup>3</sup>): 3,616 Mixed LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous solid (tons): 15 Hazardous liquid (tons): 0 Non-hazardous solid (yd<sup>3</sup>): 7,500 Non-hazardous liquid (gal): 50,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 9,000 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 0 Non-hazardous solid (yd<sup>3</sup>): 6,400 Non-hazardous liquid (gal): 40,000</p> <p><b>Operation</b> Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd<sup>3</sup>): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd<sup>3</sup>): 12,000 Non-hazardous Liquid Waste (gal):46,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal):3,515 LLW solid (yd<sup>3</sup>): 12,000 Mixed LLW liquid (yd<sup>3</sup>): 3,616.4 Mixed LLW solid (yd<sup>3</sup>): 72.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19 Hazardous liquid (tons): 0.6 Non-hazardous solid (tons): 15,600 Non-hazardous liquid (gal): 125,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal):8,925 LLW solid (yd<sup>3</sup>): 12,640 Mixed LLW liquid (gal): 3,622.4 Mixed LLW solid (yd<sup>3</sup>): 782.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19.9 Hazardous liquid (ton): 6.5 Non-hazardous solid (yd<sup>3</sup>): 27,600 Non-hazardous liquid (gal): 171,000</p>	<p>NTS would be unaffected by the Capability Based Alternative.</p>



**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
Pantex	<p>The following existing levels of waste generation would be expected to continue:</p> <p>Wastes from 2005</p> <p>LLW (yd<sup>3</sup>): 96.8 Mixed LLW (yd<sup>3</sup>): 1.8 Hazardous (yd<sup>3</sup>): 711 Non-hazardous (yd<sup>3</sup>): 6,375 Sanitary (yd<sup>3</sup>): 944.9 TSCA (yd<sup>3</sup>): 2,036 Universal (yd<sup>3</sup>): 31</p> <p>Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 0 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous waste (tons): 7 Non-hazardous solid (yd<sup>3</sup>): 10,900 Non-hazardous liquid (gal): 56,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 950 LLW liquid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 3,900 Mixed LLW liquid (yd<sup>3</sup>): 0.4 Mixed LLW solid (yd<sup>3</sup>): 2.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd<sup>3</sup>): 8,100 Non-hazardous liquid (yd<sup>3</sup>): 75,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 0 LLW liquid (yd<sup>3</sup>): 3,615 LLW solid (yd<sup>3</sup>): 8,100 Mixed LLW liquid (yd<sup>3</sup>): 3,620 Mixed LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous solid (tons): 15 Hazardous liquid (tons): 0 Non-hazardous solid (yd<sup>3</sup>): 7,500 Non-hazardous liquid (gal): 50,000</p>	<p>No A/D/HE Center is proposed at Pantex because the A/D/HE mission is part of the No Action Alternative.</p>	<p>Pantex performs the A/D/HE mission; therefore the impact of a CNC at this site is identical to the CNPC impact. See CNPC Operation in next column.</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (yd<sup>3</sup>): 3,615 LLW solid (yd<sup>3</sup>): 12,000 Mixed LLW liquid (yd<sup>3</sup>): 3,620 Mixed LLW solid (yd<sup>3</sup>): 72.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd<sup>3</sup>): 15,600 Non-hazardous liquid (yd<sup>3</sup>): 125,000</p>	<p>Current and planned activities would continue as required to support smaller stockpile requirements.</p> <p>LLW (yd<sup>3</sup>): 73 Mixed LLW (yd<sup>3</sup>): 1.4 Hazardous (yd<sup>3</sup>): 530 Non-hazardous (yd<sup>3</sup>): 4,800 No major impacts are expected.</p>
	<p>Existing levels of waste generation of:</p> <p>Wastes from 2001</p> <p>TRU (yd<sup>3</sup>): 64.1 LLW (yd<sup>3</sup>): 4,610 Mixed TRU (yd<sup>3</sup>): 380 Hazardous (yd<sup>3</sup>): 45.3 Sanitary (yd<sup>3</sup>): 1,560</p> <p>And are expected to be increased by the construction of the MOX/PDCFC facilities which are expected to add:</p> <p>TRU (yd<sup>3</sup>): 500 LLW (yd<sup>3</sup>): 270 Mixed (yd<sup>3</sup>): 6.5</p> <p>Existing waste management facilities are more than adequate to manage these wastes in compliance with all</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 0 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 7 Non-hazardous solid (yd<sup>3</sup>): 10,900 Non-hazardous liquid (gal): 56,000</p> <p><b>Operation</b> TRU solid (yd<sup>3</sup>): 950 LLW liquid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 3,900 Mixed LLW liquid (yd<sup>3</sup>): 0.4 Mixed LLW solid (yd<sup>3</sup>): 2.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd<sup>3</sup>): 8,100 Non-hazardous liquid (gal): 75,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000</p> <p><b>Operation</b> TRU Solid Waste (yd<sup>3</sup>): 0 Low Level Liquid Waste (gal): 3,515 Low Level Solid Waste (yd<sup>3</sup>): 8,100 Mixed Low Level Liquid Waste (yd<sup>3</sup>): 3,616 Mixed Low Level Solid Waste (yd<sup>3</sup>): 70 Hazardous TRU Solid Waste (yd<sup>3</sup>): 0 Hazardous waste solid (tons): 15 Hazardous waste liquid (tons): 0 Non-Hazardous Solid</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 9,900 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 0 Non-hazardous solid (tons): 7,100 Non-hazardous liquid (gal): 45,000</p> <p><b>Operation</b> Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd<sup>3</sup>): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd<sup>3</sup>): 12,000 Non-hazardous Liquid Waste (gal): 46,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal): 3,515 LLW solid (yd<sup>3</sup>): 12,000 Mixed LLW liquid (yd<sup>3</sup>): 3,616.4 Mixed LLW solid (yd<sup>3</sup>): 72.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19 Hazardous liquid (tons): 0.6 Nonhazardous solid (tons): 15,600 Nonhazardous liquid (gal): 125,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal): 8,925 LLW solid (yd<sup>3</sup>): 12,040 Mixed LLW liquid (yd<sup>3</sup>): 3,622.4 Mixed LLW solid (yd<sup>3</sup>): 782.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19.9 Hazardous liquid (tons): 6.5 Nonhazardous solid (yd<sup>3</sup>): 27,600 Nonhazardous liquid (gal): 171,000</p>	<p>Reduced tritium operations would reduce LLW by approximately 50%, from 138 yd<sup>3</sup> to approximately 69 yd<sup>3</sup>. No other waste streams would be affected.</p>

**Table S.3.16-1—Comparison of Environmental Impacts among Programmatic Alternatives (continued)**

SITE	NO ACTION ALTERNATIVE	Major New Restructured SNM Facilities in the DCE and CCE Alternatives				CAPABILITY BASED ALTERNATIVE*	
		CPC	CUC (or UPF at Y-12)	A/D/HE	CNC Operation		CNPC Operation
	regulatory requirements.		Waste (tons): 7,500 Non-Hazardous Liquid Waste (gal) : 50,000				
Y-12	<p>Wastes generated in 2003: LLW liquid (yd<sup>3</sup>): 17.4 LLW solid (yd<sup>3</sup>): 7,800 Mixed LLW liquid (yd<sup>3</sup>): 17.9 Mixed LLW solid (yd<sup>3</sup>): 21.1</p> <p>Existing waste management facilities are more than adequate to manage these wastes in compliance with all regulatory requirements</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 0 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 7 Non-hazardous solid (tons): 10,900 Non-hazardous liquid (gal): 56,000</p> <p><b>Operations</b> TRU solid (yd<sup>3</sup>): 950 LLW liquid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 3,900 Mixed LLW liquid (gal): 0.4 Mixed LLW solid (yd<sup>3</sup>): 2.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 4.0 Hazardous liquid (yd<sup>3</sup>): 0.6 Non-hazardous solid (tons): 8,100 Non-hazardous liquid (gal): 75,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 70 Mixed LLW solid (yd<sup>3</sup>): 4 Hazardous (tons): 4 Non-hazardous solid (tons): 800 Non-hazardous liquid (gal): 0</p> <p><b>Operations</b> TRU solid (yd<sup>3</sup>): 0 LLW liquid (gal): 3,515 LLW solid (yd<sup>3</sup>): 7,800 Mixed LLW liquid (gal): 3,616 Mixed LLW solid (yd<sup>3</sup>): 70 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous solid (tons): 15 Hazardous liquid (yd<sup>3</sup>): 0 Non-hazardous solid (tons): 7,500 Non-hazardous liquid (gal): 50,000</p>	<p><b>Construction</b> TRU solid (yd<sup>3</sup>): 0 LLW solid (yd<sup>3</sup>): 9,900 Mixed TRU solid (yd<sup>3</sup>): 0 Hazardous (tons): 0 Non-hazardous solid (yd<sup>3</sup>): 7,100 Non-hazardous liquid (gal): 45,000</p> <p><b>Operation</b> Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd<sup>3</sup>): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd<sup>3</sup>): 12,000 Non-hazardous Liquid Waste (gal): 46,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal): 3,515 LLW solid (yd<sup>3</sup>): 11,700 Mixed LLW liquid (gal): 3,616.4 Mixed LLW solid (yd<sup>3</sup>): 72.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 19 Hazardous liquid (yd<sup>3</sup>): 0.6 Non-hazardous solid (tons): 15,600 Non-hazardous liquid (gal): 125,000</p>	<p>TRU solid (yd<sup>3</sup>): 950 LLW liquid (gal): 8,925 LLW solid (yd<sup>3</sup>): 11,740 Mixed LLW liquid (gal): 3,622.4 Mixed LLW solid (yd<sup>3</sup>): 23.5 Mixed TRU solid (yd<sup>3</sup>): 340 Hazardous solid (tons): 18.9 Hazardous liquid (tons): 6.5 Non-hazardous solid (yd<sup>3</sup>): 27,225 Non-hazardous liquid (gal): 171,000</p>	<p>LLW liquid (yd<sup>3</sup>): 10.4 LLW solid (yd<sup>3</sup>): 4,700 Mixed LLW liquid (yd<sup>3</sup>): 10.7 Mixed LLW solid (yd<sup>3</sup>): 12.7</p>

\* Data is presented for Capability-Based Alternative. The No Net Production/Capability-Based Alternative is discussed in Chapter 5, as appropriate for any potentially-affected site. The No Net Production Capability-Based Alternative would result in less weapons-related activities at NNSA sites. This would translate into smaller infrastructure demands, less waste generation, less dose to workers, and reductions in employment. Although these changes would vary differently at the NNSA sites (see Section 3.6.2), most reductions would be on the order of approximately 10 percent compared to the Capability-Based Alternative.

**Table S.3.16-2—Summary of Impact Comparison of SNM Consolidation: Transfer SNM from LLNL**

<b>Resource</b>	<b>No Action Alternative</b>	<b>Remove Category I/II SNM from LLNL (Includes the impacts of phasing out Category I/II SNM operations from LLNL Superblock)—Preferred Alternative</b>
Land	No land issues	No land impacts or issues
Noise	No noise impacts	No change
Air Quality	No changes to air quality	<ul style="list-style-type: none"> <li>no emissions of radionuclides to air from Superblock; therefore, phasing out this facility would have no effect on radiological air quality</li> <li>no nonradiological changes expected</li> </ul>
Socioeconomic	No change	<ul style="list-style-type: none"> <li>if Superblock operated as Category III SNM facility: minor impacts to facility employment associated with security force reductions</li> <li>if Superblock closed and undergoes D&amp;D: employment would be expected to increase because of the D&amp;D work, but would likely not be significant, and would be offset by the transfer of some personnel to LANL.</li> </ul>
Transportation	No change. LLNL is authorized to transport approximately 584 shipments annually.	<ul style="list-style-type: none"> <li>less than 19 shipments of radiological material expected</li> <li>population dose for all shipments: &lt; 3 person-rem</li> <li>LCF risk: &lt;0.01</li> </ul>
Human Health	There are no emissions of radionuclides from Superblock.	<ul style="list-style-type: none"> <li>phasing out Category I/II SNM operations from Superblock would have no effect on population doses to the surrounding population.</li> <li>material-at-risk limit for Superblock reduced by 60%;</li> <li>bounding accident source term for Superblock reduced by 60%</li> <li>Superblock accident consequences reduced from 1.3 LCFs to 0.52 LCFs.</li> </ul>
Waste Management	Small quantities of hazardous, and liquid and solid non-hazardous wastes	<ul style="list-style-type: none"> <li>if Superblock operated as Category III SNM facility: wastes would drop to 10% of current quantities (to 10 TRU waste drums per year and 40 LLW drums per year)</li> <li>if Superblock closed and undergoes D&amp;D: waste would increase in short-term; for bounding case, wastes could double to 200 TRU waste drums and 800 LLW drums per year for several years</li> </ul>

**Table S.3.16-3—Summary of Impact Comparison of SNM Consolidation: Transfer SNM from Pantex Zone 4 to Zone 12**

Resource	No Action Alternative	Move Category I/II SNM Storage from Zone 4 to Newly Constructed Underground Storage Facility in Zone 12 at Pantex—Preferred Alternative
Land	No land issues	Would disturb 42-57 acres of brownfield land for construction; A maximum of 11 acres would be utilized once operational
Noise	No noise impacts	Minor increase in noise during construction of new 95,900-142,800 sq. ft. underground storage facility.
Water	Water use limited to personal consumption of employees	Would require an additional 1,500,000-2,950,000 gallons of water for 5-year construction period
Air Quality	No impacts to air from SNM storage	Minor fugitive dust emissions during construction of new underground storage facility
Socioeconomics	Currently employs 40 workers	No change
Transportation	No impacts	No impacts off site; all transportation on-site Human health impacts from transportation included under “Human Health”
Human Health	Average dose of 12 mrem to 10 radiological workers	Movement of material would entail an additional total dose of 1,100 person-rem, which would statistically translate into a maximum of approximately 0.657 LCFs
Waste Management	No waste generation	Once material moved D&D of old facility would be expected to generate: <ul style="list-style-type: none"> <li>• 12,000 yd<sup>3</sup> of solid waste</li> <li>• 700 yd<sup>3</sup> of LLW</li> </ul>

**Table S.3.16-4—Summary of Impact Comparison of Tritium R&D Alternatives**

Resource	No Action	SRS Consolidation— Preferred Alternative	LANL Consolidation	Downsize-in-Place
Land	Continue operations at LLNL, LANL, and SRS	No new land disturbed	No new land disturbed	No new land disturbed
Noise	Continue operations at LLNL, LANL, and SRS	No change	No change*	No change
Air Quality	Continue operations at LLNL, LANL, and SRS No change	<ul style="list-style-type: none"> <li>• SRS tritium emissions increase by 1,000 Curies (2.4% increase over current tritium emissions)</li> <li>• LANL tritium emissions decrease by 1,000 Curies (42% decrease compared to current tritium emissions)</li> <li>• No change to nonradiological emissions</li> </ul>	No change*	No change
Socioeconomic	Continue operations at LLNL, LANL, and SRS No change	<ul style="list-style-type: none"> <li>• 25 jobs restructured at LANL</li> <li>• 25 new jobs would be created at SRS</li> </ul>	No change*	No change
Human Health	Continue operations at LLNL, LANL, and SRS	<ul style="list-style-type: none"> <li>• Average exposure to worker from tritium R&amp;D would be approximately 4.3 mrem</li> <li>• Total worker dose: 0.11 person-rem</li> <li>• Worker LCF risk: <math>6.6 \times 10^{-5}</math></li> <li>• MEI dose at SRS: increase by 0.0008 mrem/year;</li> <li>• 50-mile population dose: increase 0.041 person-rem.</li> <li>• LANL decreases would be similarly small</li> </ul>	No change*	No change
Waste Management	Continue operations at LLNL, LANL, and SRS	Wastes would change by less than 1%	No change*	No change

\* Consolidation to LANL includes LLNL tritium R&D activities, which amount to one glovebox system.

**Table S.3.16-5—Summary of Impact Comparison of Major HE R&D Alternatives\***

Resource	No Action	Consolidate HE R&D to LANL	Consolidate HE R&D to LLNL	Consolidate HE R&D to Pantex	Consolidate HE R&D to SNL/NM	Consolidate HE R&D to NTS
<b>Donor Sites</b>	Not Applicable	SNL/NM, LLNL, Pantex	SNL/NM, LANL, Pantex	SNL/NM, LLNL, LANL	Pantex, LLNL, LANL	SNL/NM, LLNL, Pantex, LANL
Land	Continue operations at LANL, LLNL, SNL/NM, Pantex	5 acres disturbed at LANL in vicinity of the Two-Mile Mesa Complex (includes portions of TA-6, TA-22, and TA-40)	8-10 acres disturbed on main LLNL site near the HEAF	5.7 acres disturbed in vicinity of Zone 11 and Zone 12	13.5 acres disturbed in Technical Areas 2 or 3	15 acres disturbed in vicinity of the BEEF
Noise	Continue operations at LANL, LLNL, SNL/NM, Pantex	“thunder-like” explosives testing; noise occasional, not continuous; public, and sensitive wildlife receptors unlikely to be adversely impacted	None detectable outside of HEAF.	“thunder-like” explosives testing; noise occasional, not continuous; public, and sensitive wildlife receptors unlikely to be adversely impacted	“thunder-like” explosives testing; noise occasional, not continuous; public, and sensitive wildlife receptors unlikely to be adversely impacted	“thunder-like” explosives testing; noise occasional, not continuous; public, and sensitive wildlife receptors unlikely to be adversely impacted
Air Quality	Continue operations at LANL, LLNL, SNL/NM, Pantex	Short-term impacts from construction; Operation increases in pollutants would be less than 1% of site emissions. No radiological emissions.	Short-term impacts from construction; Operation increases in pollutants would be less than 1% of site emissions. No radiological emissions.	Short-term impacts from construction; Operation increases in pollutants would be less than 1% of site emissions. No radiological emissions.	Short-term impacts from construction; Operation increases in pollutants would be less than 1% of site emissions. No radiological emissions.	Short-term impacts from construction; Operation increases in pollutants would be less than 1% of site emissions. No radiological emissions.
Socioeconomic	Continue operations at LANL, LLNL, SNL/NM, Pantex	<ul style="list-style-type: none"> <li>• 125 peak construction jobs;</li> <li>• LANL: +300 jobs</li> <li>• LLNL: -175 jobs</li> <li>• SNL/NM: -45 jobs</li> <li>• Pantex: -10 jobs</li> </ul>	<ul style="list-style-type: none"> <li>• 150 peak construction jobs;</li> <li>• LLNL: +300 jobs</li> <li>• LANL: -150 jobs</li> <li>• SNL/NM: -45 jobs</li> <li>• Pantex: -10 jobs</li> </ul>	<ul style="list-style-type: none"> <li>• 210 peak construction jobs;</li> <li>• Pantex: +160 jobs</li> <li>• LANL: -150 jobs</li> <li>• SNL/NM: -45 jobs</li> <li>• LLNL: -175 jobs</li> </ul>	<ul style="list-style-type: none"> <li>• 220 peak construction jobs;</li> <li>• SNL/NM: +325 jobs</li> <li>• LANL: -150 jobs</li> <li>• LLNL: -175 jobs</li> <li>• Pantex: -10 jobs</li> </ul>	<ul style="list-style-type: none"> <li>• 250-300 peak construction jobs;</li> <li>• NTS: +250 jobs</li> <li>• LLNL: -175 jobs</li> <li>• LANL: -150 jobs</li> <li>• SNL/NM: -45 jobs</li> <li>• Pantex: -10 jobs</li> </ul>

**Table S.3.16-5—Summary of Impact Comparison of Major HE R&D Alternatives (continued)**

<b>Resource</b>	<b>No Action</b>	<b>Consolidate HE R&amp;D to LANL</b>	<b>Consolidate HE R&amp;D to LLNL</b>	<b>Consolidate HE R&amp;D to Pantex</b>	<b>Consolidate HE R&amp;D to SNL/NM</b>	<b>Consolidate HE R&amp;D to NTS</b>
Human Health	Continue operations at LANL, LLNL, SNL/NM, Pantex	No change	No change	No change	No change	No change
Waste Management	Continue operations at LANL, LLNL, SNL/NM, Pantex	Construction solid waste: 4,930 cubic yards. Operational wastes minimal.	Construction solid waste: 6,200 cubic yards. Operational wastes minimal.	Construction solid waste: 1,550 cubic yards. Operational wastes minimal.	Construction solid waste: 2,650 cubic yards. Operational wastes minimal.	Construction solid waste: 4,650 cubic yards. Operational wastes minimal.

\* Impacts of minor downsizing/consolidation alternatives are presented in Section 5.13.1 of Final SPEIS. Preferred alternative is presented in Section 5.20.

**Table 3.16-6—Summary of Impact Comparison of Flight Testing Alternatives**

Resource	No Action Alternative	Mobile Upgrade Alternative	Campaign Mode at TTR Alternative			Move to NTS Alternative	Move to WSMR Alternative
			OPTION 1	OPTION 2	OPTION 3 Preferred Alternative		
Noise Impacts	No noise impacts to public	Same as No Action	Same as No Action	Same as No Action	Same as No Action	Same as No Action	Same as No Action
Impact on Air Quality	No impacts to air	Same as No Action	Same as No Action	Same as No Action	Same as No Action	Temporary PM-10 emissions during construction	Temporary PM-10 emissions during construction
Socioeconomic Impacts	Currently employs 135 at Tonopah	No impact to jobs	Loss of 92 jobs at Tonopah with secondary impacts on community	Loss of 57 jobs at Tonopah with secondary impacts on community	Loss of 70 jobs at Tonopah with secondary impacts on community	Loss of 135 jobs at Tonopah with impacts to community and gain of 135 jobs at NTS	Loss of 135 jobs at Tonopah and gain of 135 jobs at WSMR
Human Health Impacts	No radiological emissions (note 1)	No radiological emissions (note 1)	No radiological emissions (note 1)	No radiological emissions (note 1)	No radiological emissions (note 1)	No radiological emissions (note 1)	No radiological emissions (note 1)
Waste Management Impacts	Small quantities of hazardous and liquid and solid non-hazardous	Same as No Action	Same as No Action	Same as No Action	Same as No Action	Same as No Action	Same as No Action

Note 1: Some Flight Test operations utilize depleted uranium in the Joint Test Assembly. There is no explosive event and the depleted uranium is contained within the weapon case. Following each flight test, the depleted uranium is removed.



**Table S.3.16-7—Summary of Impact Comparison of Hydrodynamic Testing Alternatives**

<b>Resource</b>	<b>No Action Alternative</b>	<b>Downsize in Place Alternative—Preferred Alternative*</b>	<b>Consolidate at LANL Alternative—Preferred Alternative*</b>	<b>Consolidate at NTS Alternative—Preferred Alternative*</b>
Impacts to Land	No land issues	Would not require additional land	Require 5-7 acres additional land	Require 17 acres additional land
Noise Impacts	Limited to workers at facilities	Limited to workers at closure and facility sites	Limited to workers at closure construction and work sites	Limited to workers at closure construction and work sites
Impact on Air Quality	Less than 100 pounds of NOX and CO emissions/year from DARHT & CFF	Same as No Action	Construction PM-10 Emissions	Construction PM-10 Emissions
Socioeconomic Impacts	None as facilities do not employ but are used and managed by other programs	Loss of 26 jobs at LLNL Loss of 5 jobs at LANL	Loss of 56 jobs at LLNL Gain of 5 jobs at LANL	Loss of 56 jobs at LLNL Gain of 5 jobs at LANL
Human Health Impacts	No human health issues	No impacts	No impacts	No impacts
Waste Management Impacts	Small quantities of hazardous waste generated by DARHT and CFF	Additional waste from facility closures	Additional waste from facility closures	Additional waste from facility closures

\* Preferred alternative contains elements of the Downsize in-Place Alternative, Consolidate at LANL Alternative, and Consolidate at NTS Alternative.

**Table S.3.16-8—Summary of Impact Comparison of Major Environmental Test Facilities Alternatives**

<b>Resource</b>	<b>No Action Alternative</b>	<b>Downsize in Place Alternative</b>	<b>Move All ETF to NTS</b>	<b>Move all ETF to SNL/NM—Preferred Alternative*</b>
Impacts to Land	Currently has 558,311 sq ft of floor space at four sites	Reduce building floor space by 62,777 sq ft	Reduce building floor space by 537,385 sq ft but require 23.5 acres of land at NTS	Reduce building floor space by 159,268 sq ft but require 2.5 acres of land at SNL/NM
Noise Impacts	Limited to workers at work sites	Limited to workers at closure and work sites	Limited to workers at closure construction and work sites	Limited to workers at closure construction and work sites
Transportation	No transportation issues	No transportation issues	Closure D&D could cause traffic congest at LANL and Sandia	Closure D&D could cause traffic congestion at LANL
Impact on Air Quality	Small emissions from Bldg 836 at LLNL	Same as no action alternative	PM-10 issues during Construction	PM-10 issues during Construction
Socioeconomic Impacts	Currently employs 29 at LANL 6 at LLNL 224 at SNL/NM	Jobs Lost: 6 at LLNL 16 at SNL/NM	Jobs Lost: 29 at LANL 6 at LLNL 224 at SNL/NM	Jobs Lost: 29 at LANL 6 at LLNL 16 at SNL/NM
Human Health Impacts	No human health issues	Same as no action alternative	Same as no action alternative	Same as no action alternative
Waste Management Impacts	Small waste generation from DAF and SNL/NM	Additional waste from facility closures	Additional waste from facility closures	Additional waste from facility closures

\*Preferred alternative includes the option of moving environmental testing of nuclear explosive packages currently performed in LLNL Building 334 and the Building 834 environmental conditioning functions to Pantex by 2012.

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