Summary

S.1 INTRODUCTION

This *Complex Transformation*[1] *Supplemental Programmatic Environmental Impact Statement* (SPEIS) analyzes the potential environmental impacts of alternatives to make the U.S. nuclear weapons complex (Complex) smaller, and more responsive, efficient, and secure. 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,[2] as well as core competencies in nuclear weapons.[3] Since completion in 1996 of the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) and associated Record of Decision (ROD) DOE has implemented these policies through the Stockpile Stewardship Program (SSP).[4] 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 twelve sites in the late 1980s 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 semi-autonomous 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 complex of 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 security policy. NNSA's preferred alternatives (described in Section S.3.17) would achieve these benefits.

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[1] In the Notice of Intent to prepare this SPEIS (71 FR 61731, October 19, 2006), 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.

[2] The nuclear weapons stockpile consists of nuclear weapons that are both deployed to the various 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.

[3] 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.

[4] 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.

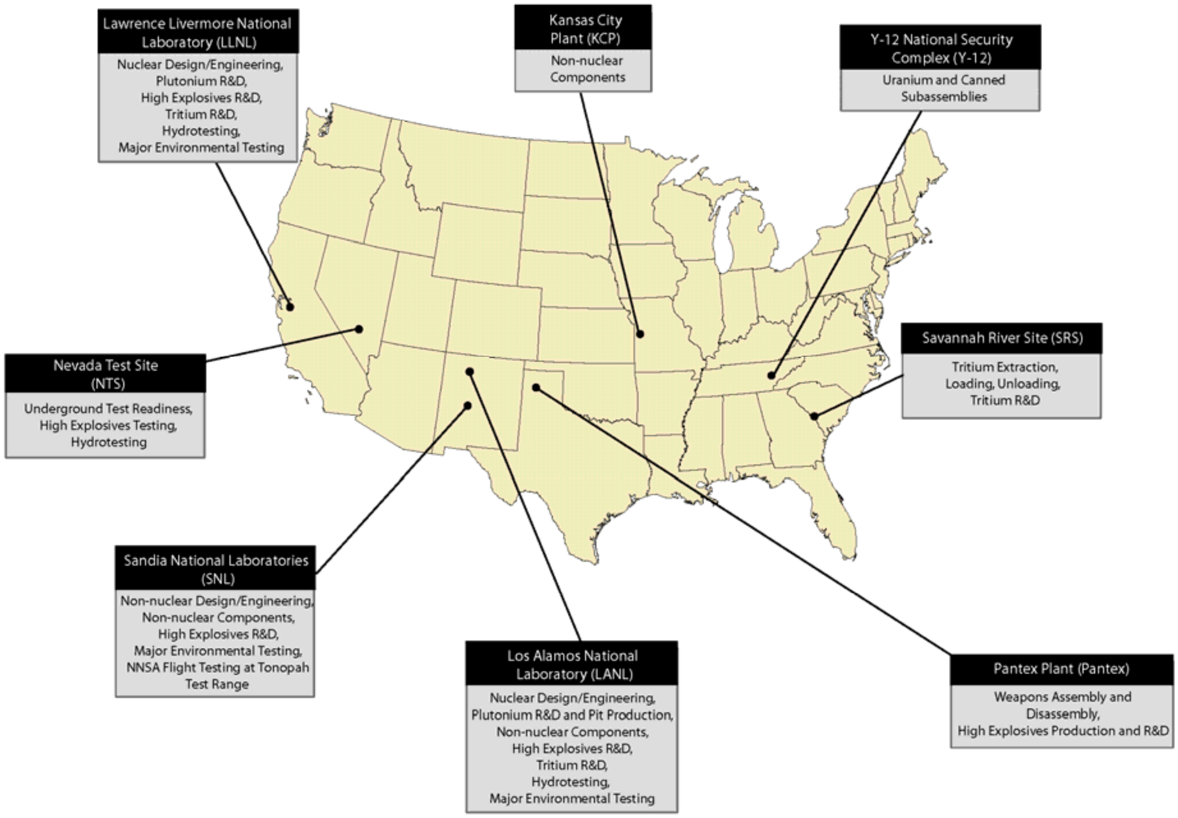

Figure S.1-1 — Nuclear Weapons Complex Sites and Current Major Responsibilities

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[5]) quantities of special nuclear material (SNM).[6] 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; Savannah River Site (SRS) in Aiken, South Carolina; and Y-12 National Security Complex (Y-12) in Oak Ridge, Tennessee. Common to each of these programmatic alternatives, NNSA

[5] 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.
[6] 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.

also proposes to consolidate the storage of SNM currently at the Lawrence Livermore National Laboratory (LLNL) in Livermore, California, and 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 programmatic and project-specific alternative are summarized in Section S.3.16. NNSA has identified preferred programmatic and project-specific alternatives in this draft SPEIS. These are described in Section S.3.17. These preferred alternatives could change prior to issuance of the final SPEIS, expected in 2008.

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 Record of Decision (ROD) (61 FR 68014, December 26, 1996) 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[7] 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,[8] 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

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 new but smaller 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).

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.

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[7] 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.
[8] Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions

Savannah River Site (SRS) (Aiken, South Carolina) – SRS extracts tritium and performs loading, unloading, surveillance of tritium reservoirs, and conducts tritium R&D.[9] 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, such as the Environmental Management (EM) program.

Pantex Plant (Pantex) (Amarillo, Texas) – Pantex dismantles retired weapons; fabricates high-explosive (HE) components and performs HE research and development (R&D); assembles HE, nuclear, and non-nuclear components into nuclear weapons; work on and modifies weapons; performs non-intrusive pit modification;[10] 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[11] (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.

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. SNL/NM is currently removing its Category I/II SNM, and by the end of 2008 should no

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[9] 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.

[10] 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.

[11] The General Services Administration (GSA), as the lead agency, and NNSA, as a cooperating agency, are preparing an Environmental Assessment to evaluate the potential environmental impacts associated with relocating the facilities and infrastructure for the non-nuclear production activities conducted at KCP. This SPEIS does not assess alternatives for the activities conducted at KCP (see Section S.3.2.10).

longer need Category I/II SNM quantities on a permanent basis. 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 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: (1) to inform the public about the proposed action and the alternatives being considered, and (2) to 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. (see Figure S.1-2). 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 were reviewed by NNSA in preparing this draft of the Complex Transformation SPEIS. All late comments received were also reviewed and, in general, determined to be similar to previous comments received. More than 33,000 comment documents were received from individuals, interested groups, Native Americans, and Federal, state, and local officials during the public scoping period. A majority of the documents received were form letters or e-mail campaigns. Twenty different form letters or e-mails were submitted. A summary of the major scoping comments is provided below, and in more detail in Appendix D.

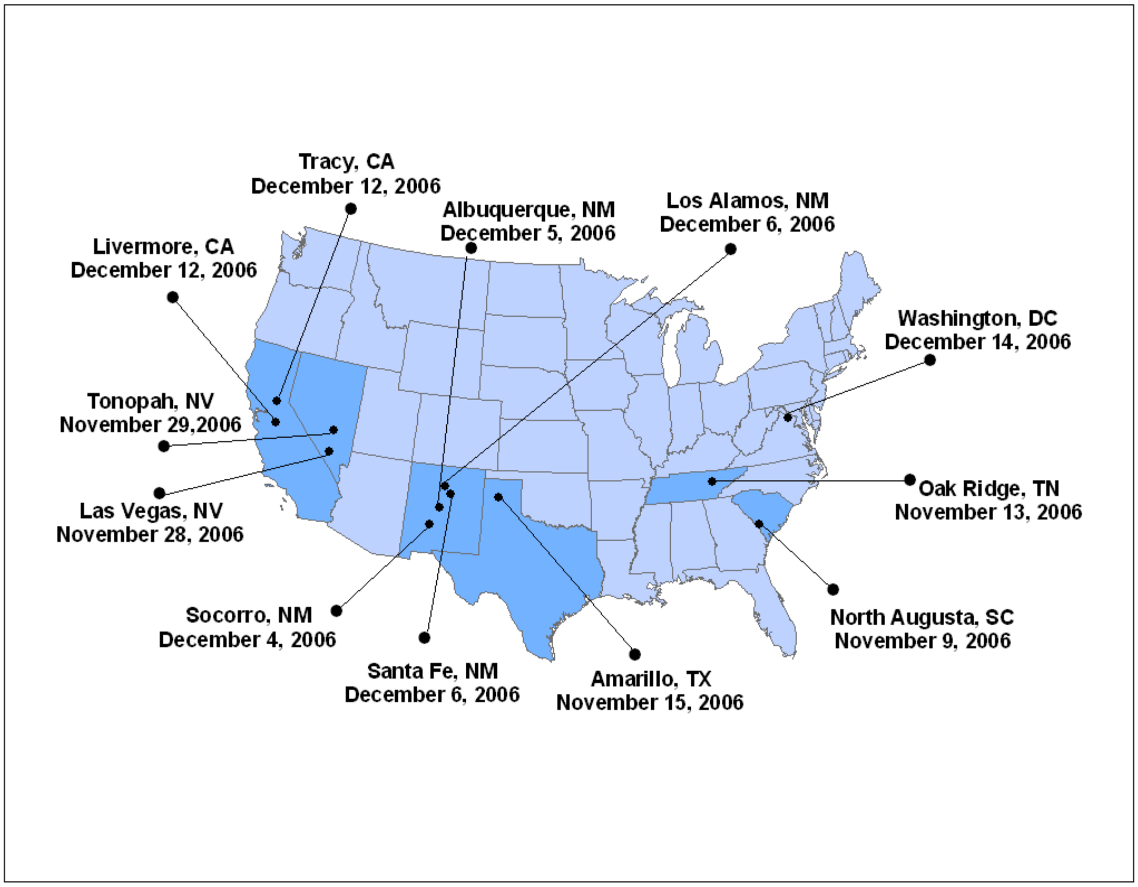

Figure S.1-2 — Public Scoping Meeting Locations and Dates

S.1.4.1 *Summary of Major Scoping Comments*

A summary of the major comments received during the scoping period and responses to these comments follows:

Comment: The majority of the comments expressed opposition to the nuclear weapons program and U.S. national security policies. Many of the comments stated that the U.S. is violating the Nuclear Nonproliferation 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.

Response: The security policies of the U.S. require the maintenance of a safe, secure, and reliable nuclear weapons stockpile, and the maintenance of core competencies to design, manufacture, and maintain nuclear weapons. Article VI of the NPT obligates the parties "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control." Actions by the U.S., including its moratorium on nuclear testing accompanied by significant reductions in its strategic force structure, nuclear weapons stockpile, and production infrastructure, constitute significant progress toward these goals. However, unless and until there are significant changes in national security policy, NNSA is required to design, produce, and maintain the nuclear weapons stockpile pursuant to requirements established by the President and funded by Congress. In conjunction with the 2001 NPR, President Bush set an objective of "…achieving a credible nuclear deterrent with the lowest-possible number of nuclear warheads consistent with our national security needs…". In recognition of this objective and the reduction in the U.S. stockpile since the end of the Cold War, this SPEIS qualitatively evaluates changes in the alternatives that would be appropriate if the stockpile is reduced below the level called for by the Moscow Treaty. Accordingly, this SPEIS analyzes alternatives that satisfy requirements of the existing national security policy framework, as well as a capability-based alternative that, while not capable of meeting current requirements, could meet those requirements if the stockpile were reduced below the level called for by the Moscow Treaty.

Comment: Commentors stated that the reliable replacement warhead (RRW) was not needed and should not be pursued.

Response: RRW refers to possible future warhead designs that could replace existing "legacy" warheads. The RRW would not affect the proposed action of this SPEIS related to restructuring SNM facilities, or the proposed action to restructure R&D facilities. The proposed actions are independent of whether an RRW is developed. Because the environmental impacts analyzed are based on the maintenance of the legacy weapons that are currently in the stockpile, a conservative estimate of the environmental impacts is provided in this SPEIS. If RRW is approved as part of the national strategy for providing a nuclear deterrent, it would enable a shift to fewer hazardous operations. However, a production capacity for plutonium and highly-enriched uranium components, as well as for weapons assembly and disassembly, will be required for the foreseeable future with or without implementation of RRW. Section S.3.15 provides a discussion of the RRW's possible impact on the nuclear weapons stockpile and decisions about the Complex facilities.

Comment: 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 that include preventing proliferation, ensuring the effectiveness of the NPT, and developing strategies to ensure the peaceful denuclearization of existing and threshold nuclear states, and the underlying legal obligations and treaty commitments.

Response: The fundamental principle underlying NNSA's evaluation of alternatives is that the Stockpile Stewardship Program (SSP) must continue to support existing and reasonably foreseeable national security requirements. This is NNSA's obligation and responsibility under the *Atomic Energy Act*[12] and the *National Nuclear Security*

[12] 42 U.S.C. 2011 et seq.

Administration Act.[13] This SPEIS does not analyze alternatives to U.S. national security policy. Rather, it examines the environmental effects of proposed actions and reasonable alternatives for executing the SSP, which is based on requirements established by national security policy including the maintenance of a safe, secure, and reliable nuclear weapons stockpile, and the maintenance of core competencies to design, manufacture, and maintain nuclear weapons. NNSA continues work in other areas, including those identified in comments. Nuclear weapons knowledge has and will continue to enable nonproliferation; however, they are not dealt with in this SPEIS.

Comment: Commentors asked why NNSA was not assessing a consolidated nuclear production center (one site for plutonium, enriched uranium, and weapons assembly/disassembly) as a reasonable alternative for transforming the Complex.

Response: A consolidated nuclear production center (CNPC) alternative was added as a reasonable alternative and is discussed in Section S.3.5 of this SPEIS. NNSA decided to analyze this alternative in order to assess the potential impacts of consolidating major nuclear weapons and SNM production missions at one site.

Comment: Commentors stated that pits will last up to 100 years and potentially longer; therefore, there is no need for new pit production capacity.

Response: This SPEIS addresses the environmental effects of both possessing and utilizing a pit production capacity in the event decisions are made to produce pits. While the current state of knowledge is that there may not be a need to produce pits in the near future because of the plutonium's longevity, NNSA cannot be certain that other issues associated with pits, other than the aging of plutonium materials, would never arise. Accordingly, prudent management requires that NNSA maintain a capacity to produce pits as long as this nation maintains its nuclear stockpile. A small pit fabrication capability is currently being maintained at LANL and is part of the No Action Alternative evaluated in this SPEIS.

Comment: Commentors asked why KCP was 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 by KCP.

Response: Following the Non-nuclear Consolidation Environmental Assessment (DOE/EA-0792, 1993), NNSA decided to consolidate most non-nuclear operations to improve efficiency. In the SSM PEIS (1996), NNSA further considered alternatives with respect to non-nuclear operations, including relocating those capabilities to the NNSA national laboratories. The decision was made (61 FR 68014; December 26, 1996) to retain the existing facilities at the KCP. This was the environmentally preferable alternative, posed the least technical risk, and was the lowest cost alternative.

[13] Title 32, *National Defense Authorization Act for Fiscal Year 2000*, Public Law 106-65

Because the non-nuclear operations at KCP are essential and do not duplicate the work at other sites, no proposal for combination or elimination of these missions was formulated. A recent analysis has concluded that transferring these KCP non-nuclear operations to a site other than one within the immediate Kansas City area would not be cost-effective (SAIC 2007). Consequently, the non-nuclear operations would remain at either the current KCP or a new facility in the Kansas City area, and would neither affect nor be affected by the decisions regarding the alternatives in this SPEIS.

Comment: Commentors requested an analysis of the risks and impacts of terrorist attacks on NNSA facilities.

Response: With respect to intentional destructive acts, substantive details of attack scenarios and security countermeasures are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks. Depending on the malevolent, terrorist, or intentional destructive acts, impacts may be similar to or would exceed accident impact analyses prepared for the SPEIS. A separate classified appendix to this Draft SPEIS has been prepared that evaluates the underlying facility threat assumptions with regard to malevolent, terrorist, or intentional destructive acts. The methodology for the analysis in this classified appendix is discussed in Appendix B. These data provide NNSA with information upon which to base, in part, decisions supported by this SPEIS.

Comment: Support for the continuation of the NNSA flight test mission at the Tonopah Test Range was received from the Tonopah community. Commentors demanded evidence of a compelling reason to move this mission from Tonopah.

Response: A detailed impact analysis was prepared for the NNSA flight testing alternatives and is presented in Section 5.15.4.2 of the SPEIS. The analysis discusses the potential socioeconomic impacts to the Tonopah community of NNSA flight testing alternatives.

Comment: Commentors expressed opposition to any new nuclear facilities. There was specific opposition to expanding pit production at LANL, as well as the proposed consolidated plutonium center (CPC). Commentors stated that the LANL Site-Wide EIS should follow the Complex Transformation SPEIS.

Response: NNSA added analysis of an alternative that would upgrade facilities at LANL for a smaller pit production capacity (up to 80 pits per year) than the baseline capacity (125 pits per year, single shift) of the proposed CPC (see Section S.3.4.1.2). NNSA is evaluating increasing its current capacity to produce nominally 20 pits per year at LANL in a site-wide EIS (LANL 2006a). It is expected that a final LANL Site-wide EIS will be issued prior to completion of this SPEIS, but NNSA will not make any new decisions specifically related to pit production at LANL prior to the completion of this SPEIS.

Comment: Commentors stated that a site near the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, should be considered as a reasonable location for a CPC.

Response: In order to determine the reasonable site alternatives for a CPC, all existing, major DOE sites were initially considered as a potential host location for a CPC. Sites that do not maintain Category I/II SNM were eliminated from consideration, as were sites that do not conduct major NNSA program activities. WIPP did not meet these siting criteria. Other DOE sites were not considered reasonable locations because they do not satisfy certain criteria such as population encroachment, mission compatibility, or synergy with the site's existing mission. Following this process, NNSA decided that Los Alamos, NTS, Pantex, SRS, and Y-12 constitute the range of reasonable site alternatives for a CPC.

S.1.4.2 *Key Changes to the Scope of the Complex Transformation SPEIS Resulting from Public Comments*

As a result of the scoping process, NNSA made the following significant changes to the scope of the Complex Transformation SPEIS:

- A consolidated centers of excellence (CCE) alternative was added as a reasonable alternative (see Section S.3.5). 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 (see Section 5.11 of the SPEIS).

- A discussion was added of the 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 the RRW were to be developed (see Section S.3.15).

- 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 to the Tonopah community from the alternatives (see Section 5.15.4.2 of the SPEIS).

- An analysis of a smaller pit production facility (50 to 80 pits per year) was added (see Section S.3.4.1.2).

- A more detailed explanation of why the Kansas City Plant non-nuclear operations are not included in this SPEIS was added (see Section S.3.2.10).

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* and the *National Nuclear Security Administration Act*. 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 reliable replacement warheads (RRWs) as compared to maintaining legacy warheads[14] with Life Extension Programs.[15] 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 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.

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[14] A legacy warhead is a weapon in the current stockpile.
[15] 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.

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 FY 2006 (Public Law 109-163). The purpose of a reliable and responsive infrastructure is to deter adversaries from trying to seek advantage – 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.

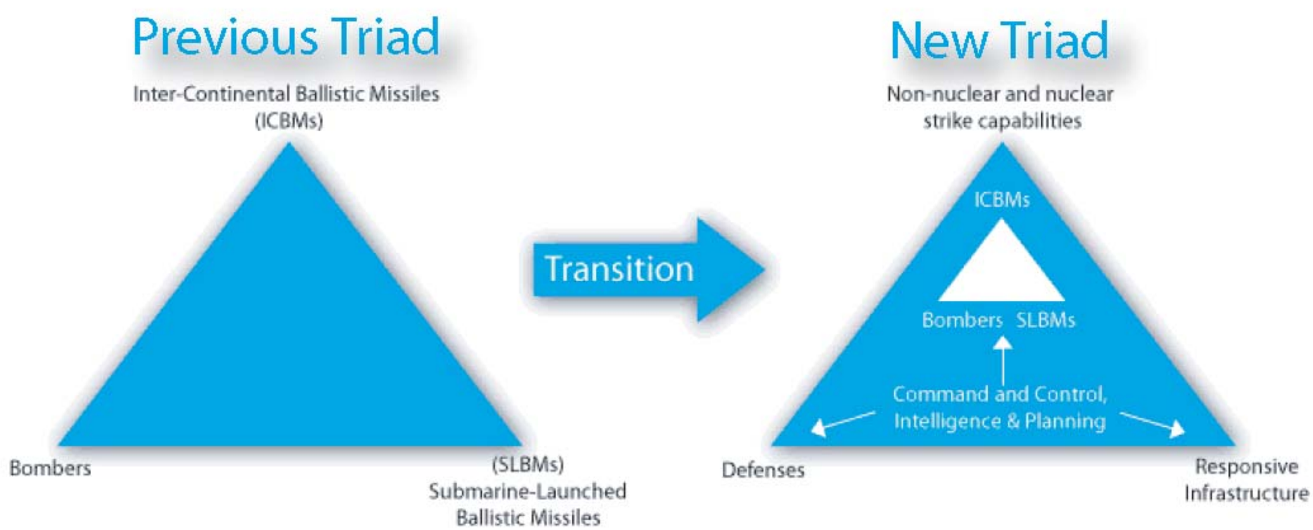

Figure S.2-1 — Transition to the New Triad

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 50-125 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 special nuclear materials (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 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). This effort was a continuation of NNSA's planning for a Complex that would be more responsive to changing national security requirements, as determined by the President and funded by Congress, and could be operated more efficiently. The planning scenario was developed to determine if 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 excess and redundant facilities eliminated - in other words, whether and how the Complex could be made more secure and efficient.

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 included in this proposed action:

- Plutonium operations, including pit manufacturing, Category I/II SNM storage, and related R&D;
- Enriched uranium operations, including canned subassembly[16] 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.

- **Programmatic Alternative 1: Distributed Centers of Excellence (DCE).** As described in Section S.3.4, the DCE alternative retains 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 consolidated plutonium center (CPC) for R&D, storage, processing, and manufacture of plutonium parts (pits) for the nuclear weapons stockpile. Production rates of 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.[17] A CPC could consist of new facilities, or modifications to existing facilities at one of the following sites: Los

[16] Canned subassembly – The component of a nuclear weapon which contains the secondary, including uranium and lithium components.
[17] See Section S.3.14 for a discussion of a new CPC with a smaller capacity.

Alamos,[18] NTS, Pantex, SRS, or Y-12. This SPEIS also considers an upgrade of 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 existing facilities at Y-12 are 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, the CCE Alternative consolidates the three major SNM functions (plutonium, uranium, and weapon assembly/disassembly) involving Category I/II quantities of SNM at one or two sites. 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 consolidated nuclear centers [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 with one another. If Pantex or Y-12 were not selected for this option, weapons operations at Pantex, Y-12, or both sites 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 assesses production rates of 125 weapons per year for single shift operations and 200 weapons per year for multiple shifts and extended work weeks.[19]

- **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 at existing or planned facilities. Under this alternative, pit production at LANL would not be expanded beyond a capability to provide 50 pits per year. Production capacities at Pantex, Y–12, and the SRS would be reduced to a capability-based level.[20]

[18] 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).
[19] See Section S.3.14 for a discussion of a new CNPC with a smaller capacity.
[20] A capability-based capacity is defined as the facility capacity inherent with the facilities and equipment required to manufacture one component of any stockpile system. In the Notice of Intent to prepare this SPEIS, this capacity was referred to as a "nominal capacity".

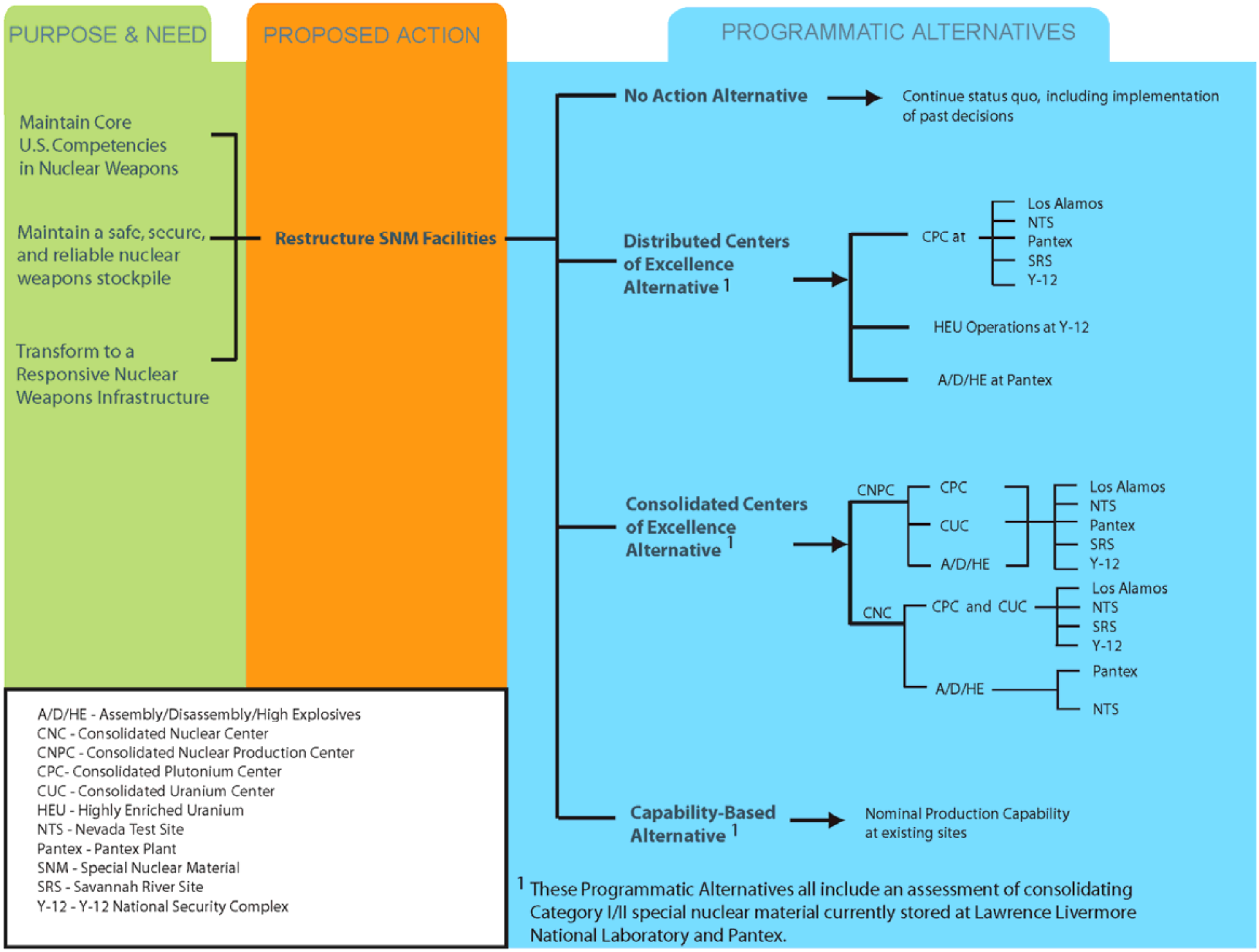

Figure S.3.1-1 — Programmatic Alternatives

The DCE Alternative, CCE Alternative, and the Capability-Based Alternative all include proposals to consolidate Category I/II SNM involving LLNL[21] 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 the proposed action to restructure R&D and testing facilities, 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

> **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 support actions that could be implemented after the SPEIS ROD, without any additional NEPA analysis.

The analysis of alternatives for these capabilities is "project specific," meaning that no further NEPA review would likely 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. The project-specific alternatives, shown on Figure S.3.1-2, were developed 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.

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[21] 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 actions involving greater quantities of SNM and more shipments than are identified 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.

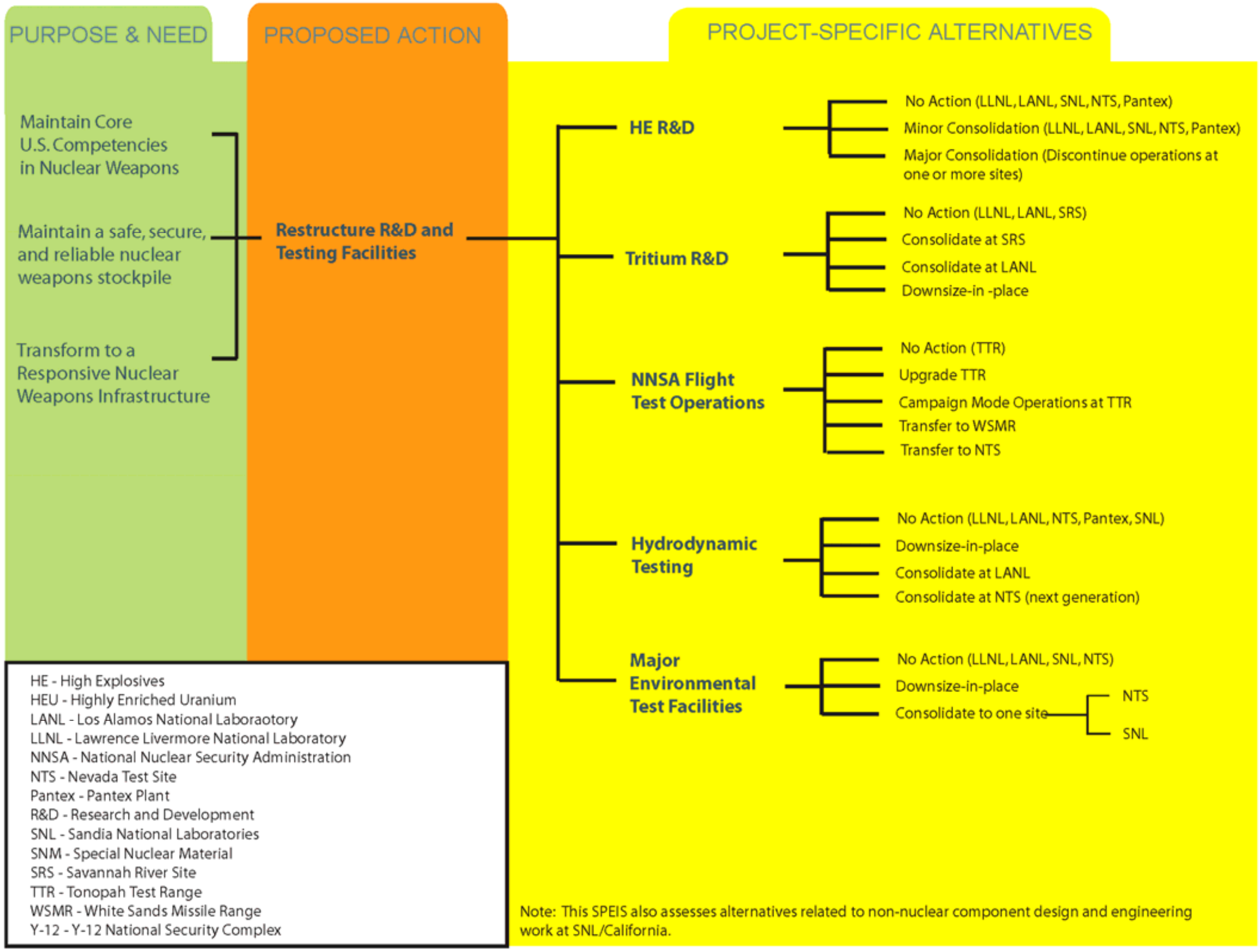


Figure S.3.1-2 — Alternatives to Restructure R&D and Testing Facilities

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).[22] LANL performs research, design, development, testing, surveillance, assessment, and maintains certification capabilities in support of the SSP. In addition, LANL could nominally produce 20 pits per year, as announced in the Record of Decision for the 1999 LANL Site-Wide EIS (64 FR 50797, September 20, 1999). LANL also conducts surveillance of pits and manufactures some non-nuclear components (e.g., detonators).

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 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

[22] 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.

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 867,000 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) has been reserved for future missions, and one-third has been reserved for R&D, nuclear device assembly, diagnostic canister assembly, and radioactive waste management. In addition, DOE is preparing an application seeking Nuclear Regulatory Commission 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 Nuclear Emergency Search Team based at NTS 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 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, January 27, 1997). 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.[23]

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 mission is implementation of the SSP and related systems engineering and non-nuclear component design and engineering. 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.

In regard to nuclear weapons, SNL is responsible for cradle-to-grave oversight of the non-nuclear components and is the system integrator for assuring the safety and reliability of the entire weapons system. 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.

[23] 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.

S.3.2.7 *White Sands Missile Range*[24]

The White Sands Missile Range (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, including requirements concerning penetrating weapons, weapons recovery, and test materials.

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, and extracts tritium for use in the nation's nuclear weapons. As a NNSA mission that is separate from weapons activities, a mixed oxide fuel fabrication facility is under construction and a pit disassembly and conversion facility is planned to be built 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

[24] WSMR is not currently part of the NNSA nuclear weapons complex. However, WSMR is being considered as a location for NNSA Flight Testing.

(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 dispositions 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 KCP. 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/EA-0792, 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 KCP; it also analyzed three alternatives in which the manufacture of electrical and mechanical components would be consolidated at sites other than KCP. Based on the evaluations in this Environmental Assessment, DOE issued a Finding of No Significant Impact (FONSI) (58 FR 48043, September 14, 1993) on its proposal to consolidate non-nuclear component manufacturing and related activities, and decided to consolidate most non-nuclear operations at 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, June 21, 1994) 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, December 26, 1996) 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 KCP are essential and do not duplicate the 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. A recent analysis of transferring these non-nuclear operations to a location other than one in the immediate vicinity of the Kansas City area concluded that "…no prospects for economic benefits are apparent…" (SAIC 2007).

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 is preparing an Environmental Assessment with NNSA as a cooperating agency to inform a decision on whether to construct a new, appropriately sized facility for NNSA in the Kansas City area or to refurbish the existing facility. NNSA expects to make a decision on how to modernize its facility for non-nuclear electrical and mechanical components before it makes any decisions regarding the alternatives analyzed in this SPEIS. Consequently, NNSA will continue the manufacture of most non-nuclear components at either the current KCP or a new facility nearby.

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 designs and engineers non-nuclear components and is responsible for systems engineering of nuclear weapons. 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 nominally 20 pits per year. NNSA is currently preparing a LANL SWEIS that evaluates an alternative to produce up to 80 pits per year in order to obtain at least 50 certified[25] pits per year. LANL manufactures pits in the Plutonium Facility Complex, consisting 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.

[25] "Certified pits," as used in the LANL SWEIS, has the same meaning as "pits to the stockpile."

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, January 27, 1997). 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, Y-12, SNL/NM, and NTS. All Category I/II quantities of SNM are planned to be removed from SNL/NM by the end of 2008.

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,[26] primarily 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.

[26] "Superblock," LLNL's defense plutonium research and development 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 high explosives research and development. 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 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.

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 Uranium Processing Facility (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.[27] 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.

[27] 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.

- 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

	Construction (acres)	Operation (acres)	
Greenfield Alternative[28] (Los Alamos, NTS, Pantex, SRS, Y-12)	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 CPC based on this SPEIS; specific locations would be evaluated in a future NEPA review for the site selected if required.[29] 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 planned facilities for the disposition of surplus plutonium: the Pit Disassembly and Conversion Facility (PDCF) and the Mixed-Oxide (MOX) Fuel Fabrication Facility. This location would support either a new independent CPC or use the infrastructure associated with the NNSA PDCF and MOX facilities to support a CPC.

[28] "Greenfield," in this context, refers to a completely new facility that would not use existing facilities and therefore requires significantly more acreage.
[29] Such a specific location at Los Alamos is evaluated in the LANL SWEIS that is currently being prepared.

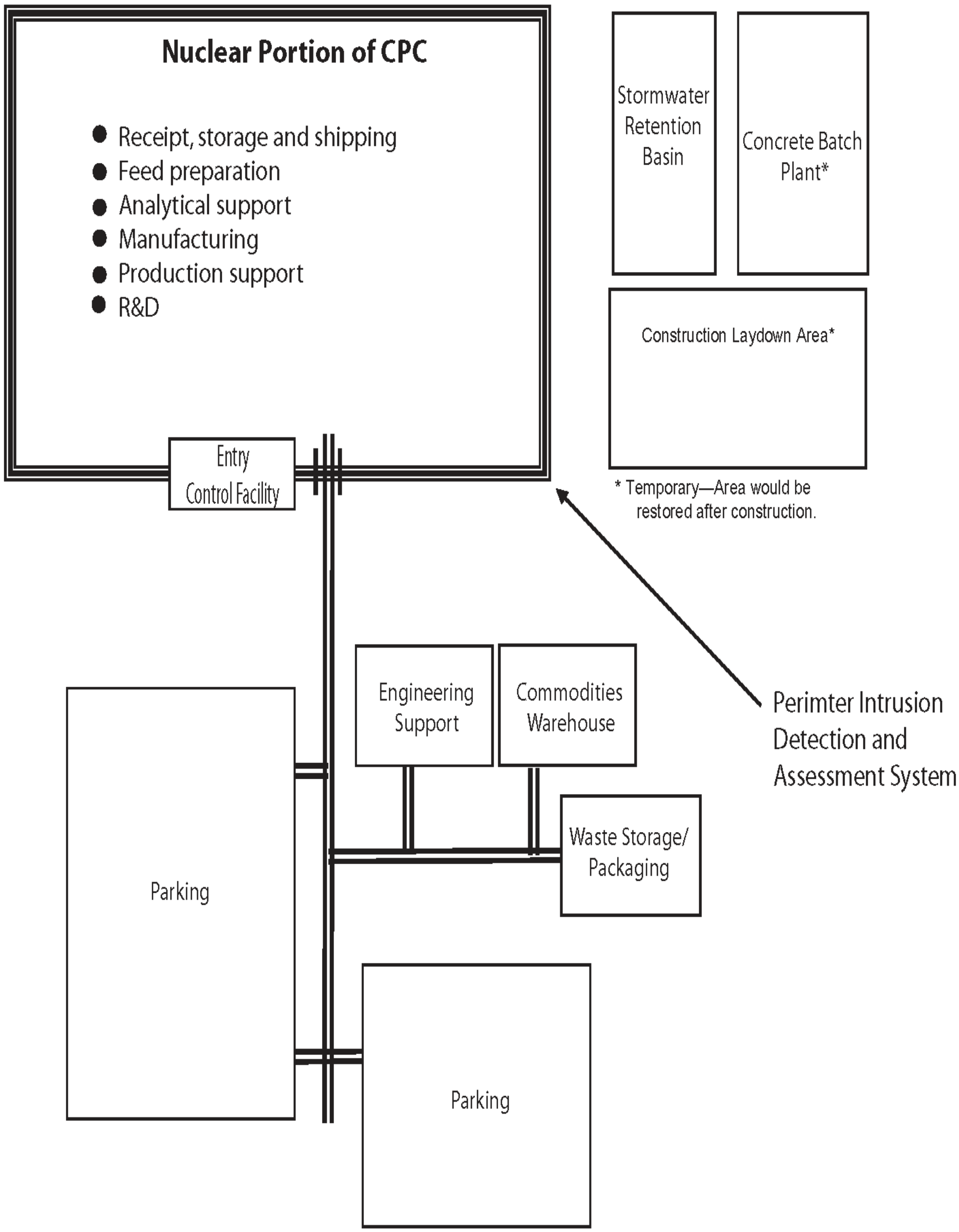


Figure S.3.4.1-1 — Generic Layout of a CPC

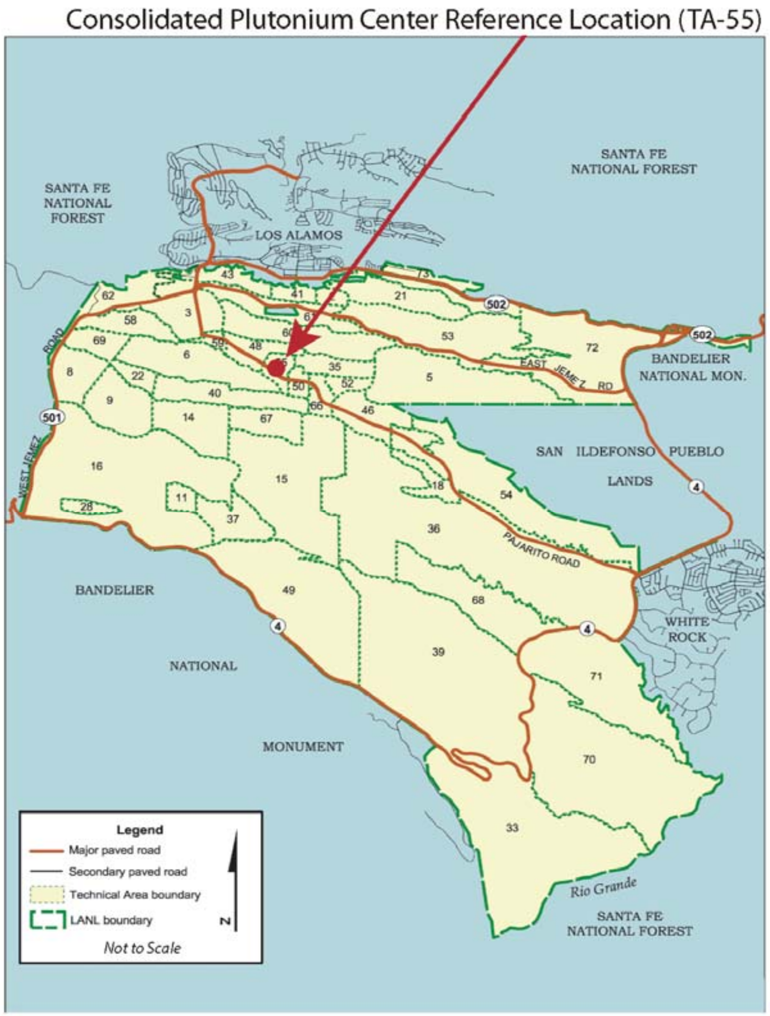


Figure S.3.4.1-2 — Los Alamos Consolidated Plutonium Center Reference Location

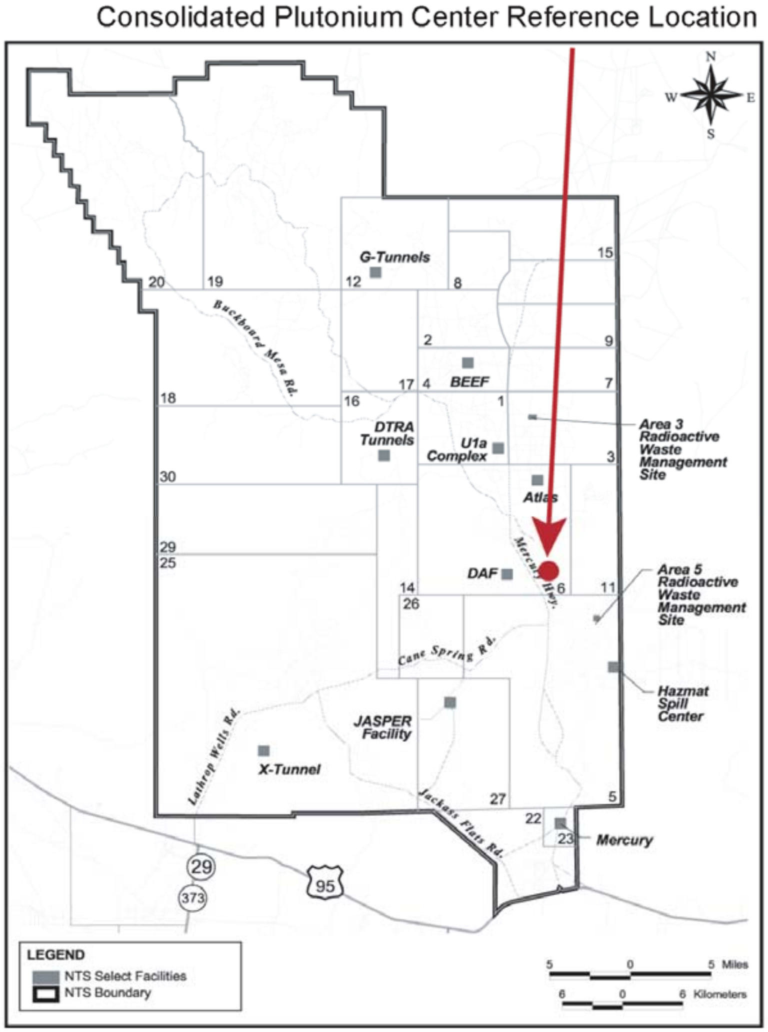


Figure S.3.4.1-3 — NTS Consolidated Plutonium Center Reference Location

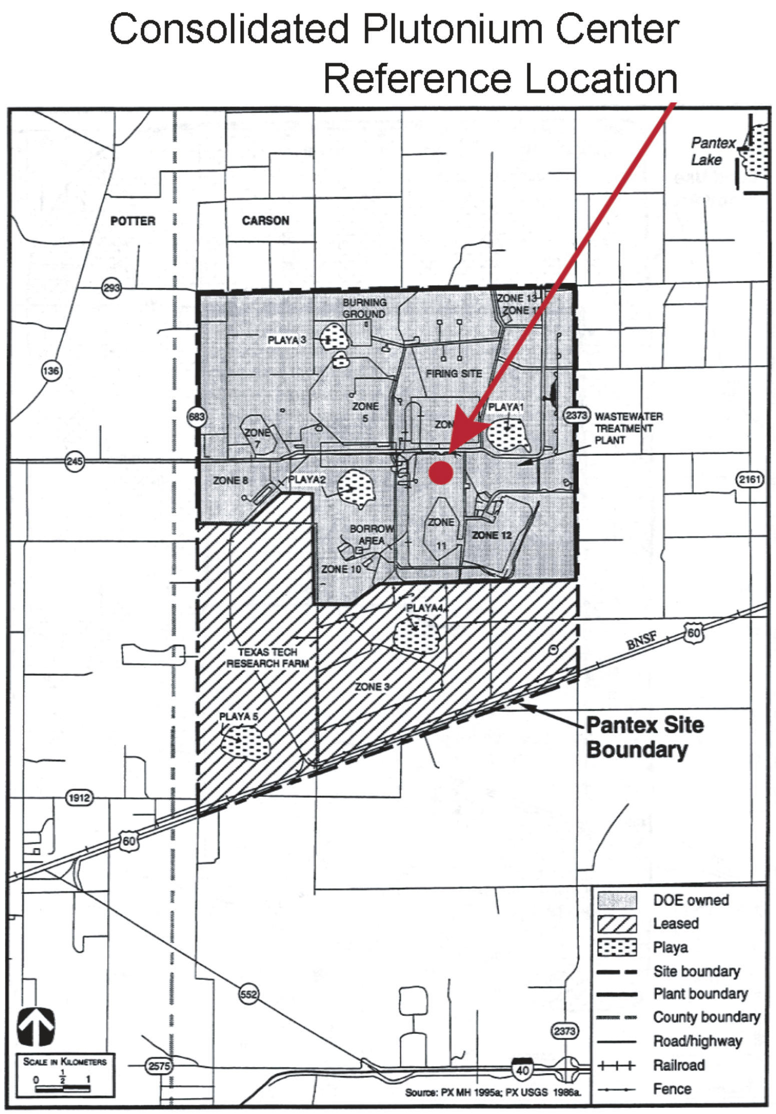


Figure S.3.4.1-4 — Pantex Consolidated Plutonium Center Reference Location

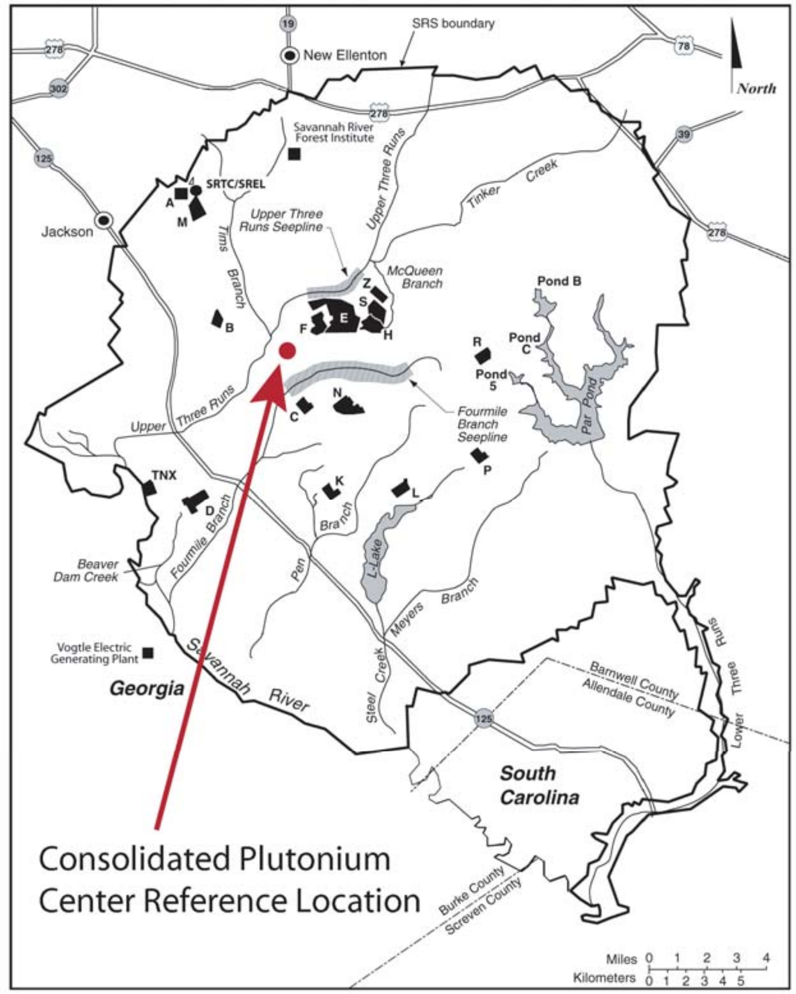


Figure S.3.4.1-5 — SRS Consolidated Plutonium Center Reference Location

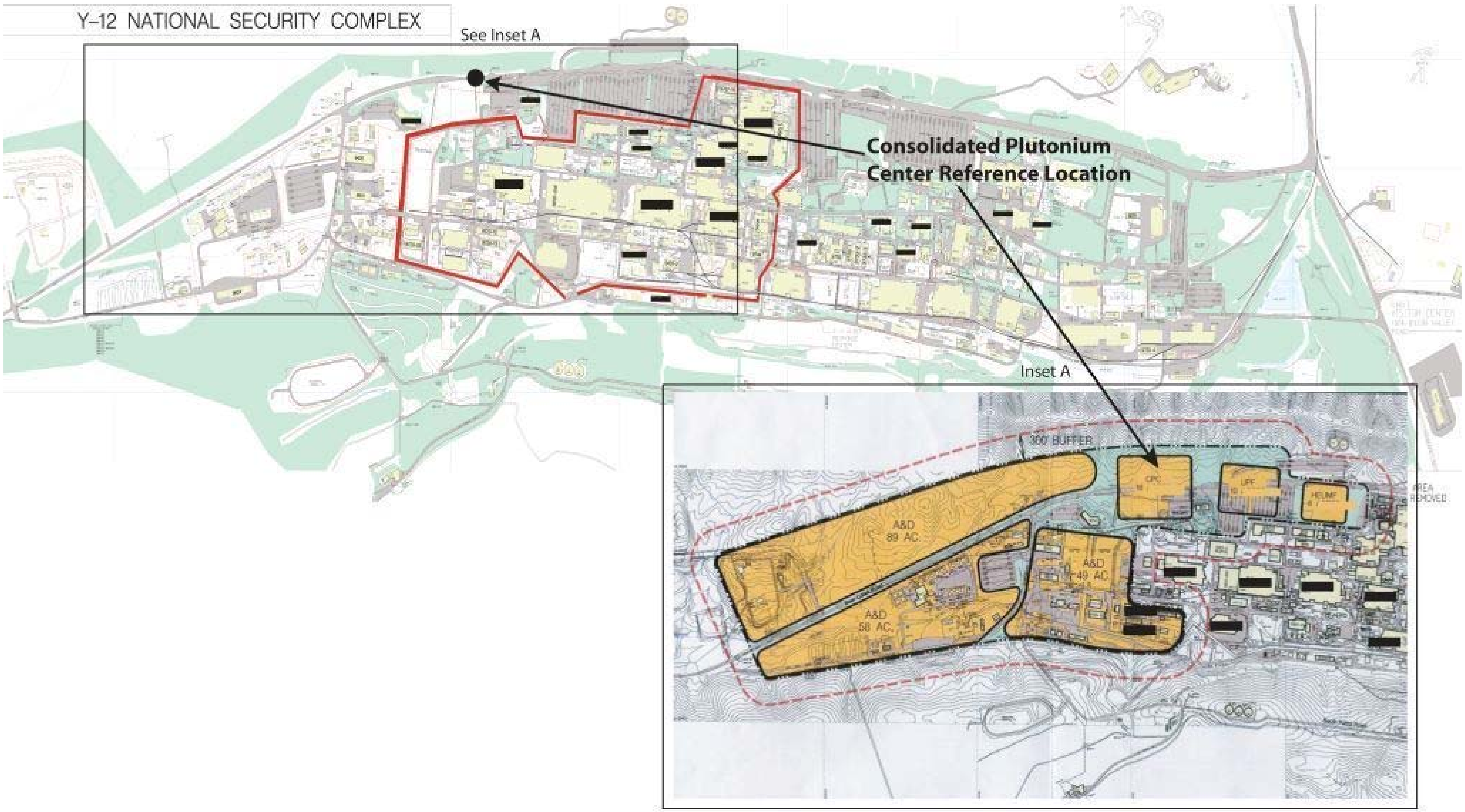


Figure S.3.4.1-6 — Y-12 Consolidated Plutonium Center Reference Location

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[30]). 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 Chemistry and Metallurgy Research Building Replacement (CMRR) Facility would be located in TA-55. In addition, LANL has several existing and planned facilities 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 [LLUOB])) 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 [RLUOB]). This annex would be located near the existing PF-4 structure to minimize the logistics of material and personnel movements between the facilities,

[30] The name “50/80 Alternative” reflects the fact that this alternative would expand pit production capacity up to 80 pits per year.

which would take place through hardened tunnels. An overhead conceptual view of this configuration is shown in Figure S.3.4.1-7.

Note: 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 provide NNSA with an alternative that has a pit production capacity of less than 125 pits per year. PF-4 at TA-55 is the only existing plutonium facility capable of being upgraded to support reduced national security requirements without major construction. Implementation of this 50/80 Alternative (if selected) would be planned to minimize disruption of LANL’s interim pit production activities.

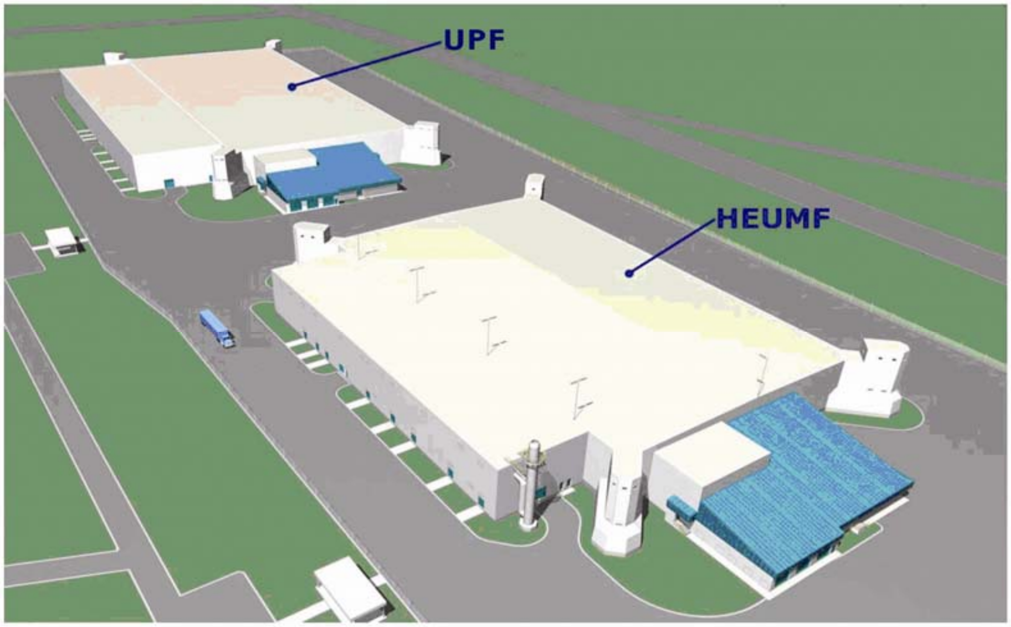
The 50/80 Alternative differs from a Greenfield CPC in several important aspects. First, NNSA assumes this facility would produce up to approximately 80 pits per year; a CPC would produce 125 pits per year (single shift) and is assessed at the higher rate of 200 pits per year (multiple shifts and extended 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.

The 50/80 Alternative includes completing the previously analyzed CMRR facility, which could require expansion by up to 9,000 additional square feet, to accommodate pit manufacturing operations. Modifications to existing facilities at TA-55 could be required to accommodate additional workers employed in pit manufacturing. The construction of these new facilities 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 (currently under 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.

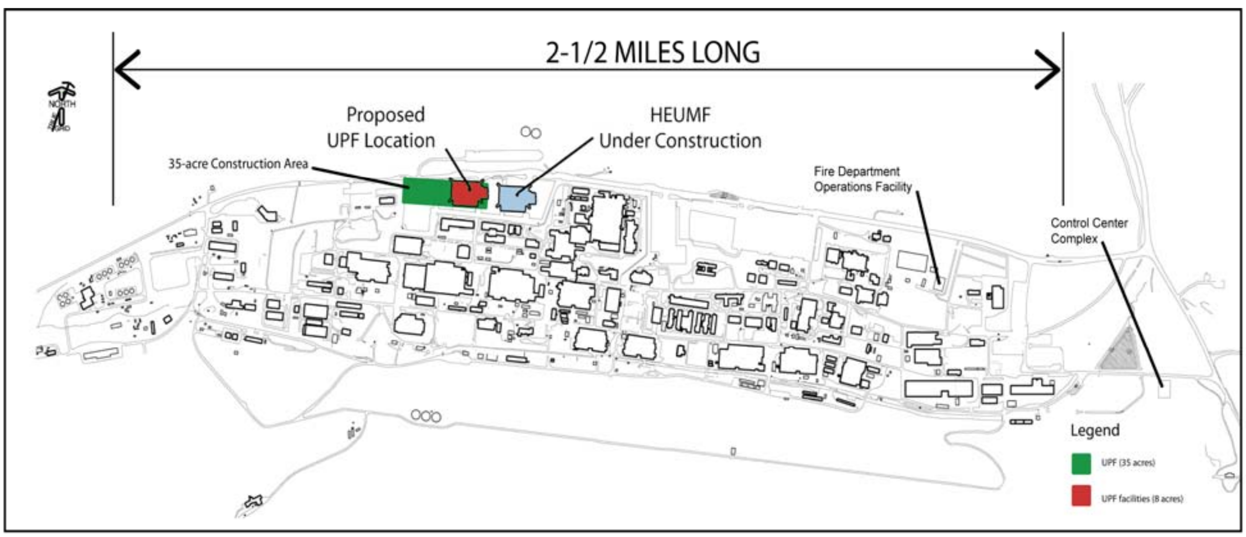
A UPF would replace multiple existing enriched uranium and other processing facilities. The current operating and support areas occupy approximately 633,000 square feet in multiple buildings, while the UPF would result in approximately a 33 percent reduction, to approximately 400,000 square feet in one 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 Relative to Other Buildings 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. For continued operations in the existing facilities, major investments would be required for roof replacements; 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

An alternative under consideration in this Complex Transformation SPEIS is 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 be sized to 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 beyond normal maintenance.

- CCE facilities would be located at one or more of the following sites: Los Alamos, Pantex, NTS, SRS, and Y-12.

- A modular arrangement of facilities (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.[31] The assumed schedule for the CCE functional facilities is:

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 PIDAS. A buffer area would provide 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**
	Total: 235 • CPC: 40 • CUC: 15 • A/D/Pu Storage: 180	**Total: 310** • Non-SNM component production: 20 • Administrative Support: 70 • Explosives Area: 120 • Buffer Area: 100

*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**
	Total: 55 • CPC: 40 • CUC: 15	**Total: 140** • Non-SNM component production: 20 • Administrative Support: 70 • Buffer Area: 50 acres

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

[31] 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.[32] 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*

Construction (acres)	**50**	
Operation (acres)	**Total Area: 35****	
	PIDAS	**Non-PIDAS**
	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.

[32] A CUC at Y-12 would not require construction of a new HEU storage facility because NNSA is already building a modern storage facility (the HEUMF) at that site.

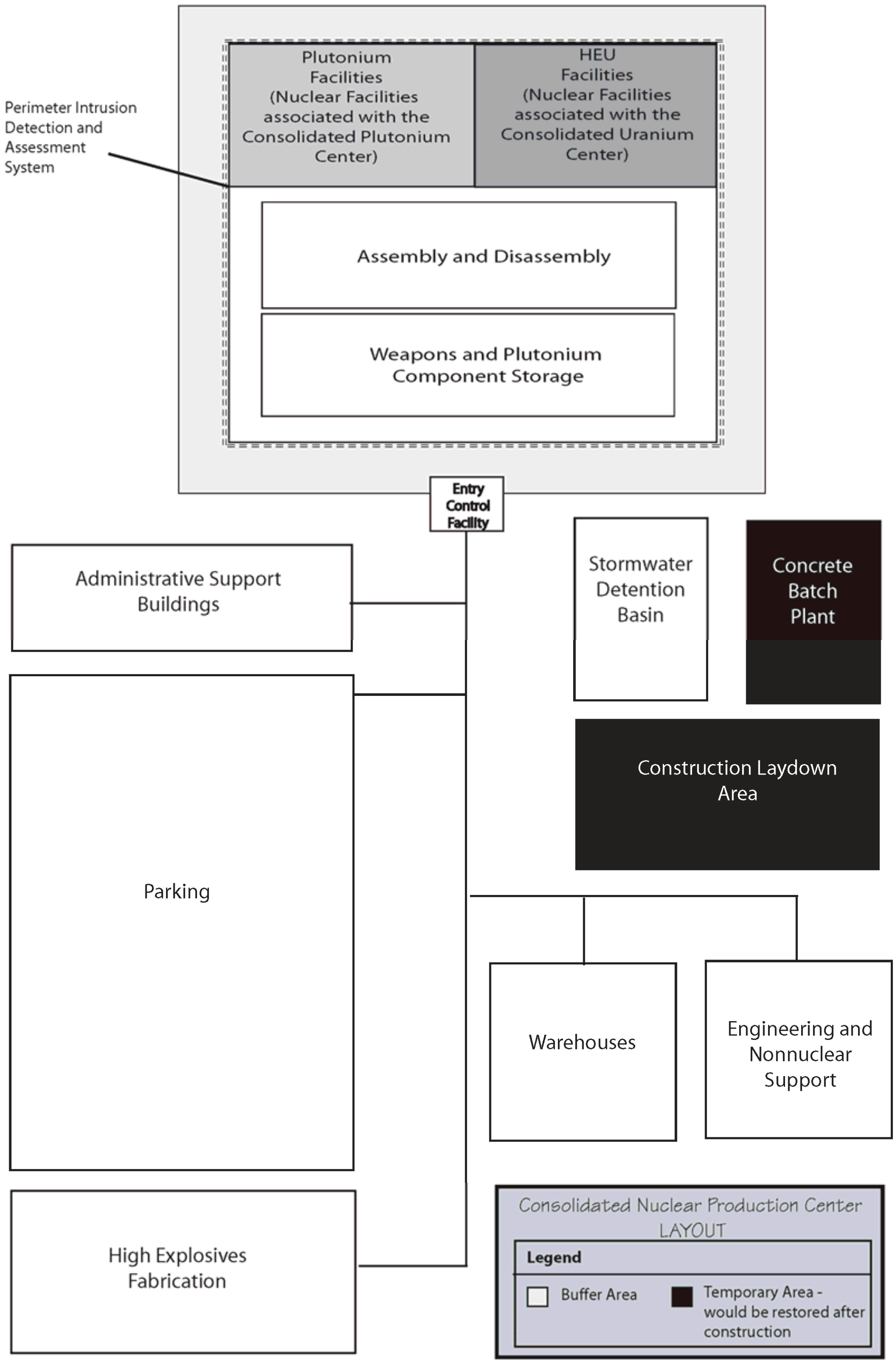


Figure S.3.5.1-1 — Generic Layout of the Consolidated Nuclear Production Center

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,[33] 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*

Construction (acres)	**300**	
Operation (acres)	**Total Area: 300****	
	PIDAS	**Non-PIDAS**
	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.

[33] 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.

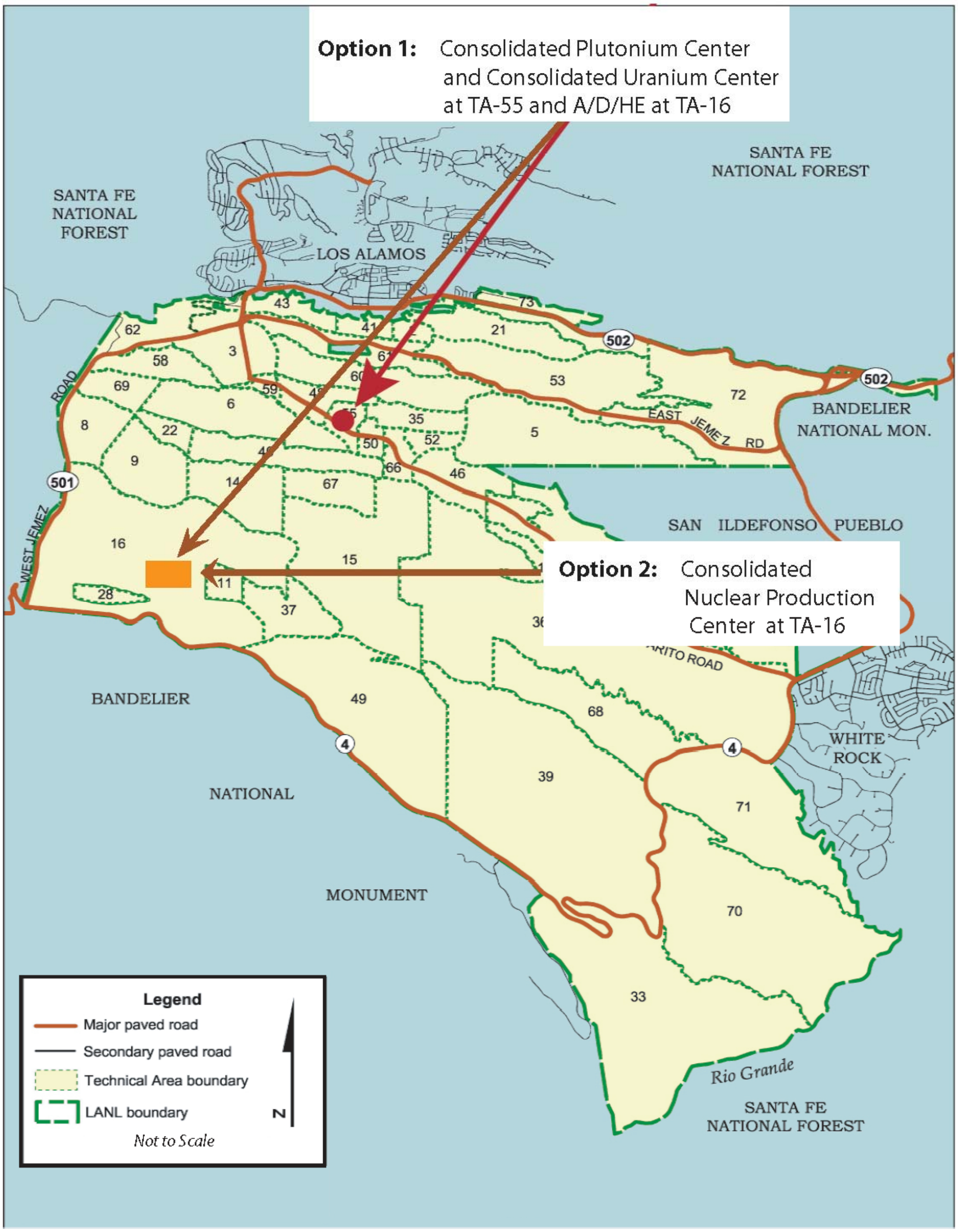


Figure S.3.5.1-2 — Los Alamos Consolidated Nuclear Production Center Reference Locations

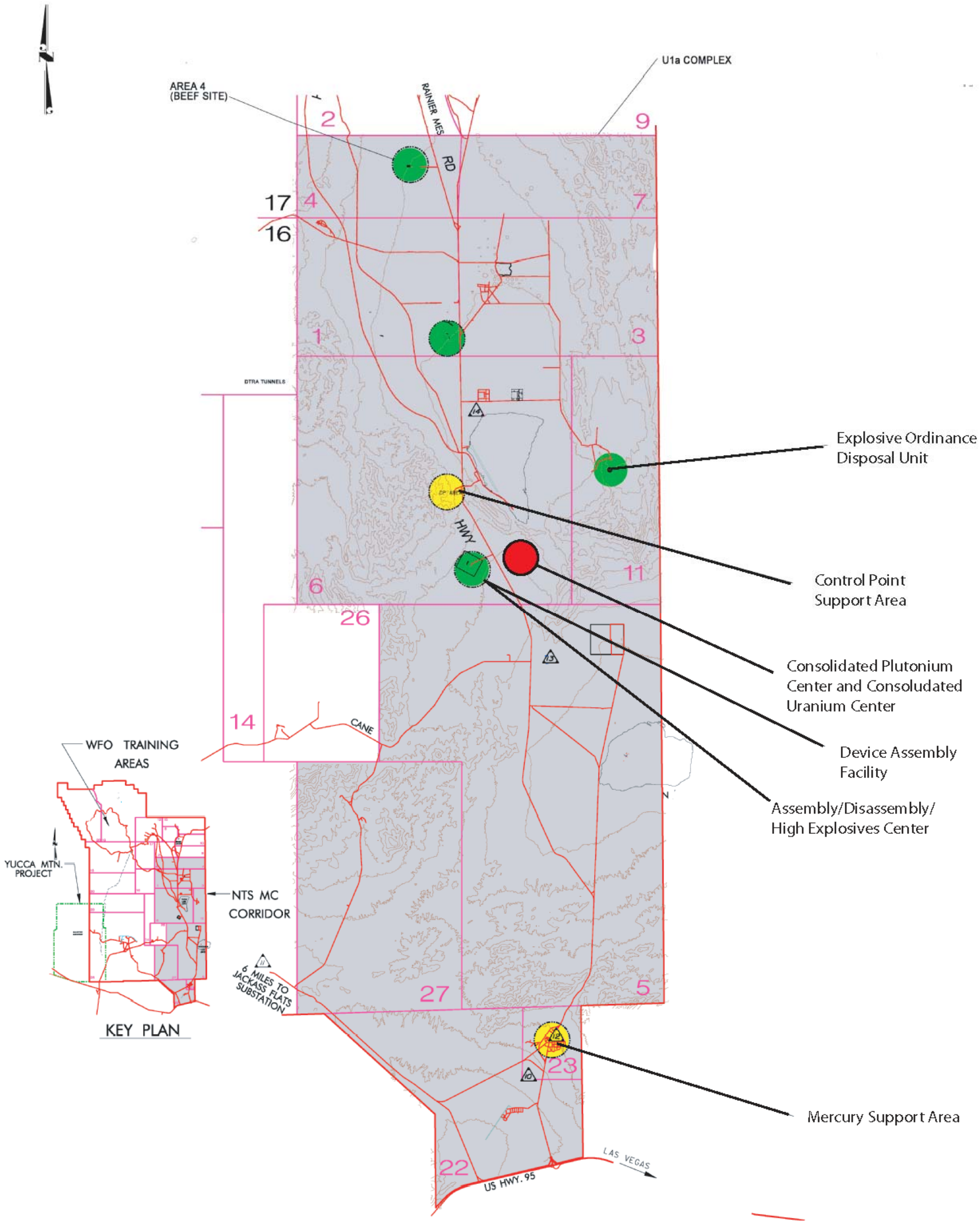


Figure S.3.5.1-3 — NTS Consolidated Nuclear Production Center Reference Locations

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.

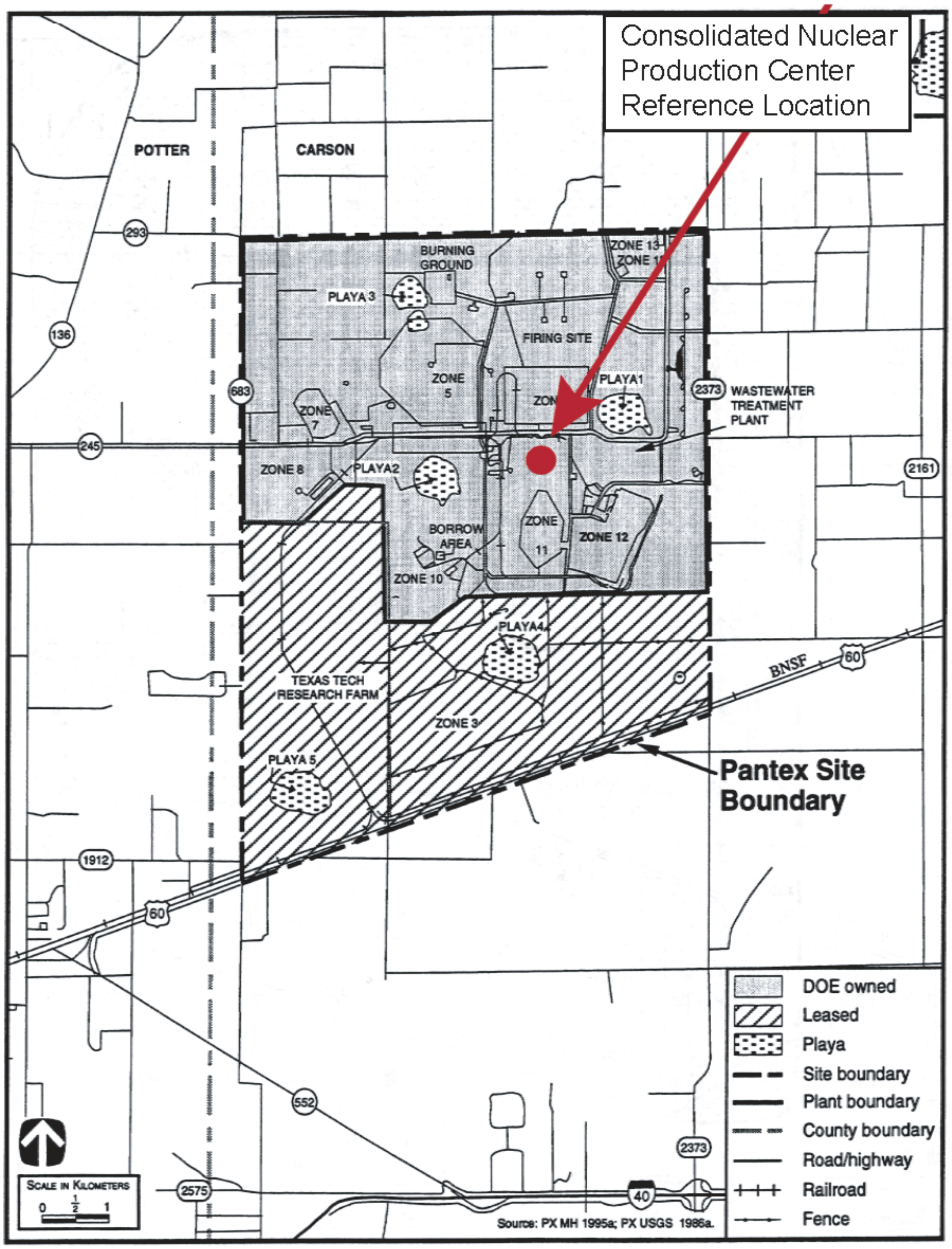


Figure S.3.5.1-4 — Pantex CNPC Reference Location

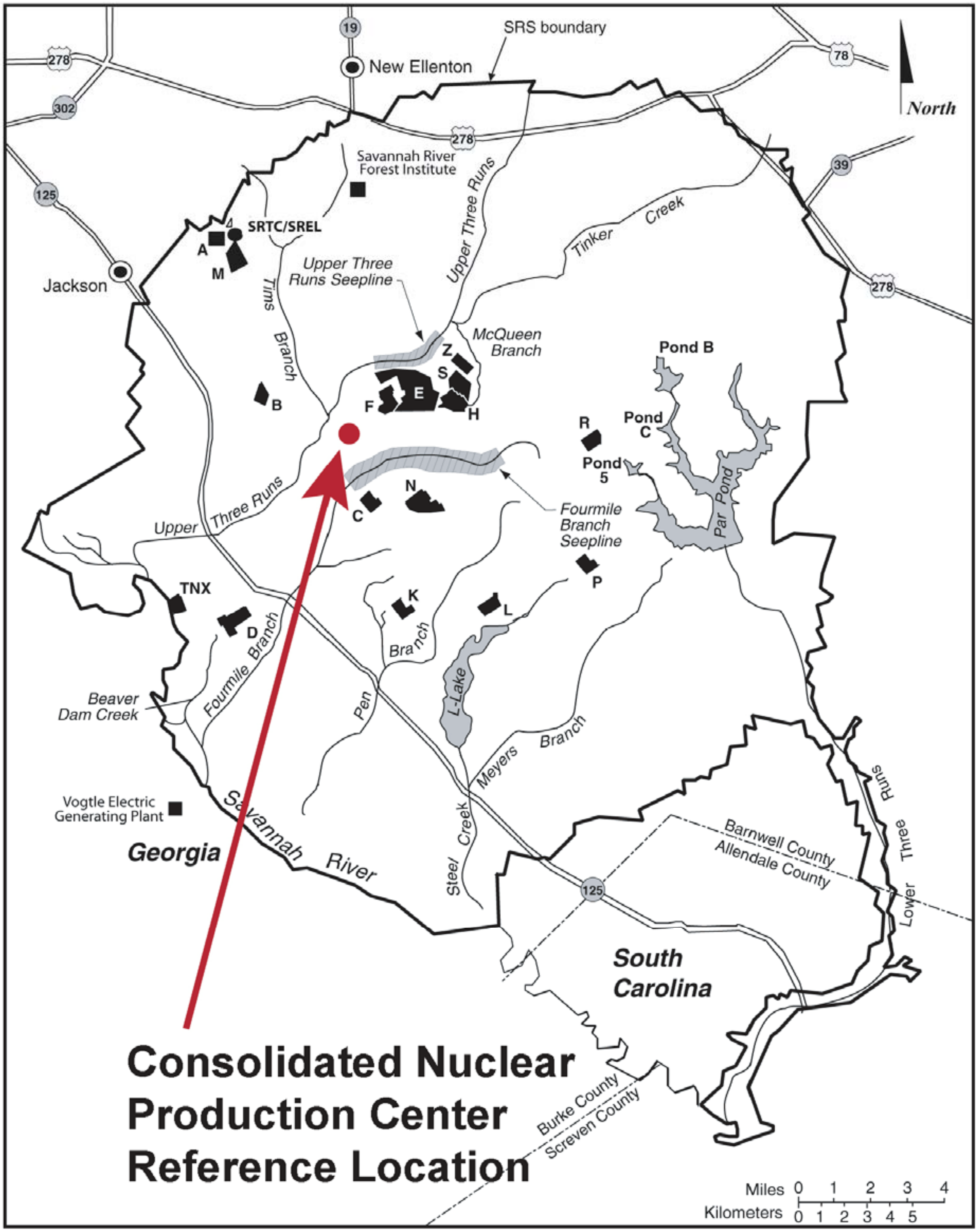


Figure S.3.5.1-5 — SRS CNPC Reference Location

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.

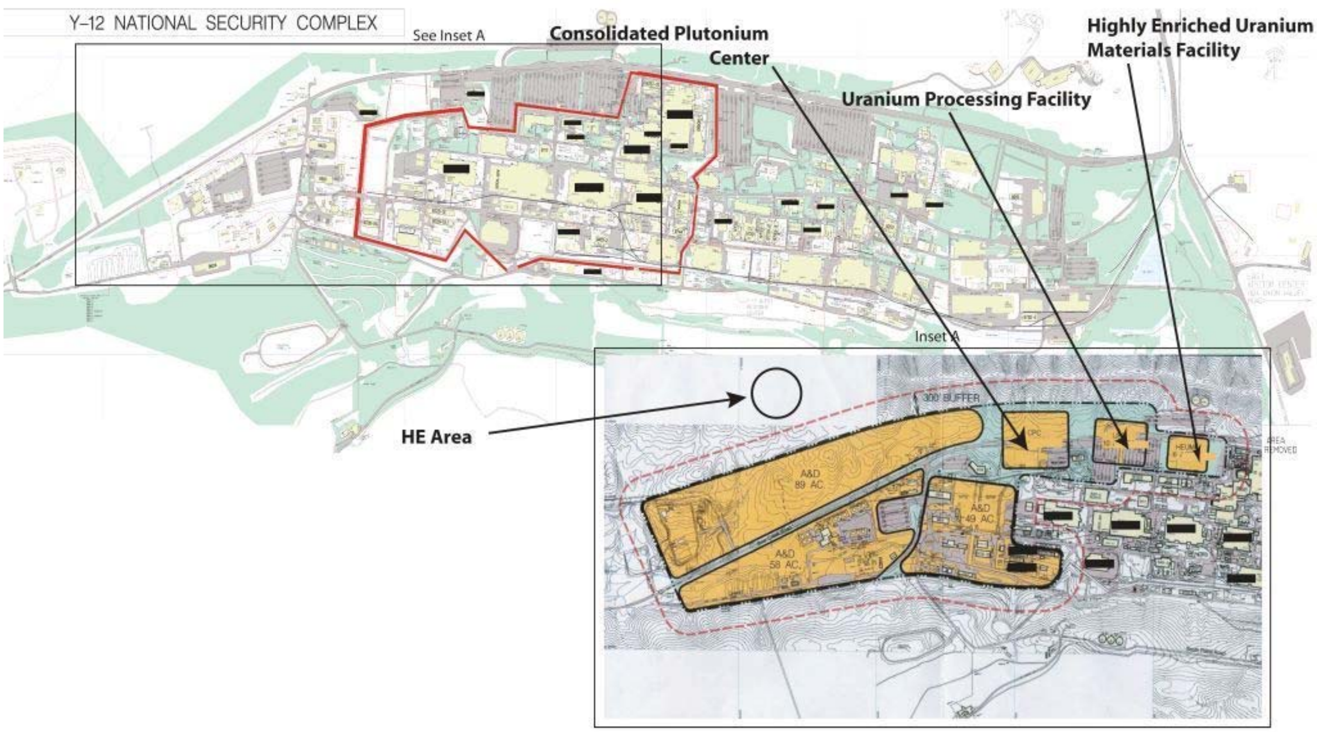


Figure S.3.5.1-6 — Y-12 CNPC Reference Location

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).

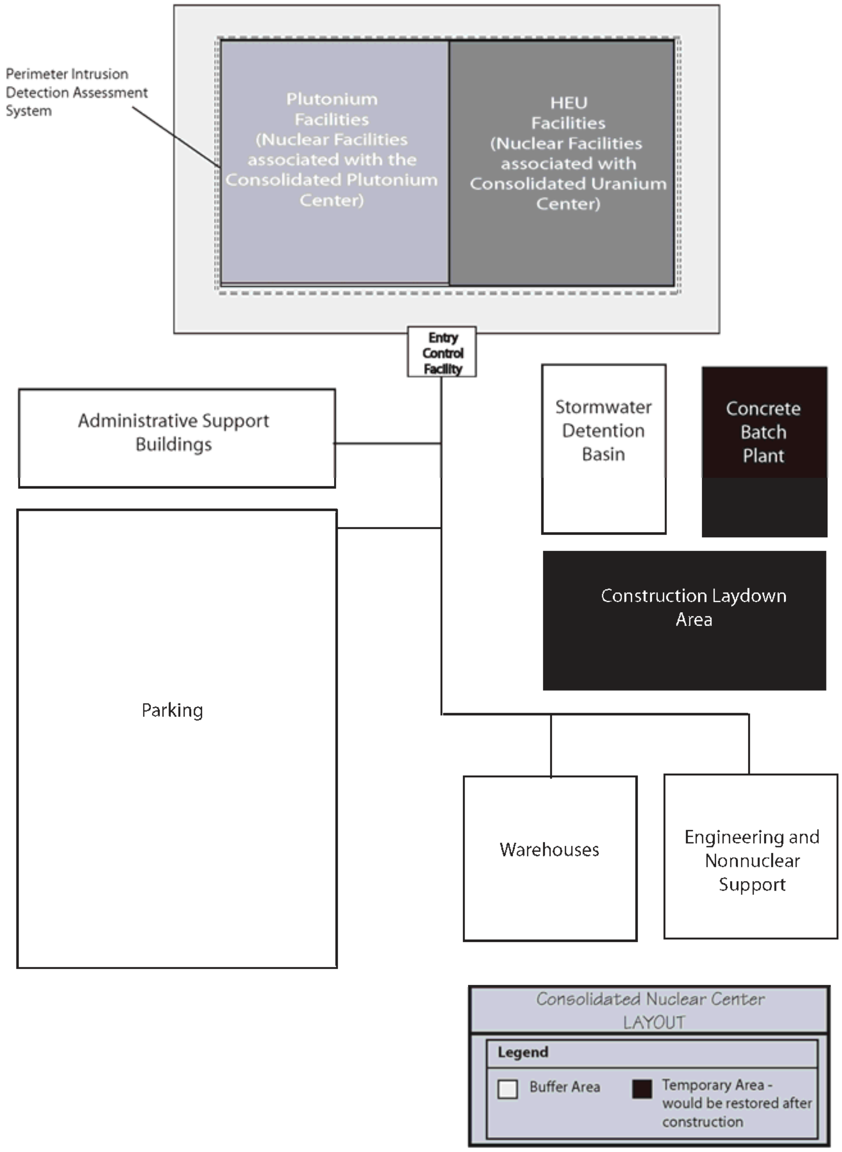


Figure S.3.5.2-1 — Generic Layout of the Consolidated Nuclear Center

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

In the 2001 Nuclear Posture Review (NPR), the President established the objective of achieving a credible nuclear deterrent with the lowest possible number of nuclear warheads consistent with our national security needs. An alternative in this SPEIS, referred to as the "Capability-Based Alternative," has been developed to analyze the potential environmental impacts associated with operation of a Complex that would support stockpiles smaller than required to meet anticipated future national security needs. For pit production, a capability-based alternative would be similar to the pit production capacity being assessed in the LANL SWEIS (DOE 2006a).

The objective of this alternative is to identify potential environmental impacts associated with operations to support a smaller stockpile. In addition, analysis of this alternative enhances NNSA's understanding of the infrastructure that might be appropriate if the U.S. continues to reduce stockpile levels. In this alternative, NNSA would maintain a basic manufacturing capability to produce nuclear weapons, as well as laboratory and experimental capabilities to support stockpile decisions. This 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;
- Reductions of production capacities at Pantex, Y-12, and SRS.

This SPEIS also assesses even further stockpile reductions beyond those that are the basis for the Capability-Based Alternative.

S.3.7 Category I/II SNM Consolidation Actions Common to All of the Programmatic Action Alternatives

Category I/II quantities of SNM are stored at seven NNSA sites: LLNL, LANL, NTS, Pantex, SNL/NM, SRS, 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 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[34]	49	SRS	10
SNM Required for Programmatic Missions	47	LANL[35]	9
Waste	4	WIPP	1

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, which NNSA decided to implement (70 FR 71491, November 29, 2005). That analysis includes consideration of transportation actions involving greater quantities of SNM and more shipments than are identified in Table S.3.7-1. As such, the transportation activities identified in Table S.3.7-1 are included in the existing No Action Alternative. 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

This SPEIS also assesses phasing out Category I/II SNM Operations from LLNL Superblock.

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

Under this alternative, NNSA would transfer more than 10,000 pits currently stored at Pantex in Zone 4 to Zone 12. The storage in Zone 4 is approximately 74,200 square feet. Because there is insufficient storage space in existing Zone 12 facilities, a new underground reinforced concrete storage facility would be required. Transfer of the pits from Zone 4 to Zone 12 would enable all Category I/II SNM at Pantex to be consolidated into a central location, close to the assembly, modification, and disassembly operations. This would reduce the area at Pantex requiring a high level of security.

[34] In 2007, DOE prepared a Supplement Analysis (SA) that evaluated the potential environmental impacts associated with the consolidation at SRS of surplus, non-pit, weapons-usable plutonium from Hanford, LLNL and LANL. The SA concluded that the potential environmental impacts associated with this consolidation would not be a significant change from the potential environmental impacts associated with the alternatives analyzed in previous NEPA reviews (DOE/EIS-0229-SA-4). 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 risk associated with disposition of all surplus plutonium from LLNL to SRS.

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

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[1]
- **Consolidate Tritium R&D at SRS** — move gas transfer system R&D support from LLNL[2] 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

[1]Tritium Operations at SNL/NM are primarily associated with the Neutron Generator Production Facility, which would be unaffected under all alternatives.
[2] 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 • **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 • **Reduce in Place** ➢ Consolidate LLNL hydrotesting to Contained Firing Facility (CFF) ➢ Consolidate LANL hydrotesting to Dual Axis Radiographic Hydrodynamic Test (DARHT) facility ➢ Consolidate NTS hydrotesting to 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**[1] ➢ 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 [1]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 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 must 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 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 29 buildings, the majority of which are small laboratories and office structures. The major facilities include the Combustion Research Facility (CRF), Building 910, Building 914, Building 916, Building 927, the Micro and Nano Technologies Laboratory (MANTL), and the Distributed Information Systems Laboratory (DISL). 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
• No Action — Maintain current non-nuclear component design and engineering work at SNL/CA with SNL personnel • Consolidate SNL/CA non-nuclear component design and engineering work to SNL/NM

S.3.14 Alternatives Considered But Eliminated from Detailed Study

NNSA has determined that some alternatives suggested during the scoping process do not merit further study for the reasons set forth below:

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 basic research, design, system engineering, development testing, reliability assessment, and certification of nuclear performance. In 1995, the President concluded that the continued vitality of all three nuclear weapons laboratories was essential to the nation's ability to fulfill the requirements of stockpile stewardship in the absence of underground nuclear testing (White House 1995). 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. This SPEIS assesses reasonable alternatives for maintaining a safe, secure, and reliable nuclear weapons stockpile. This includes a Capability-Based Alternative that would support a stockpile much smaller than currently planned and a qualitative discussion of how other alternatives might be adapted if the President directs further reductions in the size of the stockpile. Each of these alternatives would maintain weapons design, R&D, and manufacturing capabilities, because these are necessary to ensure the safety, security, and reliability of the nuclear weapons stockpile. These alternatives are consistent with the Nuclear Nonproliferation Treaty. With respect to not designing or building new nuclear weapons, this SPEIS does not propose to design or build new nuclear weapons. Decisions to design or build new weapons are made by the President and the Congress.

Curatorship Alternative. 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. 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 CUC/CNC/CNPC Alternative. Because this SPEIS includes an analysis of an alternative that would produce up to 80 pits per year (the 50/80 Alternative), DOE also considered whether there should be an alternative at this production level for secondary components (CUC) and the A/D/HE Center. 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,[36] 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 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.

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 host location for a CPC. Sites that do not maintain Category I/II SNM were eliminated from consideration, as were sites that did not conduct major NNSA program activities. Other DOE 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

[36] Plutonium Processing Facility Reduced Capacity Study, NNSA, September 2007.

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 highly-enriched uranium instead) for the sole reason of not building a long-term, assured 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.

NNSA Flight Testing. In addition to the White Sands Missile Range (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.

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 the Reliable Replacement Warhead (RRW)

The current status of the RRW 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 the 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 first RRW is being considered as a possible replacement for the

Navy's W76 Trident warhead starting as early as the 2014 timeframe. The first RRW would not have a different military requirement than the W76 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 Effect on the Proposed Actions and Alternatives*

Consideration of 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 the RRW. However, the RRW would not affect the SNM consolidation efforts or the action alternatives related to restructuring SNM facilities, nor the action alternatives related to the restructure 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 *Potential Effects of the RRW on Complex Transformation*

One of the objectives of the RRW is to simplify component and subassembly fabrication and warhead assembly/disassembly processes. In general, simplifying the design to one with fewer, less complex parts would reduce costly 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 positive benefits on the Complex of a design that is easier to produce, the proposed reduction of hazardous and problematic materials from RRW designs has the potential to 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 has the potential to reduce the cost of normal operations and severity of accidents.

S.3.15.3 *RRW's 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, Canned subassemblies (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 there would be no major difference in accident risks and consequences. For the DCE and CCE Alternatives, the location of any new facilities could impact the risks and consequences associated with accidents. In general, if missions were conducted at 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.

A draft classified appendix to this SPEIS has been prepared 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, the NNSA strategy for the mitigation of environmental impacts resulting from extreme events, including intentional destructive acts or terrorism, has three distinct components: (1) prevent or deter terrorists from making 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 malevolent, terrorist, or intentional destructive acts, impacts may be similar to or would exceed accident impact analyses prepared for the SPEIS. These data will provide NNSA with information upon which to base, in part, decisions regarding transformation of the Complex. The draft classified appendix evaluates several intentional destructive act scenarios for alternatives at the following sites (LANL [both at TA-16 and TA-55], LLNL, NTS, SRS, Pantex, and Y-12) and calculates consequences to the noninvolved worker, maximally exposed individual, and population in terms of radiation dose and LCFs. Although the results of the analyses cannot be disclosed in this unclassified SPEIS, the following general conclusion can be made: 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 inherent security features included in a new facility.

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. However, operation of a CNPC would have the potential to use approximately 96 percent of the peak power capacity that is available.

At NTS, the existing infrastructure would be adequate to support all construction requirements. 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. 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 (CNC or 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 its preferred alternative to meet its purpose and need, if one exists, in a Draft EIS (40 CFR 1502.14(e)). At this time, NNSA has identified the preferred alternatives as described below. This is based on the consideration of environmental impacts described in this Draft SPEIS, as well as consideration of other factors such as mission and infrastructure compatibility, economic analyses, safety, safeguards and security, and workforce training and retention.

Restructuring SNM Facilities Preferred Alternatives

Pursue Distributed Centers of Excellence as follows:

- Plutonium Manufacturing and R&D: Los Alamos (50/80 Alternative) would provide up to 80 pits per year enabled by construction and operation of the Chemistry and Metallurgy Research Replacement - Nuclear Facility (CMRR-NF). Other national security actinide needs and missions would 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 providing component and canned subassembly production, surveillance and dismantlement. Independent of this SPEIS, NNSA is completing construction of the HEUMF and consolidating HEU storage in that facility; and can proceed with the preliminary design of a UPF that could be located at any of the sites under consideration in this SPEIS.

- Assembly/Disassembly/High Explosives Production and Manufacturing: Pantex would remain the Assembly/Disassembly/High Explosives production and manufacturing center. Consolidate non-destructive surveillance operations at Pantex.

- Consolidation of Category I/II SNM: Phase-out Category I/II operations at LLNL Superblock by the end of 2012. Consolidate Category I/II SNM at Pantex within Zone 12, and close Zone 4.

Restructuring R&D and Testing Facilities Preferred Alternatives

HE R&D. Reduce footprint of NNSA weapons activity HE production and R&D; reduce number of firing sites as well. Use of energetic materials for environmental testing (e.g., acceleration or sled tracks, shock loading, or in explosive tubes) is not included in HE R&D. Consolidate weapons HE R&D and testing at the following locations by 2010.

- Pantex would remain the HE production (formulation, processing, and testing) and machining center. All HE production and machining to support nuclear explosive package (NEP) development is performed at Pantex. HE experiments up to 22 kg HE could remain at Pantex;

- NTS would remain the R&D testing center for large quantities of HE (greater than 10 kg);
- LLNL would be the HE R&D center for formulation, processing, and testing (less than 10 kg) HE at the High Explosives Applications Facility (HEAF);
- SNL/NM would remain the energetic devices R&D center (less than 1 kg of HE) at the existing Explosives Test Facility (ETF); and
- LANL would produce HE detonators and conduct contained HE R&D.

Maintain one open-burn/open detonation area at each site for safety and disposal purposes.

Tritium R&D. 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 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. Move bulk quantities of tritium from LANL to SRS by 2009. Remove tritium materials above the 30 gram level from the Weapons Engineering Tritium Facility (WETF) at LANL by 2012.

NNSA Flight Test Operations. Cease NNSA operation of TTR in approximately 2009 and conduct flight testing at a DoD facility. No Category I/II SNM will be used in future flight tests.

Hydrodynamic Testing. Cease open-air hydrotesting at LANL and LLNL in 2009, and conduct future open-air hydrotesting at NTS. Consolidate in-place LANL and LLNL hydrotesting facilities. Close CFF at LLNL in approximately 2015 which could enable transfer or closure of Site 300. As the LANL Dual Axis Radiographic Hydrodynamic Test (DARHT) facility approaches end of life in approximately 2025, plan for a next generation facility at the NTS.

Major Environmental Test Facilities. Consolidate major environmental testing at SNL/NM and conduct infrequent operations requiring Category I/II SNM in security campaign mode. Close LANL and LLNL major environmental testing facilities by 2010 (except those in LLNL Building 334). Move environmental testing of nuclear explosive packages currently performed in LLNL Building 334 to Pantex by 2012. As SNL/NM facilities used for infrequent Category I/II SNM testing (Annular Core Research Reactor and Aerial Cable Facility) reach the end of their life, NNSA would evaluate building replacement facilities at NTS.

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	
Land Use							
LANL	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.	*Greenfield CPC*: Potential disturbance of 140 acres for construction and 110 acres for operation. *Upgrade*: Potential disturbance of 13 acres for construction and 6.5 acres for operation. *50/80*: 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.
NTS	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.
Pantex	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	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.
Visual Resources							
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.
Pantex	Current and planned activities	Short-term, temporary visual	Construction activities	No A/D/HE Center is	Pantex performs the	New facilities would be	Planned activities

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.	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.	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.	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.	obstructed from off-site view. Change would be consistent with currently developed areas. No change to VRM Classification.	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.	UPF could disturb approximately 35 acres at Y-12. 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.
Site Infrastructure							
LANL	Current and planned activities would continue as required resulting in no additional impacts. The current power pool peak power capacity is 130 megawatts-electric [MWe]). The available site capacity is 43 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 26% 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 43% of the peak power capacity that is available.	Operation of A/D/HE Center would have the potential to use approximately 28% of the peak power capacity that is available.	Although the CNC operations would not exceed LANL electrical power capacity, the total load could approach approximately 70% of the peak power capacity that is available.	Operation of a CNPC would have the potential to use approximately 96% 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 expected to continue using	Existing infrastructure would be adequate to support construction and operation requirements. Power requirements would be 64%	Existing infrastructure would be adequate to support construction requirements. Power requirements would be	Existing infrastructure would be adequate to support construction. . Power requirements would be 69% of	Power requirements would be 288% of available site electrical energy capacity. For operations, NTS would need to procure additional	Power requirements would be 357% of available site electrical energy capacity. For operations, NTS would need to procure additional	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	
	101,377 MWh of electricity per year. Electrical usage is below current site capacity.	of available site electrical energy capacity.	224% of available site electrical energy capacity. For operations, NTS would need to procure additional power.	available site electrical energy capacity.	power.	power.	
Pantex	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.
SRS	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.
Y-12	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.
Air Quality							
LANL	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 LANL's air emission sources	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 than 5% of baseline for most	Construction activities would create temporary increased in air quality impacts similar to CPC. For operations, CUC contribution to non-radiological emissions would not cause any standard or guideline to be exceeded.	Construction activities would create temporary increase in air quality impacts that could result in exceeding PM_{10} regulatory limits. Operations could have the potential to exceed the 24-hour standard for nitrogen	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	
	at maximum capacity, as described in the Title V permit application, would not exceed any state or Federal ambient air quality standards.	pollutants. The greatest increase would occur for total suspended particulates (TSP), which could increase by approximately 28%.		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 non-radiological 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 suppression), and the 8-hour	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	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	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	
		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.	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.	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.			
Water Resources							
LANL	Current and planned activities would continue as required resulting in no additional impacts. Approximately 359 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 22%. However, LANL water use would remain within water rights.	For construction and operation, the increase in groundwater consumption would be approximately 29%. LANL water use would remain within water rights.	For construction and operation, annual groundwater use would increase by approximately 36%. LANL water use would be within water rights.	Annual groundwater use would increase by approximately 52%. LANL groundwater use would exceed water rights by approximately 2 million gallons/year.	Annual groundwater use would increase by approximately 110%. LANL groundwater use would exceed water rights by approximately 212 million gallons/year.	Same a No Action Alternative.
NTS	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.
Pantex	Current and planned activities would continue as required with an expected demand for water of 130,000 million gallons per year. Pantex obtains its water from the	For construction and operation, annual groundwater use would increase by 68% compared to existing use. No impact on groundwater availability or	For construction and operation, annual groundwater use would increase by approximately 81% compared to existing use. No impact on	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.	CNPC operations would increase groundwater use by approximately 150% compared to existing use. CNPC would require total of approximately 315.5	Planned activities would continue as required to support smaller stockpile requirements resulting in no

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	
	City of Amarillo, which obtains water from the Ogallala aquifer.	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.	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.			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.	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 6% 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.
Biological Resources							
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 heavily industrialized	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	
		portions that do not contain habitat sufficient to support biologically diverse species mix.					
Pantex	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.
SRS	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 biological diverse species mix.	Same as CNC.	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 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 habitat sufficient to support	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	
		biologically diverse species mix.					
Socioeconomics							
LANL	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.	*Greenfield CPC:* 850 workers during the peak year of construction. Total of 1,751 jobs. 1,780 operational workers, total of 3,667 jobs *Upgrade 125:* 300 workers during peak year of construction. Total of 618 jobs. 1,780 operational workers, total of 3,667 jobs. *50/80:* 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.
LANL Plutonium Phaseout: 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.							
NTS	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 1,751 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,678 jobs. 935 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	525 jobs during peak year of construction. Total 1,025 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.
Pantex	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 1,579 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,414 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, resulting in a loss of	Reduced operations would reduce the workforce from 1,644 to 1,230. This workforce, which currently represents approximately

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	
						approximately 6,500 jobs.	1.6% of area employment, would fall to 1.2%. No major impact would occur.
SRS	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 1,460 jobs. 1,780 operational workers. No appreciable changes to regional socioeconomic characteristics expected.	1,300 workers during the peak year of construction. Total of 2,233 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. 1,285 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.	Reduced operations would reduce the workforce by approximately 25 workers. This reduction would be inconsequential relative to the total site workforce.
Y-12	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.
Environmental Justice							
LANL	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.
NTS	Current and planned activities would continue as required	Minority population: 50 percent of ROI	Construction activities would not result in any	Same as CUC.	Operation activities would not result in any	Same as CNC.	NTS would be unaffected by the

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 no additional impacts.	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.	disproportionately high or adverse effects on minority or low-income populations.		disproportionately high or adverse effects on minority or low-income populations.		Capability-Based Alternative.
Pantex	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: 33.1 percent of ROI Low-Income population: 13 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.
SRS	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.
Y-12	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.
Health and Safety							
LANL	Current and planned activities would continue as required resulting in no additional impacts. SRS operations expected to cause total dose to the offsite MEI of 1.7	*Greenfield CPC:* Potential worker fatalities during construction: 0.6 *Upgrade:* 0.2 *50/80:* 0.1	Potential worker fatalities during construction: 0.9. Collective dose to population during operations: 0.376 person-	Potential fatalities during construction: 2.6. Collective dose to population during operations: 0.003 person-	Collective dose to population during operations: 0.376 person-rem; 2.3 × 10^{-4} LCFs. MEI dose: 0.046 mrem;	Collective dose to population during operations: 0.379 person-rem; 2.3 × 10^{-4} LCFs. MEI dose: 0.046 mrem;	Collective dose to population during operations: 2.5 × 10^{-8} person-rem ; 1 × 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	
	mrem/yr. Worker dose from increased pit production at TA-55 would increase from 90 person-rem per year to 220 person-rem per year	*Greenfield CPC and Upgrade:* Collective dose to population during operations: 5.9×10^{-7} person-rem; 4×10^{-10} latent cancer fatalities (LCFs) MEI dose: 3.6×10^{-9} mrem; 2.2×10^{-15} LCFs annually. Worker dose: 333 person-rem; 0.20 LCFs annually. *50/80:* Collective dose to population during operations: 2.5 x 10^{-8} person-rem; 1 x 10^{-11} LCFs MEI dose: 3.0×10^{-9}mrem; 1.8×10^{-15} LCFs annually Worker dose: 154 person-rem; 0.09 LCFs annually.	rem; 2.3×10^{-4} LCFs annually MEI dose: 0.046 mrem; 2.8 $\times 10^{-8}$ LCFs annually Worker dose: 11 person-rem; 0.006 LCFs annually.	rem; 1.8×10^{-6} LCFs annually MEI dose: 3.52×10^{-4} mrem; 2.1×10^{-7} LCFs annually A/D/HE Center worker dose: 42 person-rem; 0.24 LCFs annually.	2.8×10^{-5} LCFs annually Worker dose: 344 person-rem; 0.21 LCFs annually.	2.86×10^{-5} LCFs annually Worker dose: 386 person-rem; 0.23 LCFs annually.	Worker dose from increased pit production at TA-55 would increase from 90 person-rem per year to 220 person-rem per year
LANL Plutonium Phaseout: 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.							
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.	Potential worker fatalities during construction: 0.7. Collective dose to population during operations: 2.7×10^{-8} person-rem; 2×10^{-11} LCFs. MEI dose: 1.6×10^{-9} mrem; 1×10^{-15} LCFs annually. Worker dose: 333 person-rem; 0.20 LCFs annually.	Potential worker fatalities during construction: 0.9. Collective dose to population during operations: 1.3×10^{-2} person-rem; 7.80×10^{-6} LCFs. MEI dose: 4.06×10^{-3} mrem; 2.44×10^{-6} LCFs annually. Worker dose: 11 person-rem; 0.006 LCFs annually.	Potential worker fatalities during construction: 0.2. Collective dose to population during operations: 9.79×10^{-5} person-rem; 5.8×10^{-8} LCFs annually MEI dose: 3.12×10^{-5} mrem; 1.8×10^{-8} LCFs annually Worker dose: 42 person-rem; 0.24 LCFs annually.	Collective dose to population during operations: 1.3×10^{-2} person-rem; 7.8×10^{-6} LCFs. MEI dose: 4.06×10^{-3} mrem; 2.5×10^{-9} LCFs annually. Worker dose: 344 person-rem; 0.21 LCFs annually.	Collective dose to population during operations: 1.3×10^{-2} person-rem; 7.8×10^{-6} LCFs. MEI dose: 4.09×10^{-3} mrem; 2.5×10^{-9} LCFs annually. Worker dose: 386 person-rem; 0.23 LCFs annually.	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 result in a dose to the MEI of 4.28 x 10^{-9} person-rem per year.	Potential worker fatalities during construction: 0.7. Collective dose to population during operations: 1.2 × 10^{-7} person-rem; 7.2 × 10^{-11} LCFs. MEI dose: 1.7 × 10^{-8} mrem; 1×10^{-14} LCFs annually. Worker dose: 333 person-rem; 0.20 LCFs annually.	Potential worker fatalities during construction: 0.9 Collective dose to population during operations: 0.138 person-rem; 8.3 × 10^{-5} LCFs. MEI dose: 0.019 mrem; 1.1 × 10^{-8} LCFs annually. Worker dose: 11 person-rem; 0.006 LCFs annually.	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.	Collective dose to population during operations: 0.138 person-rem; 8.3 × 10^{-5} LCFs; MEI dose: 0.019 mrem; 1.1 × 10^{-5} LCFs annually. Worker dose: 386 person-rem; 0.23 LCFs annually.	Reduced operations 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 2.6×10^{-2} to 2.0×10^{-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: 5.9 × 10^{-7} person-rem; 4 × 10^{-10} LCFs. MEI dose: 3.6 × 10^{-9}mrem; 2.2 × 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: 0.138 person-rem; 8.3 × 10^{-5} LCFs. MEI dose: 3.36×10^{-3} mrem; 2.02×10^{-6} LCFs annually. Worker dose: 11 person-rem; 0.006 LCFs annually.	Potential worker fatalities during construction: 2.6. Collective dose to population during operations: 3.19×10^{-3} person-rem; 1.9 × 10^{-6} LCFs. MEI dose: 2.52×10^{-5} mrem; 1.5 × 10^{-8} LCFs annually. Worker dose: 42 person-rem; 0.24 LCFs annually.	Collective dose to population during operations: 0.426 person-rem; 2.6 × 10^{-4} LCFs. MEI dose: 3.36×10^{-3} mrem; 2.02×10^{-6} LCFs annually. Worker dose: 344 person-rem; 0.21 LCFs annually	Collective dose to population during operations: 0.429 person-rem; 2.6 × 10^{-4} LCFs . MEI dose: 3.39×10^{-3} mrem; 2.1×10^{-6} 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 2.5×10^{-3} to 1.9×10^{-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: 1.2 × 10^{-7} person-rem; 7.2 × 10^{-11} LCFs. MEI dose: 1.7 × 10^{-8} mrem; 1 × 10^{-11} LCFs annually.	Potential worker fatalities during construction of UPF: 0.7. Collective dose to population during UPF operations: 10.8 person-rem; 6.5 × 10^{-3} LCFs. MEI dose: 0.8 mrem; 4.8 × 10^{-4} LCFs annually.	Potential worker fatalities during construction: 0.2. Collective dose to population during A/D/HE Center operations: 0.032 person-rem; 1.9×10^{-5} LCFs. MEI dose: 3.75×10^{-3} mrem; 2.25×10^{-6} LCFs annually	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: 10.8 person-rem ; 6.5 × 10^{-3} LCFs. MEI dose: 0.8 mrem; 4.8 × 10^{-4} 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

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	
		Worker dose: 333 person-rem; 0.20 LCFs annually.	UPF worker dose: 12.6 person-rem; 0.008 LCFs annually.	Worker dose: 42 person-rem; 0.24 LCFs annually.			would be reduced from 1.9×10^{-2} to 1.1×10^{-2}.
Facility Accidents							
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 9×10^{-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 0.926 rem. Statistically, MEI would have 1 chance in 1,800 of 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 6×10^{-7}, or less than one in a million. For the population, the LCF risk would be 7.2×10^{-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 9×10^{-6}, or approximately 1 in 100,000. For the population, the LCF risk would be 3×10^{-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.
LANL Plutonium Phaseout: 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.							
NTS	Current and planned activities would continue as required resulting in no additional impacts. The maximum reasonably foreseeable accident at the NTS would be	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	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	Accident with the highest consequences to the offsite population is the explosive driven plutonium and tritium dispersal from an internal	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	
	a non-nuclear explosion involving high explosives in a storage bunker, which has al 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.	could result from such an 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). 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 6×10^{-6}, or approximately 1 in 150,000. For the population, the LCF risk would be approximately 2×10^{-3}, meaning that an LCF would statistically occur once every 400 years in the population.	from such an accident. An offsite MEI would receive a maximum dose of 0.0037 rem. Statistically, the LCF risk to the MEI would be approximately $2x10^{-6}$, or about 1 in half a million. 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 $2x10^{-9}$, or about 1 in half a billion. For the population, the LCF risk would be approximately $9x10^{-7}$, or about 1 in a million.	event. Approximately 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 2×10^{-4} chance of developing a LCF (i.e., about 1 chance in 57,000 of an LCF). When probabilities are taken into account for this accident, the LCF risk to the MEI would be approximately $2x10^{-8}$, or less than 1 chance in a million. For the population, the LCF risk would be approximately $7x10^{-6}$, or approximately once every 150,000 years.			
Pantex	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.	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). . 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	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. 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	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). When probabilities are taken into account for this accident, the LCF risk to	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	
		$8x10^{-5}$, or approximately one in 10,000. For the population, the LCF risk would be $3x10^{-2}$, meaning that an LCF would statistically occur once every 31 years in the population.	LCF risk to the MEI would be approximately $3x10^{-8}$, or approximately 1 in 33 million. For the population, the LCF risk would be $1x10^{-5}$, or approximately 1 in 100,000.	the MEI would be $2x10^{-7}$, or approximately 1 in 5 million. For the population, the LCF risk would be approximately $9x10^{-5}$, or approximately 1 in 10,000. **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.**			
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.	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. 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 $1×0^{-5}$, or approximately 1 in 100,000. For the population, the LCF risk would be approximately $6×10^{-2}$, meaning that an LCF would statistically occur once every 18 years in the population.	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 $7x10^{-6}$ chance of developing a LCF, or about 1 in 150,000. When probabilities are taken into account, the accident with the highest risk is the design-basis fire for HEU storage. For this accident, the maximum LCF risk to the MEI would be $4x10^{-9}$, or approximately 1 in 250 million. For the population, the LCF risk would be $2x10^{-5}$, or approximately 1 in 50,000.	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. When probabilities are taken into account for this accident, the LCF risk to the MEI would be $3x10^{-8}$, or approximately 1 in 33 million. For the population, the LCF risk would be $1x10^{-4}$, or approximately 1 in 6,500.	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.	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. 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 $2x10^{-3}$, 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.	Accident with the highest consequences to the offsite population is the aircraft crash into the EU facilities. Approximately 0.4 LCFs in the offsite population could result from such an accident. An offsite MEI would receive a maximum dose of 0.3 rem. Statistically, this MEI would have a $2x10^{-4}$ chance of developing a LCF, or about 1 in 5,000. When probabilities are taken into account, the accident with the highest risk is the design-basis fire for HEU storage. For this accident, the maximum LCF risk to the MEI would be $5x10^{-7}$, or about 1 in 2 million. For the population, the LCF risk would be $4x10^{-4}$, or about 1 in 2,500. **Note: the accidents described above are for the UPF. No CUC is proposed at Y-12 because Y-12 currently conducts this mission.**	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. When probabilities are taken into account for this accident, the LCF risk to the MEI would be $7x10^{-6}$, or about 1 in 150,000. For the population, the LCF risk would be $3x10^{-3}$, or about 1 in 350.	Y-12 performs the CUC mission, therefore the impact of a CNC at this site is identical to the CPC impact.	See CPC and UPF 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.
Waste Management							
LANL	Current and planned activities would continue as required resulting in no additional impacts.	**Construction (Greenfield/Upgrade/50/80 Upgrade)** TRU solid (yd^3): 0/200/0 LLW solid (yd^3): 0/200/0	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous (tons): 6	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 9,900 Mixed TRU solid (yd^3): 0 Hazardous (tons): 0		TRU solid (yd^3): 850 LLW liquid (gal):8,925 LLW solid (yd^3): 11,640 Mixed LLW liquid (gal): 3,622.4	Same a No Action 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**	
	Wastes in 2005 were as follows: LLW (yd^3): 7,080 Mixed LLW (yd^3): 90 TRU Waste(yd^3): 100 Mixed TRU(yd^3): 130 Hazardous (lbs.): 43,400 Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.	Hazardous liquid (gal): 6.5/4/4 **Operation (Greenfield/Upgrade/50/80 Upgrade)** TRU solid (yd^3): 850/850/575 Mixed TRU(yd^3):310/310/2.6 LLW solid (yd^3): 3,500/3,500/1,850 LLW liq (yd^3): 0/0/19.5 Non-hazardous solid (tons): 3.6/3.6/265 Non-hazardous liquid (gal): 69,500/69,500/16,000	Non-hazardous solid (tons): 1,000 **Operation** TRU solid (yd^3): 0 LLW liquid (yd^3):3,515 LLW solid (yd^3): 8,100 Mixed LLW liquid (gal): 3,616 Mixed LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous solid (tons): 15 Hazardous liquid (gal): 0 Non-hazardous solid (yd^3): 7,500 Non-hazardous liquid (gal): 50,000	Non-hazardous solid (tons): 7,100 Non-hazardous liquid (gal): 40,000 **Operation** Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd^3): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (yd^3): 1,350 Hazardous waste liquid (gal): 8,850 Non-hazardous Solid Waste (yd^3): 15,000 Non-hazardous Liquid Waste (gal):46,000		Mixed LLW solid (yd^3): 72.3 Mixed TRU solid (yd^3): 310 Hazardous solid (tons): 1,368.6 Hazardous liquid (gal): 8,850.5 Non-hazardous solid (tons): 29,900 Non-hazardous liquid (gal): 165,500	
NTS	Current and planned activities would continue as required resulting in no additional impacts. Wastes from 2001 LLW (yd^3): 0 Hazardous (tons): 4.86 Sanitary (tons): 4,550 Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 0 Mixed TRU solid (yd^3): 0 Hazardous (tons): 7 Non-hazardous solid (yd^3): 10,900 Non-hazardous liquid (gal): 56,000 **Operation** TRU solid (yd^3): 950 LLW liquid (gal): 0 LLW solid (yd^3): 3,900 Mixed LLW liquid (gal): 0.4 Mixed LLW solid (yd^3): 2.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd^3): 8,100 Non-hazardous liquid (gal): 75,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000 **Operation** TRU solid (yd^3): 0 LLW liquid (gal):3,515 LLW solid (yd^3): 8,100 Mixed LLW liquid (gal): 3,616 Mixed LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous solid (tons): 15 Hazardous liquid (tons): 0 Non-hazardous solid (yd^3): 7,500 Non-hazardous liquid (gal): 50,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 9,000 Mixed TRU solid (yd^3): 0 Hazardous (tons): 0 Non-hazardous solid (yd^3): 6,400 Non-hazardous liquid (gal): 40,000 **Operation** Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd^3): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd^3): 12,000 Non-hazardous Liquid Waste (gal):46,000	TRU solid (yd^3): 950 LLW liquid (gal):3,515 LLW solid (yd^3): 12,000 Mixed LLW liquid (gal): 3,616.4 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19 Hazardous liquid (gal): 0.6 Non-hazardous solid (tons): 15,600 Non-hazardous liquid (tons): 125,000	TRU solid (yd^3): 950 LLW liquid (gal):8,925 LLW solid (yd^3): 12,640 Mixed LLW liquid (gal): 3,622.4 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19.9 Hazardous liquid (ton): 6.5 Non-hazardous solid (yd^3): 27,600 Non-hazardous liquid (gal): 171,000	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	The following existing levels of waste generation would be expected to continue: Wastes from 2005 LLW (yd^3): 96.8 Mixed LLW (yd^3): 1.8 Hazardous (yd^3): 711 Non-hazardous (yd^3): 6,375 Sanitary (yd^3): 944.9 TSCA (yd^3): 2,036 Universal (yd^3): 31 Existing waste management facilities are sufficient to manage these levels and maintain compliance with all regulatory requirements.	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 0 Mixed TRU solid (yd^3): 0 Hazardous waste (tons): 7 Non-hazardous solid (yd^3): 10,900 Non-hazardous liquid (gal): 56,000 **Operation** TRU solid (yd^3): 950 LLW liquid (yd^3): 0 LLW solid (yd^3): 3,900 Mixed LLW liquid (gal): 0.4 Mixed LLW solid (yd^3): 2.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (tons): 8,100 Non-hazardous liquid (gal): 75,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000 **Operation** TRU solid (yd^3): 0 LLW liquid (gal):3,615 LLW solid (yd^3): 8,100 Mixed LLW liquid (gal): 3,620 Mixed LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous solid (tons): 15 Hazardous liquid (tons): 0 Non-hazardous solid (tons): 7,500 Non-hazardous liquid (yd^3): 50,000	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.	TRU solid (yd^3): 950 LLW liquid (gal):3,615 LLW solid (yd^3): 12,000 Mixed LLW liquid (gal): 3,620 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19 Hazardous liquid (tons): 0.6 Nonhazardous solid (yd^3): 15,600 Nonhazardous liquid (gal): 125,000	Current and planned activities would continue as required to support smaller stockpile requirements. LLW (yd^3): 73 Mixed LLW (yd^3): 1.4 Hazardous (yd^3): 530 Non-hazardous (yd^3): 4,800 No major impacts are expected.
SRS	Existing levels of waste generation of: Wastes from 2001 TRU (yd^3): 64.1 LLW (yd^3): 4,610 Mixed TRU (yd^3): 380 Hazardous (yd^3): 45.3 Sanitary (yd^3): 1,560 And are expected to be increased by the construction of t he MOX/PDCF facilities which are expected to add: TRU (yd^3): 500 LLW (yd^3): 270 Mixed (yd^3): 6.5 Existing waste management facilities are more than adequate to manage these	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 0 Mixed TRU solid (yd^3): 0 Hazardous (tons): 7 Non-hazardous solid (yd^3): 10,900 Non-hazardous liquid (gal): 56,000 **Operation** TRU solid (yd^3): 950 LLW liquid (yd^3): 0 LLW solid (yd^3): 3,900 Mixed LLW liquid (gal): 0.4 Mixed LLW solid (yd^3): 2.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 4.0 Hazardous liquid (tons): 0.6 Non-hazardous solid (yd^3): 8,100 Non-hazardous liquid (gal): 75,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 70 Mixed TRU solid (yd^3): 0 Hazardous (tons): 6 Non-hazardous solid (tons): 1,000 **Operation** TRU Solid Waste (yd^3): 0 Low Level Liquid Waste (gal): 3,515 Low Level Solid Waste (yd^3): 8,100 Mixed Low Level Liquid Waste (gal): 3,616 Mixed Low Level Solid Waste (yd^3): 70 Mixed TRU Solid Waste (yd^3): 0 Hazardous waste solid (tons): 15 Hazardous waste liquid (tons): 0	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 9,000 Mixed TRU solid (yd^3): 0 Hazardous (tons): 0 Non-hazardous solid (tons): 6,400 Non-hazardous liquid (gal): 40,000 **Operation** Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd^3): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd^3): 12,000 Non-hazardous Liquid	TRU solid (yd^3): 950 LLW liquid (gal):3,515 LLW solid (yd^3): 12,000 Mixed LLW liquid (gal): 3,616.4 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19 Hazardous liquid (tons): 0.6 Nonhazardous solid (tons): 15,600 Nonhazardous liquid (gal): 125,000	TRU solid (yd^3): 950 LLW liquid (yd^3):8,925 LLW solid (yd^3): 12,040 Mixed LLW liquid (gal): 3,622.4 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19.9 Hazardous liquid (tons): 6,5 Nonhazardous solid (yd^3): 27,600 Nonhazardous liquid (gal): 171,000	Reduced tritium operations would reduce LLW by approximately 50%, from 620 yd^3 to approximately 310 yd^3. No other waste streams would be affected.

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	
	wastes in compliance with all regulatory requirements.		Non-Hazardous Solid Waste (yd^3): 7,500 Non-Hazardous Liquid Waste (gal) : 50,000	Waste (gal):46,000			
Y-12	Wastes generated in 2003: LLW liquid (yd^3): 17.4 LLW solid (yd^3): 7,800 Mixed LLW liquid (yd^3): 17.9 Mixed LLW solid (yd^3): 21.1 Existing waste management facilities are more than adequate to manage these wastes in compliance with all regulatory requirements	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 0 Mixed TRU solid (yd^3): 0 Hazardous (tons): 7 Non-hazardous solid (tons): 10,900 Non-hazardous liquid (gal): 56,000 **Operations** TRU solid (yd^3): 950 LLW liquid (yd^3):0 LLW solid (yd^3): 3,900 Mixed LLW liquid (gal): 0.4 Mixed LLW solid (yd^3): 2.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 4.0 Hazardous liquid (gal): 0.6 Non-hazardous solid (tons): 8,100 Non-hazardous liquid (gal): 75,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 70 Mixed LLW solid (yd^3): 4 Hazardous (tons): 4 Non-hazardous solid (yd^3): 800 Non-hazardous liquid (gal): 0 **Operations** TRU solid (yd^3): 0 LLW liquid (gal):3,515 LLW solid (yd^3): 7,800 Mixed LLW liquid (gal): 3,616 Mixed LLW solid (yd^3): 21 Mixed TRU solid (yd^3):0 Hazardous solid (tons): 14 Hazardous liquid (gal): 0 Non-hazardous solid (tons): 7,125 Non-hazardous liquid (gal): 50,000	**Construction** TRU solid (yd^3): 0 LLW solid (yd^3): 9,900 Mixed TRU solid (yd^3): 0 Hazardous (tons): 0 Non-hazardous solid (yd^3): 7,100 Non-hazardous liquid (gal): 45,000 **Operation** Low Level Liquid Waste (gal): 5,410 Low Level Solid Waste (yd^3): 40 Mixed Low Level Liquid Waste (gal): 6 Hazardous waste solid (tons): .90 Hazardous waste liquid (tons): 5.9 Non-hazardous Solid Waste (yd^3): 12,000 Non-hazardous Liquid Waste (gal):46,000	TRU solid (yd^3): 950 LLW liquid (gal): 3,515 LLW solid (yd^3): 11,700 Mixed LLW liquid (gal): 3,616.4 Mixed LLW solid (yd^3): 72.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 19 Hazardous liquid (gal): 0.6 Non-hazardous solid (tons): 15,600 Non-hazardous liquid (gal): 125,000	TRU solid (yd^3): 950 LLW liquid (gal): 8,925 LLW solid (yd^3): 11,740 Mixed LLW liquid (gal): 3,622.4 Mixed LLW solid (yd^3): 23.5 Mixed TRU solid (yd^3): 340 Hazardous solid (tons): 18.9 Hazardous liquid (tons): 6.5 Non-hazardous solid (yd^3): 27,225 Non-hazardous liquid (gal): 171,000	LLW liquid (yd^3): 10.4 LLW solid (yd^3): 4,700 Mixed LLW liquid (yd^3): 10.7 Mixed LLW solid (yd^3): 12.7

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

Resource	No Action Alternative	Remove Category I/II SNM from LLNL (Includes the impacts of phasing out Category I/II SNM operations from LLNL Superblock)
Land	No land issues	No land impacts or issues
Noise	No noise impacts	No change
Air Quality	No changes to air quality	• no emissions of radionuclides to air from Superblock; therefore, phasing out this facility would have no effect on radiological air quality • no non-radiological changes expected
Socioeconomic	No change	• if Superblock operated as Category III SNM facility: minor impacts to facility employment associated with security force reductions • if Superblock closed and undergoes D&D: employment would be expected to increase because of the D&D work, but would likely not be significant, and would be offset by the transfer of some personnel to LANL.
Transportation	No change. LLNL is authorized to transport approximately 584 shipments annually.	• less than 19 shipments of radiological material expected • population dose for all shipments: < 3 person-rem • LCF risk: <0.01
Human Health	There are no emissions of radionuclides from Superblock.	• phasing out Category I/II SNM operations from Superblock would have no effect on population doses to the surrounding population. • material-at-risk limit for Superblock reduced by 60%; • bounding accident source term for Superblock reduced by 60% • Superblock accident consequences reduced from 1.3 LCFs to 0.52
Waste Management	Small quantities of hazardous, and liquid and solid non-hazardous wastes	• 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) • if Superblock closed and undergoes D&D: waste would increase in short-term; for bounding case, wastes could double to 200 TRU waste drums and 800 LLW drums for per year for several years

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 Pu Storage from Zone 4 to Newly Constructed Underground Pu Storage Facility in Zone 12 at Pantex
Land	No land issues	Would disturb 57 acres of brown-field land for construction; 11 acres utilized once operational
Noise	No noise impacts	Minor increase in noise during construction of new 456,000 sq. ft. underground storage facility
Water	Water use limited to personal consumption of employees	Would require an additional 2,950,000 gallons of water for five-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, all transportation on-site
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 approximately 0.657 LCFs
Waste Management	No waste generation	Once material moved D&D of old facility would be expected to generate • 12,000 yd^3 of solid waste • 700 yd^3 of LLW

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

Resource	No Action	SRS Consolidation	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	• SRS tritium emissions increase by 1,000 Curies (2.4% increase over current tritium emissions) • LANL tritium emissions decrease by 1,000 Curies (42% decrease compared to current tritium emissions) • No change to non-radiological emissions	No change*	No change
Socioeconomic	Continue operations at LLNL, LANL, and SRS No change	• 25 jobs restructured at LANL • 25 new jobs would be created at SRS	No change*	No change
Human Health	Continue operations at LLNL, LANL, and SRS	• Average exposure to worker from tritium R&D would be approximately 4.3 mrem • Total worker dose: 0.11 person-rem • Worker LCF risk: 6.6×10^{-5} • MEI dose at SRS: increase by 0.0008 mrem/year; • 50-mile population dose: increase 0.041 person-rem. • LANL decreases would be similarly small	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
Donor Sites	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	• 125 peak construction jobs; • LANL: +300 jobs • LLNL: -175 jobs • SNL/NM: -45 jobs • Pantex: none	• 150 peak construction jobs; • LLNL: +300 jobs • LANL: -150 jobs • SNL/NM: -45 jobs • Pantex: none	• 210 peak construction jobs; • Pantex: +160 jobs • LANL: -150 jobs • SNL/NM: -45 jobs • LLNL: -175 jobs	• 220 peak construction jobs; • SNL/NM: +325 jobs • LANL: -150 jobs • LLNL: -175 jobs • Pantex: -10 jobs	• 250-300 peak construction jobs; • NTS: +250 jobs • LLNL: -175 jobs • LANL: -150 jobs • SNL/NM: -45 jobs • Pantex: none

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

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
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: 7,440 cubic yards. Operational wastes minimal.	Construction solid waste: 4,650 cubic yards. Operational wastes minimal.

Table S.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
Impacts to Land	No land issues	No land impacts or issues	Same as No Action	Disturb less than 2 acres at NTS Free up 3,047 acres at Tonopah	Disturb less than 2 acres as WSMR Free up 3,047 acres at Tonopah
Noise Impacts	No noise impacts to public	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	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	Loss of 135 at Tonopah and gain of 135 at NTS	Loss of 135 at Tonopah and gain of 135 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)
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

Note 1: Some Flight Test operations utilize depleted uranium in the Join 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

Resource	No Action Alternative	Downsize in Place Alternative	Consolidate at LANL Alternative	Consolidate at NTS Alternative
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	Closure employment of 313 man years	Closure employment of 508 man-years Construction employment of 60 man-years	Closure employment of 508 man-years Construction employment of 175 man-years
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

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

Resource	No Action Alternative	Consolidate in Place Alternative	Move All ETF to NTS	Move all ETF to SNL/NM
Impacts to Land	Currently has 500,708 sq ft of floor space at four sites	Reduce building floor space by 62,777 sq ft	Reduce building floor space by 546,385 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

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