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FINAL SUPPLEMENT ANALYSIS FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS

U.S. Department of Energy
National Nuclear Security Administration
NNSA Production Office

SUMMARY

The Pantex Plant (Pantex or Plant) is located in the Texas Panhandle, approximately 17 miles northeast of Amarillo, Texas. Pantex is the primary site for the assembly of nuclear weapons for the nation's stockpile and disassembly of nuclear weapons being retired from the stockpile. Pantex also evaluates, repairs, and retrofits nuclear weapons in the stockpile; provides interim storage for nuclear material; develops, fabricates, and tests chemical explosives and explosive components for nuclear weapons; and supports the U.S. Department of Energy (DOE) initiatives.

In November 1996, DOE issued the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225; DOE 1996a) (referred to as the Pantex Site-Wide EIS [or SWEIS]). The SWEIS assessed impacts on areas of the human and natural environment potentially affected by operations performed at Pantex. The SWEIS evaluated activities associated with ongoing operations, including onsite nuclear material storage, transportation of nuclear material to an alternate site for interim storage, and transportation of classified components between Pantex and other sites occurring over a period of approximately 10 years, from 1996 through 2006.

DOE published its Record of Decision (ROD) for the SWEIS in the *Federal Register* (FR) on January 27, 1997 (62 FR 3880), announcing its decision to implement the Preferred Alternative as follows: "(1) continuing nuclear weapon operations involving assembly and disassembly of nuclear weapons at the Pantex Plant; (2) implementing facility projects, including upgrades and construction consistent with conducting these operations; and (3) continuing to provide interim pit storage at the Pantex Plant and increasing the storage level from 12,000 to 20,000 pits."

DOE's *National Environmental Policy Act* (NEPA) implementing regulations at Title 10 Code of Federal Regulations (CFR) 1021.330(d) require evaluation of a SWEIS at least every five years through preparation of a Supplement Analysis (SA) as provided in 10 CFR 1021.314. The National Nuclear Security Administration (NNSA), a semi-autonomous agency within DOE, has prepared this SA in accordance with these requirements. This SA compares the information presented in the SWEIS with continued operations at Pantex, including any changes in programs/operations/impacts that would occur through approximately 2023. The purpose of this SA is to determine whether continued operations at Pantex (including any changes) constitute a substantial change that is relevant to environmental concerns, or if there are significant new circumstances or information relevant to environmental concerns and bearing on continued operations at Pantex that were analyzed in the SWEIS. Based on this SA, NNSA will determine whether the existing SWEIS remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented.

The analysis in this SA indicates that continued operations at Pantex, including changes that are expected to occur through approximately 2023, would be similar in nature and would not be expected to differ significantly from those NNSA identified and analyzed in the SWEIS. After comparing the analysis of impacts associated with the changes identified in this SA with the impacts analyzed in the SWEIS, NNSA has determined that there are no significant new circumstances or information relevant to environmental concerns that warrant preparation of a supplemental or new environmental impact statement (EIS). Based on the analysis in this SA, continued operations at Pantex are adequately supported by the existing SWEIS and other existing NEPA documentation, and no further supplementing documentation is required. Stand-alone NEPA documents for any future projects would be prepared as needed and tiered to the SWEIS.

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ACRONYMS AND ABBREVIATIONS

ASC	Administrative Support Complex
BAS	Building Automation System
BLM	Bureau of Land Management
CAS	Central Alarm Station
CD	Critical Decision
CEQ	Council on Environmental Quality
CERCLA	*Comprehensive Environmental Response Compensation Liability Act*
CFR	*Code of Federal Regulations*
CHAMP	Cooling and Heating Asset Management Program
Ci	curie
CNS	Consolidated Nuclear Security
CRM	Cultural Resource Management
CWG	Construction Working Group
CX	Categorical Exclusion
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMCS	Energy Management Control System
EPA	U.S. Environmental Protection Agency
FDS	Flame Detection System
FONSI	Finding of No Significant Impact
FM	Farm-to-Market (road)
FR	*Federal Register*
FS	Firing Site
FY	Fiscal Year
g	the acceleration due to gravity
GPP	General Plant Project
GTAS	Ground Threat Assessment System
HE	High Explosives
HEFF	High Explosive Formulation Facility
HEPF	High Explosive Pressing Facility
HESE	High Explosive Science and Engineering
HPFL	High Pressure Fire Loop
HVAC	Heating, Ventilation, and Air Conditioning
kVA	kilovolt amperes
LLW	Low-Level Radioactive Waste
LMA	Lightning Mapping Array
MAA	Material Access Area
MEI	maximally exposed individual
mrem	millirem
MSF	Material Staging Facility
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NDE	Non-Destructive Evaluation
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NNSA	National Nuclear Security Administration
NRHP	National Register of Historic Places

NSE	Nuclear Security Enterprise
NSHMP	National Seismic Hazard Maps Project
OWBS	Old world bluestem
PA/CRMP	Programmatic Agreement/Cultural Resource Management Plan
Pantex	Pantex Plant
PEIS	Programmatic EIS
PIDAS	Perimeter Intrusion Detection and Surveillance
Plant	Pantex Plant
PREP	Pantex Renewable Energy Project
RAMS	Radiation Alarm Monitoring Systems
RCRA	*Resource Conservation and Recovery Act*
ROD	Record of Decision
ROI	Region of Influence
RTG	Radioisotope Thermoelectric Generator
SA	Supplement Analysis
SAS	Secondary Alarm Station
SEPT	Southeast Pump & Treat
SHPO	State Historic Preservation Officer
SPRS	Southern Plains Range Research Station
SWMU	Solid Waste Management Unit
SWEIS	*Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225)
TCEQ	Texas Commission on Environmental Quality
TLAP	Texas Land Application Permitted
TSCA	*Toxic Substances Control Act*
TTU	Texas Tech University
TWQP	Texas Water Quality Permit
UPS	Uninterruptible Power Supply
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WSF	Weapons Surveillance Facility
WWTF	Wastewater Treatment Facility
WWII	World War II

Conversion Factors

English to Metric		
Multiply	**By**	**To get**
Acres	0.4046873	Hectares
Square feet	0.092903	Square meters
Miles	1.6093	Kilometers
Feet	0.3048	Meters
Inches	2.54	Centimeters
Tons (short)	0.90718	Metric tons
Pounds	0.45359	Kilograms
Gallons	3.78533	Liters
Cubic yards	0.76456	Cubic meters

Metric to English		
Multiply	**By**	**To get**
Hectares	2.47104	Acres
Square meters	10.764	Square feet
Kilometers	0.62137	Miles
Meters	3.2808	Feet
Centimeters	0.3937	Inches
Metric tons	1.1023	Tons (short)
Kilograms	2.2046	Pounds
Liters	0.26418	Gallons
Cubic meters	1.3079	Cubic yards

1. INTRODUCTION

The U.S. Department of Energy's (DOE's) *National Environmental Policy Act* (NEPA) implementing regulations at Title 10 Code of *Federal Regulations* (CFR) 1021.330(d) require evaluation of a site-wide environmental impact statement at least every five years through preparation of a Supplement Analysis (SA) as provided in 10 CFR 1021.314. This SA will enable DOE's National Nuclear Security Administration (NNSA) to determine whether the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (referred to as the Pantex Site-Wide EIS or SWEIS) remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented. DOE/NNSA has prepared this SA in accordance with these requirements.

In 2000, the NNSA was established as a semi-autonomous agency within DOE, responsible for the management and security of the nation's nuclear weapons, including oversight of the Pantex Plant (Pantex or Plant). Within this document, DOE's role is more specifically attributed to DOE/NNSA, or simply NNSA, unless the discussion deals with actions taken before 2000 or on a broader scale.

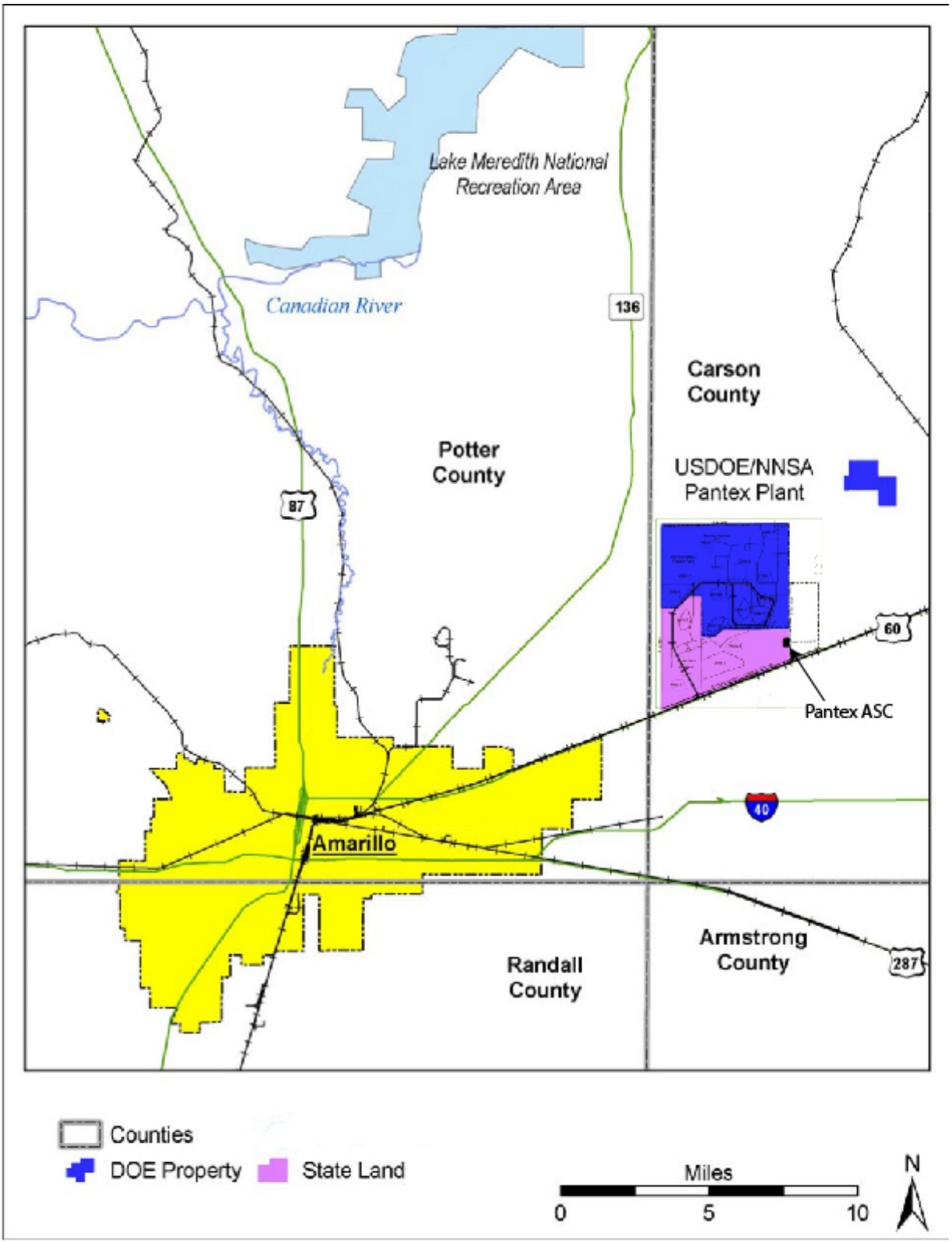
1.1 Background

The Pantex Plant is located in the Texas Panhandle, approximately 17 miles northeast of Amarillo, Texas. Figure 1-1 shows the location of the Pantex Plant and Figure 1-2 shows key onsite and offsite areas relevant to this SA. The Pantex Plant was originally built during the early days of World War II (WWII) to produce conventional munitions, bombs, and artillery projectiles for the United States Army. After the war, the Plant was deactivated and remained vacant until 1949, when Texas Technological College (now Texas Tech University [TTU]) purchased the site for $1. In 1951, the main Plant and surrounding land were reclaimed under the recapture clause of the sales agreement by the Atomic Energy Commission (DOE's predecessor) and used for nuclear weapons assembly operations. Since that time, the four other Plants in the United States with nuclear weapons assembly and modification missions were shut down, and nuclear weapons assembly and disassembly operations in the United States were consolidated at the Pantex Plant (DOE 1996a).

The primary missions of the Pantex Plant are as follows:

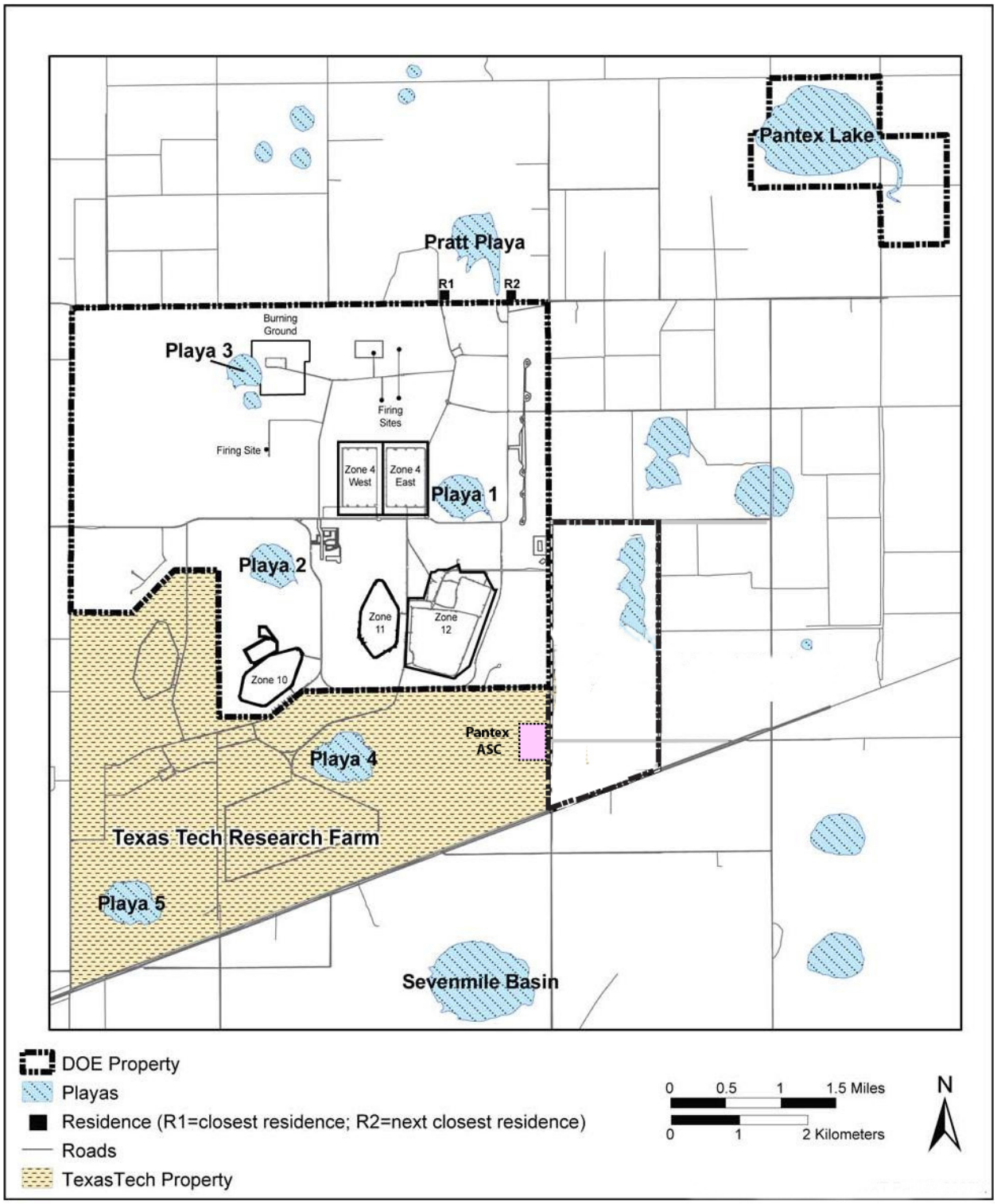
- Assemble nuclear weapons for the nation's stockpile;
- Disassemble nuclear weapons being retired from the stockpile;
- Evaluate, repair, and retrofit nuclear weapons in the stockpile;
- Provide interim storage for nuclear material;
- Develop, fabricate, and test chemical explosives and explosive components for nuclear weapons; and
- Support DOE/NNSA initiatives to include serving as a national asset related to nuclear weapon technology and competencies focused on explosives manufacturing, performance, and behavior characteristics.

DOE issued the Pantex SWEIS (DOE/EIS-0225; DOE 1996a) in November 1996. The SWEIS assessed impacts on areas of the human and natural environment potentially affected by operations performed at Pantex. The SWEIS evaluated activities associated with ongoing operations, including onsite nuclear material storage, transportation of nuclear material to an alternate site for interim storage, and transportation of classified components between the Pantex Plant and other sites occurring over a period of approximately 10 years, from 1996 through 2006. The analysis assumed that production (the combined activities of assembly, disassembly, and modifications) would not exceed 2,000 weapons per year and assessed the impacts of activity levels required to produce 2,000, 1,000, and 500 weapons per year.



Source: NNSA 2008a.

Figure 1-1. Pantex Plant Site Location



Source: NNSA 2008a.

Figure 1-2. Location of Key Areas at Pantex Plant

These activity levels were considered a reasonable but conservative estimate of the work that could be required based on policy directives at that time (DOE 1996a).

DOE published its Record of Decision (ROD) in the *Federal Register* (FR) on January 27, 1997 (62 FR 3880), announcing its decision to implement the Preferred Alternative evaluated in the Pantex SWEIS by "(1) continuing nuclear weapon operations involving assembly and disassembly of nuclear weapons at the Pantex Plant; (2) implementing facility projects, including upgrades and construction consistent with conducting these operations; and (3) continuing to provide interim pit storage at the Pantex Plant and increasing the storage level from 12,000 to 20,000 pits." In 2008, NNSA reaffirmed that decision after preparing the *Complex Transformation Supplemental Programmatic Environmental Impact Statement* (Complex Transformation Supplemental PEIS) (DOE/EIS-0236-S4; NNSA 2008b). In the ROD for that document, NNSA decided that, "assembly and disassembly of nuclear weapons and high explosives production and manufacturing will remain at the Pantex Plant in Texas" (73 FR 77644, December 19, 2008).

1.2 Purpose of and Need for the Supplemental Analysis

An SA is a document NNSA prepares in accordance with NEPA (42 U.S.C. §4321 et seq.) and DOE regulations (10 CFR 1021.314(c)) to determine if a supplemental or new environmental impact statement (EIS) should be prepared or if no further NEPA documentation is required. Three SA's for the SWEIS have been completed since the issuance of the 1996 SWEIS and 1997 ROD: (1) 2003 SA (DOE/EIS-0225/SA-03; NNSA 2003), approved on March 10, 2003; (2) 2008 SA (DOE/EIS-0225/SA-04; NNSA 2008a), approved on January 14, 2009; and (3) 2013 SA (DOE/EIS-0225-SA-05; NNSA 2013a), approved on January 28, 2013. The analyses in these three SAs indicated that, for the time period evaluated, the identified and projected impacts for all resource areas, including cumulative impacts, were not substantially changed from those identified in the SWEIS, nor did they represent significant, new circumstances or information relative to environmental concerns. Therefore, NNSA issued determinations that there was no need to supplement the SWEIS or to prepare a new SWEIS for the Pantex Plant.

This SA document, the fourth five-year update of the 1996 SWEIS, fulfills DOE/NNSA's requirement to review the SWEIS at least every five years as required by 10 CFR §1021.330(d). This SA accomplishes that requirement by comparing the information presented in the Pantex SWEIS and subsequent SAs with any changes in programs/operations/impacts that are expected to occur through approximately 2023. The purpose of the SA is to determine whether these changes constitute a substantial change that is relevant to environmental concerns, or if there are significant new circumstances or information relevant to environmental concerns. Based on the SA, NNSA will determine whether the existing SWEIS remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented.

1.3 Scope of the SA

Continued operations at Pantex are needed to efficiently and safely support the national security missions and other missions assigned to the site. This SA assesses continued operations at Pantex, with a focus on the changes and new information gathered, that have occurred at Pantex since publication of the SWEIS and the 2013 SA, or are expected to occur within the next five years. The analysis also includes changes in the environment that have occurred since publication of the SWEIS and the 2013 SA. This SA evaluates the projected impacts of these changes through approximately 2023.

In general, the descriptions of the missions, operations, and activities presented in the SWEIS and the subsequent SAs are still accurate and are not repeated in this SA. However, any relevant changes are described in Chapter 2 of this SA. Sections 2.1 and 2.2 of this SA identify changes relevant to the missions/facilities/operations that may give rise to changes in environmental impacts in comparison to those presented in the SWEIS. Section 2.3 identifies changes in the environmental baseline at Pantex. Section

2.4 discusses any changes in NNSA's approach to NEPA analyses. Chapter 3 of this SA presents a comparison of changes in environmental impacts that have occurred since the SWEIS was issued and those that are expected to occur during the next five years (2018 through 2023).

1.4 Relevant National Environmental Policy Act Documents

This section identifies and discusses NEPA documents that are potentially relevant to this SA. Decisions as a result of previous (and future) NEPA documents have affected (or will affect) operations/activities at Pantex. With respect to previous NEPA documents that have been completed, the most important documents are as follows:

***Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225; DOE 1996a).** As discussed in Section 1.1 of this SA, 1996 SWEIS analyzed the potential environmental impacts of ongoing and future operations and activities at Pantex. In the ROD (62 FR 3880), DOE decided to continue nuclear weapon operations involving assembly and disassembly of nuclear weapons at the Pantex Plant; implement facility projects, including upgrades and construction consistent with conducting these operations; and continue to provide interim pit storage at the Pantex Plant and increasing the storage level from 12,000 to 20,000 pits. The SWEIS provides information about Pantex site operations, baseline environmental conditions, and ongoing environmental impacts relevant to this SA, as supplemented by the three SAs that have been prepared since the 1997 ROD.

***Complex Transformation Supplemental Programmatic Environmental Impact Statement* (DOE/EIS-0236-S4; NNSA 2008b)**. This programmatic document, which was completed in October 2008, assessed the reasonable alternatives for continuing the modernization and consolidation of nuclear weapons activities at all major sites in the nuclear weapons complex, including Pantex and included a wide range of potential options for storage and staging of nuclear materials. As a result of that document, NNSA reaffirmed the decisions in the 1996 SWEIS that, "assembly and disassembly of nuclear weapons and high explosives production and manufacturing will remain at the Pantex Plant in Texas" (73 FR 77644).

***Supplement Analysis for the Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225/SA-03, [NNSA 2003]; DOE/EIS-0225/SA-04 [NNSA 2008a]; and DOE/EIS-0225/SA-05 [NNSA 2013a]).** These three SAs evaluated changes that had resulted since the 1996 SWEIS was prepared. The analyses in the these three SAs indicated that, for the time period evaluated, the identified and projected impacts for all resource areas, including cumulative impacts, were not substantially changed from those identified in the SWEIS, nor did they represent significant, new circumstances or information relative to environmental concerns. Therefore, NNSA issued determinations that there was no need to supplement the SWEIS or to prepare a new SWEIS for the Pantex Plant.

New projects and modifications to existing projects that have been initiated since issuance of the SWEIS have been described and evaluated in past environmental assessments (EAs), SAs, and NEPA review forms in accordance with Pantex Plant Work Instruction 02.01.04.02.01, "Prepare National Environmental Policy Act Documents." The SWEIS and the three subsequent SAs identify any projects prior to 2013 that have been addressed in NEPA documents. With respect to the analyses in this SA, the most relevant NEPA documents relate to projects that have been initiated since the 2013 SA, or which are expected to be initiated in the next five years. Since publication of the 2013 SA, no EISs and two EAs (described below) have been prepared for the Pantex Plant.

***Environmental Assessment for the Proposed High Explosive Science & Engineering Project, Pantex Plant, Amarillo, Texas (*DOE/EA-1993; NNSA 2017a).** In August 2015, NNSA issued this draft EA to

evaluate the potential impacts of designing, constructing, and operating a High Explosive Science and Engineering (HESE) facility that would support NNSA's mission at the Pantex Plant. The Final EA and a Finding of No Significance Impact (FONSI) were approved in 2018. Section 2.1.3 of this SA provides additional information on the HESE Facility. The HESE Facility is considered a part of the operational baseline at Pantex.

***Environmental Assessment for the Construction Landfill Expansion at the Pantex Plant* (DOE/EA-1997; NNSA 2017b).** On October 8, 2015, NNSA published a Notice of Intent to prepare an EA for the Construction Landfill Expansion at the Pantex Plant. The Final EA and FONSI were approved in 2018. The landfill expansion is considered a part of the operational baseline at Pantex.

In addition to these two EAs, numerous Categorical Exclusions (CXs) have been issued for projects at Pantex since publication of the 2013 SA. CXs are applicable to classes of actions that normally do not require EAs or EISs. Table 1-1 describes these projects. Projects expected to occur within the next five years are identified and discussed in Chapter 2 of this SA.

Table 1-1. NEPA Actions Initiated Since Issuance of the 2013 SA

Item	Title of Project/Activity	Project/NEPA Status	Discussion
1	Closure Turf Installation — Landfill 1	This project is complete. NNSA issued a CX (B6.1- Cleanup Actions) in August 2013 (NNSA 2013b).	This project installed a synthetic Closure Turf ™ system at Landfill 1 (Solid Waste Management Unit 68b) to prevent wind and water erosion of the existing landfill cap. The existing landfill cap consisted of 2-4 feet of clean borrow material with vegetation that creates a barrier between the landfill debris and the general public or industrial workers.
2	Routine Administrative, Maintenance, and Operating Activities at Pantex Plant for Fiscal Year (FY) 2014 and FY 2015	This project is complete. NNSA issued a CX (B1.3- Routine Maintenance) in September 2013 (NNSA 2013c).	Activities addressed by this standard NEPA Review Form include: • Routine maintenance and repair activities; • Plant rearrangements and/or building modifications and relocations; • Maintenance and repair of Plant utilities and data processing equipment; • Fabrication or modification of weapon tooling; • Equipment and service purchases planned for Pantex facilities; and • Training activities and simulations.
3	Site Characterization, Monitoring, and General Research Activities for Pantex Plant for FY2014	This project is complete. NNSA issued a CX (B3.1- Site characterization and environmental monitoring; B3.3- Research related to conservation of fish, wildlife, and cultural resources; B3.6- Small-scale research and development, laboratory operations, and pilot projects; and B3.8- Outdoor terrestrial ecological and environmental research) in September 2013 (NNSA 2013d).	The scope of this work covered onsite and offsite site characterization and environmental monitoring, including siting, construction (or modification), operation, and dismantlement or closing (abandonment) of characterization and monitoring devices and siting, construction, and associated operation of a small scale laboratory building or renovation of a room in an existing building for sample analysis. Activities covered include, but were not limited to, site characterization and environmental monitoring under the *Comprehensive Environmental Response Compensation Liability Act* (CERCLA) and the *Resource Conservation and Recovery Act* (RCRA).
4	Environmental Restoration and Waste Management Activities for Pantex Plant for FY 2014	This project is complete. NNSA issued a CX (B1.3- Routine Maintenance; and B6.2- Waste collection, treatment, stabilization, and containment facilities) in September 2013 (NNSA 2013e).	The scope of this project included the following types of activities: • Remedial actions, including design, construction, and operation of corrective measures (e.g., landfill covers and soil remediation activities); • Accelerated soil cleanups; • Integration of cleanup actions conducted in accordance with RCRA corrective action requirements, with CERCLA requirements and as applicable, requirements of NEPA; • Lining of ditches with geosynthetic materials (e.g., reinforced polypropylene) to prevent downward migration of surface water and residual contamination through ditches and to the groundwater; • Control and management of Solid Waste Management Units (SWMUs); and • Installation of fences, warning signs, or other site control precautions.

Item	Title of Project/Activity	Project/NEPA Status	Discussion
5	Safety, Health, and Environmental Improvements for FY2014 and FY2015	This project is complete. NNSA issued a CX (B2.1- Workplace enhancements; B2.2- Building and equipment instrumentation; B2.3- Personnel safety and health equipment; B2.5- Facility safety and environmental improvements) in September 2013 (NNSA 2013f).	The types of activities within the scope of this review were modifications of an existing structure to enhance workplace habitability; installation of, or improvements to, building and equipment instrumentation; installation of, or improvements to, equipment for personnel safety and health; safety and environmental improvements of a facility, including replacement and upgrade of facility components that did not result in a significant change in the expected useful life, design capacity, or function of the facility, and during which operations may have been suspended and then resumed.
6	Pantex Lake Land Utilization	This project is complete. NNSA issued a CX (B1.11- Fencing) in November 2013 (NNSA 2013g).	This project removed approximately 1,150 linear feet of existing fence and installed approximately 840 linear feet of new fence. The purpose of this project was to allow an adjacent land owner the ability to use the approximately three acres of DOE land that is currently in cultivation.
7	NNSA Utility Communications Easement	This project is complete. NNSA issued a CX (B1.24- Property transfers; and B4.13 - Upgrading and rebuilding existing power lines) in November 2013 (NNSA 2013h).	This project involved relocating three utility poles and underground electrical lines. The utility poles and lines were located on the west side of Farm-to-Market Road (FM) 2373 and east of the Pantex Plant. They were relocated five feet inside of the Pantex Plant property fence, also located on the west side FM 2373. The relocation of the power poles and electrical lines is in correlation with the Pantex Renewable Energy Project (PREP), which was covered under the EA of July 2010.
8	Lightning Mapping Array (LMA) Project	This project is complete. NNSA issued a CX (A8- Awards of certain contracts; A9- Information gathering, analysis, and dissemination; B3.1- Site characterization and environmental monitoring; and B1.24- Property transfers) in December 2013 (NNSA 2013i).	The LMA project installed eight sensors, on tripods, to detect the electrical activity in the area surrounding the Pantex Plant. The advantage of the LMA system, besides providing redundancy with the existing Lightning Location and Protection System, is that it could predict cloud-to-ground lightning strikes, based on electrical activity of the cloud, before they occur. Permanent installation on concrete pads may be a later option.
9	Southeast Pump and Treat Upgrades	This project is complete. NNSA issued a CX (B5.1- Actions to conserve energy or water) in December 2014 (NNSA 2014).	This Southeast Pump and Treat project upgraded the process area and control room at the Southeast Pump and Treat System and included reconfiguration of the process piping, installation of redundant process pumping, improved pump controls, electrical upgrades, pressure vessel relining, boron treatment prior to injection, a carbon backwash system, and system programming. These upgrades increased system capacity, allowing for improved operation and maintenance, and improved system performance and efficiency.

Item	Title of Project/Activity	Project/NEPA Status	Discussion
10	LMA Project - Amendment 2	This project is complete. NNSA issued a CX (A8- Awards of certain contracts; A9- Information gathering, analysis, and dissemination; B3.1- Site characterization and environmental monitoring; and B1.24- Property transfers) in March 2015 (NNSA 2015a).	The first amendment addressed the addition of a third site on Texas Tech property as well as sensors to be located at the Nuclear Incident Response Program near the Amarillo Rick Husband International Airport. The second amendment addressed the installation of containment boxes for the 12-volt batteries associated with each solar-powered sensor. Plastic boxes were installed inside the existing battery box at each location to provide containment in case of leakage of the lead acid battery.
11	Building 12-75B Expansion for Uninterruptable Power Supply (UPS) and Heating, Ventilation, and Air Conditioning (HVAC) Upgrade	This project is ongoing. NNSA issued a CX (B1.15- Support Buildings; and B2.1- Workplace enhancements) in March 2015 (NNSA 2015b).	The project would replace the UPS for Building 12-75 with an upgraded 200-kilovolt amperes (kVA) capability. This project would also replace two existing and add one new computer room air conditioners and a new HVAC unit in the data center as well as transformers external to the facility. The hardened emergency generator building would also be modified to accommodate a new larger generator and a new larger diesel fuel storage tank.
12	Administrative Support Complex (ASC)	This project is under construction. NNSA issued a CX (B1.15- Support Buildings) in February 2015 (NNSA 2015c).	The ASC would provide Pantex Plant with a new office building with a multi-purpose and multi-disciplinary environment. The facility is planned to be approximately 300,000 square feet and provide occupancy for 1,100 people. A cafeteria, conference rooms, support areas, and an Occupational Health Center would be part of the complex. The ASC would have a backup Emergency Operations Center area. The ASC would have secure and non-secure areas, and classified and unclassified computing capabilities. The ASC would be designed for ease of system and unit operations, checkout, maintenance, inspection, and allow ready access to operations and support equipment.
13	Routine Administrative, Maintenance, and Operating Activities Planned at Pantex Plant For FY2016 and FY2017	This project is complete. NNSA issued a CX (B1.3- Routine Maintenance) in August 2015 (NNSA 2015d).	Activities addressed by this standard NEPA Review Form include: • Routine maintenance and repair activities; • Plant rearrangements and/or building modifications and relocations; • Maintenance and repair of Plant utilities and data processing equipment; • Fabrication or modification of weapon tooling; • Equipment and service purchases planned for Pantex facilities; and • Training activities and simulations.

Item	Title of Project/Activity	Project/NEPA Status	Discussion
14	Safety, Health, and Environmental Improvements for FY2016 and FY2017	This project is complete. NNSA issued a CX (B2.1- Workplace enhancements; B2.2- Building and equipment instrumentation; B2.3- Personnel safety and health equipment; B2.5- Facility safety and environmental improvements) in August 2015 (NNSA 2015e).	The types of activities within the scope of this review were modifications of an existing structure to enhance workplace habitability; installation of, or improvements to, building and equipment instrumentation; installation of, or improvements to, equipment for personnel safety and health; safety and environmental improvements of a facility, including replacement and upgrade of facility components that did not result in a significant change in the expected useful life, design capacity, or function of the facility, and during which operations may have been suspended and then resumed.
15	Ground Threat Assessment System (GTAS) — Amendment 1	This project is ongoing. NNSA issued a CX (B1.15- Support Buildings) in October 2015 (NNSA 2015f).	The original GTAS consisted of installing seven 25 feet towers placed in different areas of the Property Protected Area. This amendment was for the installation of an eighth tower. The new tower is 30 feet high with a concrete footing of approximately 2 feet 6 inches deep x 5 square feet. It consists of three guy wires approximately 30 feet in length with gravel covering the area between each guy wire and the tower base. The tower is connected to local power via conduits from existing buildings, electrical transformers/services, and/or local power poles. A new secondary electrical line is buried in 3-inch conduit from the pole mounted transformer to the load center. An electrical box is mounted at the tower base and contains electronics and two backup power batteries.
16	Temporary Back-Up Generator Installation	This project is ongoing. NNSA issued a CX (B1.3- Routine Maintenance; B1.15- Support Buildings; B1.31- Installation or relocation of machinery or equipment; B2.2- Building and equipment instrumentation) in December 2015 (NNSA 2015g).	This project was for design, installation and start-up of a temporary, stand-alone, stand-by diesel generator unit (approximately 10 feet wide x 60 feet long) to provide temporary back-up power to the G-Loop as assurance that the Plant has adequate protection until planning, design and construction of permanent replacement generators. Activities included the installation of a stand-alone generator, Automatic Transfer Switch and switchgear that ties into an existing above ground junction enclosure, exterior security lighting and lightning protection. The generator is set on a concrete pad and a temporary gravel roadway was installed for fuel truck access.
17	GTAS — Amendment 2	This project is complete. NNSA issued a CX (B1.15- Support Buildings) in March 2016 (NNSA 2016a).	This Amendment 2 addressed the upgrade of 500 feet of existing access with gravel to provide an all-weather roadway. The Corps of Engineers performed all work associated with this amendment.
18	LMA Project — Amendment 3	This project is complete. NNSA issued a CX (B3.1- Site characterization and environmental monitoring) in June 2016 (NNSA 2016b).	This third amendment addressed the deletion of two previously identified locations and adding one location. The new location is approximately 75 feet away from one monitoring well, which is an Ogallala Monitoring well.

Item	Title of Project/Activity	Project/NEPA Status	Discussion
19	ASC — Amendment 1	This project is under construction. NNSA issued a CX (B1.15- Support Buildings) in August 2016 (NNSA 2016c).	At the time the original NEPA document for the ASC was prepared and approved, the final selection had not been made for the location of the ASC. The determination has been made that the ASC will not be constructed on government-owned property nor with government funding. This amendment was prepared to address the easements required for right-of-way across Government-owned facilities for the purpose of construction, installation, operations, maintenance, and/or repair, and/or replacement of utility connections. Many of the identified requirements from the original NEPA document would only be of a concern if the ASC was going to be constructed on government property. Additional environmental considerations would be addressed in an additional amendment for the extension of Pantex utilities to the new ASC.
20	Site Characterization, Monitoring, and General Research Activities for Pantex Plant for FY2017 and FY2018	This project is ongoing. NNSA issued a CX (B3.1- Site characterization and environmental monitoring; B3.3- Research related to conservation of fish, wildlife, and cultural resources; B3.6- Small-scale research and development, laboratory operations, and pilot projects; and B3.8- Outdoor terrestrial ecological and environmental research) in July 2016 (NNSA 2016d).	The scope of this work covers onsite and offsite site characterization and environmental monitoring, including siting, construction (or modification), operation, and dismantlement or closing (abandonment) of characterization and monitoring devices and siting, construction, and associated operation of a small scale laboratory building or renovation of a room in an existing building for sample analysis. Activities covered include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA.
21	Environmental Restoration and Waste Management Activities for Pantex Plant for FY2017 and FY2018	This project is ongoing. NNSA issued a CX (B6.1- Cleanup actions; and B6.2- Waste collection, treatment, stabilization, and containment facilities) in July 2016 (NNSA 2016e).	The scope of this project includes the following types of activities: • Remedial actions, including design, construction, and operation of corrective measures (e.g., landfill covers and soil remediation activities); • Accelerated soil cleanups; • Integration of cleanup actions conducted in accordance with RCRA corrective action requirements, with CERCLA requirements and as applicable, requirements of NEPA; • Lining of ditches with geosynthetic materials (e.g., reinforced polypropylene) to prevent downward migration of surface water and residual contamination through ditches and to the groundwater; • Control and management of SWMUs; and • Installation of fences, warning signs, or other site control precautions.
22	Landfill 2 — Closure Turf Installation	This project is complete. NNSA issued a CX (B6.1- Cleanup Actions) in October 2016 (NNSA 2016f).	A synthetic Closure Turf system was installed at Landfill 2 in order to prevent wind and water erosion of the existing landfill cap. The prior landfill cap consisted of a vegetative cover and 6-8 inches of clean borrow material that created a barrier between the landfill debris and the general public or industrial workers.

2. CHANGES SINCE PREPARATION OF THE SWEIS AND THE 2013 SUPPLEMENT ANALYSIS

This section describes the mission, facility, operational, and environmental changes that have occurred since the SWEIS was issued in 1996, as well as those expected to occur through 2023. These changes and projects provide the basis for the analyses in this SA.

2.1 Pantex Site Mission and Facility Changes

The Pantex Plant has implemented an integrated planning process that conceptualizes the plans for the future, identifies and assesses the near-and long-term actions required, and develops a process for alternatives assessment and course correction necessitated by Federal budget limitations. The top-tier documents that guide this planning process are the *Consolidated Nuclear Security* (CNS) *Ten-Year Site Plan for the Pantex Plant and Y-12 National Security Complex (FYs 2016-2025)* (CNS 2015a), *Pantex Plant Master Site Plan 2017-2040* (CNS 2016a), and the *CNS Strategic Plan* (CNS 2016b). Together, these documents set forth a vision for the Pantex of the future and a pathway for achieving that vision.

The primary mission of the Pantex Plant described in the integrated planning documents is consistent with that identified in the SWEIS (DOE 1996a) and the three subsequent five-year review SAs (NNSA 2003, NNSA 2008a, and NNSA 2013a). Individual operations conducted at Pantex to support these programmatic mission elements and analyzed within the scope of the SWEIS include: assembly and disassembly of nuclear weapons; certain maintenance and modification activities regarding the nuclear weapons stockpile; stockpile evaluation; quality assurance testing of weapon components; and research and production of high explosives (HE) components and associated components for nuclear weapons. Related activities at Pantex include quality assurance evaluations of weapons; research and development activities supporting nuclear weapons; demilitarization and sanitization of weapon parts, equipment, and related materials (although demilitarization is not currently performed at the Plant); waste management; environmental restoration; and onsite transportation (DOE 1996a).

The SWEIS also identified areas of Pantex that support the mission. These areas, shown in Figure 2-1 of this SA, are:

- Zone 12, where assembly, disassembly, and surveillance operations are performed and nonnuclear components are staged. Zone 12 also contains significant portions of HE production and component fabrication;
- Zone 11, where high-explosives research and production occur and nonnuclear components are staged;
- Zone 4 West, where nuclear weapons and classified components are staged and nuclear materials are stored on an interim basis;
- Zone 4 East, where high explosives are stored and nonnuclear components are staged;
- The Burning Ground (located northwest of Zone 4, as shown on Figure 1-2), where high-explosive material is thermally sanitized or treated; and
- The firing sites (located north of Zone 4, as shown on Figure 1-2), where testing and sanitization are conducted on high-explosive material and items containing energetic material.

Source: CNS 2016a.

Figure 2-1. Visual Depiction of Major Operating Areas at Pantex

Although there are no major changes in the primary mission planned for the next five years, activities at Pantex will not be static. In accordance with the integrated planning documents, NNSA is consolidating, downsizing, and transforming Pantex to achieve a future state that is more modern, responsive, and cost effective while providing the most efficient responses for health, safety, and security requirements (CNS 2016a). The four key contributors to achieving the vision are:

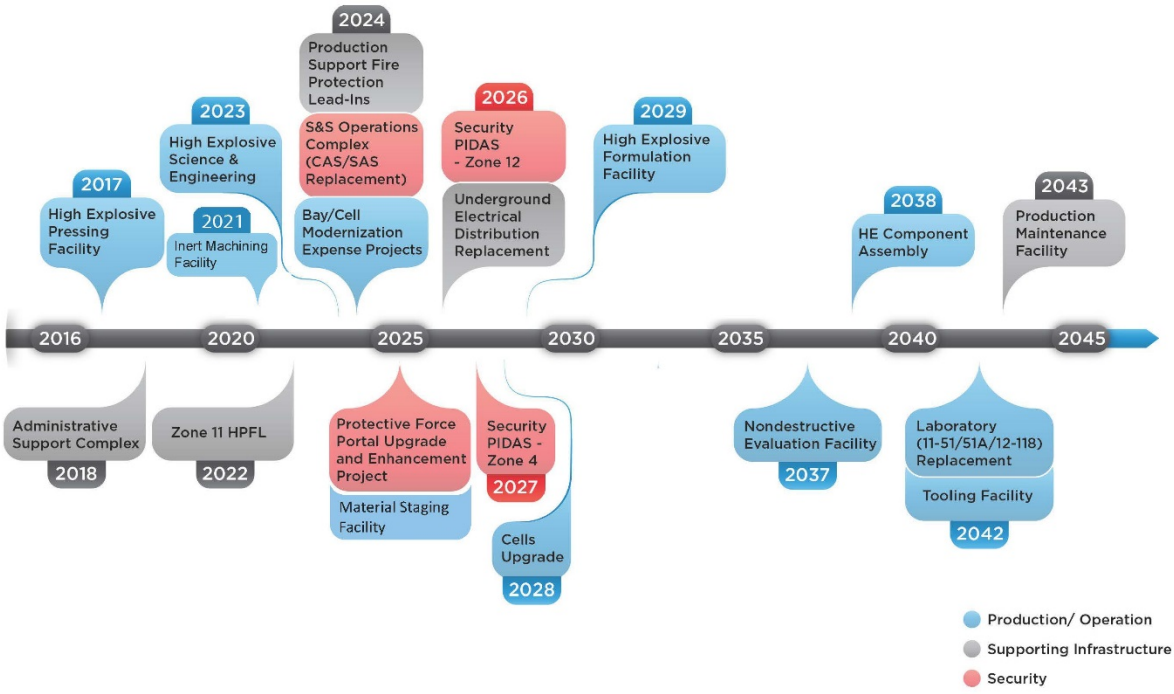
- Facility replacement/recapitalization/consolidation;
- Security enhancements;
- Enduring facility sustainment; and
- Facility disposition (CNS 2016a).

The integrated planning documents describe a strategic vision of how Pantex will provide the supporting infrastructure to accomplish its assigned mission for the next 25 years and beyond. The major line item construction projects envisioned at Pantex over the next three decades are identified in Figure 2-2. These projects have been acknowledged within the NNSA *Fiscal Year 2017 Stockpile Stewardship and Management Plan* (NNSA 2015h) and are based on the latest available timeline. Numerous implementation strategies are available for completion of major construction projects. For purposes of this SA, a project is considered "near-term" if construction or operation would commence within the next five years. Near-term projects are within the scope of actions addressed by this SA. Long-term actions are identified and considered within the cumulative impact analysis as appropriate. The near-term projects that NNSA has identified are as follows:

- High Explosive Pressing Facility (HEPF);
- ASC;
- Zone 11 High Pressure Fire Loop (HPFL) (note: project is being evaluated for execution as a non-Line Item project);
- HESE Facility;

- Bay/Cell Modernization Expense Projects (note: project is being evaluated for execution as a non-Line Item project);
- Production Support Fire Protection Lead-Ins;
- Inert Machining Facility;
- Security Upgrade Projects (Central Alarm Station [CAS] and Secondary Alarm Station [SAS] Replacement) (note: project is being evaluated for execution as a non-Line Item project); and
- Material Staging Facility (MSF) (CNS 2016a).

Table A-1 (see Appendix A) provides more details concerning these near-term projects. That table also identifies and describes: (1) Recapitalization Projects (e.g., projects that would improve the condition and extend the design life of general purpose infrastructure, equipment, and/or systems required to support NNSA missions); (2) Perched Groundwater Corrective Measures Projects Funded by Long-Term Stewardship; and (3) Other Long-Term Projects.



Source: CNS 2016a.

Figure 2-2. Major Construction Projects Planned at Pantex (2016-2045)

The following sections describe initiatives that are planned to transform Pantex operations to achieve a future state that is more modern, responsive, and cost effective. Initiatives are described for the following: Weapon Assembly/Disassembly (Section 2.1.1), Nuclear Materials Management (Section 2.1.2), High Explosives (Section 2.1.3), and Enabling Infrastructure (Section 2.1.4).

2.1.1 Weapon Assembly/Disassembly

Most weapon assembly/disassembly operations are conducted in multiple bay and cell facilities as well as special purpose satellite facilities. Bay facilities are production buildings constructed for the assembly, disassembly, examination, testing, training, staging, and packaging of cased nuclear explosives sub-

assemblies. Production operations involving cased HE, as well as uncased insensitive HE, are conducted in bays. Production operations involving uncased conventional HE main charges must be performed in cells (CNS 2016a).

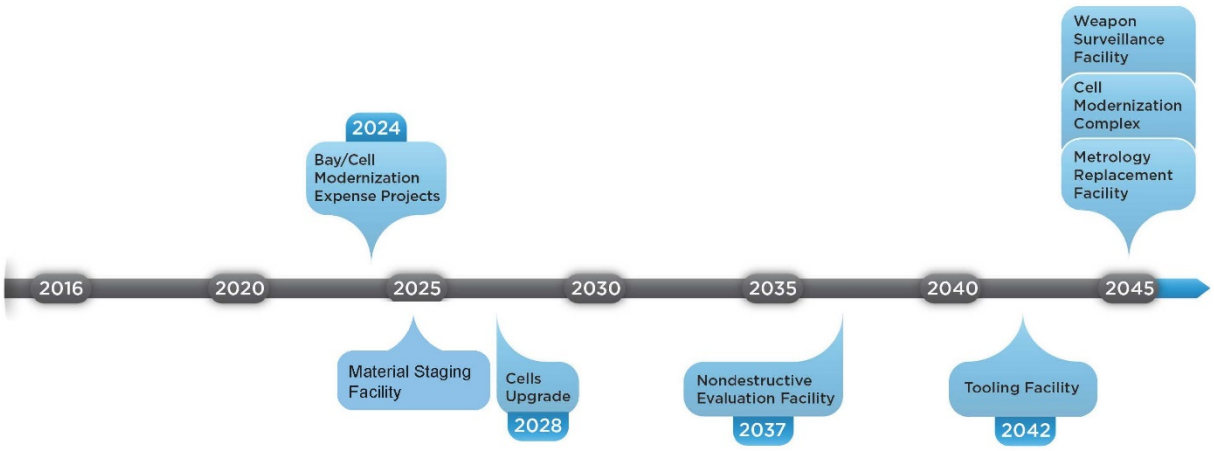
Staging of nuclear weapons is approved in multiple staging magazines located in the Zone 4 Material Access Area (MAA). Pantex receives off-site nuclear explosive shipments in the Zone 4 MAA, where staging is approved until the items are delivered to the Zone 12 Production area, and again after work is completed and the item is waiting to be shipped off site. Bay facilities can be used for staging weapons after delivery from Zone 4 before the unit is processed or vice versa (CNS 2016a).

Figure 2-3 depicts the initiatives related to weapon assembly/disassembly that could occur over the next three decades. As shown on Figure 2-3, the near-term initiatives planned for the weapon assembly/disassembly operations involves: (1) the Bay/Cell Modernization Expense Projects, which would modernize the existing bay and cell facilities to ensure continued operations; and (2) construction of the MSF, which could begin in approximately 2021.

For the Bay/Cell Modernization Expense Projects, the initial modernization project will specifically address replacement of HPFL Lead-ins, flame detection, and Radiation Alarm Monitoring Systems (RAMS). Other modernization activities will be performed as required, such as blast door interlock systems, electrostatic discharge flooring installation and repair, or mechanical and electrical upgrades. As part of the Bay/Cell Modernization Expense Projects, Production Support Fire Protection Lead-Ins to production bay and cell facilities would be replaced, as well as the portion of the Zone 12 MAA HPFL main piping that was not replaced with the Zone 12 MAA HPFL line item project. The Zone 11 HPFL line item project would replace the Zone 11 HPFL and lead-in piping (CNS 2016a). The HPFL would be dedicated to supply water for fire protection systems or fire apparatus to both Zones 11 and 12 and would be designed to provide water at a pressure, flow rate, and quantity to meet the demands of the fire suppression system in each facility. A loop and grid configuration would provide multiple water paths and allow sectional isolation with no or limited impact on facility fire protection. The majority of the Zone 12 MAA HPFL main loop piping was replaced in 2012, and two new tank and pump facilities were constructed in 2013. NNSA would prepare appropriate NEPA documentation for the Production Support Fire Protection Lead-Ins and HPFL, as discussed in Table A-1 (see Appendix A).

With regard to the MSF, that facility would involve relocating the current staging of weapons operations in a new location in close proximity to the Zone 12 Production Area. This would reduce the safety and security risk associated with transporting nuclear weapons and nuclear parts through limited and protected areas. It would also eliminate inclement weather risks that may cause delays and postpone weapon movements between the two areas. Because construction of the MSF is expected to begin in approximately 2021, the MSF is addressed within the scope of this SA. Once operational in approximately 2025, the MSF would allow for demolition of all Zone 4 MAA facilities, as discussed in Table A-1 (CNS 2017a).

As shown on Figure 2-3, the most notable long-term initiative related to weapon assembly/disassembly operations would be the Weapons Surveillance Facility (WSF). The WSF would be used for future surveillance requirements, including high-energy radiography, neutron radiography, and to coordinate measured/computed tomography (CNS 2016a).



Source: CNS 2016a.

Figure 2-3. Weapon Assembly/Disassembly Initiatives (2016-2045)

2.1.2 Nuclear Materials Management

Pantex has played a pivotal role in NNSA nuclear materials management strategies since its inception. Pantex strives to continue improving execution of current program mission and securing new mission assignments while enhancing safety, security, and quality. Nuclear materials management includes production and surveillance functions required to certify the current nuclear weapons stockpile, requalification efforts supporting life extension activities, and nuclear material staging and nuclear component on-site and off-site transport. Program elements include:

- Pit requalification;
- Pit surveillance;
- Pit, reservoir, and radioisotope thermoelectric generator (RTG) packaging; and
- Nuclear material staging/storage.

From a Pantex mission perspective, requalification involves processes that generally restore the component to its original mark-quality condition with essentially no changes to its design or performance features. Pit requalification activities support life extension activities and include capabilities to perform radiographic analysis, cleaning operations, visual inspection, weighing operations, leak testing, dye penetrant inspection, eddy current testing, dimensional inspection, marking operations, imaging, microfocus X-ray tube and weld analysis, gas enhancement, gas analysis, and non-pit metallography.

Pit surveillance activities support disassembly and inspection activities that provide data on aging characteristics and include capabilities to perform radiographic analysis, cleaning operations, visual inspection, weighing operations, leak testing, marking operations, imaging, microfocus X-ray tube and weld analysis, gas sampling, gas analysis, dimensional inspection, and non-pit metallography.

Pit, reservoir, and RTG packaging activities support component surveillance, component disposition, and limited life component exchanges.

Figure 2-4 depicts the initiatives related to nuclear materials management that could occur over the next three decades. Long-term pit surveillance activities include pit imaging, weighing operations, leak testing, radiographic analysis, gas sampling, gas analysis, dimensional inspection, visual inspection, and thermal monitoring of pits in sealed insert containers. The majority of nuclear material staging is currently approved

for Zone 4 MAA. Long-term nuclear material staging will be located at Pantex for the foreseeable future. In-process nuclear material staging activities in the Zone 12 Production area are currently approved for various facilities. To meet staging capacity requirements, a certain number of bays are being converted from packaging and container support operations. The proposed MSF (described in Section 2.1.1) would also support the nuclear materials management mission once it becomes operational in 2025 and would eliminate the need for nuclear material staging in certain facilities.

Source: CNS 2016a.

Figure 2-4. Nuclear Materials Management Initiatives (2016-2045)

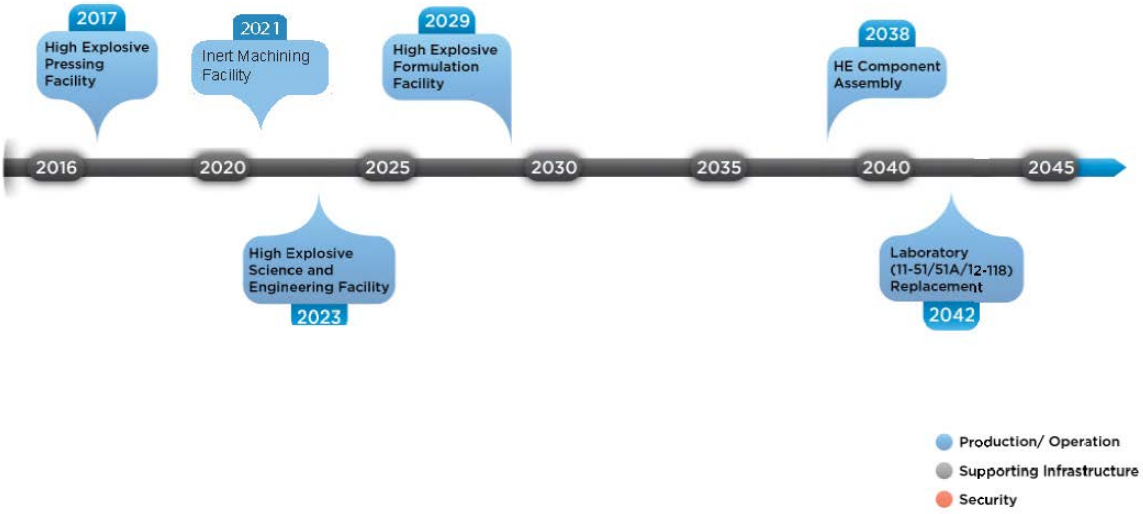
2.1.3 High Explosives

Pantex is designated as the Center of Excellence for HE Manufacturing and as a collaborative partner with the national laboratories for transitioning research and development from bench scale to production scale. Pantex is the only site in NNSA's Nuclear Security Enterprise (NSE) with cradle-to-grave responsibility for HE production; including HE synthesis, formulation, pressing, machining, chemical and mechanical testing, small component assembly and disassembly, test firing, and disposition. Consequently, long-term stewardship of the facilities, equipment, and infrastructure that make this unique and vital capability possible is paramount. HE operations are currently housed in more than 33 facilities in Zone 11, Zone 12 South, and at the remote firing sites (CNS 2016a). HE storage is located in the Zone 4 East magazines.

Figure 2-5 depicts the initiatives related to high explosives that could occur over the next three decades. As shown on Figure 2-5, three near-term initiatives related to high explosives are expected to occur within the next five years: (1) operation of the HEPF; (2) construction of the HESE Facility; and (3) construction of the Inert Machining Facility. These missions and the three new facilities are described below.

HEPF. Currently, Buildings 12-063 and 12-017 support explosive pressing operations. Building 12-017 is a World War II-era facility built in 1945, and Building 12-063 was built in 1969. The new HEPF has been constructed; however, at the current time, this facility is not operational. After start-up of the new HEPF is completed, pressing operations will have adequate facilities for the foreseeable future. The HEPF will consolidate several HE operations and improve efficiency and safety while also decreasing operational costs (CNS 2016a). The HEPF is shown in Figure 2-6. NNSA completed an EA for the HEPF and issued a FONSI in 2008 (DOE/EA-1613; NNSA 2008c).

HESE. The HESE Facility would provide a modernized capability-based infrastructure for HE manufacturing, surveillance, testing, and technology development. The HESE Facility would replace 25 critical aging facilities, averaging more than 58 years old. The facility is currently being designed, with construction assumed to occur in late 2018, and operations assumed to begin in approximately 2023. Construction of the HESE Facility would provide production space and adequate administrative facilities for the Zone 11 HE production area. Administrative office buildings in Zone 11 would be demolished after construction of the HESE (CNS 2016a).



Source: CNS 2016a.

Figure 2-5. High Explosive Initiatives (2016-2045)

The HESE Facility would include an HE wet chemistry/synthesis area currently located in Building 11-017 and a metals analysis area currently located in two rooms of Building 11-051. The rooms vacated in 11-051 would then be used for the other operations (e.g., High Pressure Liquid Chromatography, Ultra Performance Liquid Chromatography, and Discrete Analysis) currently located in Building 11-017, which would allow 11-017 and 11-017A to be demolished. In addition, all explosive physical properties testing operations currently in Building 11-005 and testing operations in Building 11-038 are scheduled to be moved into the HESE upon completion of the project. Buildings 11-005 and 11-038 could then be demolished (CNS 2016a). NNSA completed an EA for the HESE Facility and is expected to issue a FONSI in 2018 (DOE/EA-1993; NNSA 2017a).

Inert Machining Facility. The Inert Machining Facility, which is also referred to as the Advanced Fabrication Facility, is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS. This facility, which is expected to be located in Zone 11, would provide a modernized capability-based infrastructure for HE manufacturing, surveillance, testing, and technology development. This facility would support the characterization, sanitization, and disposition of components generated from dismantlement processes. This facility would also support new HE technology. Construction of the facility is assumed to occur in 2019, with operations assumed to begin in approximately 2021.

As shown on Figure 2-5, there are three additional facilities associated with the HE mission that could be constructed in the 2029-2042 timeframe. NNSA would prepare appropriate NEPA documentation for these facilities when they are ripe for analysis and decision-making.

Source: CNS 2016a.

Figure 2-6. High Explosive Pressing Facility

2.1.4 Enabling Infrastructure

At Pantex, the majority of space is captured in the mission-dependent support category, which houses operations that support mission-critical facilities and operations. Approximately 58 percent of the Plant's square footage is in this support category. As these facilities age, the cost to maintain these facilities over the planning horizon will continue to increase. The loss of support functions provided by these facilities could directly impact mission deliverables (CNS 2016a).

Enabling infrastructure includes information related to the following categories of assets:

- Administrative;
- Change houses;
- Information Technology;
- Maintenance;
- Warehousing;
- Security;
- Waste Management;
- Work for others; and
- Site Infrastructure (CNS 2016a).

Administrative facilities account for more than 430,000 square feet at Pantex, of which approximately 51,000 square feet is leased. With a few exceptions, the majority of the Pantex administrative operations

are conducted in Zone 12 North. The existing Zone 12 North facilities that house Pantex strategic and administrative capabilities are, on average, approximately 50 years old, are functionally inadequate, and technologically obsolete. Administrative functions are housed in large, WWII-vintage facilities and maintenance-laden aging metal structures that are high energy users, difficult to sustain, and nearing the end of their useful life. Most administrative facilities are DOE owned, with only four contractor-leased office buildings. Zone 11 administrative offices are mainly located in Buildings 11-002, 11-027, 11-054, 11-054A, and leased Building 09-059. Administrative and technical support functions located in other production areas are normally located in small portions of production or staging facilities. Some examples are 12-042 offices, 12-061 offices, and the 12-121 office area (CNS 2016a).

Pantex has developed a strategy to implement the NNSA vision for the plant by providing assets that can be managed in a sustainable manner and administrative facilities to attract, manage, train, and retain the best workforce to meet future mission needs. A new administrative facility, the ASC, will be an approximately 343,000 square foot facility that will be leased by the Pantex management and operating contractor. The ASC, which will replace 51 aging buildings, will house approximately 1,100 site personnel and provide conference rooms, medical facilities, a large auditorium, and a cafeteria. NNSA approved the construction of the ASC, received approval from the U.S. Office of Management and Budget, and the developer has begun construction. After personnel are relocated to the new ASC, the existing facilities will be demolished and leases terminated over a 10-year time frame. The ASC will provide Pantex with adequate administrative facilities into the foreseeable future. Groundbreaking for the ASC occurred on August 18, 2016 and construction is currently underway. The ASC is expected to be operational in the spring of 2018. The ASC will be located approximately one mile southeast of the southernmost boundary of Pantex (CNS 2016a). As shown in Table 1-1, NNSA issued a categorical exclusion (CX) for the ASC in 2015 (NNSA 2015c).

With regard to Security Upgrade Projects, in the near term, NNSA is planning to replace security booths, upgrade cameras and communications, upgrade/replace the CAS/SAS, upgrade perimeter fences, provide enhanced detection devices, and construct new convoy routes within the site (CNS 2016a). NNSA would prepare appropriate NEPA documentation for these security upgrades as discussed in Table A-1 (see Appendix A).

Other than excessing a few small trailers, Pantex has not received funding for building demolition since the end of NNSA's Facilities and Infrastructure Recapitalization Program funding. Demolition is not a high priority for the majority of excess facilities. In general, the existing excess facilities (approximately 35,000 square feet) currently at Pantex are small and do not present hazards to workers, the public, or the environment. In addition, there is lack of major resources required to manage the facilities to ensure they remain in a safe configuration. Planned modernizations at Pantex within the next 10 years through the construction of the ASC, HEPF, HESE Facility, and MSF will substantially increase the number of vacated facilities. Approximately 456,000 square feet of demolition related to the ASC and HESE facility is expected to occur in 2018-2027 (CNS 2017a). Table A-1 in Appendix A lists the facilities that would be demolished once the ASC and HESE Facility become operational.

2.2 Operating Basis and Operational Changes

The SWEIS presented the environmental impacts of operating Pantex at a maximum activity level of 2,000 weapons per year and increasing the interim storage limit of pits from 12,000 pits to 20,000 pits. Table 2-1 provides a summary of the Pantex Plant's operating basis in terms of the number of weapons assembly/disassembly actions accomplished since DOE issued the SWEIS, as well as those actions planned over the next five years. [Note: The 2003 SA identified the pit repackaging activities as a separate, scheduled function that was also representative of the Plant's operating basis. However, the backlog of repackaging actions was completed in the 2005/2006 timeframe, so those actions are not shown in the table.

Changes in the number of pits in interim storage and pit packaging, or repackaging, actions are now a direct function of the weapons assembly/disassembly activity.]

Table 2-1. Weapons Work Since the SWEIS was Issued and Planned Through 2023[a]

Fiscal Year	Weapons Assembly/Disassembly[b] (units)	Fiscal Year	Weapons Assembly/Disassembly[b] (units)	Fiscal Year	Weapons Assembly/Disassembly[b] (units)
1996	1,976	2006	828	2016	919
1997	884	2007	1,027	2017	869
1998	1,422	2008	1,152	2018	1,039
1999	591	2009	704	2019	987
2000	636	2010	766	2020	1,095
2001	530	2011	774	2021	931
2002	985	2012	708	2022	880
2003	699	2013	552	2023	922
2004	430	2014	901		
2005	562	2015	597		

a. Source: CNS 2017a.
b. Includes dismantlement, evaluation, maintenance, rebuilds, limited life components, and repair units. The unit numbers are actuals for FY1996 through FY2016. The estimates (FY2017 through FY2023) were as of October 2017, but they change frequently over time as planning factors change.

Operational changes evaluated in this SA include changes in mission-related and non-mission-related activities at Pantex that may result in environmental impacts or may indicate variances in the parameters that were assumed in the SWEIS analyses. These changes mainly involve the weapons workload level and associated activities; explosives fabrication, detonation, and disposition activities (including sanitization); and the overall square footage of facilities. In addition, changes in staffing levels may result from changes in mission- and non-mission-related activities. As shown in Table 2-1, Pantex operations over the next five years are expected to be less than the activity level of 2,000 weapons per year analyzed in the SWEIS. In addition, the interim storage limit of pits is not expected to increase beyond the 20,000 pits analyzed in the SWEIS. Lastly, as discussed in Table 3-1 of this SA, the overall square footage of facilities at Pantex is expected to increase slightly until ASC related demolition is completed.

2.3 Environmental Changes

Environmental changes pertain to changes in the environmental resources that provide the baseline for evaluating environmental impacts or to changes in the parameters and assumptions used for the environmental impacts analyses. This section summarizes information, primarily from the *Site Environmental Report, Pantex Plant 2015* (CNS 2016c), to demonstrate that the natural environment depicted in the SWEIS has not changed appreciably.

2.3.1 Land Resources

There have been minor, but notable, changes to land resources at the Pantex Plant since the SWEIS. The Pantex Plant comprises 11,703 acres of land, including 9,100 acres in the main Plant area, 1,526 acres in four tracts purchased in the latter part of 2008 (adjacent to the main Plant area, but east of FM 2373), and 1,077 acres approximately 2.4 miles to the northeast, at Pantex Lake (CNS 2016c). Additionally, 5,748 acres of land south of the main Plant area are leased from TTU for use as a safety buffer zone (Note: The leased buffer zone from TTU was 5,800 acres but 52 acres were sold recently for construction of the new ASC) (CNS 2017a). In 2014, the Pantex Plant completed the development of the PREP, an 11.5 megawatt, five-turbine wind farm, which is currently in operation on the newly acquired land east of FM 2373 (CNS

2016c). The PREP was evaluated in an EA and a FONSI was issued in 2010 (DOE/EA-1696; NNSA 2010a, NNSA 2010b).

Pantex has developed a long-range plan that balances new construction, energy conservation, and facilities disposition and is aligned with workload projections to ensure support of the mission. Future plans for the Pantex Plant include reinvestments to make the Plant more responsive to the country's needs and will be managed by DOE in accordance with the *Ten-Year Site Plan for the Pantex Plant and Y-12 National Security Complex (FYs 2016-2025)* (CNS 2015a).

Onsite Land Uses. Pantex is located in Carson County in the Texas Panhandle, north of U.S. Highway 60 and 17 miles northeast of downtown Amarillo (Figure 1-1). The site is composed of several functional areas, commonly referred to as zones (Figure 2-1). Land use at the site is categorized as Operations, Mixed Use, Cultivation, Grazing, and Undeveloped. Overall, there are more than 610 buildings at the site. Many of these areas are grouped into large functional zones, four of which remain active. Included within the zones are a weapons assembly/disassembly area, a weapons staging area, an area for experimental explosives development, a drinking water treatment plant, a sanitary wastewater treatment facility (WWTF), a vehicle maintenance facility and administrative areas. Other functional areas include a utilities area for steam and compressed air, an explosives test-firing facility, a Burning Ground for thermally processing (i.e., burning or flashing) explosive materials, pump and treat groundwater remediation facilities, several agricultural tracts which are irrigated via a subsurface fluid distribution system, and landfills. One functional area is currently used only for storage. (CNS 2016c)

Wastewater generated at Pantex is routed through a sewer system to a wastewater treatment facility. On October 6, 2003, the Texas Commission of Environmental Quality (TCEQ) issued Pantex a Texas Land Application Permit (TLAP) that authorizes beneficial reuse of the wastewater for the purpose of agricultural irrigation via a subsurface water distribution system. Construction of the subsurface distribution system was completed prior to the end of 2004. The treated effluent from the wastewater treatment facility and from the perched aquifer pump and treat systems can be discharged to this subsurface irrigation system. Pantex is also authorized to discharge wastewater to an on-site playa wetland pursuant to a Texas Water Quality Permit (TWQP) issued by the TCEQ (CNS 2016c).

The weapons assembly/disassembly area covers approximately 200 acres and contains more than 100 buildings. Nuclear components, parts received from other DOE Plants, chemical explosive components, and metal parts fabricated at Pantex can be assembled into nuclear weapons in this zone. Nuclear weapons are also disassembled there (CNS 2016c).

One zone is used for general warehousing and temporary holding (or staging) of weapons and weapon components awaiting movement to another area for modification, repair, or disassembly; for shipment to other DOE facilities for reworking; for shipment to a facility for sanitization; or for shipment to the military. The warehouse area is also used for interim storage of plutonium components from disassembly operations (CNS 2016c).

The explosives development area consists of facilities for synthesizing, formulating, and characterizing experimental explosives.

The drinking water treatment system consists of production wells, water treatment/pumping facilities, storage tanks, and associated distribution lines. This system also supplies water to the high-pressure fire protection system (CNS 2016c).

Surrounding Land Use. The land surrounding Pantex is used mainly for winter wheat and grain sorghum farming, for ranching, and for mining (oil and gas) (CNS 2016c). Ranching in the region consists of cow-

calf and yearling operations. In the area near the Pantex Plant, residences occur mostly in the small town of Panhandle, 11 miles east of Pantex. Other concentrations of residences are at Highland Park Village, approximately 7 miles southwest and Washburn 6.5 miles south. The closest residences to the Site are approximately 100 feet west and north of the Plant boundary along FM 683 and FM 293, and within 0.5 miles east of the Plant boundary along FM 2373.

2.3.2 Visual Resources

The Pantex Plant is located on the Southern High Plains portion of the Great Plains, at an elevation of approximately 3,500 feet. Topography is relatively flat, characterized by rolling grassy plains and numerous natural playa basins. The office and production buildings at Pantex are visible to some landowners, and to traffic along Highway 60, FM 2373, 683, and 293. The region is a semi-arid farming and ranching area. Pantex is surrounded by agricultural land, but several industrial facilities are also located nearby (NNSA 2017a).

The developed areas at Pantex are consistent with a Visual Resource Management Class IV designation ("To provide for management activities which require major modification of the existing character of the landscape, the level of change to the characteristic landscape can be high"), as defined by the Bureau of Land Management (BLM) (DOI 2001). The remainder of the Pantex Plant is consistent with a Visual Resource Management rating of Class III ("To partially retain the existing character of the landscape, the level of change to the characteristic landscape should be moderate") or IV (BLM 1980).

The Pantex Plant landscape is comprised largely of cultivated cropland and rangeland, which is typical of the High Plains region of Texas. The industrial land uses within Pantex are surrounded by cropland and rangeland that blend into the offsite viewscape. The site's interior is generally visible from surrounding roads and low-density rural housing areas. The elevated, spherical water tower is the site's most visible feature (NNSA 2013a).

From the most sensitive vantage point for Plant facilities at the intersection of FM 2373 and U.S. Highway 60, the Plant appears as a low cluster of buildings on the flat landscape. U.S. Highway 60 is part of the Texas Plains Trail, a scenic road that designates the Pantex Plant as a point of interest. The Plant operations area is visible from Interstate 40, which is located farther to the south, with the closest viewpoint at a distance of about 6 miles (NNSA 2013a).

The current viewscape of the Pantex Plant is basically the same as it was in the mid-1990s when the SWEIS was prepared. Several new structures have been constructed and older buildings have been demolished. However, new facilities are similar in size and appearance to existing facilities, and neither construction nor demolition has changed the overall appearance of Pantex (NNSA 2013a, CNS 2017a).

2.3.3 Geology and Soils

The Pantex Plant is located in the Southern High Plains. The topography is relatively flat and marked by thousands of playa wetlands. Pantex is located on the Amarillo Uplift, which, along with the Oldham-Harmon Trend, comprise a west-northwest trending uplifted area that separates the Anadarko Basin to the northeast and the Palo Duro Basin to the southwest. Pantex is located at the southeastern edge of the Whittenburg Trough that separates the Amarillo Uplift from Bush and Bravo Domes to the west (NNSA 2008b).

Geology. The primary surface deposits at Pantex are the Pullman and Randall soil series, which grade downward to the Blackwater Draw Formation. This formation consists of about 50 feet of interbedded silty clays with caliche and very fine sands with caliche (NNSA 2017a). Underlying the Blackwater Draw

Formation, the Ogallala Formation consists of interbedded sands, silts, clays, and gravels. The base of the Ogallala Formation is an irregular surface that represents the pre Ogallala topography. As a result, depths to the base of the Ogallala vary. At the Pantex Plant, the vertical distance to the base of the Ogallala varies from 300 feet at the southwest corner to 720 feet at the northeast corner of the property. Underlying the Ogallala Formation is sedimentary rock of the Dockum Group, consisting of shale, clayey siltstone, and sandstone. The deep geology 4,000 feet below the site has a major influence on the natural radiation environment, because radon is released from the underlying granitic rocks (CNS 2016c).

Onsite soil monitoring results for 2015 were within the concentration ranges observed for uncontaminated local soil and was comparable to both historical results and those for control locations (CNS 2016c).

Seismology. Seismic events have occurred infrequently in the region, and their magnitudes have been low. The stress conditions at the site are such that the possibility of high-order seismic events is extremely unlikely. A qualitative understanding of present conditions at Pantex indicates that anticipated seismic activity is well below the level that is necessary to cause significant damage to structures at the Plant (CNS 2016c).

The U.S. Geologic Survey (USGS) prepared the "Documentation for the 2014 Update of the United States National Seismic Hazard Maps" (USGS 2014), which provides seismic hazard assessment information that can be used to identify areas where built structures are likely to experience large seismic loads. The USGS National Seismic Hazard Maps Project (NSHMP) maps depict time-independent earthquake ground-shaking exceedance levels at specified probabilities over a 50-year time period at several hundred thousand sites across the U.S. The models only apply time-independent models and do not consider the time since the last earthquake in the calculations. Figure 2-7 shows the differences between the 2008 and 2014 values for peak horizontal ground acceleration, 5-hertz (0.2-second) and 1-hertz (1-second) spectral accelerations for a 2-percent and 10-percent probability of exceedance in 50 years on a uniform firmrock site condition (USGS 2014). As shown in Figure 2-7, the potential for local or regional earthquakes (with a magnitude great enough to damage structures at the site to the degree that hazardous materials would be released) has increased slightly since 2008. Figure 2-8 provides more details regarding the location of the Pantex Plant on the new seismic hazard map.

Since 1995, there have been no earthquakes of magnitude 4 or greater within the Texas Panhandle and no earthquakes of magnitude 5 or greater within 200 miles of the Pantex Plant (NNSA 2013a). In 2015, there was a magnitude 3.1 earthquake near the Pantex Plant, but was not detected by the onsite seismograph. The earthquake was centered between the city of Amarillo, Texas, and the Pantex Plant, at a depth of approximately 2.5 miles, and lasted approximately seven seconds. CNS reported there was no damage and that the earthquake could not be felt by personnel in the operations center (Pantex Plant Defense Nuclear Facilities Safety Board [DNFSB] 2015).

The analysis presented in the SWEIS continues to conservatively estimate the potential for geologic hazards to affect existing or proposed facilities at Pantex. As was done in the SWEIS, the current value for land disturbance is for construction of projects that may occur within an approximately five year window starting at the present time.

Construction of the HESE Facility was recently evaluated in an EA (DOE/EA-1993, NNSA 2017a). All land-disturbing activities would include application of best management practices to minimize soil erosion, including measures to limit the amount of time soils are exposed until revegetated or otherwise covered.

Soils. Surface soils at Pantex consist mainly of Pullman clay and Randall clay, with areas of Estacado, Lofton, and Pep clay loams. The Pullman series dominate the upland areas, and Randall series dominate the playa bottoms. The Estacado, Lofton, and Pep clay loams are found in sloping areas surrounding the

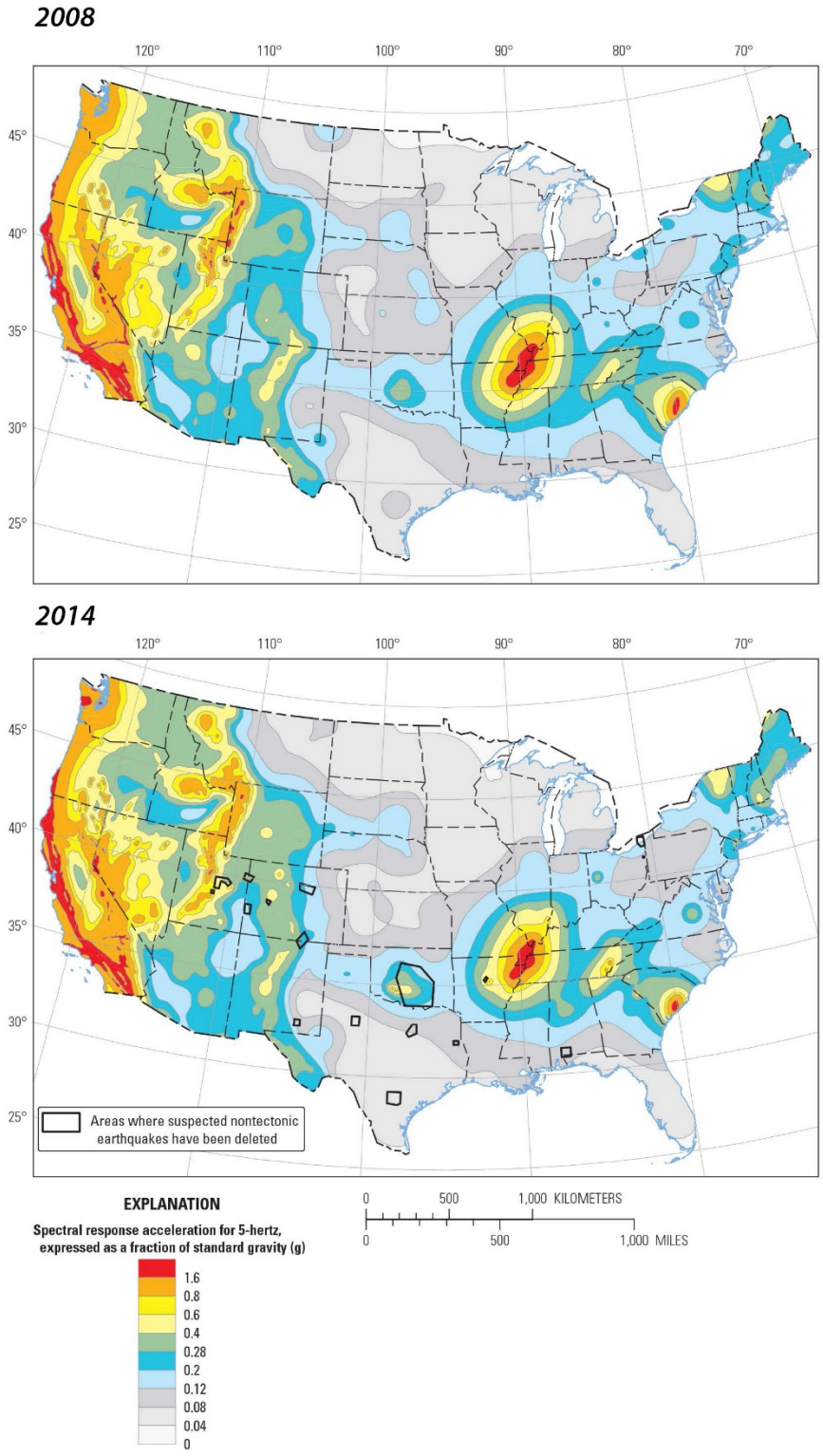
playa bottoms (NNSA 2008b). Pantex contains several soil types classified as prime farmland, which is defined in Prime and Unique Farmlands (7 CFR 657) as land containing the best combination of physical and chemical characteristics for producing crops. This includes cropland and rangeland, which covers the majority of the Pantex Plant (NNSA 2017a).

2.3.4 Water Resources

Surface Water, Floodplains, and Playas. Surface water represented by rivers or streams does not exist around the facility site and all surface water drains to isolated playa wetlands. The major surface water source near Pantex is the Canadian River, which flows into man-made Lake Meredith approximately 25 miles north of the Plant. Playa wetlands are shallow, ephemeral wetlands that have clay-lined basins that fill periodically with surface water runoff from major storm events. There are approximately 20,000 of these playas in the Southern High Plains. Playa lakes are extremely important hydrologic features that provide prime habitat for wildlife, especially waterfowl that winter in the Southern High Plains. Playas are also believed by most authorities to be an important source of recharge for the Ogallala Aquifer, the area's primary source of groundwater.

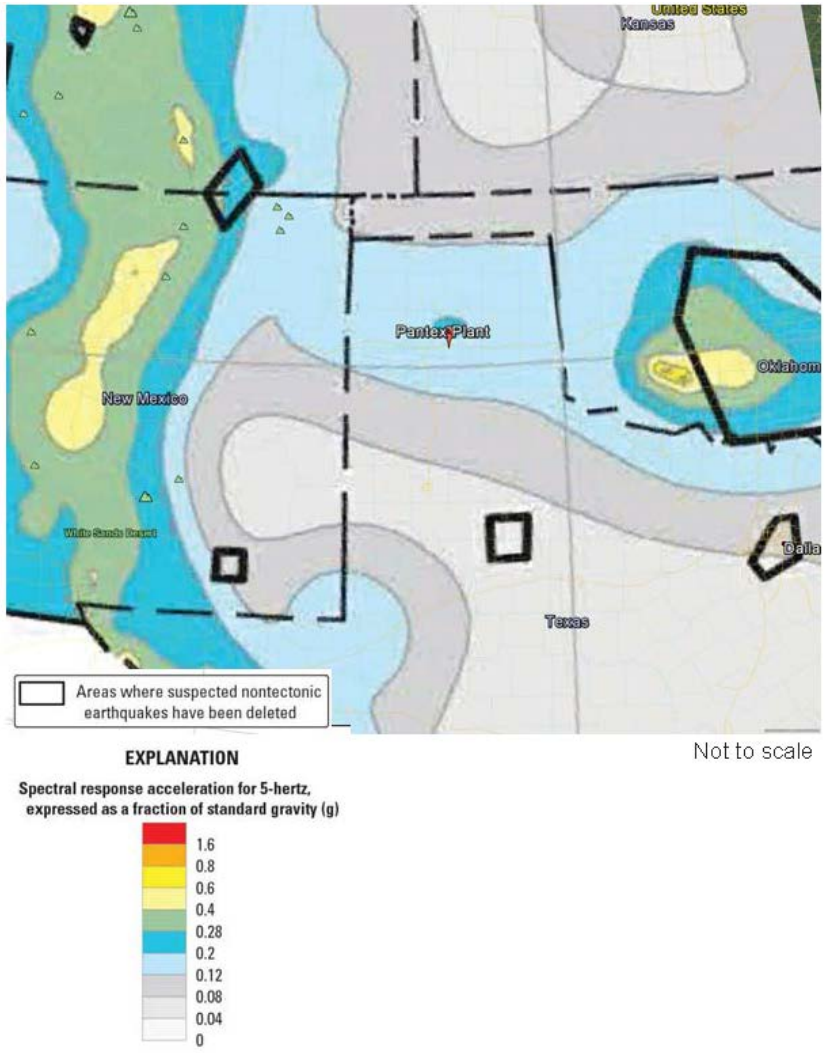
At Pantex, six playas are located on DOE-owned and -leased property. Two of these are on property owned by TTU. Most of the surface drainage on the DOE-owned and -leased lands flows via man-made ditches, natural drainage channels, or by sheet-flow to these on-site playa basins. Playa basins consist of the ephemeral wetlands themselves and their surrounding watersheds. Figure 2-9 is a map of the Pantex Plant that shows the locations of the five playas at the main site with their respective drainage basins (watersheds) (note: the sixth playa is Pantex Lake, which is shown on Figure 1-2). Some storm water flows to off-site playas. These areas are at the outer periphery of the site and, for the most part, a considerable distance from most Plant operations (CNS 2016c). Surface waters, for the most part, discharge into onsite playas. Storm water from agricultural areas at the periphery of the Plant drains into both onsite and offsite playas. From the various playas, water either evaporates or infiltrates the soil (NNSA 2013a).

The Tulsa District of the U.S. Army Corps of Engineers delineated floodplains on the Pantex Plant site in a 1995 delineation which revised an earlier delineation (CNS 2016c). Floodplain boundaries were delineated for Playas 1, 2, 3, and 4, Pantex Lake, and Pratt Lake (north of Pantex). According to the SWEIS, Playa 1 received continuous discharges from the Pantex Plant WWTF. Since issuance of the SWEIS, DOE/NNSA has obtained discharge permits and installed systems that allow treated water from the WWTF to be beneficially reused through discharge to an onsite subsurface irrigation system. Discharge of treated effluent to Playa 1 is still a permitted option, but is only used for backup. This has allowed the Playa 1 area to develop and be managed as a more natural environment. It also removes or reduces a primary source of focused recharge for the perched groundwater that underlies Playa 1 (NNSA 2013a). In calendar year 2015, all proposed activities at the Pantex Plant were evaluated during the NEPA process for potential impacts on floodplains and wetlands and other criteria required by 10 CFR §1022 (CNS 2016c).



Source: USGS 2014.

Figure 2-7. 5-Hertz (0.2 second) Spectral Acceleration for 2-Percent Probability of Exceedance in 50 Years



Source: USGS 2014.

Figure 2-8. Location of Pantex Plant on New Seismic Hazard Map

Groundwater. Groundwater beneath the Pantex Plant and vicinity occurs in the Ogallala and Dockum Formations at two intervals. The first water-bearing interval below Pantex is a discontinuous zone of perched groundwater located at approximately 200 to 300 feet below ground surface and 100 to 200 feet above the drinking water aquifer. The perched groundwater ranges in saturated thickness from less than a foot at the margins to more than 75 feet beneath Playa 1. The largest area of perched groundwater beneath Pantex is associated with natural recharge from Playas 1, 2, and 4, treated wastewater discharge to Playa 1, historical releases to the ditches draining Zones 11 and 12, and storm water runoff that drains to the unlined ditches and playas. Two hydraulically separate, relatively small, perched zones occur around Playa 3 (near the Burning Ground in the north central portion of the Plant) and near the Old Sewage Treatment Plant in the northeast corner of Pantex (CNS 2016c).

Historical operations at Pantex resulted in contamination of the larger perched groundwater area, and the contaminant plume has migrated past the Pantex Plant boundaries and beneath the adjacent leased property to the south and recently purchased DOE land to the east. Most of the impacted property to the east was

purchased in 2008 to allow better access for monitoring and control of perched groundwater. Because concentrations of contaminants in the perched groundwater beneath the Plant's property and off-site to the south and east currently exceed drinking water standards, the water is not safe for domestic or industrial use. On-site use of perched groundwater is restricted by Pantex (CNS 2016c).

The second water-bearing zone, the High Plains Aquifer (also known as the Ogallala Aquifer), is located below the fine-grained zone in the Ogallala and Dockum Formations. The Ogallala Aquifer is the major groundwater source in the vicinity of the Plant, which is used as a domestic source by numerous municipalities, and by industries in the High Plains. The groundwater surface of the Ogallala Aquifer beneath the Pantex Plant is approximately 400 to 500 feet below ground surface with a saturated thickness of approximately one to 100 feet in the southern regions of the Plant and approximately 250 to 400 feet in the northern regions. In the vicinity of the Plant, the primary flow direction of the Ogallala Aquifer is north to northeast due to the influence of the City of Amarillo's well field located north of the Plant. Historical groundwater withdrawals, and long-term pumping from the Ogallala in Carson County and the surrounding eight-county area, have exceeded the natural recharge rate to the Ogallala. These overdrafts have removed large volumes of groundwater from recoverable storage, and have caused substantial water-level declines (CNS 2016c).

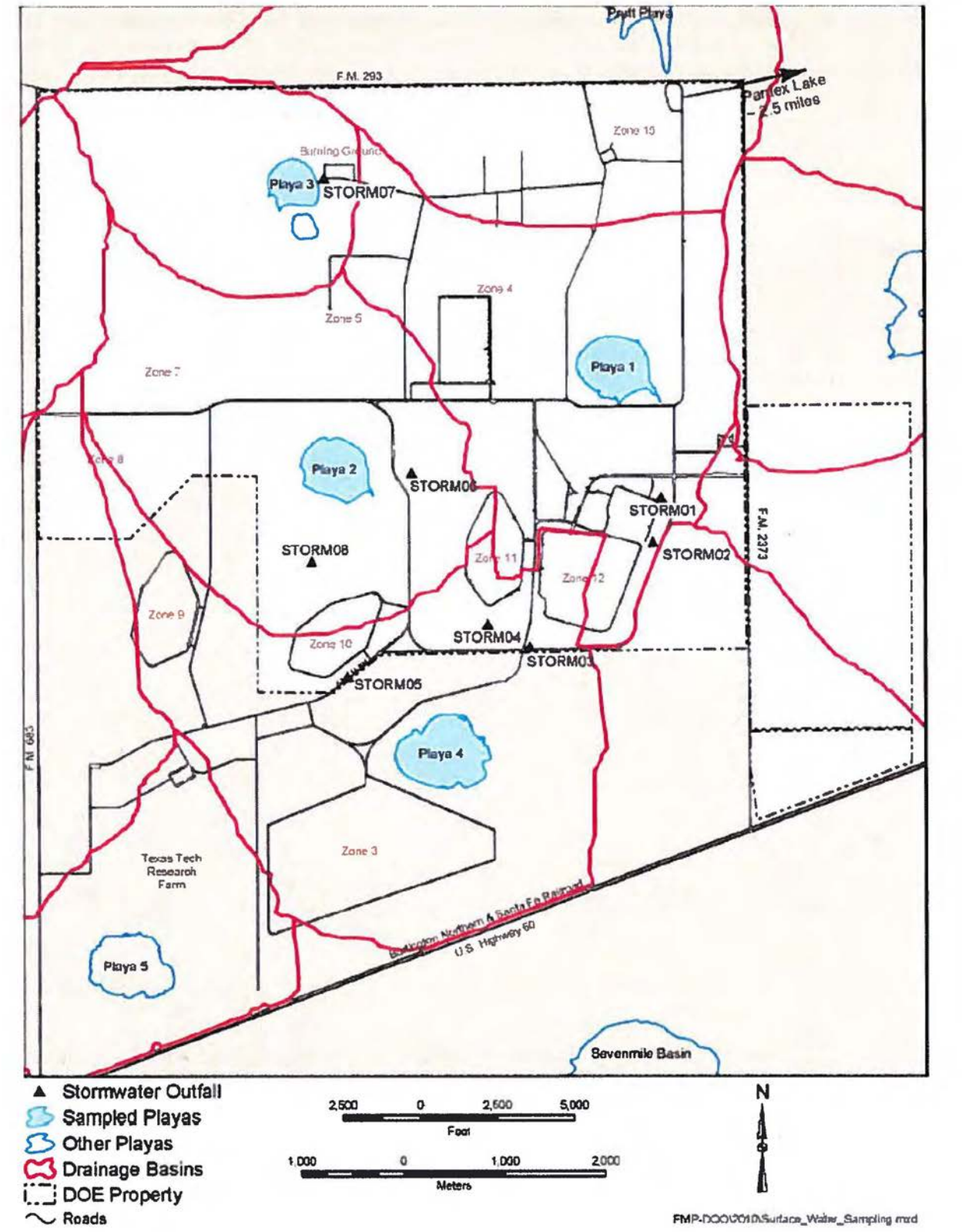
The large demands of the Amarillo area; which are mostly agricultural, are primarily responsible for the drop in the water table. The average change in "depth to water" from 1,209 Ogallala Aquifer observation wells in the Panhandle during 1988 to 1997 was 1.49 feet. Groundwater withdrawals from the Ogallala Aquifer in Carson County have averaged approximately 39 billion gallons over the last several years. This groundwater withdrawal rate is more than 10 times greater than the estimated annual recharge rate of 358 million gallons. Groundwater withdrawal rates are expected to decline each decade to approximately 21 billion gallons in 2060 (CNS 2016a).

The City of Amarillo, the largest municipal Ogallala water user in the area, pumps water for public use from the Carson County Well Field north and northeast of the Plant. Pantex obtains water from five wells in the northeast corner of the site. In 2016 Pantex pumped approximately 120 million gallons of water from the Ogallala Aquifer (CNS 2017a). Most of the water used at Pantex is for domestic purposes. Through an agreement with TTU, Pantex provides water for its domestic and livestock uses (CNS 2016c).

2.3.5 Air Quality

The climate at Pantex is classified as semi-arid and is characterized by hot summers and relatively cold winters, with large variations in daily temperature extremes, low humidity, and irregular periods of rainfall of moderate amounts. Based on data from the National Weather Service, rainfall during 2015 was very much above normal for the year with approximately 34.63 inches for the year. The annual average rainfall each year is typically 19.71 inches. Conditions during 2015, in terms of rainfall, resulted in the fourth wettest year on record since 1880 (CNS 2016c).

Pantex is located in an area with a relatively high frequency of tornadoes, convective wind events and hail. An average of 17 tornadoes occurred each year in the 20 counties of the Texas Panhandle and the adjacent three counties of the Oklahoma Panhandle during the period between 1950 and 2015. While the threat of tornadoes is real, tornado occurrences in Amarillo are generally rare. Tornadoes are most common from April to June. There were a total of 24 tornadoes reported in the Texas and Oklahoma Panhandles during 2015, a fraction of the number observed (58) during the very active year of 2007 (CNS 2016c).



Source: CNS 2016c.

Figure 2-9. Drainage Basins, Playas, and Storm Water Outfalls at Pantex Plant

Modeling results of concentrations for criteria and toxic pollutants using Pantex Plant emissions for ongoing operations indicated that none of the National Ambient Air Quality Standards (NAAQS) would be exceeded at the Plant boundary. All of the toxic air pollutants were estimated to be below their respective Effect Screening Levels at the Plant boundary (CNS 2016a). Modeling performed in 2008 demonstrated that the activities modeled would not cause a condition of "air pollution" as defined in the *Texas Clean Air Act*, Section 382.003(3) or violate the *Texas Clean Air Act*, Section 382.085 as codified in the Texas Health and Safety Code (NNSA 2013a).

Since the 2008 baseline year, the Pantex site has reduced total Greenhouse Gas emissions by 45 percent. The decrease in emissions is primarily associated with reductions in purchased electrical energy after the installation of the Pantex Renewable Energy Project in the summer of 2014.

Atmospheric emissions of radionuclides from DOE facilities are limited under the U.S. Environmental Protection Agency (EPA) regulation 40 CFR Part 61, Subpart H. The EPA annual effective dose equivalent limit of 10 millirem (mrem) per year to members of the public for the atmospheric pathway is also incorporated in DOE Order 458.1, "Radiation Protection of the Public and the Environment."

During current operations at Pantex, various radioactive materials including tritium, plutonium, uranium, and miscellaneous sources (e.g., thorium, cobalt and cesium) may be present in the components of nuclear weapons being managed. However, in normal operating situations, the nature of the work at Pantex and the physical form of the material are such that there is very little potential for the public, the environment, or Plant personnel to be affected by releases of radioactive materials as a result of Plant operations. As shown in Table 2-2, most of the small numbers of radionuclide releases during normal operations for CY 2015 at Pantex are tritium releases. Very small amounts of tritium escape as gas or vapor during normal operations (CNS 2016c). A small percentage (1.19×10^{-3} percent) of calculated emissions is due to emissions of uranium-238 and other radionuclides from various routine Plant activities. These emissions are summarized in Table 2-2.

Table 2-2. Average Pantex Radiological Atmospheric Emissions in Curies for CY 2015

Tritium (curies)	Total Uranium (curies)	Total Plutonium	Total Other Actinides (curies)	Other
1.87×10^{-2}	2.61×10^{-5}	None	6.94×10^{-15}	None

Source: CNS 2016c.

Since DOE issued the SWEIS, the Plant's air quality permits have evolved to address any changes in emissions as well as changes in regulations and compliance with permit limits has been maintained. Similarly, based on projected emissions for continued operations during the period 2012 through 2016, concentrations at the Pantex Plant boundary are estimated to continue to remain within all NAAQS and Effect Screening Levels, and overall Plant emissions should continue to be within permit and regulatory limits (CNS 2016c). All radiological air monitoring results in 2015 indicated results were not distinguishable from the background (CNS 2016c).

2.3.6 Acoustics

Sources of environmental noise onsite consist of background sounds from industrial processes, vehicular traffic, routine operations, alarms (fixed and on construction equipment), occasional high-explosives testing, firearms training for security police officers, ongoing construction and demolition of infrastructure, and the operation of heavy equipment during agricultural activities by TTU Research Farm personnel on lands managed for DOE/NNSA (NNSA 2013a, NNSA 2017a). Sources of environmental noise offsite

consist of background sounds from vehicular traffic on Highway 60 and county roads, airport traffic, railroad traffic, and the operations of heavy equipment during agricultural activities.

There have been no changes to most acoustic sources within and around Pantex since DOE issued the SWEIS. Since DOE issued the SWEIS, changes in acoustic sources include those associated with the testing of high explosives and PREP activities. The frequency of high explosives testing and the limits on the quantity of high explosives involved in a single test have increased since DOE issued the SWEIS. The 2013 SA (NNSA 2013a) addressed the potential effects from those testing increases in detail and concluded that the changes were not significant. There have been no further changes in acoustics associated with high explosives testing since that 2013 SA was prepared. With respect to the noise from the operation of wind turbine generators, those turbines are located far enough from developed areas that the noise is attenuated. Noise levels from the operation of wind turbines are within the same 40-60 dBA range as the existing average onsite sound levels (NNSA 2010a).

2.3.7 Biotic Resources

The Pantex SWEIS described the affected environment of the Pantex Plant in terms of vegetation and wildlife, with special attention given to the aquatic and wetlands resources associated with the playa areas of the Plant. The site of Pantex in the Southern High Plains is characterized as shortgrass prairie with a couple of specific dominant grass species, as well as several less abundant species. The SWEIS noted that in addition to the built-up operations areas within the Plant, much of the native shortgrass prairie had been converted for agricultural purposes. The SWEIS also identified birds, mammals, and reptiles that occur or potentially occur within the Plant area and are listed or considered rare or species of concern by the Federal or state governments. The bald eagle was identified as the only Federally-protected species known to inhabit the area for extended periods of time. This should have read "Federally threatened or endangered" species as most of the bird species found in the region are Federally-protected as migratory birds. The white-faced ibis was identified as a State-listed species that resided within the Plant area for at least portions of the year and the Texas horned lizard is a year-round inhabitant (DOE 1996a).

The SWEIS concluded there would be minimal impacts to biotic resources as a result of continued Plant operations because there would be no additional disturbance. The SWEIS recognized the potential for effects on protected or sensitive species as a result of associated noise, human activity, and equipment operations, but noted that animal and plant surveys had not shown any decline in the number of species present (DOE 1996a). Old world bluestem (*Bothriochloa and Dichanthium* [OWBS]) invasion and establishment hastened by Plant mowing activity has occurred since the SWEIS and is discussed extensively in "Vegetation" below. The SWEIS also concluded that existing natural resource programs within the Plant were attempting to manage portions of the property, particularly the playas, for the benefit of native and migratory wildlife species (DOE 1996a). Thus, continued Plant operations would include beneficial impacts.

Current Pantex operations are basically the same as those that were evaluated in the SWEIS. There have been changes available to characterize biotic resources and, in the case of protected and sensitive species, there have been changes in the status of specific species. There have also been changes in the direction and emphasis of some resource management plans, such as providing added focus on shortgrass prairie, playa wetlands, migratory birds, and pollinators. However, the objective of maintaining and enhancing habitat for native and migratory wildlife species has not changed.

Vegetation. Pantex is located within the Southern High Plains region. Vegetation is characterized as shortgrass prairie. The land ranges from unvegetated in the south-central industrial area of the Plant to a variety of shortgrass prairie species elsewhere on the site. The Plant and land leased from TTU incorporate three different land uses: cultivated ground, native grass, and rangeland. Cultivated ground consists of both

dry land and irrigated properties. The dry land areas are typically planted with winter wheat or grain sorghum. Irrigated land may be planted with winter wheat, cotton, grain sorghum, corn, or soybeans. The native grass areas primarily consist of blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*). Established cover on the Conservation Reserve Program land (no longer in the Federally-funded program as of October 2012 and only within the property leased from TTU) is blue grama, buffalograss, side oats grama (*Bouteloua curtipendula*) and, in several areas, OWBS. Although the Conservation Reserve Program is used in the SWEIS to characterize vegetation in the Pantex vicinity, land is accepted into the Program for specific contract periods and contracts on the Texas Tech Research Farm expired in the fall of 2012. All but a small percentage of this has been converted to dryland crop production. Unfortunately, OWBS, which was the grass cover established on Conservation Reserve Program lands, has invaded all of the shortgrass prairie areas on the Pantex Plant. This exotic grass spreads through blowing of seed by winds and is hastened by seed transport on mowing equipment. The grass eventually forms a monoculture stand of grass, rapidly out-competing forbs and grasses native to the soil type. Establishment of this species is happening across the region, especially in roadsides, however, its spread into grasslands has been especially rampant at the Pantex Plant.

OWBS was introduced into the Panhandle area as early as the 1920's by way of the Southern Plains Range Research Station (SPRS), Woodward, Oklahoma. The SPRS worked with several different varieties with origins from southeast Russia, Turkey, India, and Africa. These grasses were said to have great germination and establishment qualities, provide excellent cover, keep erosion to a minimum, and were cheaper than native grass seed mixtures. Once established the OWBS have become very aggressive due to the great adaptability to a wide range of soil types and ability to survive in semi-arid regions. These grasses tend to do best on loam to clay loam soils and produce a tremendous amount of seed with good growing conditions.

Pantex will continue to factor in OWBS as a habitat concern, in future research projects. Besides current evidence regarding horned lizards at Pantex, it has already been documented that lower bird species' richness, abundance, and arthropod availability are found in OWBS dominated grasslands compared to native prairie (Hickman, K. R., G. H. Farley, R. Channell, and J. E. Steier 2006).

Habitat. Shortgrass prairie, consisting of buffalograss, blue grama, and, in drainage ditches and low lying areas, western wheatgrass (*Agrophyron smithii*) represents the primary habitat for species of concern in the area, for example, the Texas horned lizard (*Phrynosoma cornutum*), ferruginous hawk (*Buteo regalis*), western burrowing owl (*Athene cunicularia hypugaea*), as well as various other migratory birds. This habitat is also the focus of DOE migratory bird and pollinator initiatives that have been implemented since the SWEIS; i.e., the most productive habitat and the areas least impacted by frequent mowing and other Plant activities.

Grassland habitat at Pantex has changed since the SWEIS. The establishment and spread of OWBS is of serious concern in regard to species adapted to the short and diverse structure of shortgrass prairie of which it displaces. Most grassland areas at Pantex have been affected and some are now solid stands of OWBS. Many areas are mowed frequently for fire prevention, safety, security and cosmetic reasons. Mowing after seed maturity creates a "clean" substrate that facilitates blowing of seed out of roadsides and grass stands and into surrounding areas. In addition, seed is also dispersed on mowing equipment and there are now sources of seed across the Pantex Plant. Black-tailed prairie dogs appear to be extremely effective in preventing the establishment of OWBS through their grazing and clipping activity.

Lower bird species' richness, abundance, and arthropod availability are found in OWBS dominated grasslands compared to native prairie (Hickman, K. R., G. H. Farley, R. Channell, and J. E. Steier 2006). In addition, OWBS displacement of native grasses was identified as a major threat to horned lizards at Pantex (Kazmeier 2011).

Over the next five years, there could continue to be minor fluctuations to the amount of land area associated with most of the habitat categories within the Pantex Plant and Pantex Lake. However, the wetlands and the associated grasslands that make up the playa management units as well as the shortgrass prairie areas in other parts of Pantex represent key areas of wildlife habitat and would be expected to remain at their current size.

Wildlife. There have been only minor changes to wildlife at Pantex since DOE issued the SWEIS and these are increases related to time and survey effort versus changes in habitat to this point in time. However, comparisons are yet to be made between surveys conducted before and after OWBS invasion. The current wildlife list for Pantex includes 46 species of mammals (up from 45 species reported in the 2013 SA), 202 species of birds (up from 197 in 2012), and 29 species of reptiles and amphibians (up from 28 species in 2012) (CNS 2016c). The majority of these species are associated with the playas and grassland areas. NNSA has instituted management initiatives to maintain biodiversity, including revegetation of formerly cultivated areas, especially around playas, and to manage prairie dogs as part of the shortgrass prairie ecosystem.

Threatened and Endangered Species. Since DOE issued the SWEIS, there have been changes to designations of several threatened and endangered species found at the Pantex Plant. Black-tailed prairie dog (*Cynomys ludovicianus*) colonies are found in the area. They are considered a species of concern by the State of Texas and attract or provide habitat for other special status species such as the ferruginous hawk, bald eagle (*Haliaeetus leucocephalus*), mountain plover (*Charadrius montanus*), and western burrowing owl.

The Texas horned lizard, designated as Threatened by the State of Texas, is the only threatened or endangered species that is a year-round resident of the area. With regard to Federal species of concern, the American and Arctic peregrine falcons (*Falco peregrinus anatum* and *Falco peregrinus tundrius*), American bald eagle, and whooping crane (*Grus americana*) may be observed on and around Pantex during the fall through spring migrational and wintering periods.

Table 2-3 identifies bird, mammal, reptile, and plant species that occur or could potentially occur at the Pantex Plant and that are listed or considered species of concern by the Federal government or the State of Texas. Included for comparison are the species of concern specifically identified in the SWEIS.

The "current status" information is obtained primarily from "The Rare, Threatened, and Endangered Species of Texas by County" database maintained by the Texas Parks and Wildlife Department. The table includes listings from the database for both Carson and Potter Counties. The State database also lists the status of species listed or considered species of concern by the Federal government. Because Table 2-3 is basically derived from two separate listings of different time periods, there are instances in which a species did not occur on both lists, indicated in the table by shading.

The Pantex SWEIS identified species of Federal interest with a specific listing status (for example, threatened, endangered, or candidate) or as "species of concern." For each State entry, the SWEIS included a specific listing status or the species was identified as "not listed." With regard to the current status in Table 2-3, the Southwest Region of the U.S. Fish and Wildlife Service indicated it does not keep a formal list of "species of concern," so no attempt was made to place species in that grouping, and the table entry is "not listed."

As can be seen in Table 2-3, there are several instances where the listing status for a species has changed since DOE issued the SWEIS. Primary examples are the bald eagle and peregrine falcon. In both instances, the species have been delisted from Federal status and downgraded from 'endangered' to 'threatened' on the State list. It should be noted, however, that the peregrine falcon and bald eagle are still protected under

the *Migratory Bird Treaty Act* (16 U.S.C. 703-7012) and the bald eagle has additional protections under the *Bald and Golden Eagle Protection Act* (16 U.S.C. 668-668d). Changes in the numbers of species in the different categories are unrelated to the operation of Pantex, and current operations of the Plant are having no different effect on protected or sensitive species than was identified in the SWEIS.

Table 2-3. Species of Interest Occurring or Potentially Occurring at the Pantex Plant

Common Name	Scientific Name	Status from SWEIS[a]		Current Status[b]	
		Federal	State	Federal	State
Birds					
American peregrine falcon	*Falco peregrinus anatum*	E	E	DL	T
Arctic peregrine falcon	*Falco peregrinus tundris*	E (S/A)	T	DL	SAT
Baird's sparrow	*Ammodramus bairdii*	SOC	NL	NL	NL
Bald eagle[c,d]	*Haliaeetus leucocephalus*	T	E	DL	T
Black tern[c]	*Chlidonias niger*	SOC	NL		
Ferruginous hawk[c,d]	*Buteo regalis*	SOC	NL	NL	NL
Loggerhead shrike[c]	*Lanius ludovicianus*	SOC	NL		
Migrant loggerhead shrike	*Lanius ludovicanus migrans*	SOC	NL		
Mountain plover[d]	*Charadrius montanus*	C	NL	NL	NL
Snowy plover	*Charadrius alexandrinus*			NL	NL
Western burrowing owl[c,d]	*Athene cunicularia hypugea*	SOC	NL	NL	NL
Western snowy plover	*Charadrius alexandrinus nivosus*			NL	NL
White-faced ibis[c]	*Plegadis chihi*	SOC	T	NL	T
Whooping crane[c]	*Grus americana*	E	E	E	E
Mammals					
Big free-tailed bat	*Nyctinomops macrotis*			NL	NL
Black bear	*Ursus americanus*			NL	T
Black-footed ferret	*Mustela nigripes*			E	NL
Black-tailed prairie dog[d]	*Cynomys ludovicianus*			NL	NL
Cave myotis	*Myotis velifer*	SOC	NL	NL	NL
Gray Wolf	*Canis lupus*			E	E
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*			NL	NL
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	NL	NL	NL
Swift fox[c]	*Vulpes velox*	C	NL	NL	NL
Western small footed myotis	*Myotis ciliolabrum*	SOC	NL	NL	NL
Reptiles					
Texas horned lizard[c,d]	*Phrynosoma cornutum*	SOC	T	NL	T
Plants					
Mexican mud-plantain	*Heteranthera mexicana*			NL	NL

Species not appearing in the SWEIS or, as applicable, not currently listed or of concern to the State for Carson and Potter Counties.

Status Codes:
C – Candidate for listing
DL – Delisted
E – Endangered
NL – Not listed
PT – Proposed threatened
R – Rare
S/A – Protected under the similarity of appearances provision of the *Endangered Species Act* (16 U.S.C. 1531)
SAT – Threatened due to similarity of appearance
SOC – Species of concern
T – Threatened

a. Source: DOE 1996a. Note: some species originally identified in the SWEIS are not included in this table if they have been delisted, not observed on the Pantex site, or the site does not have suitable habitat for that species.
b. Source: Federal listings – USFWS 2017; State listings – TPWD 2017. Note: The white-faced ibis did not occur on the species of concern lists for either Potter or Carson County, but since it is still considered "Threatened" by the State of Texas and is on the list of observed birds within Pantex, it is included in the table.
c. Species identified in the Pantex SWEIS as being observed within the Pantex Plant (DOE 1996a).
d. Species whose presence at the Pantex Plant was verified in 2015 (CNS 2016c) or in the case of birds, are on the All-Time Bird List for Pantex (B&W Pantex 2010).

2.3.8 Cultural Resources

Cultural resources identified at Pantex include archeological sites from prehistoric Native American use of what is now Plant land; standing structures that were once part of the WWII-era Pantex Ordnance Plant (1942- 1945); and buildings, structures, and equipment associated with the Plant's Cold War operations (1951- 1991). In addition, many artifacts and historical documents have been preserved which are valuable sources for interpreting prehistoric and historic human activities at Pantex. Some of these cultural resources are eligible for inclusion in the National Register of Historic Places (NRHP); thus, requiring protection and preservation under the *National Historic Preservation Act* (NHPA) and related Cultural Resource Management (CRM) requirements. The Pantex Plant's CRM program ensures compliance with all applicable state and Federal requirements (CNS 2016c).

The goal of the CRM program is to manage the Plant's cultural resources efficiently and systematically, taking into account both the Plant's continuing mission and historic preservation concerns. This goal is achieved through coordination with the Plant's project review process for compliance with the NEPA, and through consultation with the State Historic Preservation Officer (SHPO) and the President's Advisory Council on Historic Preservation (Advisory Council). In October 2004, DOE, Pantex, the Texas State Historic Preservation Office, and the Advisory Council completed execution of a Programmatic Agreement/Cultural Resource Management Plan (PA/CRMP). This PA/CRMP ensures compliance with Section 106 of the NHPA, providing for more efficient and effective review of Pantex projects having the potential to impact prehistoric, WWII era, and Cold War era properties, objects, artifacts and records. In addition, the PA/CRMP outlines a range of preservation activities planned for the Plant's compliance program. The PA/CRMP provides for the systematic management of all archeological and historic resources at Pantex under a single document (CNS 2016c). There have been no significant changes in cultural resources since the 2013 SA was prepared.

Archeological Resources. Pantex lies within the southern Great Plains archeological province; specifically, within the High Plains Ecological Region of the Texas Panhandle. Approximately half of the DOE owned and -leased land at Pantex has been systematically surveyed for archeological resources and based upon those surveys, a site-location model was developed. In 1995, a 2,400-acre survey confirmed that prehistoric archeological sites at Pantex are situated within approximately 0.25 mile of playas or their major drainage locations. The 69 archeological sites identified at Pantex consist of 57 Native American prehistoric sites and 12 Euro-American farmstead sites. In consultation with the SHPO, DOE determined that the 12 Euro-American historic sites are not eligible for inclusion in the NRHP. DOE and the SHPO concluded that two of the 57 prehistoric sites (41CZ66 and 41CZ23) are potentially eligible for the NRHP, but that additional field work would be required to make a final eligibility determination. DOE/NNSA will continue to protect these two sites and monitor them on a regular basis, as though they are eligible. If additional features are exposed and found, excavation will proceed if they cannot be adequately protected in-situ. These exposed features will be analyzed, mapped, collected, and excavated by archeological methods. All archeological reports, records, photographs, maps and artifacts will be archived at Pantex in accordance with applicable Federal regulations. In addition, 22 of the prehistoric sites are protected within playa management units surrounding the four DOE-owned playas. In the fall of 1996, Pantex personnel monitoring for erosion discovered a number of large bones belonging to a bison. An emergency excavation was completed under the supervision of a qualified archeologist. Today the bison bones have been placed in a permanent exhibit within the Pantex Visitor Center located in Building 16-12 (CNS 2016c).

Historic Resources. The WWII-era historical resources of Pantex consist of 118 standing buildings and structures, all of which have been surveyed and recorded. In consultation with the SHPO, Pantex has determined that these properties are not eligible for inclusion in the National Register within a WWII context. The WWII era buildings and structures have been preserved to some extent through survey documentation, photographs, individual site forms, and oral histories.

The NHPA typically applies only to historic properties that are at least 50 years old unless they are of "exceptional importance" (National Park Service Bulletin 15, 1997). However, 69 buildings that were constructed during WWII and used during the Cold War are eligible for inclusion in the National Register under the Cold War context. Many properties at Pantex are associated with the Cold War arms race and are of exceptional importance. As a final assembly, maintenance, surveillance, and disassembly facility for the nation's nuclear weapons arsenal, Pantex lies at the very heart of Cold War history. The Cold War-era historical resources of Pantex consist of approximately 650 buildings and structures and a large inventory of process-related equipment and documents. The historical resources of this period are among the Plant's most significant, and offer a valuable contribution to the nation's cultural heritage. Ten buildings designated for in-situ preservation were specifically listed in the *Twenty-Five Year Site Plan FY2013-FY2037* (Pantex 2012) (CNS 2016c).

In June 2015, DOE/NNSA approved the donation of excess hardware and tools from the historic Pantex railcars to the Amarillo Railroad Museum to be used in their display. The excess material donated in 2015 consisted of cans of nuts, bolts, spikes, railcar wheels, and an assortment of miscellaneous items (CNS 2016c).

No Native American mortuary remains or funerary artifacts have been found at Pantex (CNS 2016c).

2.3.9 Socioeconomics and Environmental Justice

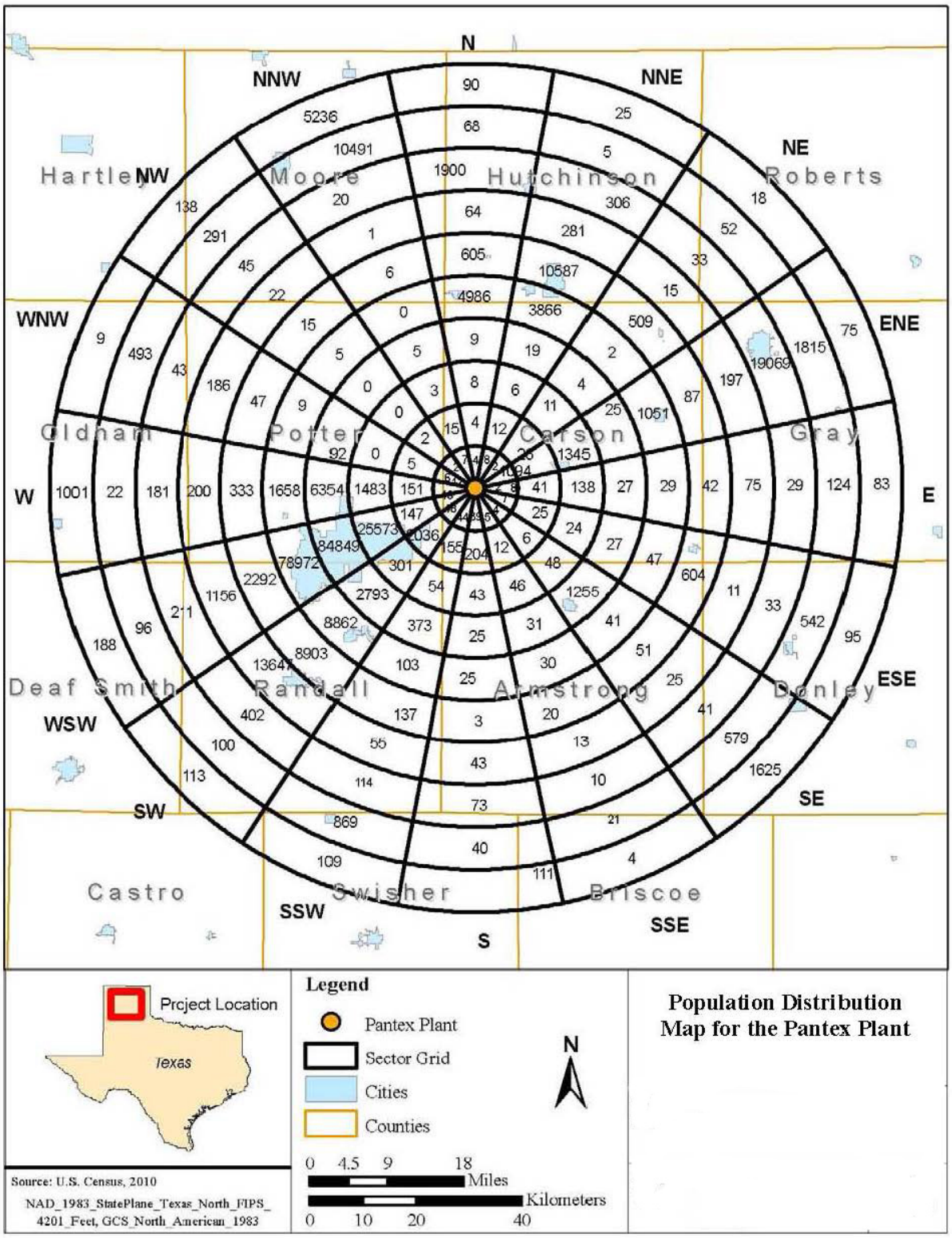
Population data from the 2010 Census were used to generate Figure 2-10, showing the population distribution at 5-mile intervals within 50 miles of the Plant. Figure 2-11 provides an expanded view of the population within the 5 and 10-mile radius. According to the 2010 Census, the total population within 50 miles of the Pantex Plant is 316,132 people. This is an increase of 18.4 percent over the corresponding population of 267,107 people described in the SWEIS (DOE 1996a). Using the U.S. Census Bureau's 2011-2015 American Community Survey 5-year estimates, the total population within 50 miles of the Pantex Plant is 329,835 people, a 23.5 percent increase in population since the SWEIS (EJSCREEN 2017a).

The total number of Pantex employees at the time DOE issued the SWEIS was 3,800 workers. Current estimates indicate 3,176 workers at the Plant (CNS 2017a). Table 2-4 lists relevant socioeconomic information from the SWEIS and based on most current data available.

Table 2-4. Socioeoconomic Data

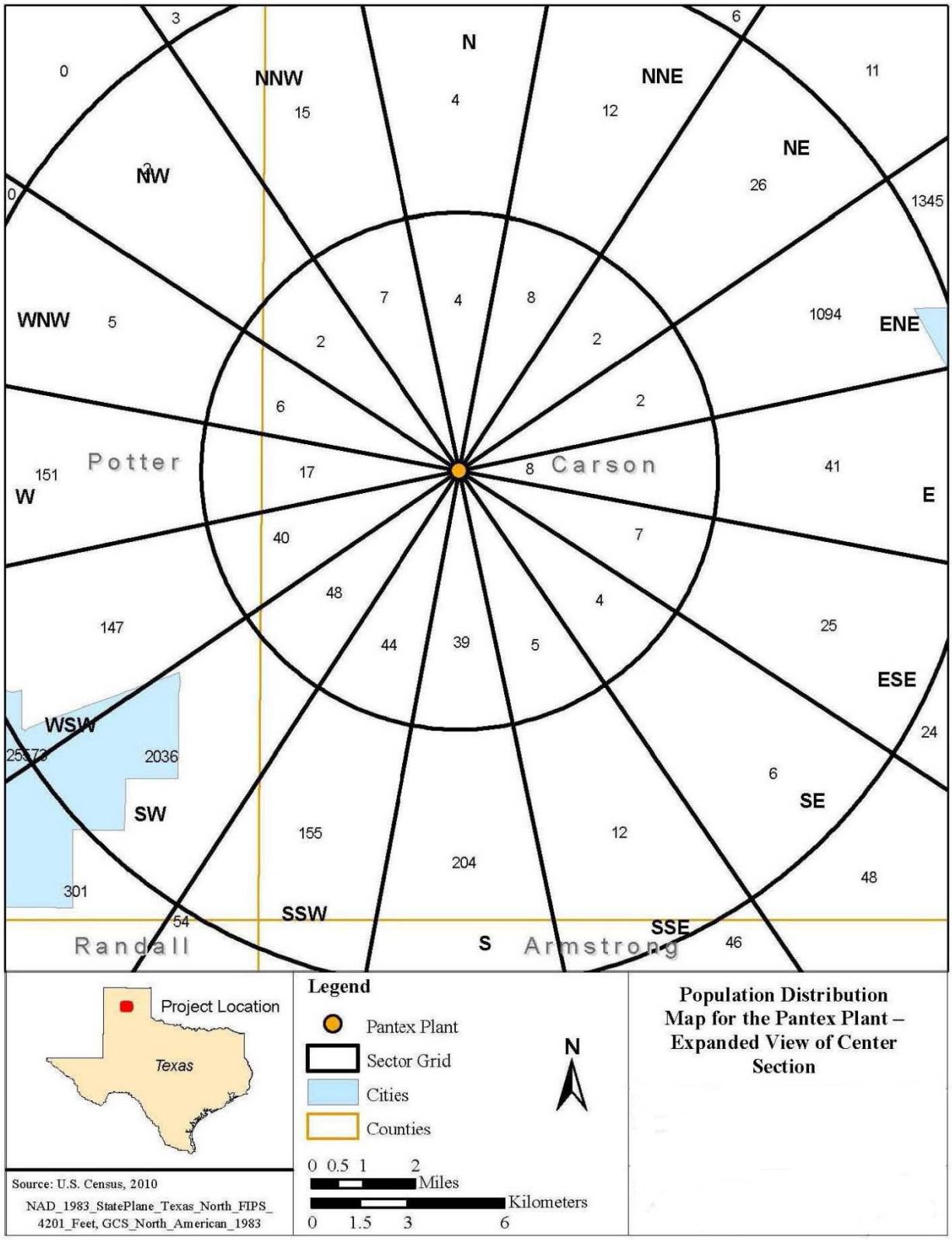
Parameter	SWEIS Value	Current Estimate
Total Pantex Plant Employees	3,800	3,176[a]
4-County ROI Population	209,762	257,145[b]
50-Mile Population	267,107	329,835[c]

a – CNS 2017a.
b – U.S. Census 2017a.
c – U.S. Census 2017b, EJSCREEN 2017a.



Source: CNS 2016c.

Figure 2-10. Population Distribution at 5-mile Intervals within 50 Miles of the Plant



Source: CNS 2016c.

Figure 2-11. Population Distribution within 50 Miles of the Plant

Environmental Justice. The SWEIS used data from the 1990 Census to determine the percentage of minority and low-income populations within a four-county region of influence (ROI) and a 50-mile radius ROI surrounding the Pantex Plant. This SA updates the population of minority and low-income populations using the U.S. Census Bureau's 2011-2015 American Community Survey 5-year estimates. Table 2-5 lists the population of minority and low-income populations from the SWEIS and current estimates for the Pantex Plant. As shown in the table, the minority and low-income populations have increased in comparison with the SWEIS. Figures 2-12 and 2-13 show the geographic distribution of minority and low-income populations near Pantex.

Table 2-5. Minority and Low-Income Populations for the Pantex Plant

Parameter	SWEIS Value	Current Estimate
Minority Population		
4-county ROI	39,794	97,969[a]
50-mile radius ROI	55,982	128,072[b]
14-county ROI	ND	148,378 [a]
Low-Income Population		
4-county ROI	30,253	39,107[c]
50-mile radius ROI	42,219	Not Available
14-county ROI	ND	56,810 [c]

ND = no data.
Note: Current estimates for the 50-mile radius surrounding the Pantex Plant for low-income populations is not available; however the 14-county ROI, which includes counties within the 50-mile radius is used to provide a conservative estimate.
a – U.S. Census 2017a.
b – U.S. Census 2017b, EJSCREEN 2017b.
c – U.S Census 2017c.

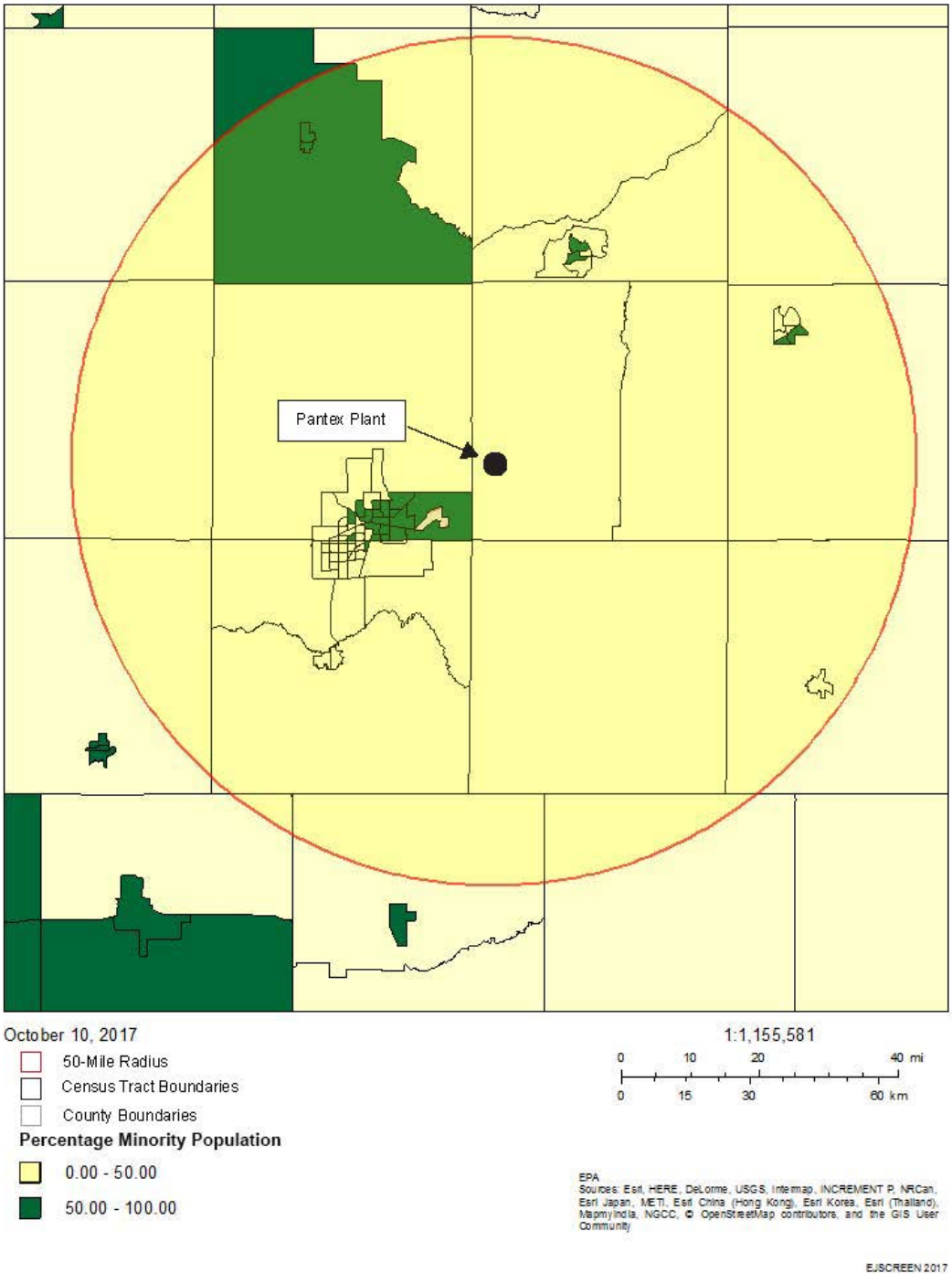
2.3.10 Infrastructure

Table 2-6 lists the utility data from the SWEIS along with current data. As shown in Table 2-6, there have been notable reductions in utility usage at Pantex since publication of the SWEIS. These reductions have been achieved through modernization/transformation activities (by reducing the number and size of operating facilities), improved energy efficiency projects, and conservation measures (CNS 2016c). Impacts on utility infrastructure would continue to be bounded by the analyses presented in the SWEIS. The Pantex Plant is actively working toward goals of reduced energy and water use and, as a result, future usages are expected to be based on downward-sloping trends that have occurred over the past 20 years.

Table 2-6. Utility Usage at Pantex

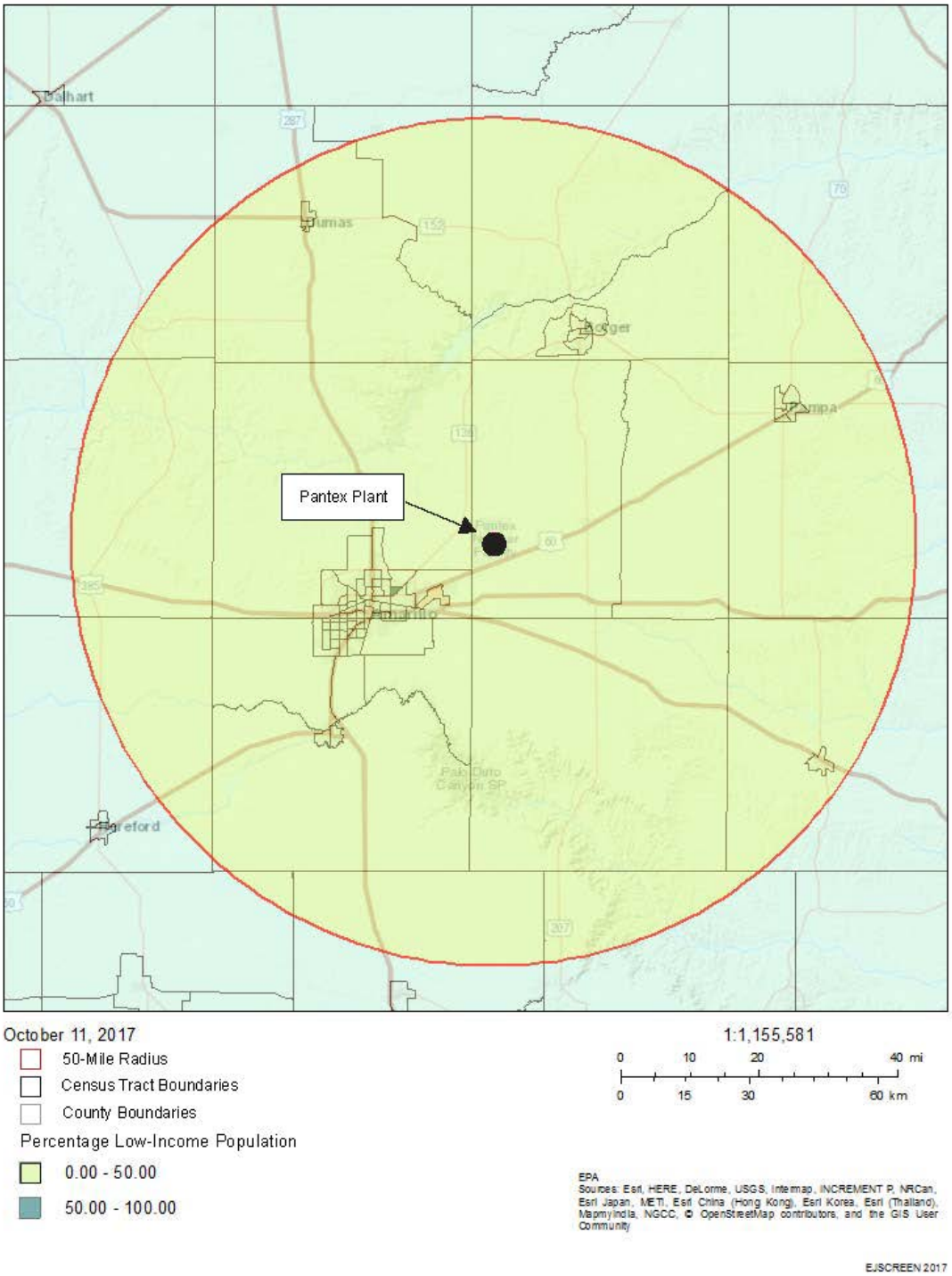
Usage	Data from SWEIS (1996)	Current Data (FY 2016)
Electricity (megawatt-hours/year)	90,400	50,008 (note 1)
Treated Water Usage (million gallons/day)	267	120
Steam (million pounds/year)	398	244
Natural gas (million cubic feet/year)	573	330
Wastewater treatment (influent) (million gallons/year)	171	55
Wastewater discharge (treated wastewater and treated perched groundwater) (million gallons/year)	171	235

Note 1: includes electricity produced by the PREP, which became operational in May 2014.
Source: DOE 1996a; CNS 2016c; CNS 2017a.



Source: EJSCREEN 2017b.

Figure 2-12. Minority Population – Census Tracts with More than 50 Percent Minority Population in a 50-Mile Radius of the Pantex Plant



Source: EJSCREEN 2017b.

Figure 2-13 Low-Income Population – Census Tracts with More than 50 Percent Low-Income Population in a 50-Mile Radius of the Pantex Plant

Electricity. The electrical distribution system consists of two public utility 115-kVA feeds to the north and south sections of the site with a connection between. The feeds and associated switch gear are the property of, and are maintained by, the public utility. Wind turbine generation capacity was installed in 2014 consisting of five 3.2-megawatt (MW) units with a total capacity of 13 MW at optimum wind speed. The wind turbine supply is connected through the south substation with capability to supply the site or public utility feed (CNS 2016a).

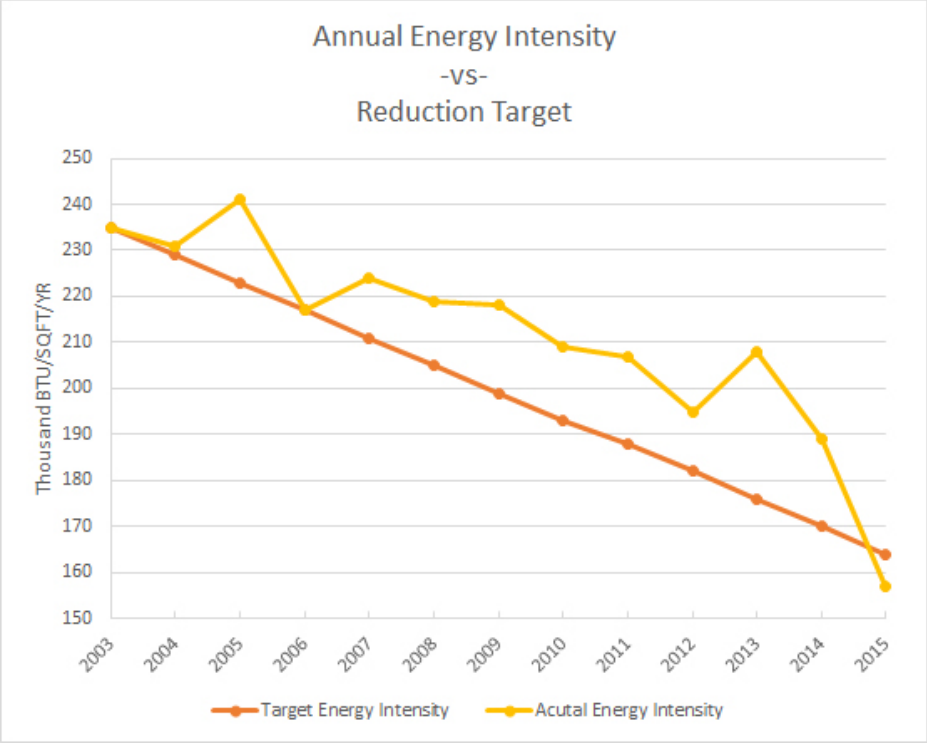
The site distribution equipment consists of two essentially similar substations with two 115/12.470-kVA transformers in each substation. Any one transformer has capacity to supply the site. Three primary circuits extend from the substations through underground infrastructure to supply the site, each circuit having redundant feeds. Three interconnect stations provide alternative switching capability to afford maintenance on the circuits in specific locations while maintaining service to facilities. An additional circuit supplies the overhead lines to more remote site facilities. The site maintains limited-capacity auxiliary-fueled generators in specific facilities and for specific systems. Wind turbines may be available as a back-up power source depending on wind conditions and failure mode. There is no solar capacity for electric generation (CNS 2016a).

Continued success in reducing energy use at Pantex is primarily realized from energy savings activities such as: (1) utilizing the Energy Management Control System (EMCS) to implement and maintain night, weekend and holiday setbacks; (2) installation of occupancy sensors to control lighting in areas in several facilities with low occupancy rates (conference rooms, break rooms, restrooms); (3) installation of new or retrofitted advanced meters that are integrated with a communication network and dedicated server that stores the meter readings for use with the EPA's Portfolio Manager building benchmarking system; (4) procurement of equipment such as Energy Star products that are more energy efficient and (5) continuous and retro-building commissioning (CNS 2016c). At the end of FY 2015, the Pantex Plant had achieved a 30.5 percent reduction in energy intensity from the 2003 baseline (see Figure 2-14, which illustrates the calculated annual energy intensity in each of the several years from FY 2003 through FY 2015). Electricity usage in 2016 was approximately 50,008 megawatt-hours per year, which is approximately 55 percent as much as was presented in the SWEIS (CNS 2016c).

Water. Water supply for the site is provided by wells in the northeast corner of the site, which produce water from the Ogallala aquifer. Local agriculture producers, towns, and cities also produce water from the aquifer, resulting in increasing volume being drawn from a finite source. Pantex water is supplied from five domestic water wells ranging in depth from 600 to 750 feet. Water is pumped by the wells from the underground supply to two 2.5 million gallon ground-level storage tanks through a disinfectant process meeting Texas Administrative Code requirements for a public drinking water system. System pressure of 55 psi nominal is maintained by pumping into a 500,000 gallon elevated storage tank. A domestic water pump facility houses four 30 horsepower booster pumps to maintain the water level in the elevated tank, which provides the water pressure in the system (CNS 2016a). Through an agreement with TTU, Pantex Plant provides water for its domestic and livestock uses (CNS 2016c).

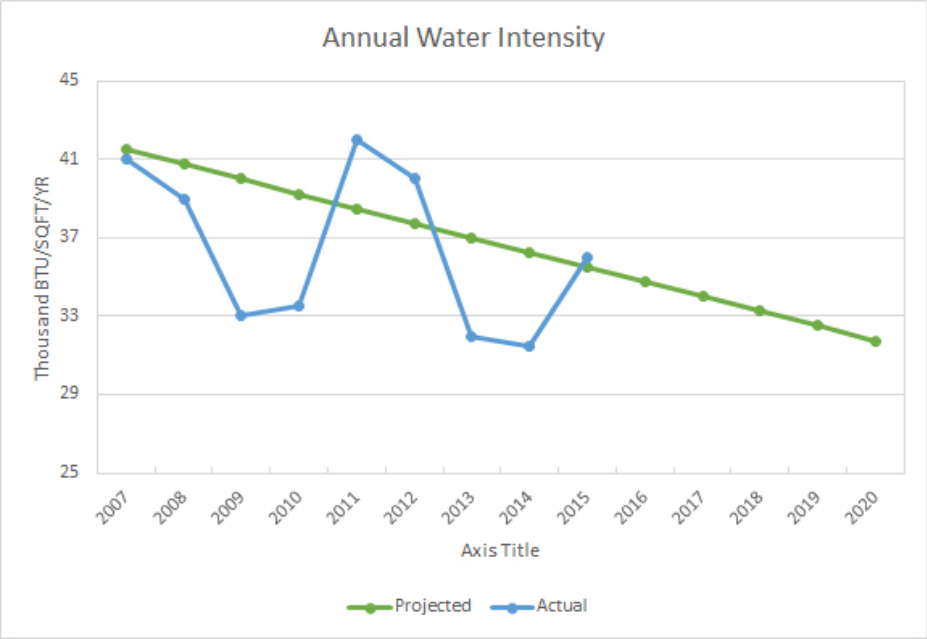
The looped domestic water distribution system consists of 30 miles of pipe ranging in size from 6 to 24 inches with a variety of cast and ductile iron, polyvinyl chloride, steel, and high-density polyethylene pipe. Approximately 1,200 components on the system are used for flow direction and control. The domestic water system is under configuration control and is managed in accordance with TCEQ regulations using American Water Works Association standards for operating and maintenance guidance. An active backflow preventer program is in effect (CNS 2016a).

During 2016, water consumption was approximately 120 million gallons. While Pantex shows about a 5.5 percent increase in square footage since 2007, water intensity has decreased about 12 percent over the same timeframe (CNS 2016c). Figure 2-15 provides the graphic status of Pantex water usage.



Source: CNS 2016c.

Figure 2-14. Actual Energy Usage versus Planned Usage



Source: CNS 2016c.

Figure 2-15. Actual Water Usage versus Planned Usage

Sanitary Sewer. Domestic and industrial wastewater is collected and transported from facilities to the WWTF through approximately 16 miles of pipe ranging in size from 6 to 10 inch. Pipe type includes clay, concrete, cast iron, polyvinyl chloride, and high-density polyethylene. The topography of the site is relatively level, which requires sewage to be pumped from 16 lift stations to the WWTF. Lift stations are concrete pits containing electric pumps and automatic controls for water transfer. Two of the lift stations are connected to back-up generator power. The remaining lift stations do not have pump capability if utility power is not available. However, lift stations not already connected to a back-up power source can be connected to portable electric generators, should it be needed. Disposal of pumped media is through the on-site treatment system. Wastewater is received at the 13-048 lift station to be transferred into a treatment lagoon. The lift station has a back-up generator and an independently operated back-up diesel pump to augment redundancy in the event of power loss. Wastewater gravity flows from the facultative lagoon into either the upper storage lagoon or the lower storage lagoon. Based on Plant effluent, the retention time in the facultative lagoon is approximately 45 days (CNS 2016a, CNS 2017a).

There are seven septic systems on site that treat domestic sewage at remote facilities. These septic systems are not connected to the sanitary sewer collection system. Septic systems were installed in accordance with applicable standards at the time of installation. Replacement of septic systems is based on system condition and performance (CNS 2016a).

Natural Gas. Natural gas is provided from a contracted utility service. The gas is transferred from the utility supply through a valve and metering station to a DOE-owned 8-inch high-density polyethylene line extending approximately 8.6 miles through private and TTU land to the west side of the site through a second valve and metering station to the site distribution system. The high-density polyethylene pipe was installed from the supplier's station throughout the site in 2009. Valves throughout the distribution system were replaced during the 2008-2009 replacement project. There are no plans for upgrade or replacement of the natural gas distribution system in the foreseeable future (CNS 2016a).

Steam. Steam is generated on site in a facility containing four boilers and associated support equipment capable of producing 120,000 pounds/hour and delivering 120 to 150 psig of steam for Plant operations through steam lines. The 14-inch mainline steam pipe from the generation facility to the first branch lines was removed from a trench system and replaced with overhead supported lines in 2012-2013. Two short underground sections remain to accommodate security requirements. There are approximately 4.8 miles of steam lines on site. Normal configuration is one small and one large unit in daily operation. Boilers are fired with natural gas, consuming approximately 85 percent of gas purchased. Boilers may be configured to fire on #2 fuel oil as a contingency for natural gas curtailment or line failure (CNS 2016a).

2.3.11 Transportation

Section 4.12 of the SWEIS described the handling and transportation (intrasite and offsite) of nuclear and other hazardous materials at Pantex. That section discussed the impacts of handling and transporting of nuclear weapons, plutonium pits, uranium components, RTGs, depleted uranium, tritium reservoirs, low-level radioactive waste (LLW) and mixed wastes, and high explosives. The three SAs (NNSA 2003, NNSA 2008a, and NNSA 2013a) that have been prepared subsequent to the SWEIS have reaffirmed the bounding analysis in the SWEIS. There have been no significant changes in the types or quantities of materials handled and transported (CNS 2017a).

2.3.12 Waste Management

The primary waste-generating operations at the Pantex Plant are related to the production of high explosives and the ongoing assembly and dismantlement of nuclear weapons; the same primary waste-generating activities the Pantex SWEIS identified. Wastes are also generated from support operations, including

maintenance, administration, and construction activities; medical services; laboratory operations; and environmental monitoring and restoration activities. Efforts to reduce and eliminate waste from routine operations at Pantex through pollution prevention and waste minimization efforts have resulted in significant waste reductions since the SWEIS was prepared (see Table 2-7, which identifies waste generation at Pantex over the past 25 years, with a particular focus on wastes generated over the past five years [2012-2015]). Types of waste generated at Pantex, along with their typical generating activities, makeup, and disposition pathways are summarized as follows:

Table 2-7. Waste Volumes Generated at Pantex (in cubic yards)

Waste Type	1993	2012	2013	2014	2015	2016
LLW	376	35.9	54.9	79.0	36.8	47.5
Mixed	49.1	0.0	0.10	0.4	26.8	0.2
TSCA	147.9	68.2	57.8	87.0	108.5	4.3
Hazardous	484.2	707.5	681.1	722.8	548.2	124.3
Non-hazardous	14,259	8,149	10,363	5,845	5,892	4,442
Sanitary	802	1,292	1,364	1,289	1,189	1,189
Universal	ND	11.5	20.7	19.8	24.0	18.0
Total	**16,118**	**10,264**	**12,542**	**8,043**	**7,825**	**5,807**

Source: CNS 2016c; CNS 2017a.
ND = no data.

2.3.12.1 Low-Level Radioactive Waste

LLW is generated by weapons-related and weapons-support activities and typically includes compactable materials such as wipes, personal protective equipment, filters, and similar materials, as well as non-compactable materials such as high-efficiency particulate air filters and various packing materials. Pantex generated 47.5 cubic yards of LLW during 2016 (CNS 2017a). LLW is transported to a central collection area before being sent offsite for disposal, primarily at the Nevada National Security Site (formerly the Nevada Test Site), but it may also be shipped to commercial disposal facilities with case-by-case approval of NNSA (NNSA 2013a). Before being sent offsite, some LLW may be treated onsite through processes such as sorting, repackaging, and compacting.

2.3.12.2 Low-Level Radioactive Mixed Waste

Assembly and disassembly of weapons also resulted in some wastes that include both radioactive and hazardous constituents, which are referred to as "mixed waste." The hazardous portion of the mixed waste is regulated by the TCEQ pursuant to RCRA regulations. The radioactive portion is regulated pursuant to the *Atomic Energy Act*. During 2016, Pantex generated 0.2 cubic yards of waste that were managed as mixed waste (CNS 2017a). Mixed waste streams are stored onsite in facilities authorized according to the Plant's hazardous waste permit until the waste can be sent for onsite or offsite treatment, if required, and eventual offsite disposal; mixed waste currently generated at Pantex has identified disposal paths (NNSA 2013a).

2.3.12.3 TSCA Waste and Medical Waste

Toxic Substances Control Act (TSCA) wastes include asbestos, asbestos-containing material, and material containing or contaminated with polychlorinated biphenyls. Pantex Plant generated 4.3 cubic yards of waste regulated by TSCA, during 2016 (CNS 2017a). During the year, environmental restoration projects and deactivation and decommissioning of excess facilities and construction projects contributed to 92.3 percent of the total TSCA waste generated. All TSCA wastes were shipped off-site for final treatment and disposal (CNS 2016c).

The Pantex Medical Department generates medical wastes from various healthcare activities and includes urine cups, medical gloves, cotton balls, blood samples, contaminated sharps (e.g., needles, blades), and contaminated bandage materials. Title 30 of the Texas Administrative Code, Chapter 330 defines this waste as a special waste, and it is managed through a commercial vendor who picks up the waste and transports it to a permitted commercial facility. Because of the relatively small quantity of medical waste generated within the Pantex Plant, values are not reported in the Plant's annual site environmental reports.

2.3.12.4 Hazardous Waste

Typical hazardous wastes generated at Pantex included explosives-contaminated solids, spent organic solvents, and solids contaminated with spent organic solvents, metals, and/or explosives. During 2016, Pantex generated 124.3 cubic yards of hazardous waste (CNS 2017a). Hazardous wastes were managed in satellite accumulation areas (less than 55-gallon waste accumulation sites), less than 90-day waste accumulation sites, or permitted waste management units. Some hazardous wastes, such as explosives, were processed on-site before the process residues were shipped off-site for final treatment and disposal. During the year, environmental restoration projects and deactivation and decommissioning of excess facilities and construction projects contributed 12.5 percent of the total hazardous waste generated. Hazardous wastes and residues from hazardous waste processing are shipped to commercial facilities authorized for final treatment and disposal or, as applicable, recycling (CNS 2016c).

2.3.12.5 Nonhazardous Industrial Waste

During 2016, Pantex generated 4,442 cubic yards of non-hazardous industrial solid waste (CNS 2017a). Non-hazardous industrial solid wastes generated at the Plant were characterized as either Class 1 non-hazardous industrial solid waste or Class 2 non-hazardous industrial solid waste, as defined by Title 30 of the Texas Administrative Code, Chapter 335. Class 1 non-hazardous industrial solid wastes generated at Pantex were managed in a similar manner as hazardous waste, including shipment to off-site treatment and/or disposal facilities. Some Class 2 non-hazardous industrial solid wastes (inert and insoluble materials such as bricks, concrete, glass, dirt, and certain plastics and rubber items that are not readily degradable) were disposed in an on-site Class 2 non-hazardous industrial solid waste landfill. Other Class 2 non-hazardous industrial solid wastes, generally liquids, were shipped to commercial facilities for treatment and disposal (CNS 2016c).

The Pantex Plant's environmental restoration projects and deactivation and decommissioning of excess facilities and construction projects contributed 37.8 percent of the total non-hazardous industrial solid waste generated during 2015. Pantex continues to make progress toward diverting its construction, demolition, and solid waste from landfill disposal. In 2015, Pantex increased the diversion of municipal solid waste to 52 percent and the diversion of construction and demolition waste to 63 percent (CNS 2016c).

2.3.12.6 Sanitary Waste

During 2016, Pantex generated 1,189 cubic yards of sanitary waste (cafeteria waste and general office trash). Sanitary wastes were also characterized as Class 2 nonhazardous industrial solid wastes and disposed of at authorized off-site landfills (CNS 2017a).

2.3.12.7 Universal Waste

Universal wastes are defined as hazardous wastes that are subject to alternative management standards in lieu of regulation, except as provided in applicable sections of the Texas Administrative Code. Universal wastes include batteries, pesticides, paint and paint-related waste, and fluorescent lamps. During 2016, Pantex Plant generated 18.0 cubic yards of waste that were managed as universal wastes. During the year,

environmental restoration projects contributed to 2.6 percent of the total universal waste generated. These wastes are shipped off-site for final treatment, disposal, or, as applicable, recycling (CNS 2016c).

In summary, current waste generation rates at Pantex are somewhat different than were evaluated in the SWEIS. However, the waste streams that include radioactive contaminants (that is, LLW and mixed wastes), which generally have fewer commercial options for disposal, are now generated at notably lower rates. There are currently well established disposition paths for all Pantex waste streams, and that is expected to continue into the foreseeable future.

2.3.13 Human Health and Safety

The SWEIS stated that the average worker dose at Pantex was about 100 mrem per year. For the population, the total population dose (50-mile radius around the site) from existing Pantex operations was about 1.33×10^{-4} person-rem per year, and the dose to the maximally exposed individual (MEI) is 5.8×10^{-5} mrem per year (DOE 1996a). [Note: the MEI is a hypothetical member of the public who would receive the maximum dose from Pantex operations. In the case of Pantex, the MEI is located approximately 3.25 miles north of Building 12-53]. Based on 2015 data, the average worker dose at the site is about 81 millirem (mrem) per year (CNS 2016c), the total population dose is 2.21×10^{-6} person-rem per year, and the dose to the MEI is 1.35×10^{-7} mrem per year (CNS 2016c). Table 2-8 lists the potential doses to workers and to members of the public from the SWEIS and provides updates to these based on current information for Pantex. As shown in that table, current doses are bounded by the doses analyzed in the SWEIS. The annual dose to the MEI continues to be several orders of magnitude below the EPA's standard for the air pathway of 10 mrem per year above background. The radiological monitoring results in 2015 were consistent with those of previous years (CNS 2016c).

Table 2-8. Radiological Doses at Pantex

Dose	Data Presented in SWEIS	Current Data (2015)
Average Worker Dose (mrem/year)	100	81
Maximum Exposed Individual (MEI) Dose (mrem/year)	5.8×10^{-5}	1.35×10^{-7}
50-Mile Population Dose (person-rem/year)	1.33×10^{-4} (Note 1)	2.21×10^{-6} (Note 2)

Sources: DOE 1996a; CNS 2016c.

Note 1. This dose was based on a population of 267,107 people living within a 50-mile radius of Pantex (DOE 1996a).

Note 2. The current dose is based on a population of 296,000 people living within a 50-mile radius of Pantex (CNS 2016c). As documented in Section 2.3.9, a more current estimate of the population living within a 50-mile radius of Pantex is 329,835. For that larger population, the population dose would be 2.46×10^{-6} person-rem/year.

The background radiation dose measured at control locations (excluding radon) were attributed to naturally occurring terrestrial and cosmic radiation, and averaged 93.3 mrem for 2015. This is consistent with historical data. The results of these measurements are of the same magnitude as those measured at a background or control location in Bushland, Texas, 35 miles west of the Plant. Accordingly, DOE radiological activities at Pantex do not cause any dose above that due to background radiation and thus do not contribute significantly to the exposure of members of the public to ionizing radiation. No unplanned radionuclide releases occurred at Pantex in 2015. The ambient air monitoring results for 2015 were generally similar to those from previous years and below all applicable regulatory standards (CNS 2016c).

2.3.14 Accidents

The SWEIS identified 132 candidate accident scenarios, 11 of which were determined to be risk dominant (DOE 1996a). These accidents included radiological and non-radiological releases from seismic events, fires, equipment failures, explosions, and aircraft crashes. The accident scenarios included high probability

accidents (e.g., occurrence once every 100 years) and low probability accidents (e.g., occurrence once every 1,000,000 years).

Since publication of the SWEIS, Pantex Plant changes that could affect the accident scenarios include the operation of new or refurbished buildings, changes in radioactive material or HE limits at certain facilities, and changes in the frequency of certain operations that contribute to risk. However, as discussed in Table 3-1 of this SA, these changes do not affect the conclusion that the scenarios analyzed in the SWEIS continue to conservatively estimate the risks associated with Pantex Plant operations. In addition, no new scenarios have been identified that are appreciably different from the 11 scenarios discussed in the SWEIS (CNS 2017a). Similarly, even though the frequency of some activities that contribute to risk has increased (see NNSA 2008a and NNSA 2013a), there have been no changes associated with operations at Pantex that would more than minimally increase the accident risks arising from operations since the SWEIS was issued (CNS 2017a). In addition, external changes, such as a change in the 50-mile population surrounding the site and a change in the dose-to-risk conversion factor for estimating human health effects, would have an inconsequential change in the risks associated with the accident scenarios at Pantex. Table 3-1 provides a quantitative analysis to support this conclusion.

The bounding accident remains an explosive-driven plutonium dispersal from an external event such as an aircraft impact into a facility containing nuclear material. Assuming that such an accident occurred, the SWEIS estimated that eight excess fatal cancers to the 50-mile population surrounding the site, as well as worker fatalities, could result. When probabilities were taken into account, the risk of a fatality from that accident is 7.2×10^{-6}, meaning that one fatality could occur for approximately every 139,000 years of operation (DOE 1996a). Table 3-1 provides an updated estimate of the risk for the bounding accident based on the current 50-mile population and the most current dose-to-risk conversion factor.

With regard to seismic risks, as discussed in Section 2.3.3, the USGS released a report in 2014 with updated national seismic hazard maps for the United States to account for new methods, models, and data since the 2008 maps were released (USGS 2014). Figure 2-7 is the new seismic hazard map for the western Texas area and shows that Pantex is in an area that has a 2-percent probability over 50 years of exceeding a peak ground acceleration of 0.28*g* (where g is the acceleration due to gravity). In contrast, in 2008, the USGS estimated that Pantex is in an area that has a 2-percent probability over 50 years of exceeding a peak ground acceleration of 0.2*g* (USGS 2014). Although different, the new USGS seismic hazard map does not change the site-specific seismic data at Pantex which is used to determine facility design and construction requirements (CNS 2017a). Additionally, as discussed in Table 3-1, of the 11 risk dominant accidents evaluated in the SWEIS, only one accident was dominated by a seismic event. That accident was estimated to result in less than one excess fatal cancer (DOE 1996a). Compared to the bounding accident, a change in the potential impacts due to an increased seismic risk would remain bounded.

2.3.15 Intentional Destructive Acts

In the events following the terrorist attacks of September 11, 2001, NNSA has implemented measures to minimize the risk and consequences of potential terrorist attacks on its facilities. The safeguards applied to protecting the Pantex Plant involve a dynamic process of enhancement to meet threats; these safeguards will evolve over time. It is not possible to predict whether intentional attacks would occur at any site, or the nature or types of such attacks. Nevertheless, NNSA has re-evaluated security scenarios involving malevolent, terroristic, or intentionally destructive acts to assess potential vulnerabilities and identify improvements to security procedures and response measures (Brooks 2004). Security at its facilities is a critical priority for NNSA. Therefore, NNSA continues to identify and implement measures to defend and deter attacks. NNSA maintains a system of regulations, orders, programs, guidance, and training that form the basis for maintaining, updating, and testing site security to preclude and mitigate any postulated terrorist actions (Brooks 2004).

The conservative assumptions inherent in the accidents analyzed for the Pantex Plant assume initiation by natural events, equipment failure, or inadvertent worker actions. These same events could be caused by intentional malevolent acts by saboteurs or terrorists. For example, a criticality could be purposefully created, or high explosives could be used to damage buildings in the same way as an earthquake. However, the resulting radiological release and consequences to workers and the public would be similar, regardless of the nature of the initiating event.

The Pantex Plant's physical security protection strategy is based on a graded and layered approach supported by an armed Protective Force that is trained to detect, deter, and neutralize adversary activities and is backed up by local, State, and Federal law enforcement agencies. Both staffed and automated access-control systems are used to limit entry into areas or facilities to authorized individuals. Automated access-control systems include controlled booths, turnstiles, doors, and gates. Escort requirements provide access controls for visitors. Barriers, electronic surveillance systems, and intrusion detection systems form a comprehensive site-wide network of monitored alarms. Various types of barriers delay, channel personnel, or deny access to classified matter, protected materials, and vital areas. Barriers direct the flow of vehicles and deter or prevent penetration by motorized vehicles where they could significantly increase the likelihood of a successful malevolent act. Tamper-protected surveillance, intrusion detection, and alarm systems designed to detect adversary action or anomalous behavior inside and outside the facilities are paired with assessment systems that evaluate the nature of the adversary action. Random patrols and visual observation are also used to deter and detect intrusions. Penetration-resistant, alarmed vaults and vault-type rooms are used to protect classified materials.

There is also a potential for attempted sabotage or terrorist attack during transport. The safety features of the transportation casks that provide containment, shielding, and thermal protection also protect against sabotage. Although it is not possible to predict the occurrence of sabotage or terrorism or the exact nature of such events if they were to occur, NNSA has previously examined several transportation accident scenarios that would have the types of consequences that could result from such acts, such as documented in the *Complex Transformation Supplemental Programmatic Environmental Impact Statement* (DOE/EIS-0236-S4, NNSA 2008b). However, because the materials being considered for transport under this SA would have substantially less total radioactivity than those analyzed in the aforementioned analysis, the corresponding impacts resulting from such events would be much lower.

2.4 Changes in NNSA's Approach to NEPA Analyses

There have been no significant changes in NNSA's approach to NEPA documents since publication of the last SA in 2013. In August 2016, the Council on Environmental Quality (CEQ) provided final guidance on the ways in which Federal agencies can improve their consideration of the effects of greenhouse gas emissions and climate change in evaluating proposals for Federal actions under NEPA (CEQ 2016). In that guidance, CEQ stated that, "when addressing climate change agencies should consider: (1) The potential effects of a proposed action on climate change as indicated by assessing greenhouse gas emissions (e.g., to include, where applicable, carbon sequestration); and, (2) The effects of climate change on a proposed action and its environmental impacts." On April 5, 2017, that final guidance was withdrawn (82 FR 16576).

3. COMPARISON OF IMPACTS

3.1 Introduction

Figure 3-1 illustrates the impact assessment process used in this SA. As this figure indicates, an initial screening review of new, modified, or proposed projects and missions; new regulations; and updated environmental and operating basis information was conducted. This review identified whether associated levels of activity or potential for impact on a particular resource area, either individually or collectively, warranted additional analysis. No further analysis was conducted for those resource areas where it was evident from the initial screening that associated impacts would be minimal and within the impacts identified in the Pantex SWEIS.

Other resource areas required further analysis to determine (1) whether potential impacts on the areas were outside the envelope of environmental consequences established in the SWEIS, and (2) if so, whether the impacts could be considered significant within the context of NEPA (40 CFR 1508.27), which would require preparation of a new or supplemental EIS. The "sliding-scale" approach was used such that analyses for the resource areas are in proportion to their significance.

As discussed in Chapter 2 of this SA, the *Consolidated Nuclear Security Ten-Year Site Plan for the Pantex Plant and Y-12 National Security Complex (FYs 2016-2025)* (CNS 2015a), *Pantex Plant Master Site Plan 2017-2040* (CNS 2016a), and the *CNS Strategic Plan* (CNS 2016b) describe ongoing, planned, and proposed activities. NNSA reviewed this, as well as information provided in the 2013 SA (NNSA 2013a) and other NNSA and Pantex Plant documents, to identify potential new missions and specific project activities for analysis in this SA. Table 3-1 presents a comparison of changes in environmental impacts that have occurred since the SWEIS was issued and those that are expected to occur during the following five-year interval (2018 through 2023). These changes include those resulting from the activities described in Chapter 2 of this SA.

The columns in Table 3-1 present Pantex SWEIS values for the 2,000-weapons level of the Preferred Alternative and projected future impacts in this SA for the continued operations at Pantex (2018 through 2023) of selected impact indicators for each resource area. For each resource area, a comparison of the impacts to those evaluated in the SWEIS is presented.

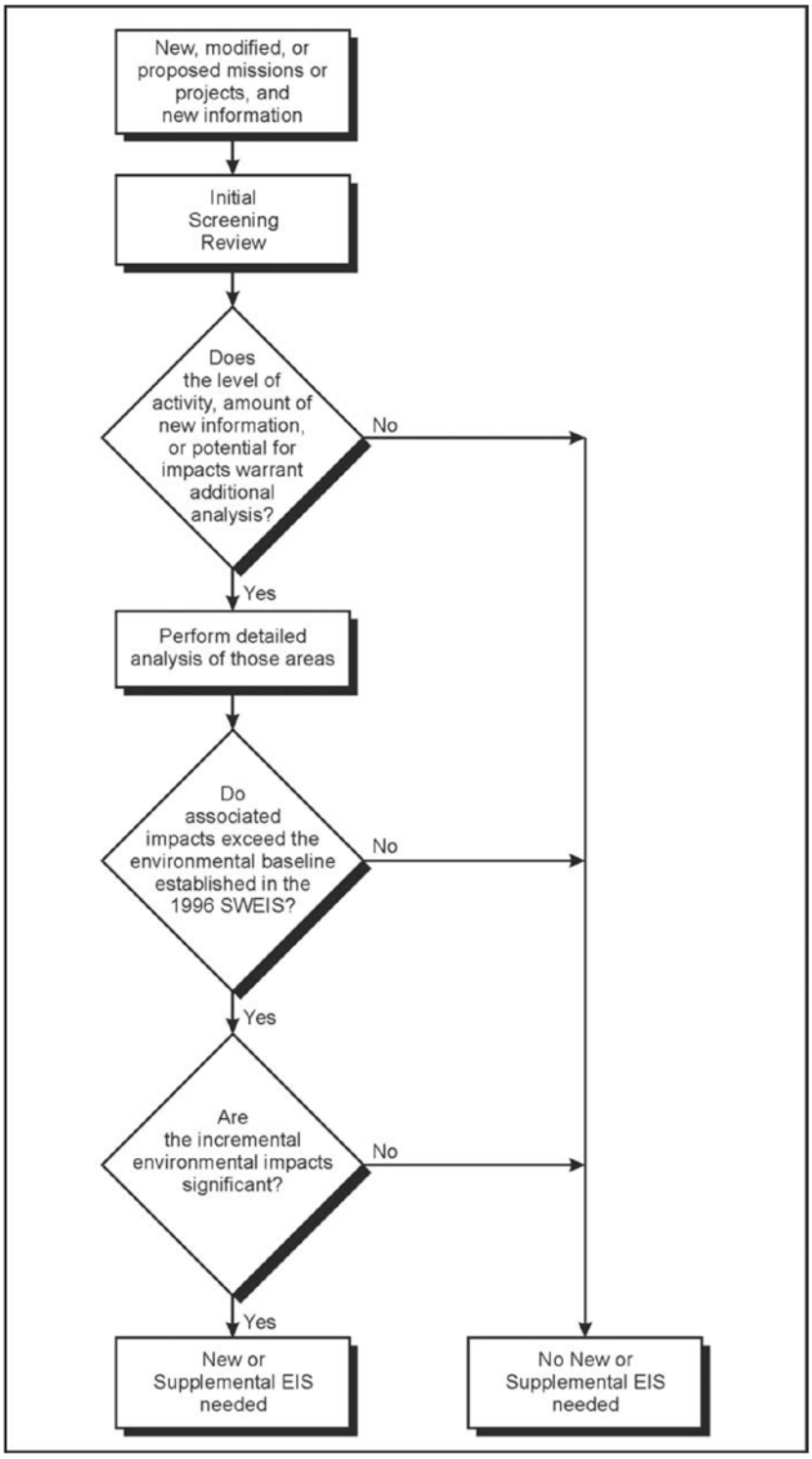


Figure 3-1. Impact Assessment Process Used in this Supplement Analysis

Table 3-1. Summary Comparison of Impact Indicators

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)	Impacts in this SA for Continued Operations at Pantex
Land Resources	DOE owns 10,177 acres of land at Pantex, comprised of 9,100 acres for the main Plant area and 1,077 acres at Pantex Lake. Adjacent to the DOE-owned land, approximately 5,800 acres are leased from TTU. DOE's activities at Pantex occur on approximately 2,000 acres; the remaining lands are used for safety and security purposes. Additionally, approximately 6,421 acres of DOE-owned land are used by TTU for agricultural purposes. The Pantex SWEIS described the facilities infrastructure as consisting of 476 buildings housing major mission operations and containing 2,483,020 square feet of floor space; an additional 144 structures for support operations containing 429,780 square feet; and six planned new buildings with a combined floor space of 171,160 square feet. Thus, the SWEIS evaluated a facility infrastructure of 626 buildings with a combined floor space of 3,083,960 square feet. The SWEIS also noted there were 47 miles of roads within the Pantex Plant boundary.	DOE owns 11,703 acres of land, including 9,100 acres in the main Plant area, 1,526 acres in four tracts purchased in the latter part of 2008 [adjacent to the main Plant area, but east of FM 2373], and 1,077 acres approximately 2.4 miles to the northeast, at Pantex Lake. Additionally, 5,748 acres of land south of the main Plant area are leased from TTU for use as a safety and buffer zone (Note: The leased buffer zone from TTU was 5,800 acres but 52 acres were sold recently for construction of the new ASC) (CNS 2017a). Currently, there are approximately 3.2 million square feet of production and support facilities, consisting of 611 buildings and trailers, with 53 mission-critical facilities. There are approximately 57 miles of roads at Pantex (CNS 2017a). Changes in land use over the next five years would generally occur within the main Plant area (the ASC is an exception to this) and would generally consist of replacement facilities. NNSA's planning objectives are to consolidate functions and operations and modernize infrastructure, including through reutilization of existing facilities, in such a manner that the Plant's operating footprint and costs are minimized. By 2023, there will be approximately 3.3 million square feet of production and support facilities; while this represents an increase in facility square footage, this number includes the ASC (343,000 square feet) and the HESE Facility (72,000 square feet). Approximately 456,000 square feet of demolition related to the ASC and HESE Facility is expected to occur in 2018-2027 (CNS 2017a).
Comparison to the SWEIS: Land usage at Pantex has not changed significantly since the SWEIS and is not expected to change significantly in the next five years. New facilities such as the ASC, HEPF, HESE, and MSF would not result in any significant change in land usage compared to past operations (CNS 2017a). DOE's activities at Pantex will still be expected to occur on approximately 2,000 acres and the remaining lands would continue to be used for safety, security, and agricultural purposes. The impacts from continued operations at Pantex would be consistent with, and bounded by the impacts presented in the SWEIS.		

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)	Impacts in this SA for Continued Operations at Pantex
Visual Resources	Although the SWEIS did not address visual resources, the appearance of the Pantex Plant and its surroundings were described in another DOE EIS (DOE 1996b) that was published the same year as being within a landscape consisting of cultivated cropland and rangeland, which was typical of the High Plains region of Texas. The industrial land uses within the Plant were surrounded by cropland and rangeland that blended into the offsite viewscape. The Plant's interior was not accessible to the public, but was generally visible from surrounding roads and low-density rural housing areas. The elevated, cylindrical water tower was identified as the Plant's most visible feature (DOE 1996b). The aforementioned DOE EIS also described the most sensitive viewpoint for the Pantex Plant as the intersection of U.S. Highway 60 and Texas FM2373, approximately 1.5 miles southeast of Pantex facilities (DOE 1996b). Highway 60 is part of the Texas Plains Trail, a scenic road that designates the Pantex Plant as a point of interest. From this viewpoint, the Plant facilities were described as low clusters of buildings on a flat horizon. The Plant operations area was described as being visible from I-40, located farther to the south, with the closest viewpoint at a distance of about 6 miles.	The current viewscape is basically the same as it was in the mid-1990s when the SWEIS was prepared, with one notable exception: the PREP is now operational and consists of five wind turbine generators that were constructed on DOE property and became operational in May 2014. NNSA concluded that the PREP would not constitute a major Federal action that would significantly affect visual resources or other aspects of the human environment (NNSA 2010b). NNSA also noted there were 61 wind turbines already in place on land to the north of the Pantex Plant, so the new project would not present a totally new viewscape to the region. A number of new structures have been constructed and demolition has occurred on several old buildings. However, new facilities are similar in size and appearance to existing facilities, and neither construction nor demolition has changed the overall appearance of the Pantex Plant (CNS 2017a). There are no major changes in primary missions at Pantex planned for the next five years, and workload requirements are expected to be consistent with SWEIS projections. Any new structures constructed over the next five years are expected to be consistent with current facilities in terms of visual impacts (CNS 2017a). Consequently, no notable visual resource impacts are expected.
Comparison to the SWEIS: The visual impacts from continued operations at Pantex would be consistent with past impacts. New facilities such as the ASC, HEPF, HESE, and MSF would not result in any significant change in visual impacts compared to past operations (CNS 2017a).		

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)		Impacts in this SA for Continued Operations at Pantex	
Geology and Soils	Construction activities would result in a potential increase in soil erosion. Appropriate mitigation, including detention basins, runoff control ditches, silt fences, and protection of stockpiled soils would minimize soil erosion and impacts. No impacts on undisturbed geological resources would be expected. All facilities would be designed and constructed to meet applicable code requirements related to geological hazards. Potential seismic hazard impacts from geology are addressed under "Facility Accidents."		Potential impacts to geology and soil would be consistent with those presented in the SWEIS. Those impacts have not changed significantly since the SWEIS and are not expected to change significantly in the next five years. Potential impacts associated with the new USGS estimate of seismic hazards at Pantex are addressed under "Facility Accidents."	
Comparison to the SWEIS: All soil-disturbing activities would include application of best management practices to minimize soil erosion, including measures to limit the amount of time soils are exposed until revegetated or otherwise covered. New facilities such as the ASC, HEPF, HESE, and MSF would not result in any significant change in impacts to soils or geology compared to past operations (CNS 2017a). The analysis presented in the SWEIS continues to bound the potential for geologic hazards to affect existing or proposed facilities at the Pantex Plant. Since 1995, there have been no earthquakes of magnitude 4 or greater within the Texas Panhandle and no earthquakes of magnitude 5 or greater within 200 miles of the Pantex Plant.				
Water Resources	Wastewater discharge (treated wastewater and treated perched groundwater) million gallons per year	171 million gallons/year	Wastewater discharge (treated wastewater and treated perched groundwater) million gallons per year	235 million gallons/year
	Volume of groundwater pumped from Ogallala Aquifer	267 million gallons/year	Volume of groundwater pumped from Ogallala Aquifer	120 million gallons/year
			Source CNS 2017a.	
Comparison to the SWEIS: Impacts on water resources would continue to be similar to the analyses presented in the SWEIS. The Pantex Plant is actively working toward goals of reduced water consumption and, as a result, future projections are based on a downward-sloping trend. New facilities such as the ASC, HEPF, HESE, and MSF would not result in any significant change in water usage compared to past operations (CNS 2017a). The large water demands of the Amarillo area are primarily agricultural and water usage at Pantex accounts for less than 0.3 percent of groundwater withdrawals from the Ogallala Aquifer in Carson County.				

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)		Impacts in this SA for Continued Operations at Pantex		
Air Quality (non-radiological)	Construction emissions	Less than 3.3 tons/year in PM_{10} in peak construction year.	Construction emissions	Not estimated; emissions would be temporary and minimized to the extent practicable.	
	Stationary source operation emissions (tons/year)	CO – 22.37 NO_x – 87.02 PM_{10} – 9.30 SO_2 – 0.0001 VOC – 3.09 HAPs – 22.40 Lead – 0.20	Stationary source operation emissions, (tons/year)	Emissions	Potential to Emit (PTE) Limits
				CO – 6.14 NO_x – 33.79 PM_{10} – 1.72 SO_2 – 0.88 VOC – 4.54 HAPs – 3.64 Lead – in HAPs Source CNS 2017a.	28.53 93.08 19.14 5.14 33.17 20.6
Comparison to the SWEIS: The impacts on air quality would not be substantially different from the analyses presented in the SWEIS and emissions would be smaller than the SWEIS estimated for all stationary source pollutants. Firing site emissions are higher than evaluated in the SWEIS, but must meet pound per hour limits set by the Plant's air permit. Also, the total tons per year from the firing sites must be included in the air permit's annual limit as well as the annual PTE certification. New facilities such as the ASC, HEPF, HESE, and MSF would not introduce any new air quality impacts compared to past operations (CNS 2017a).					
Air Quality (radiological)	Tritium is the primary radiological emission from Pantex. Small amounts of tritium escape as a gas or vapor during normal operations. Quantities of tritium released were 0.312 curies (Ci) in 1993 and 0.446 Ci in 1994. (See "Human Health" for a discussion of the impacts associated with these releases).		Tritium remains the primary radiological emission from Pantex. Small amounts of tritium escape as a gas or vapor during normal operations. Quantities of tritium released were 0.0238 Ci in 2014 and 0.0187 Ci in 2015 (CNS 2015b, CNS 2016c). (See "Human Health" for a discussion of the impacts associated with these releases).		
Comparison to the SWEIS: No major changes in the primary missions at Pantex are planned for the next five years, and workload requirements are expected to be bounded by the SWEIS projections. The continued operations at Pantex would be bounded by the radiological emissions estimated in the SWEIS. See the Human Health section of this table for potential impacts to workers and the public from radiological releases.					

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)	Impacts in this SA for Continued Operations at Pantex
Acoustics	Major noise sources at Pantex include various industrial facilities, equipment and machines (e.g., cooling systems, steam vents, paging systems, construction and materials-handling equipment, and vehicles), and operations at the firing sites. The SWEIS concluded that construction and non-firing site operations would have negligible offsite impacts. With regard to firing site operations, the SWEIS estimated the following noise impacts: Detonations per year: 60 (in 1994) • Normal maximum net explosive weight, pounds: 55 • Peak sound level decibels at closest residence (feet) by firing site (FS): FS-4: 141.1 (3,166) FS-10: 139.1 (4,003) FS-21: 130.4 (10,839) FS-22: 136.2 (5,566) • C-weighted day-night average noise levels (in C-weighted decibels): Not evaluated	Major noise sources at Pantex have not changed and are not expected to change in the next five years. Construction and non-firing site operations would continue to have negligible offsite impacts (CNS 2017a). With regard to firing site operations, the SWEIS estimated the following noise impacts: Detonations per year: There were 3,200 detonations in 2006 and that number has been verified as the most reasonable estimate of detonations expected in the future (CNS 2017a). However, the actual number of detonations per year will be driven by operational needs and may be more than 3,200. • Normal maximum net explosive weight, pounds: 154 at FS-4 and FS-10; 308 at FS-21 and FS-22. • Peak sound level decibels at closest residence (feet) by firing site: FS-4: 135.5 (3,166) FS-10: 132.6 (4,003) FS-21: 122.6 (10,839) FS-22: 130.8 (5,566) • C-weighted day-night average noise levels (in C-weighted decibels): < 62 Source: CNS 2017a.
Comparison to the SWEIS: The current number of firing site detonations is greater than described in the SWEIS, but peak sound levels at the closest residence have remained similar. The difference in peak sound levels from the SWEIS to present is attributed to the current use of a more elaborate sound propagation model that incorporates attenuation factors not considered in the SWEIS model. The SWEIS peak values are also based on a 6.9 mile per hour wind blowing from the firing site toward the sound receptor, increasing the sound effect. The 2013 SA (NNSA 2013a) included a detailed evaluation of increasing maximum net explosive weights to 154 pounds for FS-4 and FS-10, and to 308 pounds for FS-21 and FS-22. This increase in operational limits has now gone into effect. Evaluation of the increased limits indicates that peak sound levels at the nearest residence would remain below 140 decibels and the firing sites would be operated such that the C-weighted day-night average noise levels would remain below 62 C-weighted decibels at the nearest residence. Land use guidelines indicate locations with C-weighted day-night average noise levels below 62 C-weighted decibels are usually suitable for all types of land use activities. No additional changes in this operational limit are proposed (CNS 2017a). New facilities such as the ASC, HEPF, HESE, and MSF would not introduce any new noise sources or noise impacts compared to past operations (CNS 2017a).		

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)		Impacts in this SA for Continued Operations at Pantex	
Ecological Resources	The SWEIS included a detailed discussion of biotic resources at the site. The SWEIS concluded that, "Impacts to biotic resources at Pantex Plant as a result of weapons-related activities are expected to be minimal." The SWEIS also stated that, "the proposed action is not likely to adversely affect any Federally-listed threatened or endangered species at the Pantex Plant." The U.S. Fish and Wildlife Service (USFWS) concurred with that determination.		Section 2.3.7 of this SA updates the ecological resource information at the Pantex Plant. As discussed in that section, current Pantex Plant operations are basically the same as those that were evaluated in the SWEIS. As discussed in that section, there have been changes available to characterize biotic resources and, in the case of protected and sensitive species, there have been changes in the status of specific species. There have also been changes in the direction and emphasis of some resource management plans, such as providing added focus on shortgrass prairie, playa wetlands, migratory birds, and pollinators. However, the objective of maintaining and enhancing habitat for native and migratory wildlife species has not changed.	
Comparison to the SWEIS: The impacts on biotic resources would not be substantially different from the analyses presented in the SWEIS. Current wildlife habitat is similar to that at the time of the SWEIS and changes in the next five years are expected to be very minor. Changes in protected species are unrelated to operation of the Pantex Plant and the continued operations at Pantex are not likely to adversely affect any Federally-listed threatened or endangered species at the Pantex Plant. New facilities such as the ASC, HEPF, HESE, and MSF would not impact biotic resources compared to past operations (CNS 2017a).				
Cultural Resources	As detailed in Section 4.10 of the SWEIS, cultural resources identified at Pantex Plant include archeological sites from prehistoric Native American use of Plant land; standing structures that were once part of the WWII-era Pantex Ordnance Plant (1942-1945); and buildings, structures, and equipment associated with the Plant's Cold War operations (1951- 1991). The SWEIS concluded that, "no impacts to cultural resources are anticipated from continued operations at Pantex Plant."		Section 2.3.8 of this SA updates the cultural resource information at the Pantex Plant. Current Pantex Plant operations are basically the same as those that were evaluated in the SWEIS and no significant cultural impacts have occurred since the SWEIS was prepared. As was the case when the SWEIS was prepared, if subsurface cultural features or artifacts are identified during land disturbance for construction, appropriate mitigation measures would be taken in consultation with the SHPO.	
Comparison to the SWEIS: Potential impacts to cultural resources would be consistent with those presented in the SWEIS. Any cultural impacts from new facilities such as the ASC, HEPF, HESE, and MSF have been, or would be, evaluated in project-specific NEPA documents. Any activity with the potential to impact historic structures would be reviewed and evaluated to ensure compliance with Section 106 requirements.				
Socioeconomics	Total Pantex Plant Employees	3,800	Total Pantex Plant Employees	3,176
	4-County ROI Population	209,762	4-County ROI Population	257,145
	50-Mile Population	267,107	50-Mile Population	329,835
Comparison to the SWEIS: The Pantex Plant has a positive socioeconomic impact in the ROI. In the SWEIS, approximately 1.8 percent of the ROI population was employed at the Plant. Currently, approximately 1.2 percent of the ROI population is employed at the Plant. This decrease has not significantly changed any socioeconomic conditions (income, housing, public finance, or community services) within the ROI. While construction of new facilities such as the ASC, HEPF, HESE, and MSF would provide short-term socioeconomic benefits, overall site employment is not expected to vary significantly from current levels. Consequently, the potential impacts to socioeconomic resources would be consistent with those presented in the SWEIS.				

Resource Area	Impacts Indicators from the SWEIS[a] (Based on 2,000-Weapons Level)		Impacts in this SA for Continued Operations at Pantex	
Environmental Justice	Based on 1990 Census data: • Minority population: 20.9 percent • Below poverty level: 15.8 percent No significant health risks to the public; radiological dose would remain below the annual dose limit of 10 mrem. For the population, the total population dose (50-mile radius around the site) from existing Pantex operations was about 1.33×10^{-4} person-rem per year, and the dose to the MEI is 5.8×10^{-5} mrem per year. There are no special circumstances that would result in any greater impact on minority or low-income populations than the population as a whole.		Based on 2010 Census data: • Minority population: 38.8 percent • Below poverty level: 17.2 percent Although the minority population and low-income populations surrounding Pantex have increased since the SWEIS was prepared, there remain no significant health risks to the public; radiological dose would remain below the annual dose limit of 10 mrem. For the population, the total population dose (50-mile radius around the site) from existing Pantex operations was about 2.46×10^{-6} person-rem per year, and the dose to the MEI is 1.35×10^{-7} mrem per year. There are no special circumstances that would result in any greater impact on minority or low-income populations than the population as a whole.	
Comparison to the SWEIS: Since the issuance of the SWEIS, the percentage of minority and low-income populations in the Pantex area has increased. However, the projected human health risks from normal operations would not be substantially different as a result of continued operations at Pantex in comparison with the analyses in the SWEIS (see the Health and Safety portion of this table below). Continued operations at Pantex would not result in disproportionately high and adverse human health or environmental effects to minority or low-income populations.				
Infrastructure	Electricity (megawatt-hours/year)	90,400	Electricity (megawatt-hours/year)	50,008
	Steam (million pounds/year)	398	Steam (million pounds/year)	244
	Natural gas (million cubic feet/year)	573	Natural gas (million cubic feet/year)	330
	Water (from Ogallala Aquifer) (million gallons/year)	267	Water (from Ogallala Aquifer) (million gallons/year)	120
	Wastewater treatment (influent) (million gallons/year)	171	Wastewater treatment (influent) (million gallons/year)	55
	Source: CNS 2017a.			
Comparison to the SWEIS: Utility requirements would be bounded by the utility usage requirements presented in the SWEIS. Modernization activities, along with conservation and energy efficiency initiatives have significantly decreased utility demands compared to 1996.				

<table>
<tr><th>Resource Area</th><th>Impacts Indicators from the SWEIS[a]
(Based on 2,000-Weapons Level)</th><th>Impacts in this SA for
Continued Operations at Pantex</th></tr>
<tr><td>Transportation</td><td>With regard to non-nuclear transportation, the SWEIS projected no significant impacts associated with traffic and transportation for workers at the site. During operations under all alternatives, transportation of radiological materials would occur, resulting in radiological impacts to transportation workers and the public. For the 2,000 weapon level of operations, the radiological impacts and potential risks of transportation would be small (e.g., less than 0.024 latent cancer fatality to workers and the public over a 10-year period). The number of traffic fatalities associated with radiological transportation would also be small (e.g., less than 0.012 fatality over a 10-year period).</td><td>The workforce associated with continued operations at Pantex has caused no significant changes to traffic and transportation in the ROI compared to the analysis in the SWEIS. Because there would be no major changes in the primary missions at Pantex for the next five years, and workload requirements are expected to be consistent with SWEIS projections, radiological and non-radiological transportation impacts would be expected to remain small and within the bounds presented in the SWEIS.</td></tr>
<tr><td colspan="3">Comparison to the SWEIS: The impacts from continued operations at Pantex would be consistent with, and bounded by those presented in the SWEIS. The impacts associated with the transportation of radiological materials would be bounded by the SWEIS, as the amounts to be transported would not change compared to those in the SWEIS. Significantly less than 1 latent cancer fatality per year would be expected to member of the public and workers.</td></tr>
<tr><td>Waste Management</td><td>The SWEIS projected the following waste quantities would be generated at Pantex annually from operations:

<table><tr><td>LLW</td><td>326 cubic yards/year</td></tr><tr><td>Mixed</td><td>239.6 cubic yards/year</td></tr><tr><td>Hazardous and universal</td><td>251.5 cubic yards/year</td></tr><tr><td>Nonhazardous industrial</td><td>1,815.5 cubic yards/year</td></tr><tr><td>TSCA</td><td>Small</td></tr><tr><td>Medical</td><td>Small</td></tr></table></td><td>The most current projections of waste quantities generated at Pantex annually from operations are as follows:

<table><tr><td>LLW</td><td>47.5 cubic yards/year</td></tr><tr><td>Mixed</td><td>0.2 cubic yards/year</td></tr><tr><td>Hazardous and universal</td><td>142.3 cubic yards/year</td></tr><tr><td>Nonhazardous industrial</td><td>4,442 cubic yards/year</td></tr><tr><td>TSCA</td><td>4.3 cubic yards/year</td></tr><tr><td>Medical</td><td>Small</td></tr></table>Source: CNS 2017a.</td></tr>
<tr><td colspan="3">Comparison to the SWEIS: As shown above, the amounts of all wastes that would be generated by continued operations at Pantex would be generally much smaller than the amounts estimated in the SWEIS. Nonhazardous waste could be generated at higher rates than evaluated in the SWEIS, but disposal paths are well established and their availability is expected to continue in the future. All wastes would be managed in accordance with applicable regulations, with no significant impacts. New facilities such as the ASC, HEPF, HESE, and MSF would not introduce any new waste types or additional waste quantities compared to past operations (CNS 2017a).</td></tr>
</table>

Health and Safety – Normal Operations	Annual dose to maximally exposed offsite individual (mrem)	5.8×10^{-5}	Annual dose to maximally exposed offsite individual (mrem)	1.35×10^{-7}
	Annual dose to the general population (person-rem)	1.33×10^{-4}	Annual dose to the general population (person-rem)	2.46×10^{-6}
	Average worker dose (mrem)	100	Average worker dose (mrem)	81
			Source: CNS 2016c.	
Comparison to the SWEIS: No major changes in the primary missions at Pantex are planned for the next five years, and workload requirements are expected to be consistent with SWEIS projections. The continued operations at Pantex would not change radiological doses to workers or the public. New facilities such as the ASC, HEPF, HESE, and MSF would not introduce any new hazards to the health and safety of workers or the public (CNS 2017a). All radiation doses from normal operations would be below regulatory standards with no statistically significant impact on the health and safety of workers or the public. As shown above, the impacts from continued operations at Pantex would be consistent with, and bounded by those presented in the SWEIS. Impacts on human health are expected to remain very small. Because activities over the next five years are expected to be similar to past activities, doses to the public and workers are expected to remain very small and similar to or less than indicated in the SWEIS.				
Health and Safety – Facility Accidents	Accident scenarios	11 accident scenarios	Accident scenarios	11 accident scenarios
	Bounding accident	Explosive-driven plutonium dispersal from an external event such as an aircraft impact	Bounding accident	Explosive-driven plutonium dispersal from an external event such as an aircraft impact
	Population within a 50-mile radius	267,107 people	Population within a 50-mile radius	329,835 people
	Distance to maximally exposed offsite individual	Varies by onsite release location	Distance to maximally exposed offsite individual	Varies by onsite release location
	Dose to latent cancer fatality conversion factor	0.0004 for workers 0.0005 for public	Dose to latent cancer fatality conversion factor	0.0006
Comparison to the SWEIS: There have been no changes in operations at Pantex to affect the conclusion that the scenarios analyzed in the SWEIS continue to bound the risks associated with Pantex Plant operations (CNS 2017a). No new scenarios have been identified that are appreciably different from the 11 scenarios discussed in the SWEIS and the material at risk (e.g., the amount of material that could be released from an accident) has not changed (CNS 2017a). For the bounding accident, the SWEIS estimated the risk of a fatality from that accident to be 7.2×10^{-6}. Differences in the 50-mile population and the dose-to-risk conversion factor have slightly changed that risk. Based on the current 50-mile population (329,835 people) and the current dose-to-risk conversion factor (0.0006 latent cancer fatalities per rem), the risk of a fatality from that bounding accident is now 1.2×10^{-5}. This is an insignificant change compared to the estimate in the SWEIS (7.2×10^{-6}). Changes in the USGS seismic hazard map at Pantex would not change the site-specific seismic data at Pantex used to determine facility design and construction requirements (CNS 2017a). Of the 11 risk dominant accidents evaluated in the SWEIS, only one accident was dominated by a seismic event. That accident was estimated to result in less than one excess fatal cancer (DOE 1996a). Compared to the bounding accident, a change in the potential impacts due to an increased seismic risk would remain bounded. New facilities such as the ASC, HEPF, HESE, and MSF would not introduce any new accident risks or hazards to the health and safety of workers or the public (CNS 2017a).				

Intentional Destructive Acts	Not evaluated in the SWEIS.	The resulting radiological release and consequences to workers and the public would be similar to the accidents analyzed above, regardless of the nature of the initiating event (CNS 2017a).
Comparison to the SWEIS: No comparisons to the SWEIS are applicable, as NNSA did not analyze intentional destructive acts in 1996. However, given that the resulting radiological release and consequences to workers and the public would be similar to the accidents analyzed, no significant differences would be expected if the SWEIS had included an analysis of intentional destructive acts. Although the new ASC presents a new set of challenges from a physical security perspective, NNSA has been working with the design team since its inception and have developed a comprehensive protection strategy that will ensure the safety and security of the occupants (CNS 2017a).		

a. Source: DOE 1996a, unless indicated otherwise.

CO = carbon monoxide; HAP = hazardous air pollutant; HCl = hydrochloric acid; HCN = hydrogen cyanide; HF = hydrogen fluoride; N_2O = nitrous oxide; NH_3 = ammonia; NOx= nitrogen oxides; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 micrometers; PTE = potential to emit; ROI = region of influence; SHPO = State Historic Preservation Officer; SO_2 = sulfur dioxide; VOC = volatile organic compound.

4. CUMULATIVE IMPACTS

The CEQ regulations (40 CFR 1508.7) define cumulative impacts as "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." This section reviews the cumulative impacts analysis presented in the SWEIS relative to subsequent programmatic decisions and the updated resource area impacts identified in this SA.

4.1 Cumulative Actions Previously Considered in the SWEIS

The cumulative impacts analysis in the SWEIS considered the impacts of continued Pantex Plant operations at the 2,000-weapons level and the storage of 20,000 pits when added to the impacts at the Pantex Plant from the activities proposed in the following:

- The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE/EIS-0236),
- The *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE/EIS-0229), and
- The *Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200).

Each of these programmatic documents addresses activities that were planned or underway at the Pantex Plant when the SWEIS was issued. NNSA previously concluded that the potential cumulative impacts of these activities were expected to remain within the bounds of the cumulative impacts analysis presented in the SWEIS (NNSA 2013a). Consequently, this SA does not further address these actions.

4.2 New Activities Considered for Cumulative Impacts in this SA

NNSA researched off-site activities around the Pantex Plant and determined that the only notable near-term action that might result in cumulative impacts within the planning period of this SA is the construction and operation of the ASC, which is described in Section 2.1.4 of this SA. As such, the cumulative impact analysis focuses on that facility.

With respect to long-term actions that are reasonably foreseeable (as described in Table A-1 of Appendix A), the following activities could contribute to cumulative impacts well after 2023:

- HE Formulation Facility (HEFF) (2029);
- Non-Destructive Evaluation (NDE) Facility (2037); and
- HE Component Assembly Facility (2038).

(Note: The Gas Laboratory Facility (part of the NDE Facility) is currently being evaluated for execution sooner as a General Plant Project [GPP]). Although reasonably foreseeable, no conceptual design information exists for any of the three facilities identified above. Consequently, only a high-level qualitative discussion of potential cumulative impacts can be presented for these facilities.

4.3 Potential Cumulative Impacts

This SA evaluates potential impacts associated with new information, new and proposed projects, and modifications to existing projects within the Pantex Plant since the SWEIS was issued in 1996. As described in Table 3-1 of this SA, these analyses demonstrate that minor or no additional impacts are expected for the various resource areas. Table 4-1 provides a summary of the environmental impacts expected from the reasonably foreseeable actions that could be cumulative with those of the Pantex Plant operations.

Table 4-1. Summary of Potential Cumulative Impacts from Reasonably Foreseeable Actions

Resource Area	Potential Impacts by Activity	
	Administrative Support Complex	**Long-Term Actions (HEFF, NDE Facility, and HE Component Assembly Facility)**
Land Resources	Potential off-site land disturbance of 52 acres. Cumulative impact expected to be insignificant given when added to the 2,000 acres currently disturbed by existing Pantex facilities. Once operational, the ASC would enable NNSA to demolish 51 facilities (approximately 527,000 square feet of facilities), eliminating their impact and thus reduce any cumulative impact (CNS 2017a).	Replacement facilities would be constructed on-site within the existing main Plant area and would enable NNSA to consolidate operations from existing facilities. Once these facilities are operational, NNSA would demolish existing facilities, eliminating their impact and thus reduce any cumulative impact.
Visual Resources	The ASC would be similar in size and appearance to existing on-site facilities, and would not change the overall appearance of the Pantex Plant. Demolition activities after ASC operation could reduce the density of development at the main Plant area, but would not be significant (CNS 2017a).	Replacement facilities would be similar in size and appearance to existing on-site facilities, and would not change the overall appearance of the Pantex Plant.
Geology and Soils	Minor, temporary soil disturbance during construction, but relatively flat landscape minimizes potential for erosion (CNS 2017a).	Minor, temporary soil disturbance during construction, but relatively flat landscape minimizes potential for erosion.
Water Resources	Minor, water would be used during construction for compaction and dust control. As a replacement facility, the ASC would not change water usage (CNS 2017a). The large water demands of the Amarillo area are primarily agricultural and water usage at Pantex accounts for less than 0.3 percent of groundwater withdrawals from the Ogallala Aquifer in Carson County.	Minor, water would be used during construction for compaction and dust control. Replacement facilities would not change water usage.
Air Quality	Temporary dust and equipment emissions during construction. No national ambient air quality standards would be exceeded (CNS 2017a).	Temporary dust and equipment emissions during construction. No national ambient air quality standards would be expected to be exceeded.
Acoustics	Temporary noise from construction actions (CNS 2017a).	Temporary noise from construction actions.

Resource Area	Potential Impacts by Activity	
	Administrative Support Complex	**Long-Term Actions (HEFF, NDE Facility, and HE Component Assembly Facility)**
Biotic Resources	Disturbing 52 acres would not result in significant impacts; land has no notable species or habitat (CNS 2017a).	Potential loss of habitat could result, but impacts are not expected to be significant as replacement facilities would be constructed on-site within the existing main Plant area.
Cultural Resources	Disturbing 52 acres would not result in significant impacts; land surveys have revealed no cultural resources (CNS 2017a).	Potential impacts to cultural resources are considered to be small but cultural resource surveys would be conducted as appropriate prior to construction.
Socioeconomics and Environmental Justice	Peak construction workforce of 350 persons represents less than 0.2 percent of the 4-county ROI population. Once operational, the ASC will house approximately 1,100 site personnel, but will have no impact on site employment (CNS 2017a).	Construction could produce minor socioeconomic benefits, but should not be significant relative to existing ROI employment levels.
Utilities	The ASC may slightly reduce utility demands, as the facility would consolidate operations and improve efficiencies (CNS 2017a).	Any replacement facilities would be expected to reduce utility demands, as the facilities would consolidate operations and improve efficiencies.
Transportation	Temporary increases in traffic associated with construction activities would not be significant compared to existing workforce transportation activities (CNS 2017a). The peak workforce of 350 is less than 10 percent of the existing Plant workforce.	Temporary increases in traffic associated with construction activities would not be significant compared to existing workforce transportation activities.
Waste Management	Minor nonhazardous solid waste from construction. All wastes would be managed in accordance with applicable regulations.	Minor nonhazardous solid waste from construction. All wastes would be managed in accordance with applicable regulations.
Human Health	No impacts expected other than normal safety concerns during construction and operations.	No impacts expected other than normal safety concerns during construction and operations. Replacement facilities would not change human health impacts during operations.
Facility Accidents	The ASC would not change any accident risks at the Plant.	The replacement facilities would not change any accident risks at the Plant.
Intentional Destructive Acts	The ASC would not change any risks/impacts from intentional destructive acts.	The replacement facilities would not change any risks/impacts from intentional destructive acts.

5. CONCLUSION AND DETERMINATION

The Pantex SWEIS evaluated the potential impacts of continued operation of the Pantex Plant between 1996 and 2006. This SA compares the information presented in the SWEIS with continued operations at Pantex, including any changes in programs/operations/impacts that would occur through approximately 2023 to determine whether the impacts identified in the SWEIS remain valid.

DOE regulations (10 CFR 1021.314) require a supplemental EIS be issued when "there are substantial changes to the proposal" or there are "significant new circumstances or information relevant to environmental concerns." In accordance with DOE regulations, this SA provides sufficient information to assist DOE/NNSA in determining whether the existing SWEIS should be supplemented, a new SWEIS be prepared, or no further NEPA documentation is required.

The analysis in this SA indicates that the identified and projected environmental impacts of continued operations at Pantex would not be significantly different from those analyzed in the SWEIS. As presented in Table 3-1, the potential impacts of continued operations at Pantex would be consistent with, and bounded by the analysis in the SWEIS. On the basis of the comparative analysis in this SA in relation to the analysis in the SWEIS, and other existing NEPA documentation, NNSA has determined that there are no currently identified significant new circumstances or information relevant to environmental concerns that warrant preparation of a supplemental or new EIS. Based on the analysis in this SA, there is no need either to supplement the SWEIS or to prepare a new SWEIS.

Based on my review of the information and analysis in this SA regarding continued operations at Pantex, as the Head of Field Organization (as required by DOE Order 451.1B Change 3), I have determined, with the concurrence of the NNSA Production Office Counsel, that neither a supplement to the SWEIS nor a new SWEIS is required.

_____ _____

Geoffrey Beausoleil Date
Manager, NNSA Production Office

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APPENDIX A:

NEPA Actions Considered in this SA

Table A-1. NEPA Actions Considered in this SA

Title	Project Status[a]	Discussion
Near-Term Projects (Present-2023)		
Nuclear Weapons Complex Roofing Program Support	This project began in 2002 and is expected to continue as long as funding is provided. Activities were originally evaluated under *Routine Administrative and Operating Activities Planned at Pantex Plant for FY2001 and FY2002,* which was approved in August 2000. This "blanket" NEPA document is updated every two years, providing continued NEPA coverage. Annual NEPA reviews will be completed and approved for each year. The scope for FY18 has been submitted for review.	This project identifies roofing activities planned at the Pantex Plant for FY18 and beyond. The goal is to extend the service life of existing roof systems to their maximum extent possible, as well as to replace failed roofs. The requirements included in this document apply to buildings added in the future. If future roofing projects have unusual specifications that are not included in the scope of this document, an amendment would be required. This project does not cause land disturbance or impacts related to water use or operational workers. Non-radiological air emissions will be like those for adhesives, propane, and other chemicals used for specific buildings. Records of chemical usage will be tracked.
High Pressure Fire Loop – Zone 11	The Zone 11 HPFL Line Item received critical decision (CD)-0 approval 01-13-2017. The Analysis of Alternatives is currently being done, CD-1 planned for third quarter FY18, construction planned for third quarter FY19, and completion in FY24. The program is examining pathways to execute as a minor construction recapitalization project. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years. Note: This project is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS. See end of table for definitions of "critical decisions."	The HPFL would be designed to provide water at a pressure, flow rate, and quantity to meet the demands of the fire suppression system in each facility.

Title	Project Status[a]	Discussion
High Explosives (HE) Science, & Engineering Facility	The HESE has received CD-1 approval (01/09/2015) and is currently in design. While no construction funding has been shown in congressional budget information within the FYNSP (currently through 2023), Pantex assumes that funding will be provided and CD-4 approval in the fourth quarter 2022. An EA has been prepared and is waiting on NNSA to approve and sign the FONSI. Note: This project is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS.	This project involves the construction of a new facility capable of housing various Plant operations, including environmental aging, test fire operations, new lot testing, laser measurement, and sampling technology development. These operations are currently located in 24 separate facilities and ramps, which are an average of 58 years old and do not provide efficient work practices. Most of the demolitions associated with this facility are currently planned to start in 2025. This facility would support the NNSA mission to mature advanced weapons surety technologies, qualify weapon components, and provide data for annual stockpile assessments through weapon surveillance. The proposed HESE Facility would include a campus approach consisting of three buildings, an all-weather ramp connecting the buildings and vehicle access located at the southwest corner of Zone 11 of the Pantex Plant. It would be approximately 72,000 square feet and would permanently house approximately 100 employees between the three buildings. The proposed location of the HESE Facility is currently a green-field site with no significant existing infrastructure. No major demolition is expected; however, there are existing utility lines and monitoring wells within the site location. Constructing and operating the proposed HESE Facility under the LEED Gold Certification would reduce environmental impacts such as lowering energy and operating costs, optimizing performance and conserving water. Utility usage for the HESE Facility is unknown until it is operational and recording data from the advanced meters installed; however, the current design is projected to achieve a 37.9 percent energy use and 22 percent energy cost reduction with the proposed facility: • Electric – 990,142 kWh / year • Natural Gas – 22,586 therms / year • Total Energy Usage – 5,638 MMBtu / year With regard to radiological hazards, the facility would probably include radiograph capability, so any hazards would be similar to the new HEPF. The facility would include shielding, installed radiation monitors, safety interlocks, and panic buttons. No new radiological accident scenarios would be introduced compared to existing operations.

Title	Project Status	Discussion
Zone 4 Rest Room Replacement	Design is currently underway, with construction expected to begin in the first quarter FY18. Completion is expected around April 2018. This project will fall under a NEPA categorical exclusion.	Project will replace a deteriorated, undersized restroom with a new, pre-fabricated facility and runs approximately 3,000 linear feet of water supply line. The existing restroom to be demolished is 18-ft. x 20-ft. building. The new 24-ft. x 30-ft. modular restroom will be placed on a new foundation in approximately the same area. The sewage would be connected to the existing Zone 4 septic system.
Material Staging Facility	This project is not funded at this time but the FY2018 House version of the National Defense Authorization Act authorized the MSF project $5.2M for development of some of the CD-1 information. Below is the latest estimates on the next milestone approvals. CD-1 1st Q FY2019 (approval of alternative, conceptual design) CD-2 1st Q FY2021 (design) CD-3 1st Q FY2021 (construction can begin) CD-4 1st Q FY2025 (Beneficial occupancy) It is anticipated that NNSA would require that an EA be prepared for this facility. Note: This project is part of the Complex Transformation Supplemental PEIS.	This facility would involve relocating the current staging operations to an area closer to production. This would reduce the safety and security risk associated with transporting nuclear weapons and nuclear parts through limited and protected areas. It would also eliminate inclement weather risks that may cause delays and postpone weapon movements between the two areas. Proposed location for MSF is southeast of Zone 12. With no conceptual design approved, no relevant information is available. With regard to radiological hazards, the facility would require a radiological alarm monitoring system, and shielding to reduce external dose rates to 0.25 mrem/hour. No new radiological accident scenarios would be introduced compared to existing operations.
Gas Laboratory	This project is not funded at this time but is on the High-Priority Projects Over Target list for construction in FY18/19, but alternatives are currently being evaluated. NNSA would determine what level of NEPA would be required for this project.	The scope of this project is to either construct a new facility or refurbish existing facilities to replace the existing Gas Analysis Laboratory and address impacts to production. With no conceptual design approved, no relevant information is available.
Production Support Fire Suppression Lead-ins	This project is not funded at this time, but is supported by the Construction Working Group (CWG) starting in FY21. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the “blanket” NEPA documents that are approved by NNSA every two years.	This project addresses the lead-ins for the mission-dependent, non-critical facilities in Zone 12 South MAA and PA.

Title	Project Status	Discussion
Inert Machining Facility, also referred to as the Advanced Fabrication Facility	The Advanced Fabrication Facility, as a Line Item, is expected to start in 2019, complete in 2021. NNSA would determine what level of NEPA would be required for this project. Note: This project is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS.	This facility would support the characterization, sanitization, and disposition of components generated from dismantlement processes. The quantity of components would significantly increase as each nation works to reach its agreed threshold limits. This increase is anticipated to exceed the current capability at Pantex. This facility would also support new HE technology. With no conceptual design approved, no relevant information is available, although tentative location is Zone 11. The program is also evaluating alternatives utilizing GPP funding. No new radiological accident scenarios would be introduced compared to existing operations.
Long-Term Projects (Beyond 2023)		
HE Formulation Facility – now includes scope of HE Packaging & Staging Facility	This project is not currently funded, but, according to the latest assumptions, the HE Formulation Facility will get CD-0 in 2020, CD-4 in 2028-2029 time frame. It is anticipated that NNSA would require that an EA be prepared for this facility. Note: This project is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS.	The HEFF would support the expected workload and provide backup capability of sufficient quantities of HE through the construction of a new facility. Currently, operations are being performed in several facilities. The project would relocate those operations currently performed in Zone 12 to the northwest part of Zone 11, thereby improving both quality and consistency. With no conceptual design approved, no relevant information is available. The facility would include shielding, installed radiation monitors, safety interlocks, and panic buttons. No new radiological accident scenarios would be introduced compared to existing operations.
HE Component Assembly Facility	This project is not funded at this time, but is supported by the CWG starting in FY30, completed by 2038. It is anticipated that NNSA would require that an EA be prepared for this facility. Note: This project is part of the Center of Excellence as described in the Complex Transformation Supplemental PEIS.	This facility would relocate various explosives operations, quality assurance inspection and gauging activities, and explosives studies from two 1950's era facilities that are wrongly configured, have inadequate explosives limits, and are in poor repair. With no conceptual design approved, no relevant information is available, although a tentative location is in Zone 12 south. With regard to radiological hazards, the facility would probably include radiograph capability, so any hazards would be similar to the new HEPF. The facility would include shielding, installed radiation monitors, safety interlocks, and panic buttons. No new radiological accident scenarios would be introduced compared to existing operations.
Non-Destructive Evaluation (NDE) Facility	This project is not funded at this time, but is supported by the CWG starting in FY30. This facility was one of the six original projects analyzed in the SWEIS. The scope has probably changed considerably but it would be NNSA's determination whether an EA would be required.	This facility would address the need to conduct critical non-destructive evaluations and laboratory analysis of gases to support analytical and scientific evaluations of weapon systems in modern facilities. Currently, these evaluations are being performed in aging WWII structures. Various alternatives, including new construction and potentially using other existing facilities, are currently being evaluated to relocate the Gas Lab and NDE operations, utilizing GPP funding.

Recapitalization Projects		
Bay/Cell Modernization	Funded through Recapitalization, projected through FY25. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	This portfolio reflects a multi-year plan to replace HPFL lead-ins, flame detection system (FDS), and RAMS. It also includes installation of a fiber optic network to provide the speed, reliability, and redundancy required for alarm system monitoring and reporting. The primary goal of this portfolio is to replace 80 HPFL lead-ins in 16 buildings, 54 FDS in 16 buildings, and 105 RAMS in 20 buildings. Part of the scope of this project addresses the HPFL lead-ins for mission-critical bays/cells. The existing piping is predominantly ductile and cast iron. Due to pipe aging and existing soil conditions, the lead-ins have experienced degradation from corrosion. This work is expected to be completed over a ten-year period and now involves 92 facilities. Another portion of this project addresses Flame Detection System Replacements due to new regulatory requirements, component obsolescence, and the availability of new technologies for increased capabilities. This work is expected to be completed over a ten-year period and now involves 66 facilities. Replacement of the RAMS will be executed in addition to the two projects above. In some cases, other replacements are coordinated with the bay/cell outages. For example hoists are being upgraded (with approved chains) or replaced (Num-1) and ESD floors installed. There may also be an opportunity for Wall/Ceiling appurtenances and installation of electrical outlets in the interlocks when required.
Building 11-51 Generator and UPS Replacement	Funded by Pantex Recapitalization Program scope for FY18. NEPA coverage was a Categorical Exclusion.	The scope of this project includes replacement of the end-of-life UPS and the failed backup generator and automatic transfer switch at Building 11-51.
Building 12-84E Generator Replacement	Funded by Pantex Recapitalization Program scope for FY18. NEPA coverage would most likely be a Categorical Exclusion.	This project will replace the failed backup generator for the east end of Building 12-84 with a larger unit and increase the size of the conductors to the building UPS.
Building 12-44 Equipment Room Expansion	Funded by Pantex Recapitalization Program scope for FY18. NEPA coverage would most likely be a Categorical Exclusion.	This project will provide additional equipment room space for Building 12-44 and segregate the building's mechanical and electrical equipment. Aging electrical distribution system components and UPSs will be replaced. A back-up generator will be installed. Adequate HVAC and fire protection will be provided. Unnecessary electrical equipment will be removed from the existing equipment room.
Building 12-130 Generator and UPS Replacement	Funded by Pantex Recapitalization Program scope for FY19. NEPA coverage would most likely be a Categorical Exclusion.	This project replaces the backup generator and UPS at Building 12-130 Operations Center. The HVAC will be modified or replaced if necessary to provide adequate ventilation and cooling for the UPS batteries.

Building 12-98 UPS Replacement and Generator Installation	This project is not funded at this time but is on the High-Priority Projects Over Target list. NEPA coverage would most likely be a Categorical Exclusion.	This project will replace and reconfigure the four UPS units in the equipment rooms in Buildings 12-98E1 and 12-98E2. It will also replace the two backup generators. The HVAC systems and electrical systems will be modified or replaced if necessary to provide adequate cooling and ventilation for the UPS and batteries.
Building 11-55 UPS and Generator Replacement	This project is not funded at this time but is on the High-Priority Projects Over Target list. NEPA coverage would most likely be a Categorical Exclusion.	This project will replace the UPS and backup generator at Building 11-55. Modifications to the electrical system will be made to accommodate the new UPS. The HVAC will be modified or replaced if necessary to provide adequate ventilation and cooling for the UPS batteries.
Lightning Protection System Pole Replacement, Zone 12 Material Access Area	This project is not funded at this time but is on the High-Priority Projects Over Target list. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	This project will replace 73 wooden poles located in the Zone 12 Material Access Area. It will bring these systems into compliance with DOE-STD-1212-2012, NFPA 780, and DOE O 452.2E.
Building 12-85 and 12-96 Replacement and Generator Installation	This project is not funded at this time but is on the High-Priority Projects Over Target list. NEPA coverage would most likely be a Categorical Exclusion.	This project will replace and reconfigure the UPS systems at Buildings 12-85 and 12-96. It will also install a supporting backup generator. The HVAC systems and electrical systems will be modified or replaced if necessary to provide adequate cooling and ventilation for the UPS and batteries.
Chiller Replacement Project for Building 12-21	This project may be funded through the Cooling and Heating Asset Management Program (CHAMP) during FY18 or the Recapitalization Program. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	The teams recommendation was to pursue Alternative #2 which will install 2 new chillers and discontinue use of the chiller in Building 12-24E (those chillers will still feed into 12-26 so they will not be surplus) : Alternative 2 differs in scope from alternative 1 in the following areas: 1. Alternative 2 will install two new 100-ton, two refrigeration circuit, air-cooled chillers on new concrete equipment pads in the yard directly southeast of 12-21/12-21A. 2. Alternative 2 will install three new chilled water pumps on a new concrete equipment pad adjacent to the two new air-cooled chillers. Chilled water pumps shall each be sized for 240 GPM/75 ft. head. 3. Alternative 2 will not require a 400A vertical section to be installed on the existing MCC-3. Two 250A breakers will be installed on existing sections of MCC-3 to power the two 100 ton chillers. This project includes the removal of the existing air-cooled chiller in Building 12-24E.

Chiller Replacement Project for Building 12-26	This project may be funded through the CHAMP during FY19. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	Replace failing 150 ton chiller, pump, piping, and valves in Building 12-024E that feeds chilled water to Building 12-026. As well as, replace four air handling units and associated equipment serving Building 12-026. The system will be upgraded with modern, energy efficient equipment that connects to the Building Automation System (BAS). Calculations will be developed to verify the adequacy of the existing piping, ductwork, and electrical service.
Chiller Replacement Project for Building 12-86	This project may be funded through the CHAMP during FY20. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	The scope of this project is to replace the failing 174-ton chiller serving Building 12-086 production vestibules. The systems will be upgraded with modern, energy efficient equipment (Delta) that connects to BAS. Calculations will be developed to verify the adequacy of the existing piping, ductwork, and electrical service.
Building 12-24E Chiller Replacement	This project is not funded at this time but is on the High-Priority Projects Over Target list. NEPA coverage for this project would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	This project will replace the 12-24E chilled water plant with chillers located at Buildings 12-21 and 12-26. Building 12-24E will then be removed from service pending demolition.
Security Upgrade Projects	This project involves several security line item projects. The Perimeter Intrusion Detection and Surveillance (PIDAS) Upgrade project is currently planned in phases from FY19 through FY21, although CD-0 has not been approved for the Pantex Zone 4 or Zone 12 PIDAS Line Item projects. While these two Line Items are still being pursued, separate projects are being done to address the higher priority components of the PIDAS. Other planned projects include security booth replacements, camera and communications upgrades in Zone 4 and 12, and Secondary and Central Alarm Station upgrades. NEPA coverage for these projects would be a Categorical Exclusion or tiered off one of the "blanket" NEPA documents that are approved by NNSA every two years.	Several projects are proposed to support new DOE orders and enhancements of the design basis threat posture, including renovating or expanding buildings and training facilities, upgrading guard towers, and upgrading security booths.

Existing Building Demolition Projects	Demolition projects (buildings) are proposed over the next 5-7 years, including: 2018: 04-146, 11-015A. 2019: 12-017P1, 12-017P2, 12-045, 12-047, 11-R-016, 12-041SS, 12-005G3, 12-080, 12-093, 11-029. 2020: 12-024S, 12-030, 12-024E, 12-019P, 12-034, 12-R-034, 12-034SS, 16-010B, 09-049, 09-090, 16-010A, 16-031. 2025: FS-004, FS-004A. NEPA coverage would most likely be Categorical Exclusions.	Demolition would be conducted to remove aging facilities that are no longer useful as construction is completed of new facilities. It is estimated that these demolitions would eliminate approximately 14,056 square feet over the next five years. Demolition would also count toward maintaining the total facility footprint. The majority of planned future demolitions are contingent on construction of replacement facilities. Current funding levels will not support all demolitions.
Demolition Projects once HESE Facility becomes operational	2019: 11-029. 2025: 11-002, 11-027, 11-R-013, 11-014, 11-028. 2026: 11-005, 11-017, 11-017A, 11-018, 11-019, 11-R-013A, 11-R-007, 11-R-008. 2027: 11-016, 11-022, 11-038, 11-045, 11-047, 11-R-01011-R-011, 11-R-023, 11-054, 11-054A. NEPA coverage would most likely be Categorical Exclusions.	Demolition would be conducted to remove aging facilities that are no longer useful once HESE Facility becomes operational. It is estimated that these demolitions would eliminate approximately 89,491 square feet.
Demolition Projects once HEPE becomes operational	2020: 12-063E, 12-063E1, 12-063E2, 12-R-063, 12-R-063A, 12-063, 12-063A. NEPA coverage would most likely be Categorical Exclusions.	Demolition would be conducted to remove aging facilities that are no longer useful once HEPE becomes operational. It is estimated that these demolitions would eliminate approximately 8,310 square feet.
Demolition Projects once ASC becomes operational	2018: 09-059, 09-060, 09-061, 09-130. 2019: 12-036, 12-036A, 12-036P, 12-036S. 2020: 12-002, 12-002A, 12-011A, 12-014, 12-072, 12-R-002. 2021: 12-006, 12-006B, 12-006V, 12-007, 12-007A. 2022: 12-101, 12-102, 12-106, 12-106A, 12-107. 2023-2024: 12-001, 12-003, 12-003L, 12-R-003. 2025: 04-020E, 04-024, 04-027, 04-029, 04-026, 09-001, 09-054, 09-111, 09-149, 10-007, 12-005A, 12- 005B, 12-R-005A, 18-001, 18-002. 2026: 10-009, 11-026, 12-067. 2027: 12-069, 12-127, 12-132. NEPA coverage would most likely be Categorical Exclusions.	Demolition would be conducted to remove aging facilities that are no longer useful once ASC becomes operational. It is estimated that these demolitions would eliminate approximately 337,418 square feet.

Perched Groundwater Corrective Measures Projects Funded By Long Term Stewardship		
Perched Groundwater Corrective Measures	Construction started in FY07. NNSA issued the Environmental Assessment for *Proposed Perched Groundwater Corrective Measures*, DOE/EA-1579 in February 2007; the associated FONSI was issued in June 2007.	The specific scope of this environmental restoration project has depended on regulatory decisions made by the State of Texas.
Repair of Cap Degradation and Installation of Engineering Controls at Landfill 3 (SWMU 54)	This project is being planned. Covered by prior NEPA review *"Environmental Restoration and Waste Management Activities for Pantex Plant for FY2017 and FY2018"* (NNSA 2016e). NEPA document approved on 7/27/17.	This project will be to (i) repair degraded areas of the existing protective cap on Landfill 3 (SWMU 54); (ii) install engineered controls at Landfill 3; and (iii) enlarge the head and wingwalls around the upstream side of the box culvert located in a ditch west of the landfill. The primary areas of work would be the landfill's top edge and side slopes. The designed engineering controls would ensure the protective cover at Landfill 3 remains competent and fulfills requirements for protection and containment of Landfill 3.
Southeast-ISB Pad and Utility Relocation	This project is being planned. Covered by prior NEPA review: Environmental Assessment for *Proposed Perched Groundwater Corrective Measures*, DOE/EA-1579. NEPA document approved in February 2007.	Turner construction (Contractor utilized to construct new Administrative Support Complex building) would relocate the Southeast In-Situ Bioremediation (SE-ISB) pad site/staging area approximately 1,500 feet west of the original approved location. The original location became part of the ASC. Work would include trenching utilities into proposed site and construction of a caliche pad for staging. Utilities utilized would be electrical service, including a transformer, for the SE-ISB trailer, pump and treat supply water, High Density Polyethylene (HDPE) pipe from Building 16-28 (Southeast Pump and Treat System) to staging area, communication lines to/from SE-ISB wells, and HDPE piping to SE-ISB wells. The area for staging would be approximately 150 feet x 200 feet.
Southeast Pump & Treat Expansion Across FM2373 – FM2017	This project is being planned. Approved NEPA documentation tiered off the previously approved blanket document, "*Site Characterization, Monitoring, and General Research Activities for Pantex Plant for FY2017 and FY2018*. NEPA document approved in February 2007.	This project addresses the tie-ins of six extraction wells located on DOE property to the east of (FM 2373 from the Pantex Plant, to an existing header box located at the southeast corner of the plant. This scope includes installation of a radio based control system for operation of the new extraction wells.

Notes:

[a] Per DOE Orders, CDs are defined as follows:

CD-0: approve mission need
CD-1: approve alternative selection and cost range
CD-2: approve performance baseline
CD-3: approve start of construction/execution
CD-4: approve start of operations or project completion