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Pantex EIS



DOE/EIS-0225

Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Summary



U.S. Department of Energy
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Washington, DC 20585

November 1996

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SUMMARY

INTRODUCTION

As a successor agency to the Atomic Energy Commission, the Department of Energy (DOE or the Department) is required by the *Atomic Energy Act of 1954*, as amended, to provide for the safety and reliability of the Nation's nuclear weapon stockpile. Through Presidential direction and Congressional authorization and appropriation, the Department is given certain nuclear weapon stockpile requirements for the current and future years. These requirements relate to the development, production, assembly, disassembly, safety, reliability, and effectiveness of the Nation's nuclear weapons. Pantex Plant, northeast of Amarillo, Texas, is where DOE fulfills many of its responsibilities regarding the production of high explosive(s) (HE) components for nuclear weapons; assembly, modification, and disassembly of nuclear weapons; and maintenance and monitoring of the nuclear weapon stockpile.

Recent Presidential directives have sharply reduced the number of nuclear weapons in the stockpile. This has resulted in a large increase in the number of weapon disassemblies and a corresponding increase in the number of nuclear weapon components that must be disposed of or stored until future decisions on disposition can be implemented. While most of the work currently taking place at Pantex Plant relates to the disassembly of nuclear weapons, the plant must be capable of responding to any mix of assembly, disassembly, modification, or quality assurance operations that may be necessary to maintain the stockpile in the future. Other activities at Pantex Plant include certain quality assurance evaluations of weapons, quality assurance testing of weapon components, research and development activities supporting nuclear weapons, waste management, environmental protection, environmental restoration, and onsite transportation, as required.

There is a need at this time to update the Department's evaluation and analysis of environmental impacts associated with ongoing operations at Pantex Plant and evaluate any additional or changed impacts associated with an increase in dismantlement and interim storage of nuclear weapon components. Decisions must be made regarding component storage, and proper mitigative measures must be maintained to responsibly carry out assigned functions.

National Environmental Policy Act Process

The *National Environmental Policy Act of 1969* (NEPA) requires Federal agencies to take the potential environmental effects of proposed actions into account in their decision making processes. Federal agencies are required to develop internal procedures to implement the requirements of NEPA. It is the Department's policy to prepare site-wide Environmental Impact Statements (EISs) for certain large, multiple-facility DOE sites to assess the impacts of all or selected functions at those sites. Furthermore, it is DOE's policy to evaluate site-wide NEPA documents at least every 5 years to determine whether the existing EIS remains adequate or whether to prepare a new site-wide EIS or supplement the existing EIS (10 Code of Federal Regulations [CFR] 1021.330).

The operations of Pantex Plant were previously assessed in a site-wide EIS published in 1983 (DOE 1983a). The scope of operations at Pantex Plant included the staging of pits from weapons disassembly activities for transfer to other DOE sites for processing. A pit is part of a nuclear weapon that is composed of a plutonium metal core surrounded by a hermetically sealed, nonradioactive outer case. When the transfers of pits from Pantex Plant were suspended, a larger number of pits had to be staged at Pantex Plant for an interim period.

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DOE prepared the *Environmental Assessment for Interim Storage of Plutonium Components at Pantex* (DOE/EA-0812) in 1994 to assess the impacts of increased interim storage for the short term.

Because of stakeholder concerns and the complexity of issues associated with interim pit storage and with the continuing operations of Pantex Plant, the Secretary of Energy advanced the schedule for a new site-wide EIS for the plant, and committed the Department to consider alternate sites for interim storage of pits. This EIS assesses the environmental effects of Pantex Plant operations and also evaluates alternative sites for the interim storage of pits.

PURPOSE AND NEED FOR THE DEPARTMENT OF ENERGY'S ACTION

The Department needs to continue to fulfill its responsibilities as mandated by statute, Presidential direction, and Congressional authorization and appropriation. The Department's goal is to meet these needs in a manner that enhances the protection of human health and the environment, and minimizes any disruption in DOE's ability to perform all of its responsibilities.

General Scope of the EIS

The scope of this EIS includes the assessment of impacts to each area of the human and natural environment potentially affected by operations performed at Pantex Plant. These areas include issues identified during internal and public scoping. The EIS examines impacts across a reasonable range of activity levels by assessing the operations on 2,000, 1,000, and 500 weapons per year. These levels of weapons operations could involve any mix of nuclear weapons assemblies, disassemblies, retrofits, and rebuilds. The scope also includes those areas of the natural and human environment at the candidate sites that might be impacted by interim pit storage activities should they be

relocated from Pantex Plant. The candidate sites for relocation of interim pit storage are the Nevada Test Site (NTS), Savannah River Site (SRS), Hanford Site, and Kirtland Air Force Base (KAFB). The EIS assesses activities over a period of approximately 10 years.

During the scoping process for this EIS, DOE first conducted internal scoping, then invited participation by the public and other governmental agencies. This process identified issues to be addressed at Pantex Plant and the candidate sites. The areas of interest were plant facilities and infrastructure, land resources, geology and soils, water resources, air quality, acoustics (noise), biotic resources, cultural resources, socioeconomic resources, intrasite transportation, waste management, human health risks, and aircraft accidents. In addition to the analyses of these areas of interest for each site, this EIS addresses intersite transportation of nuclear and hazardous materials, potential mitigation measures, unavoidable impacts, irreversible and irretrievable commitment of resources, impacts on long-term productivity, and environmental justice.

In March 1996, the Department published the *Draft Environmental Impact Statement for the Continued Operation of Pantex Plant and Associated Storage of Nuclear Weapon Components*. A Notice of Availability of the Draft EIS was published in the Federal Register (61 FR 15232) on April 5, 1996. The comment period for the Draft EIS began on April 5, 1996, and originally was to end on July 5, 1996. However, at the request of stakeholders in the Amarillo, Texas area, the ending date was extended to July 12, 1996, for a comment period of 98 days. In addition, DOE stated that comments received after the formal comment period would be considered to the extent practicable. Comments were accepted as late as July 29, 1996, over two weeks past the end of the formal comment period.

During the comment period, public hearings were held in Amarillo, Texas; North Las Vegas,

Nevada; North Augusta, South Carolina; Albuquerque, New Mexico; and Richland, Washington. In addition, a separate Technical Exchange Meeting was held in Amarillo, Texas with representatives of the State of Texas, City of Amarillo, Panhandle Water Conservation District No. 3, the University Consortium (Texas Tech University, Texas A&M University, University of Texas, and West Texas A&M University), the Amarillo Economic Development Corporation, the Pantex Plant Citizens Advisory Board, and members of the public.

All public meeting comments were combined with comments received by all other means (e.g., hand-ins, faxes, letters, e-mail, etc.) during the public comment period. All comments were categorized by subject area and were considered for potential changes or additions to the EIS. Volume III of this Final EIS describes the public comment and public hearing processes in detail. In addition, volume III details the comments received, the analysis of the comments, the responses to the comments, and indicates what changes were made in the EIS due to the comments. Volume I, the main text of the Final EIS (this volume), and volume II, the appendixes, have been marked with a line down the left side of text columns to indicate where changes or additions have been made to the EIS text.

THE DECISION MAKING PROCESS AND DECISIONS TO BE MADE

This Pantex Plant EIS provides both DOE and the public with information on the potential environmental impacts associated with the Proposed Action and Alternatives. This EIS covers all current and reasonably foreseeable facilities and activities at Pantex Plant, interim storage requirements for pits from weapons dismantlement, and the transportation of classified components shipped from Pantex Plant. This EIS was also scoped to address alternate locations for interim pit storage (i.e., until longer-term storage decisions are made

and implemented). Accordingly, it also addresses potential environmental impacts at NTS, SRS, Hanford Site, and Kirtland Air Force Base (KAFB) should one of these installations be chosen as an alternative site for the interim storage of up to 20,000 pits.

There are two additional DOE NEPA documents that address the storage of pits. The SSM PEIS addresses the long-term storage of pits that will be needed for national security requirements (strategic reserve pits). The S&D PEIS addresses storage of all pits, including pits that have already been, or later may be, declared surplus to national security requirements, and the approach for dispositioning surplus pits.

The Proposed Action in this EIS was designed specifically to encompass the interim storage of pits from weapons dismantlement until such time as longer-term decisions regarding storage and disposition could be made and implemented. The Preferred Alternative for the interim storage of pits in this EIS is to continue to store them at Pantex Plant. The Preferred Alternative in the Draft SSM PEIS provides for the long-term storage of strategic reserve pits at whatever site is selected for the assembly/disassembly function in the future weapons complex; the Draft SSM PEIS identifies Pantex Plant as the preferred site for that function.

The Draft S&D PEIS analyzed a number of alternatives and suboptions for the storage of pits and other forms of surplus material pending disposition, but it did not identify a Preferred Alternative for the storage of pits. Several alternative sites, including Pantex Plant, were analyzed for the mission of storing surplus material pending disposition. The Draft S&D PEIS contemplated the possible transfer of surplus material to Pantex Plant for storage around the year 2004, after upgrades to existing storage facilities in Zone 12 had been completed. The Rocky Flats Environmental Technology Site (RFETS) was identified in the

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Draft S&D PEIS as one source of this surplus material.

The Final S&D PEIS will include an alternative that is a refinement of the Draft S&D PEIS alternatives described above. Under this alternative, pits could be transferred from RFETS to Pantex Plant as early as 1997 and stored temporarily in existing Zone 4 facilities until the upgraded facilities in Zone 12 are available. The environmental impacts associated with transferring surplus pits from RFETS to Pantex Plant, including the impacts of their storage at Pantex Plant, will be included in the Final S&D PEIS. The potential addition of RFETS pits at Pantex Plant would not exceed the storage limit of 20,000 pits proposed and analyzed in this EIS. Moreover, surplus RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant. (Refer to sections 1.7.2 and 1.7.3 for more information on the SSM PEIS and the S&D PEIS, respectively.) If this alternative were selected in the ROD for the S&D PEIS, surplus pits already at Pantex Plant would continue to be stored there pending disposition and, in addition, surplus pits from RFETS would be transferred to Pantex Plant in the near term for storage, also pending disposition.

At this time DOE projects that the Records of Decision (RODs) for both the SSM PEIS and the S&D PEIS will be issued in late 1996 or early 1997, at or about the same time as the ROD for this EIS, and that decisions on the longer-term storage of pits will be made in the RODs of the two PEISs. As described above, if DOE selects the Pantex Plant storage alternatives in the SSM PEIS and the S&D PEIS, strategic reserve pits would be stored at Pantex Plant indefinitely and surplus pits (including the pits currently at RFETS) would be stored at Pantex Plant until DOE implements decisions regarding their disposition. The ROD for this EIS will take into consideration the decision-making process for the PEISs when making a decision on the interim storage of pits.

However, if there is a significant delay in RODs for either PEIS, or if DOE does not make a decision on the long-term storage of pits in those RODs, then a decision will be needed on the location of interim storage of pits, uninformed by a decision on long-term storage. In any event, this EIS was completed with the analysis of interim storage alternatives, including addressing the issues and comments received from the public on this EIS, to support a decision relating to the storage of pits until a long-term storage decision has been made and implemented.

DOE encourages interested parties to comment, during the period between issuance of the Final PEISs and issuance of the RODs, on the Preferred Alternative for the SSM PEIS and the alternatives for the S&D PEIS as they affect the storage of pits at Pantex Plant.

The DOE decision-making process for the interim storage of pits will consider the analysis presented in this Final EIS along with mission requirements, costs, other technical factors, the national interest, and public input. The Secretary of Energy will then issue a ROD. The ROD may be issued no sooner than 30 days after the Final EIS. The ROD will explain all factors, including environmental impacts, that DOE considered in reaching its decision. The ROD will specify the alternative or alternatives that are considered to be environmentally preferable.

If the selected alternative is different from the environmentally preferred alternative, the ROD will present the rationale for the Department's selection. Specifically, the ROD will document the decision as to how operations at Pantex Plant would be conducted, at which site(s) interim pit storage should be performed and in what quantity, and what mitigative measures should be taken. As discussed in section 3.1, the ROD may combine aspects of various alternatives in the decision.

If mitigation measures are adopted as part of the agency's decision, these will be summarized in the ROD, as applicable, and included in a Mitigation Action Plan. The Mitigation Action Plan would explain how and when mitigation measures will be implemented. The Mitigation Action Plan must be in place prior to taking any action that is subject of a mitigation commitment.

BACKGROUND

History of Pantex Plant

Pantex Plant was originally built for the U.S. Army during the early days of World War II with the mission of producing conventional bombs and artillery shells. After the war, the plant was deactivated and lay vacant until purchased for \$1.00 in 1949 by Texas Technological College (now Texas Tech University). In 1951, the main plant and surrounding land was reclaimed for the Atomic Energy Commission (a predecessor of DOE) to assemble nuclear weapons. Originally, Pantex Plant was one of four nuclear weapon assembly and modification plants. By 1975, all nuclear weapons assembly and disassembly operations had been consolidated at Pantex Plant.

Current Operations at Pantex Plant

Pantex Plant is owned by the Department and is currently operated under contract by Mason & Hanger-Silas Mason Company, Inc. Over the years, activities at Pantex Plant have included five major types of nuclear weapons operations: fabrication of high explosives (HE); assembly of nuclear weapons; maintenance, modification, evaluation, and quality assurance testing of nuclear weapon components from the stockpile; disassembly of nuclear weapons; and assembly and disassembly of training assemblies. Associated with these major types of operational activities have been HE research, transportation of weapons and components, storage of weapon components resulting from disassembly, environmental protection,

environmental restoration, and waste management activities. In the past, Pantex Plant's emphasis had been the assembly of nuclear weapons. Currently Pantex Plant's emphasis is the disassembly of nuclear weapons, but all of the historical missions continue to be performed.

Research and Production of HE and Weapon Components

Highly specialized explosive main charges and other small explosives components are required for a weapon to be capable of producing a nuclear explosion. Research is conducted on the chemical and mechanical properties of explosives for use in nuclear weapons. Main charge subassemblies are mated with a pit during the weapons assembly process. Various small explosives subassemblies are produced from explosives and other materials. Most explosives components are made for modification, random testing, and maintenance of the stockpile.

Studies evaluating alternative treatment methods to open burning-open detonation of HE are presented in appendix G. Recycling and commercial sale of Pantex Plant explosives are currently being developed to reduce Burning Ground activities.

Assembly of Nuclear Weapons

The HE components produced at Pantex Plant are assembled with the nuclear components manufactured at other sites and encased in a protective shell. This subassembly is called a "physics package." The nuclear components include highly enriched uranium (HEU) in canned subassemblies (CSAs); radioisotopic thermoelectric generators (RTGs), which contain encapsulated plutonium heat sources; and classified components containing tritium and pits. The remaining operations involve adding other components to the cased physics package and placing the completed unit into a bomb case or warhead called the "final

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package.” All of these additional components, as well as the pits, are supplied by other manufacturing plants. The assembled weapons are sent from Pantex Plant to the Department of Defense (DOD).

Modification and Maintenance of Nuclear Weapons

Weapons remaining in the stockpile that require maintenance or modification are returned to Pantex Plant for activities ranging from replacement of limited life components to almost total rebuilds.

Stockpile Evaluation

Stockpile evaluation involves the disassembly and evaluation of pre-selected weapons returned from DOD. The main purpose of stockpile evaluation is to determine the reliability of the weapon system based on the test results of a representative sample of each weapon system in the stockpile. The weapons returned for evaluation are divided into two categories, laboratory tests and flight tests. Following evaluation, some of the weapons are rebuilt and returned to the stockpile. As part of the laboratory tests, select weapon systems are exposed to variable temperatures for prolonged time periods to simulate environmental conditions that the weapons could be subject to during their lifetimes. This type of test is referred to as aging studies. Aging studies are conducted in environmental chambers located in Buildings 12-94 and 12-104A. Currently, these environmental chambers are not in use. Prior to use, these environmental chambers will be subject to review under NEPA and site safety management systems.

Quality Assurance Testing of Weapons Components

To maintain the reliability of the Nation's nuclear weapons stockpile, Pantex Plant tests and evaluates a certain number of preselected weapons each year. These weapons are

evaluated in a selective dismantlement process whereby certain components are physically removed from the weapon, assembled into specified test configurations, and subjected to electrical and/or explosives testing.

Disassembly of Nuclear Weapons

Weapons are returned to Pantex Plant from DOD for disassembly. Prior to actual disassembly, the weapons are staged in magazines at Pantex Plant. The disassembly process takes place in three stages: the final package dismantlement stage, which involves a series of verification steps that are performed to ensure the weapon is in a safe condition and internal components are intact; the mechanical and electronic component disassembly stage; and the physics package dismantlement, which involves opening the case, removing the HE/pit subassembly and other components, and separating the HE main charge from the nuclear pit.

The nonnuclear components resulting from disassembly (e.g., HE, electronics, and structural parts) are demilitarized and sanitized, recycled, salvaged, or disposed of at Pantex Plant or other sites. The nuclear components resulting from weapons disassembly are either sent back to the original manufacturing sites or retained. The CSAs containing HEU are sent to the Oak Ridge Reservation (ORR). The RTGs are shipped to the Los Alamos National Laboratory (LANL). The pressure vessels containing tritium are sent to SRS. The pits are currently retained at Pantex Plant.

Transportation

The operations at Pantex Plant require the transfer of hazardous material between Pantex Plant and other DOE and DOD sites. These materials include nuclear explosives (weapons), nuclear components, HE, and radioactive materials. Within the Pantex Plant boundaries many hazardous materials are transported

between zones and between buildings in those zones.

Pit Storage Operations

When a pit is removed from a weapon, it is currently placed in interim storage at Pantex Plant. The pits have historically been staged at Pantex Plant for a period of time before being transferred back to the manufacturing facility for recycling. When the transfer of pits from Pantex Plant was suspended, pits had to be stored on an interim basis at the plant. Pantex Plant has sufficient storage capacity to safely accommodate 20,000 pits.

Environmental Protection Activities

The environmental protection program is continuously improving Pantex Plant's ability to ensure that missions are performed in a safe and environmentally protective manner. The DOE Amarillo Area Office is initiating the development of a resource stewardship strategy to guide future planning and management of all environmental resources at Pantex Plant.

Environmental Restoration and Waste Management

Environmental restoration activities involve assessing all inactive waste sites, determining the nature and extent of contamination, and performing remediation as needed in compliance with all appropriate regulatory requirements. The types of wastestreams generated and managed by Pantex Plant include low-level radioactive waste (LLW), low-level mixed waste (LLMW), hazardous waste (HW), and nonhazardous waste (NHW). Pantex Plant also generates and manages recyclable materials.

In 1996, the Pollution Prevention and Waste Minimization (PP/WM) program at Pantex Plant received the President's "Closing the Circle" Award for achievements in recycling and waste prevention. This program saved approximately \$4.5 million of taxpayer money in 1995.

ALTERNATIVES EVALUATED IN DETAIL

Because future stockpile requirements cannot be accurately predicted, this EIS examines the impacts of operations on 2,000, 1,000, and 500 weapons per year for each alternative. These weapons operations could consist of assemblies, disassemblies, modifications, rebuilds, quality assurance tests, retrofits, or any mix of these operations.

Operations on these numbers of weapons per year represent a reasonable, but conservative estimate of work that may be required at the plant, based on current policy directives, and allow a set of defined tasks to be accurately analyzed. The operations on each of the weapons in these defined sets is assumed to be extensive (representative of full assembly or disassembly). Actual workload and range of tasks to be performed on each weapon processed at the plant may vary, but individual tasks are well understood, and impacts of actual operations are expected to be encompassed by this conservative analysis. Accordingly, more than 2,000 weapons per year may be worked on at Pantex Plant without exceeding the environmental impacts identified in this conservative, bounding analysis. The 2,000, 1,000, and 500 weapons should not be considered to be specific limits.

ALTERNATIVES

The Proposed Action (Preferred Alternative) involves all of the different weapons activities historically performed at Pantex Plant, storage of up to 20,000 pits at the plant, and the possible implementation of six new projects.

The No Action Alternative involves all of the different weapons activities historically performed at Pantex Plant, storage of up to 12,000 pits, and the implementation of only previously approved and funded projects. Dismantlement would cease once a storage level of 12,000 pits has been achieved.

The Relocation of Interim Pit Storage Alternative involves all of the different weapons activities historically performed at Pantex Plant, relocation of storage of 8,000 or 20,000 pits to another site, and the possible implementation of six new projects.

Proposed Action—Continuing Operations at Pantex Plant—Preferred Alternative

The Department proposes to continue nuclear weapons stockpile management operations and related activities at Pantex Plant; continue the current transportation of nuclear explosives and nuclear components between Pantex Plant and other DOE and DOD sites; and implement projects and facility upgrades at Pantex Plant consistent with efficiently fulfilling these missions for approximately 10 years. This would include the interim storage of up to 20,000 pits at Pantex Plant.

The Proposed Action includes performing or maintaining the capability to perform all of the historical and current operations at Pantex Plant described above. The Proposed Action would specifically include performing all required upgrades, modifications, and replacement of facilities and equipment required to maintain

operations at the plant. New proposed projects include the Hazardous Waste Treatment and Processing Facility (HWTPF), Pit Reuse Facility, Gas Analysis Laboratory, Materials Compatibility Assurance Facility, Nondestructive Evaluation Facility, and Metrology and Health Physics Calibration and Acceptance Facility.

No Action Alternative

The No Action Alternative would continue nuclear weapons stockpile management operations and related activities at Pantex Plant and continue the current transportation of nuclear explosives and nuclear components between Pantex Plant and other DOE and DOD sites. This would include the continuation of the interim storage of up to 12,000 pits at Pantex Plant, after which weapons disassembly operations would cease. The six proposed new projects would not be undertaken.

In the March 1996 Pantex Plant Draft EIS, the proposed construction of the HWTPF was considered necessary for meeting waste operational efficiency and safety and regulatory requirements established in the Agreed Order. With offsite disposal shipments of mixed waste in 1994 and two shipments in 1996, as described in section 4.13.2.3 of this volume, and changes contained in the August 1996 Federal Facility Compliance Act (FFCA) Compliance Plan Annual Update document, construction of the HWTPF is no longer considered a regulatory requirement. DOE's purpose and need for enhanced efficiency and safety of its current LLMW, LLW, and HW operations remain and are discussed in greater detail in volume II, appendix H. Without the HWTPF, waste treatment and processing capabilities are greatly limited.

Relocation of Interim Pit Storage Alternative

With the Relocation of Interim Pit Storage Alternative, also referred to as Pit Storage Relocation Alternative, pit storage operations

**ALTERNATIVE PIT RELOCATION
AND INTERIM STORAGE SITES***Device Assembly Facility, Nevada Test Site
(8,000 pits).**P-Tunnel Complex, Nevada Test Site (8,000
or 20,000 pits).**P-Reactor, Savannah River Site (8,000 or
20,000 pits).**Fuels and Materials Examination Facility,
Hanford Site (8,000 pits).**Manzano Weapons Storage Area, Kirtland
Air Force Base (8,000 or 20,000 pits).*

would be transferred to another site. All other operations, upgrades, and new projects would be the same as for the Proposed Action. There are two options under this alternative: the relocation of up to 20,000 pits from Pantex Plant, or the relocation of up to 8,000 pits from Pantex Plant, leaving 12,000 pits at the plant. There are three DOE and one DOD candidate sites for the relocation of interim pit storage activities from Pantex Plant. With this alternative, the number of pits in interim storage at Pantex Plant could increase initially. Once the rate of pit shipments is sufficient to handle the number of pits generated by disassembly operations, the number of pits at Pantex Plant would decrease.

The four candidate sites for the relocation of interim storage of pits are the NTS, near Las Vegas, Nevada; SRS, near Aiken, South Carolina; Hanford Site, near Richland, Washington; and KAFB, near Albuquerque, New Mexico.

**ALTERNATIVES CONSIDERED BUT
ELIMINATED FROM DETAILED STUDY**

The Department considered three other alternatives to the Proposed Action that were eliminated from detailed study in this EIS.

These alternatives consisted of (1) relocation of operations, (2) shutdown of Pantex Plant, and (3) relocation of storage of nuclear components other than pits. Upon review, DOE determined that the relocation of operations from Pantex Plant within the time period of this EIS does not meet the purpose and need for DOE to maintain minimum disruption of weapons disassembly operations. Because Pantex Plant is the only facility currently capable of performing the requirements to maintain, monitor, and perform quality assurance on nuclear weapons, the shutdown of Pantex Plant within the near-term scope of this EIS is unreasonable. After review of the nature of the nuclear components being shipped to other sites, and the operations that must be performed prior to storage, DOE determined that, for the time period of this EIS, there is no other location with the required capabilities and capacities other than the sites to which the components are currently sent.

Preferred Alternative

The Council on Environmental Quality (CEQ) regulations for implementing NEPA require an agency to identify its preferred alternative(s) in the Final EIS (40 CFR 1502.14(e)). The preferred alternative is the alternative which the agency believes would fulfill its statutory mission, giving consideration to environmental, economic, technical, and other factors.

Based on these analyses and consideration of schedule and technical information, the Department's preferred alternative is to continue nuclear weapons operations at Pantex Plant; implement projects and facility upgrades consistent with fulfilling these operations; and increase interim storage levels for plutonium components (pits) from 12,000 to 20,000 pits.

ENVIRONMENTAL IMPACTS

Table S-1 (at the back of this summary) presents a comparative summary of the potential impacts to the environment at and near Pantex Plant that would result from the

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implementation of the Proposed Action, No Action, and Pit Storage Relocation alternatives. The potential impacts that would result with implementation of the Pit Storage Relocation Alternative at Pantex Plant and the candidate sites are presented in Table S-2.

For most of the environmental resources assessed in this EIS, there is no real difference between the impacts for the different alternatives. This is due to the nature of the activities described in each alternative. Each of the alternatives examines the activities at Pantex Plant in terms of three levels of activity (i.e., operations on 2,000, 1,000, and 500 weapons per year). The differences among the alternatives are the number of pits that will be stored at Pantex Plant and the new projects that might be implemented.

Impacts to facilities and infrastructure, air quality, acoustics, cultural resources, and environmental justice were determined to be similar for each of the alternatives.

The Proposed Action and the Relocation of Interim Pit Storage alternatives involve the construction of new facilities. The new facilities would have an area of 15,900 m² (171,000 ft²), involving a temporary soil disturbance of 31,800 m² (342,000 ft²). This temporary soil disturbance might result in impacts to some of the common plant and animal species, but would not impact sensitive species or habitats. The construction would result in 1,227 direct and indirect jobs, with a total of \$56 million of personal income added to the economy in the peak year.

For the No Action Alternative, the new facilities would not be constructed and the impacts described above would not occur. However, if the HWTPF is not constructed, Pantex Plant's waste treatment and processing capabilities would remain limited and may not meet future demand.

Water usage and wastewater generation were similar for each of the alternatives. The new facilities would result in less than a 0.6 percent variation between the No Action Alternative and the Proposed Action and Relocation of Interim Pit Storage alternatives. Further, normal operations, including handling and storage of pits, would not require substantial amounts of utility or resource use.

There would be unavoidable exposures to radiation resulting from normal handling of pits during transfer to storage. There would also be additional impacts to Pantex Plant workers resulting from loading the pits for transfer to the alternative storage site, if one is chosen. For the Relocation of Interim Pit Storage Alternative, the workers at Pantex Plant who would remove the pits from storage and load them for transportation to an alternate storage site would receive an additional 113 person-rem (0.04 excess cancer fatalities) for 8,000 pits, or 283 person-rem (0.11 excess cancer fatalities) for 20,000 pits. From the intersite transportation of 8,000 pits, the public would receive an additional maximum exposure of 1.2 person-rem (6×10^{-4} excess cancer fatalities) or an additional maximum exposure of 3.0 person-rem (1.5×10^{-3} excess cancer fatalities) for 20,000 pits.

For the Relocation of Interim Pit Storage Alternative, storage of some or all of the pits would be transferred to an alternate pit storage site within existing DOE facilities or Manzano Weapons Storage Area, Kirtland Air Force Base. Five facilities at the four candidate sites were assessed for the storage of either 8,000 or 20,000 pits. The impacts at the alternative pit storage candidate sites were determined to be negligible for geology and soils, water resources, air quality, waste management, and environmental justice.

If an alternate pit storage candidate site is chosen, the site would only experience an increase of approximately 150 personnel (mostly security personnel), resulting in a

negligible impact to the local economy. No major construction and attendant soil disturbance is anticipated at any of the candidate sites. The P-Tunnel Complex at NTS would require a new portal to be constructed in an already heavily disturbed area. Only one of the other candidate sites, the Device Assembly Facility (DAF) at NTS, has any associated cultural or biotic resource concerns. There are nine cultural resources sites identified in the vicinity of the DAF and it is within an area of infrequent desert tortoise activity. However, no ground disturbing actions would be required and NTS has an approved plan in place to minimize impacts to the desert tortoise.

A suite of accident scenarios was evaluated in detail to encompass the range of accidents at Pantex Plant that have the potential to affect workers or members of the public. Accidents with different characteristic locations, initiating events, and consequences were evaluated. These accidents were selected on the basis of potential release of radioactive materials (e. g., plutonium or tritium), release of hazardous chemicals (e. g., chlorine gas), or potential for direct harm to people (e. g., fires or explosions).

Risk is defined for this EIS as the frequency of an accident multiplied by the accident's consequences. The frequency of an accident is the likelihood that an accident will occur. The consequences of an accident are defined as the human health impacts that would take place if the accident did occur.

The dominant accident in terms of risk from radioactive material releases to the public involves the crash of an aircraft into a weapons storage magazine, nuclear explosive bay, or a special purpose building that results in the detonation of the conventional explosives in the weapons. This postulated accident is estimated to result in 7.2×10^{-6} excess cancer fatalities per year to the population within 80 kilometers (50 miles) of Pantex Plant.

The dominant accident scenario in terms of release of hazardous chemicals to the public involves the accidental release of 408 kilograms (900 pounds) of chlorine gas from water treatment facilities. Only workers in the vicinity of the release would be exposed to concentrations of chlorine that if experienced for over an hour could cause life-threatening health effects. Less than one percent of the public downwind from the release would be exposed to concentrations of chlorine that if experienced for over an hour could cause irreversible or serious health effects. Approximately 10 percent of the public downwind from the release would be exposed to concentrations of chlorine that if experienced for over an hour could cause mild transient adverse health effects.

The potential exists at Pantex Plant for accidents that pose risks to worker safety. These accidents include normal manufacturing and heavy equipment accidents, fires, and explosions. These types of accidents that could result in releases of radioactive or hazardous material are bounded by those accidents discussed above. However, accidents can occur where radioactive or hazardous material are not present and still have impacts to workers. The dominant accident of this type is the accidental detonation of HE due to mechanical failure or handling accidents during HE machining operations. There is a possibility of a fatal worker injury resulting directly from the HE explosion. Members of the public are not at risk from this scenario.

The dominant accident scenario in terms of risk from radioactive material releases to the public associated with pit storage activities at Pantex Plant is associated with the Zone 4 West storage operations. The risk from an aircraft crash is partly dependent on the number of magazines containing plutonium. The overall risk from an aircraft crash into Zone 4 West pit storage magazine is highest for the Proposed Action Alternative with 20,000 pits in storage. Accidents relating to Zone 4 West pit storage

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activities under the Proposed Action would result in 6.6×10^{-7} excess cancer fatalities per year. The number of magazines used for pit storage at Pantex Plant for the 8,000-pit option of the Relocation of Interim Pit Storage Alternative, would be roughly the same as the number used for the No Action Alternative. Accidents relating to Zone 4 West pit storage activities for this number of magazines would result in 2.9×10^{-7} excess cancer fatalities per year. The number of magazines used for pit storage at Pantex Plant would be minimal for the 20,000-pit option of the Relocation of Interim Pit Storage Alternative. Accidents relating to Zone 4 West pit storage activities for this option would result in no excess cancer fatalities per year.

The risk of an aircraft crash into the candidate pit storage facilities was also assessed. The accident was reasonably foreseeable only for the Manzano Weapons Storage Area (WSA) at KAFB. However, the impact of the aircraft into the Manzano Mountain storage complex would not result in a release of plutonium.

The accidents associated with pit storage activities at the alternate pit storage sites are dominated by the accidental puncture of a pit by a forklift during loading or unloading operations. The impacts of this accident at NTS would be 3.3×10^{-5} person-rem (1.7×10^{-8} excess cancer fatalities); at SRS would be 4.6×10^{-3} person-rem (2.3×10^{-6} excess cancer fatalities); at Hanford Site would be 2.9×10^{-5} person-rem (1.5×10^{-8} excess cancer fatalities); or at KAFB would be 4.0×10^{-2} person-rem (2.0×10^{-5} excess cancer fatalities).

RELATED NATIONAL ENVIRONMENTAL POLICY ACT STUDIES

There are five other NEPA documents being prepared which consider activities or programs that could also have impacts at Pantex Plant. These are discussed in the following subsections. The Pantex Plant EIS addresses

the impacts of the alternatives discussed in the following EISs by incorporating by reference the impacts identified in the EISs as a part of the discussion of cumulative impacts at Pantex Plant.

The Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS-0200)

DOE is preparing the Waste Management (WM) PEIS to evaluate the potential environmental impacts of alternative configurations of DOE's waste treatment, storage, and disposal facilities. On the basis of the evaluations in the WM PEIS and other information, DOE will decide whether to consolidate the management of some or all of its five types of waste and, if it does select consolidation, the Department would also select the sites that will manage each type of waste. The WM PEIS evaluates consolidation over the next 20 years. In contrast, the Pantex Plant EIS evaluates site specific impacts over a 10-year period.

Pantex Plant is a potential site for management of its own LLMW, LLW, and HW. Currently, Pantex Plant has only three drums of transuranic (TRU) waste and no high level waste.

To assist DOE in making decisions about whether and where to consolidate waste management functions, the WM PEIS considers 36 alternatives organized into four major alternative categories:

No Action Alternatives. Only existing or currently planned (i.e., funded) facilities would be operated or constructed at Pantex Plant. Waste currently shipped offsite would continue to be shipped offsite.

Decentralized Alternatives. Pantex Plant would treat and dispose of its LLMW and LLW

onsite. All HW would be sent to commercial facilities.

Regionalized Alternatives. Under a few alternatives, Pantex Plant would treat and dispose of all its LLMW and LLW onsite. However, under most alternatives, Pantex Plant would ship its LLMW and LLW to one or more of DOE's other sites for treatment and disposal. Under all alternatives, HW would be sent to other DOE sites or commercial vendors.

Centralized Alternatives. Pantex Plant would ship all its LLMW and LLW to a single DOE site for treatment and disposal. Centralized management of HW was not analyzed.

The Pantex Plant EIS discusses the cumulative impacts of these activities at Pantex Plant. Alternatives analyzed in the WM PEIS for Pantex Plant do not include receipt of wastes from other sites.

Differences in waste volume projections in the WM PEIS and this EIS are a result of different databases. The WM PEIS uses waste load forecasts developed for the 1992 Integrated Database (IDB) for LLW; the 1994 Mixed Waste Inventory Report (MWIR) for LLMW; and both the 1992 IDB and the 1993 MWIR for TRU waste. Where more recent data could impact programmatic decision making, updated forecasts and analysis will be presented in the Final WM PEIS. DOE plans to update the estimates of LLW at Pantex Plant in the Final WM PEIS. The Pantex Plant EIS uses the Pantex Plant Environmental Information Document and the Agreed Order and Approved Plans containing 1995 and 1996 waste stream inventories. Cumulative impacts of alternatives in the WM PEIS and Pantex Plant EIS are presented in volume I, section 4.13.5.1. The Pantex Plant PP/WM program, implemented in 1991, has significantly reduced waste volumes. Appendix G in volume II of this EIS discusses this program in detail.

The Stockpile Stewardship and Management Programmatic Environmental Impact Statement (DOE/EIS-0236)

Stockpile stewardship includes activities required to maintain a high level of confidence in the safety, reliability, and performance of nuclear weapons in the absence of underground testing, and to be prepared to test weapons if directed by the President. Stockpile management activities include maintenance, evaluation, repair, or replacement of weapons in the existing stockpile.

Pantex Plant currently performs missions that are examined in the *Stockpile Stewardship and Management PEIS* (SSM PEIS). The Final SSM PEIS was issued on November 8, 1996, with a preferred alternative which stated that both assembly/disassembly operations and HE fabrication would remain at Pantex Plant, but would be downsized. The analysis contained in the Final SSM PEIS with respect to Pantex Plant is not significantly different from that presented in the Draft SSM PEIS. The Record of Decision for the SSM PEIS can be issued no earlier than December 16, 1996.

The SSM PEIS evaluated three alternatives relative to Pantex Plant operations: (1) the No Action Alternative, which would allow Pantex Plant to continue providing the weapons assembly and disassembly capabilities, storage of pits, and HE fabrication capability; (2) the Downsize Existing Capability Alternative, which includes downsizing the assembly, disassembly, and HE fabrication capabilities, providing the capability to perform nonintrusive modification pit reuse, and evaluating the possible storage of strategic reserve materials (plutonium in the form of pits and uranium in the form of canned subassemblies); and (3) the Relocate Capability Alternative, which includes transferring the weapons assembly and disassembly capability to NTS and the HE fabrication to LANL and Lawrence Livermore National Laboratory, and a complete phase-out of facilities at Pantex Plant.

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The SSM PEIS evaluated the remaining stockpile in the year 2005 and beyond. The Pantex Plant EIS does not address the impacts of these alternatives. It does, however, incorporate by reference, the effects identified in the WM PEIS as part of the discussion of cumulative impacts at Pantex Plant.

The Long-Term Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (DOE/EIS-0229)

The *Long-Term Storage and Disposition of Weapons-Usable Fissile Materials PEIS* (S&D PEIS) evaluates alternatives for the long-term storage of weapons-usable fissile materials and for the disposition of weapons-usable plutonium, which has been or may be declared surplus to national defense needs by the President. The S&D PEIS considers storage of surplus material until disposition, and long-term storage of non-surplus material through the year 2055. Long-term storage of weapons-usable fissile materials includes both pit and non-pit forms of plutonium.

The interim storage of HEU was addressed in the *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y-12 Plant, Oak Ridge, Tennessee* (DOE/EA-0929) (DOE 1994). Disposition of surplus HEU is the subject of a separate EIS, *Disposition of Surplus Highly Enriched Final Uranium Environmental Impact Statement* (DOE/EIS-0240). The Final EIS was issued on June 17, 1996 and the ROD was issued on July 29, 1996.

DOE decided to implement a program to make surplus HEU non-weapons-usable by blending it down to low-enriched uranium (LEU). DOE will gradually sell up to 85 percent of the resulting LEU overtime for commercial use as fuel feed for nuclear power plants to generate electricity (including HEU and natural uranium that will be transferred to the United States Enrichment Corporation), and will dispose of

the remaining LEU as LLW. This decision does not affect the Pantex Plant because no activity relating to HEU disposition would occur at Pantex Plant.

DOE sites currently storing weapons-usable fissile materials include Pantex Plant, Hanford Site, Idaho National Engineering Laboratory, Rocky Flats Environmental Technology Site, SRS, LANL, and ORR. The S&D PEIS is considering four alternatives, for storage of fissile material: No Action, Upgrade at Multiple Sites, Consolidation of Plutonium at one site, and Collocation of Plutonium and HEU at one site. The S&D PEIS is currently examining for long-term storage the same four DOE interim storage sites considered in this EIS, as well as ORR. The Pantex Plant EIS includes a discussion of the cumulative impacts of locating a potential storage facility at Pantex Plant, and incorporates and summarizes relevant information from the S&D PEIS.

The collocation storage alternative and the evolutionary Light Water Reactor disposition alternative from the S&D PEIS are discussed in this Pantex Plant EIS, because those alternatives, if they occurred at Pantex Plant, could potentially have the greatest impacts to the Pantex Plant Site. It is important to note that these are conservative bounding impacts. The Final PEIS will designate a preferred alternative for the storage of fissile materials. The Final S&D PEIS will include an alternative that is a refinement of the storage alternatives discussed in the Draft S&D PEIS. As discussed in volume I, sections 1.4 and 1.7.3 of this EIS, the Final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same

characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant. Furthermore, for disposition, further site-specific tiered NEPA documentation may be required, as appropriate, before any specific site is selected.

The Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (LANL) (DOE/EIS-0238)

This site-wide EIS will address foreseeable laboratory operations and planned activities over an approximately 10-year period paralleling the timeframe considered in this EIS. The EIS will focus on operating practices and facility management, and provide an analysis of all activities at LANL and all DOE land management activities related to operations at LANL. The Pantex Plant EIS is related to the activities at LANL in that Pantex Plant ships RTGs and pits (for evaluation) to LANL. The transportation of these components to and from LANL is addressed in the Pantex Plant EIS.

The Nevada Test Site and Other Offsite Locations Within the State of Nevada Site-Wide Environmental Impact Statement (DOE/EIS-0243)

This site-wide EIS addresses projects and activities at NTS, the Tonopah Test Range, portions of the Nellis Air Force Range Complex, the Central Nevada Test Area, and the Project Shoal Area. These programs include ongoing activities for the stewardship of the nation's nuclear weapons stockpile, management of radioactive waste, and environmental restoration. This EIS also examines newer programs such as the proposed Solar Enterprise Zone sites at NTS, Dry Lake Valley, Eldorado Valley, and Coyote Spring Valley.

The EIS addresses potential environmental impacts including those resulting from transportation and disposal of wastes that are

generated on NTS and offsite. The Pantex Plant EIS is related to activities at NTS in that Pantex Plant currently ships LLW to NTS for disposal. Continuation of LLW shipments to NTS is also within the scope of the WM PEIS. Impacts of interim pit storage are within the scope of the Pantex Plant EIS only.

CHANGES SINCE THE ISSUANCE OF THE DRAFT EIS

Since the issuance of the *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*, in April 1996, there have been several changes in information, regulatory status, related EISs, as well as a revision of the Draft DOE Standard for Aircraft Crash Analysis. In addition, comments from agencies, organizations, and the public requested elaboration and additional assessment of numerous issues. These changes are reflected in this Final Pantex Plant EIS.

New and updated information has been included in the discussions for almost all environmental resources. The new information includes a different pit repackaging concept and a reduced scope for the proposed Hazardous Waste Treatment and Processing Facility (HWTPF). The new pit repackaging concept is still at a very early planning stage and is not detailed in this Final EIS. However, the foreseeable impacts have been bounded to the extent possible in the infrastructure, waste management, and human health sections. Appendix H includes discussion of both a large and a small version of the HWTPF. Since the Draft EIS, the smaller version has become the preferred alternative for this facility. The impacts of the larger version are still discussed in the appropriate sections of the EIS in order to bound the impacts. None of the new or updated information results in a significant difference in the impacts assessed.

The regulatory status of several permits has changed since the Draft EIS. The new permitted

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levels and resulting changes in operations have been taken into account in the assessment of impacts.

Updated information regarding related EISs has been added in the Summary; volume I, section 1.4; volume I, section 1.7; and in the discussions of cumulative impacts where appropriate. The information was updated in this EIS as a result of advances in the decision-making process in the related EISs.

The methodologies for assessing the risk of an aircraft crash and for assessing the cumulative impacts have changed to a degree since the Draft EIS. The aircraft crash methodology has been in development throughout the preparation of the Draft and Final EIS. The July 1996 draft was used for this Final EIS. The assessment of cumulative impacts has been changed to more accurately reflect the potential impacts and are discussed in more detail in section 4.2 of volume I of the Final EIS.

The changes due to comments received during the comment period are detailed in volume III of the Final EIS and discussed briefly in the Summary.

SUMMARY OF PUBLIC COMMENTS AND RESULTING CHANGES TO THE DRAFT EIS

Each comment was individually reviewed, analyzed, and categorized. Categories are listed below in the order in which the topics appear in the EIS:

- Alternatives
- Relationship to Other EISs
- Land Use
- Geology and Soils
- Water Resources
- Air Quality
- Socioeconomic Resources
- Intrasite Transportation

- Waste Management
- Human Health
- Aircraft Crash
- Intersite Transportation
- Environmental Justice
- DOE Policy
- NEPA Process and Procedures

The subsections that follow provide summary discussions of those major issues, organized by topic.

Alternatives

Many comments questioned the adequacy of the process used to select site alternatives. The scope of the Pantex Plant EIS included evaluation of potential DOE and DOD sites serving as alternative pit storage sites. A DOE Site Screening Committee systematically assessed a large number of candidate sites to determine the range of reasonable alternative sites. DOE selected the DAF and P-Tunnel at NTS, the Fuels and Materials Examination Facility (FMEF) at Hanford Site, and the P-Reactor at SRS as DOE alternatives for interim pit storage.

In parallel, 60 DOD installations were screened by the Nuclear Weapons Council staff. With the exceptions of the Manzano WSA on KAFB (at Albuquerque, NM) and Seneca Army Depot (at Romulus, NY), the Council staff determined the others were not feasible.

Subsequently, the Air Force agreed to become a Cooperating Agency in the preparation of this EIS regarding the Manzano WSA. However, because Seneca Army Depot was approved for closure in September 1995 in accordance with the *Defense Base Closure and Realignment Act of 1990* (Public Law 101-510), this facility was not available as a candidate site.

The Texas Resource Conservation Commission (TNRCC) asserted in its comments that the No Action Alternative (regarding the possibility of