DOE/EA-2142

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

FINAL ENVIRONMENTAL ASSESSMENT FOR THE HIGH EXPLOSIVE SYNTHESIS, FORMULATION, AND PRODUCTION FACILITY

THE PANTEX PLANT - AMARILLO, TEXAS – OCTOBER, 2020

UNCLASSIFIED

Table of Contents

FIGURES

TABLES

ACRONYMS

AEC	Atomic Energy Commission
AoA	Analysis of Alternatives
ASER	Annual Site Environmental Report
BDI	Blast Door Interlocks
CFR	Code of Federal Regulations
CNS	Consolidated Nuclear Security, LLC
D&D	Deactivation and Decommissioning
DOD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
EDE	Effective Dose Equivalent
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
ESL	Effect Screening Levels
°F	Degrees Fahrenheit
FONSI	Finding of No Significant Impact
FHA	Fire Hazard Analysis
FM	Farm-to-Market Road
ft	Foot/feet
ft^2	Square foot/feet
GOV	Government-owned vehicle
HE	High Explosive
HEPF	High Explosive Pressing Facility
HESFP	High Explosive Synthesis, Formulation, and Production
HPFL	High Pressure Fire Loop
LEED	Leadership in Energy and Environmental Design
M&O	Management & Operating Contractor
MEI	Maximally Exposed Individual
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
NSE	Nuclear Security Enterprise
OSHA	Occupational Safety and Health Administration
P&S	Packaging and Staging
PBX	Polymer-Bonded Explosive
PHA	Process Hazard Analysis
POV	Privately-owned vehicle

SHPO	State Historic Preservation Office
SWEIS	Site-Wide Environmental Impact Statement
TCEQ	Texas Commission on Environmental Quality
U.S.	United States of America
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The National Environmental Policy Act (NEPA) requires Federal agency officials to consider the environmental consequences of their proposed actions before decisions are made. In accordance with the Council on Environmental Quality (CEQ) regulations in the Code of Federal Regulations (CFR) Parts 1500−1508 and NEPA-implementing procedures in 10 CFR Part 1021, the National Nuclear Security Agency (NNSA), a semi-autonomous agency within the Department of Energy (DOE), has prepared this environmental assessment (EA) to analyze the potential environmental impacts associated with constructing and operating a new High Explosive Synthesis, Formulation, and Production (HESFP) facility. Depending on the results of this EA, NNSA could: 1) determine that the potential environmental impacts of the Proposed Action would be significant to human health and the environment, in which case NNSA would prepare a project-specific Environmental Impact Statement (EIS); 2) determine that a Finding Of No Significant Impact (FONSI) is appropriate, in which case NNSA could proceed with the Proposed Action with no additional NEPA documentation; or 3) determine that a FONSI with mitigation measures is warranted.

2.0 PURPOSE AND NEED FOR AGENCY ACTION

2.1 Background

The Pantex Plant near Amarillo, Texas (Figure 1) opened in 1942 in support of the World War II effort. From 1942 to 1945, the United States used the Pantex Ordnance Plant for loading conventional artillery shells and bombs. In 1951, the Atomic Energy Commission (AEC) arranged to begin rehabilitating portions of the original Plant and constructing new facilities for nuclear weapons operations. In 1974, the Energy Research and Development Administration (ERDA) replaced the AEC and took responsibility for the operation of the Pantex Plant, and in 1977 the ERDA was replaced by DOE. In 2000, the DOE designated the NNSA to manage Pantex Plant's nuclear weapons facilities and laboratories (ASER, 2018). In present day, the Pantex Plant supports the NNSA's objectives as the primary site for dismantlement, surveillance, nuclear nonproliferation, and nuclear stockpile refurbishment. Additionally, the Pantex Plant serves as the NNSA's High Explosive (HE) Center of Excellence with responsibilities for HE production and mission to work with DOE laboratories to transition HE from research and development to production scale.

The Pantex Plant conducts HE material production in aged facilities that have decreasing production limits. Management of safety systems is problematic because the systems are many years past their design life and routinely fail. Repair parts are becoming obsolete for these aging systems. Additionally, due to facility proximity to nuclear operations, quantity-to-distance safety calculations dictate that very small quantities of HE are allowed in them. Packaging and supplies are damaged due to the failing facility envelope, becoming susceptible to infestation by rodents and other small creatures.

The existing HE Synthesis Facility (HESF) supports pilot-scale quantities and two existing formulation facilities support pilot-scale, mock, and extrudable formulation. Large-scale synthesis, formulation, and blending are capability gaps. Due to these capability gaps, NNSA has a high reliance on a sole domestic

supplier for explosives materials. Capability gaps, improvement of formulation operations, and reliance on an external supplier are issues in need of being addressed.

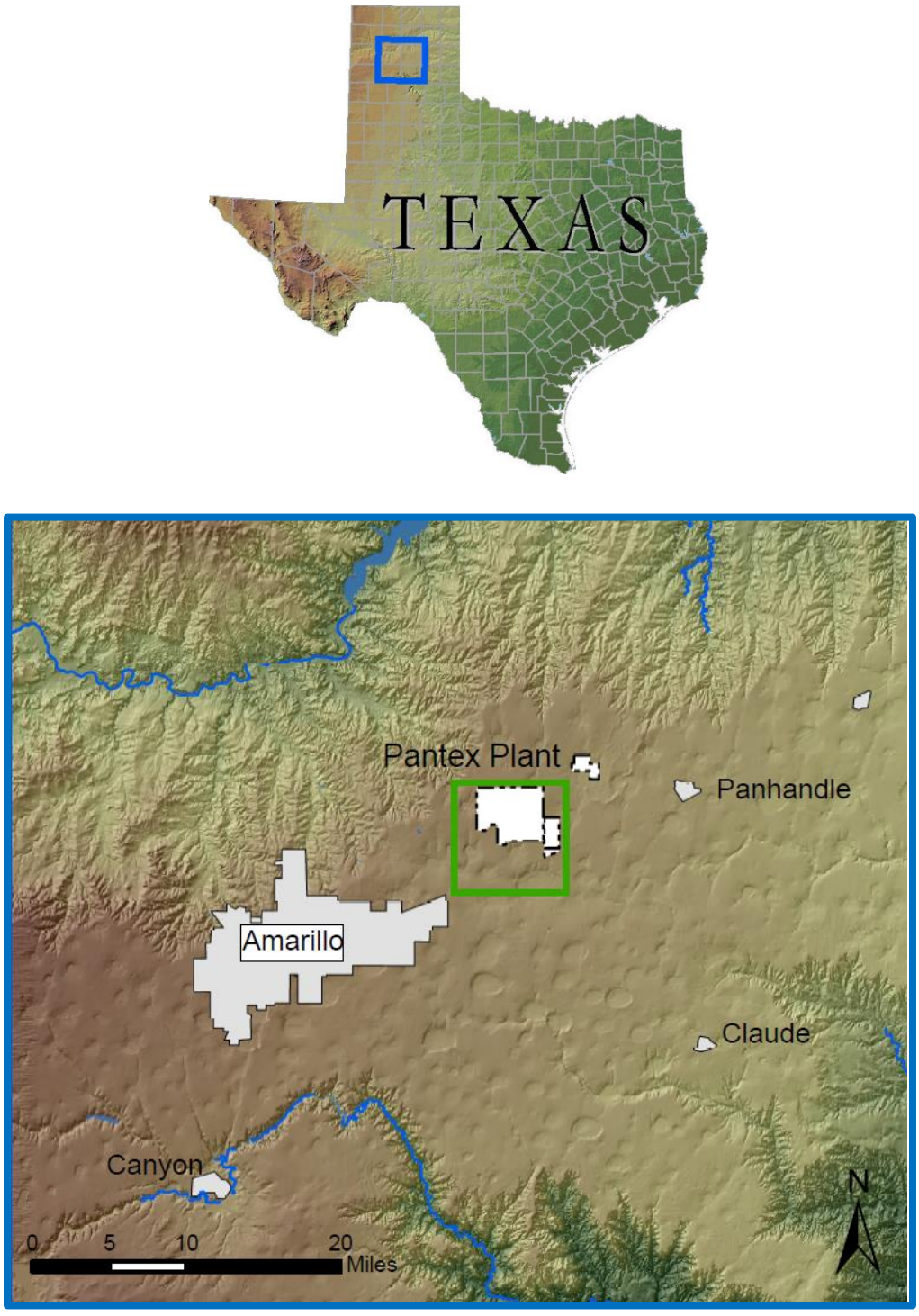

Figure 1: The Pantex Plant Site Location

2.2 Purpose and Need

Currently the NNSA relies on a single domestic vendor for large-scale synthesis, formulation, and blending for HE products. In the past, the vendor has had failures in production resulting in late deliveries. This EA discusses the alternatives considered to address the HE supply chain challenges, and the existing difficulty with meeting DOE/NNSA production requirements. This EA proposes consolidating limited capacity legacy facilities that are inadequate for current mission needs and increasing the required capability and capacity to meet future HE workload and mission requirements. Focus areas include explosive and mock formulation operations to support multiple weapons programs, extrusion operations, technology development for future programs, and support for strategic partners.

3.0 ANALYSIS OF ALTERNATIVES

The Deputy Administrator of Defense Programs tasked the Office of Decision Support, NA-14, to develop an independent Analysis of Alternatives (AoA) for HE synthesis, formulation, and production (HESFP) capability. The purpose of an AoA is to objectively evaluate the operational effectiveness, sustainability, risk, schedule, and cost of various viable alternatives for satisfying the approved mission need (DOE/NNSA, 2019). The AoA team developed a set of alternatives by researching a range of potential locations, existing facilities, and configurations for production and support functions to avoid prematurely excluding any option with potential to meet the mission need.

3.1 No-Action Alternative

Alternative 1 is the No-Action Alternative. Under this alternative, current HE facilities at the Pantex Plant would not be replaced or updated. These HE facilities would continue to deteriorate, even with increasing efforts in maintenance. Operations and maintenance costs would increase, and the risks would continue. DOE/NNSA would continue to experience HE supply chain challenges that have resulted in increased product reliance on a vendor that does not have the capacity to meet the production demand.

3.2 Preferred Alternative

Alternative 2 is the Preferred Alternative. The Proposed Action for Alternative 2 is to design, construct, and operate a new synthesis, formulation, and blending complex which will use the batch processes currently in use for synthesis, formulation, and blending at the Pantex Plant (Figure 2). The HESFP complex would support the Pantex Plant mission through polymer-bonded explosive (PBX) formulation, mock HE formulation, extrudable HE formulation, large-scale synthesis, particle size modification, large-scale blending, packaging, and staging. All non-aqueous formulation processes, including extrudable explosive formulation and large-scale blending, would be designed to an Explosives Hazard Class 1 (Table 1 [DOE/NNSA, 2019]) level of protection for explosive operations, and the design would allow for potential future mission growth.

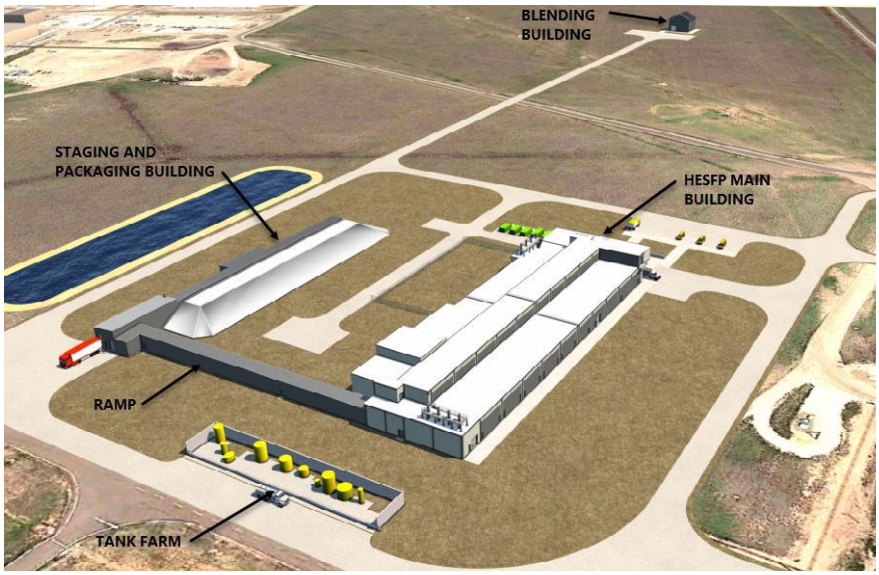

Figure 2: HESFP Facility and Blending Building

Table 1: Explosives Hazard Classes

Class	Criteria
0	Explosive operations involving the intentional initiation of explosives materials or articles. Examples are: explosives testing, firing activities associated with training, and destruction of explosives by detonation. Explosive specimens would not be permitted to accumulate in a test beyond the quantity required to sustain the test.
I	Explosive activities with a high accident potential. Remote operations are required because personnel exposure is unacceptable for Explosives Hazard Class I activities. Examples are: screening, blending, pressing, extrusion, drilling of holes, dry machining, machining explosives and metal combination, some environmental testing, new explosives development and processes, explosives disposal, and destructive testing. Explosive specimens would not be permitted to accumulate in a test beyond the quantity required to sustain the test.
II	Explosive activities with moderate accident potential because of the explosive type, condition of the explosives, or nature of the operations involved. Explosives Hazard Class II activities have an accident

Class	Criteria
	potential greater than Explosives Hazard Class III activities, but personnel exposure in contact operations is acceptable. Examples are: weighing, some wet machining, assembly and disassembly, some environmental testing, and some packaging operations. Explosive specimens would not be permitted to accumulate in a test beyond the quantity required to sustain the test.
III	Explosive activities with low accident potential such as activities during storage and operations incidental to storage or removal from storage.

3.3 Project Description for Proposed Action

The HESFP Main Building would be located in a vacant location that would be within Zone 11 (Figure 3). The HESFP facility would be comprised of bays dedicated to specific HE synthesis, formulation, and staging functions with adjacent administrative functions. HE packaging, shipping, and magazine functions would be connected to the bays via enclosed ramp structures. A separate blending facility would be located at a distance dictated by explosives safety requirements.

The HESFP facility, including the administrative functions and all bays, less packaging, would be approximately 98,092 gross square feet (ft^2), would include necessary platforms for access to process equipment, and a mechanical penthouse enclosure for air handling equipment. The packaging, shipping, and magazine spaces would consist of five (5) earth covered magazines opening into a shared circulation area for shipping totaling approximately 13,828 gross ft^2. The interconnecting ramp structure would be approximately 4,347 gross ft^2. The Blending Building would be a single level with a process equipment platform totaling approximately 3,407 gross ft^2 (BMD, 2019).

Access to the new HESFP facility would be provided with two new entrance points from the Zone 11 perimeter road. The road between the existing High Explosive Pressing Facility (HEPF) and the HESFP would be widened to allow for concurrent HEPF and HESFP facility operations to occur without any restrictions.

The existing location for the proposed facility is relatively flat, and consists of native grasses and weeds. The Soil Survey for Carson County classifies the soils as Amarillo-Urban land complex consisting of well-drained soils with high surface runoff and moderate permeability. Surface runoff drains from the northeast to southwest. Local topography would be considered during facility design. Design would include provisions for erosion control and soil stabilization in ditches, fill slopes, embankments, and eroded and bare areas. Areas disturbed by the project would be restored to original or improved conditions. All site work design would consider future projects and be coordinated with ongoing utility projects.

Figure 3: HESFP Facility Conceptual Design

The project location is located outside the 0.2 percent annual chance floodplain; therefore the natural hazard impact of flooding is minimal; however, because the project site is relatively flat, the possibility of flooding exists. Flooding has occurred during large rainfall events at surrounding facilities. An earthwork analysis would be performed to determine the fill material quantity needed to bring the project site up to and above a 2,000-year, 24-hour rainfall event (BMD, 2019). The project would use existing storm water drainage networks where possible; however, filtration detention ponds may be required.

The HESFP facility would include: an Administrative and Support area (including control room, engineer and manager enclosed offices, open work stations); non-HE material loading area; non-HE material staging area; HE formulation; HE synthesis; HE support; HE process staging; HE material loading dock; and ramp access to packaging and material service magazines. A separate HE blending facility would be constructed.

Administrative Space

The administrative space within the facility would house approximately 16 employees with various workstation configurations. This portion of the building would have separate utilities from the remainder of the facility. Functional spaces within this category include:

- Breakroom, conference/training room, engineer office, technician computer stations, operations manager offices, file room, and instrument system monitor stations.

The instrument system monitor stations would have approximately four to five monitors per person that could be stacked. These monitors would be used to view camera feeds and programming for longer timeframes.

Non-HE Support

The spaces within the non-HE category would contain storage and operation space for inert and chemical materials as well as functions for the building support system. Functional spaces within this category include: Inert Staging, Solid Chemical Staging, Equipment Staging, Mechanical Equipment Rooms, Electrical Rooms, Battery Rooms, and Communication Rooms.

Inert Staging, Solid Chemical Staging, and Equipment Staging bays would be separated from production bays to increase safety. Large quantities of input materials would be stored in these spaces and measured out for use in production. Inert Staging contains a Hammer Mill that would be partitioned off to further control the spread of particulate byproduct and prevent potentially contaminating the room and building.

HE Formulation

HE Formulation areas would contain production, process, interim packaging operations, and associated equipment. These activities would occur within HESFP Main Building: Small and Large-Scale PBX; Powder and Product Drying; Extrudable Operations; and In-Process Staging. Packaging and Staging (P&S) would occur in a series of magazines supported by a metal building and mechanical services connected to the facility via weather-proof ramp enclosure. Blending would occur in a detached metal building dedicated to that purpose with material delivery by truck.

Operations in HE Formulation spaces would be designed to Explosives Hazard Class II level of protection requirements, except Extrudable Operations and Blending, which would be designed to Explosives Hazard Class I level of protection requirements (Table 1). The Mock Formulation bay would not initially be used for class-rated explosive operations, however, the space would be designed for future expanded Explosives Hazard Class II production operations.

HE Synthesis

HE Synthesis operations are Explosives Hazard Class II (Table 1). HE Synthesis areas would contain synthesis operations and associated equipment. These activities would occur within the HESFP facility: In-process Analysis; Synthesis Drying; Nitration; Amination; and In-Process Staging. Doors into these areas would be blast-resistant. Each bay would have two exterior exit doors at the ground level, and one exterior exit door at each level as required for high-hazard spaces. The in-process analysis bay would be a laboratory space that would be used to test raw materials, in-process materials, and final products from the HESFP processes. The bay would contain analytical equipment and fume hoods.

HE Support

HE Support areas would provide operations to support HE Formulation and HE Synthesis operations. These activities occur in the Particle Modification bay and Solvent Recovery bay within the HESFP. Particle Modification operations are Explosives Hazard Class I and must be accessed through a clean room vestibule. Solvent recovery does not include Explosives Hazard Class operations. This bay does not require exterior exits, but does require a crane for equipment maintenance.

Packaging and Staging

The Packaging and Staging (P&S) Building would be a single-story structure. The main purpose is staging of explosives produced from the Explosives Synthesis, Formulation, and Production operations. This structure would include service magazines, a packaging magazine, support areas, and a loading dock. The packaging magazine would be appropriately separate from the loading dock and designed to Explosives Hazard Class II specifications.

Blending Building:

The blending operation would be performed external to the main HESFP Building. The blending process would be performed using a non-mechanical system. The Blending Building would only require local exhaust and domestic water for cleaning to support local operation. Blending operations would be Explosives Hazard Class II; however, the Blending Building would be designed to an Explosives Hazard Class I level of protection requirements (Table 1).

Ramp:

Ramp R-1 would be a pedestrian walkway that connects the HESFP Main Building to the P&S Building. Walkways are considered separate structures and not part of any building it serves. The ramp would provide the required circulation between the loading dock, magazines, and packaging.

Parking Lot:

A north entrance drive would provide access to the parking lot. No privately-owned vehicle parking is included for this facility; however, parking for approximately 14 government-owned vehicles (GOV) with one space handicap-accessible would be provided for by the GOV parking lot on the north side of the facility. Large vehicle delivery trucks would deliver supplies and HE materials to the facility at the truck access area which would be shared with the HEPF facility. Fire department vehicles would be able to access the facility at both entrances around the facility and magazines for access.

Utilities:

Surveys for new utilities include, but are not limited to: natural gas, compressed air, High Pressure Fire Loop (HPFL), water, sanitary sewer, potable water, electricity, local area network, telephone, public address system, and maintenance communication system.

The full scope of utilities to be surveyed would be determined during final project design. Coordinates and elevations would be determined for utilities at principal points of definition and any and all points of demarcation. The surveyed information would be provided on the design drawings as part of both existing conditions and part of the design package. Points of definition for utilities would be determined, identified, and marked by the surveyor in the field.

All aboveground utilities that cross roadways would be elevated a minimum of 16.5 feet (ft.) above the roadway. Aboveground utilities available near the HESFP site include steam/condensate and compressed air. These utilities would need to be extended from their connection points overhead to their proposed locations. All utilities that cross roadways that have less than the required clearance would be replaced with new utility lines that comply with CNS Master Design Criteria Division 5 - Civil/Site Design, Section 5.20.4, Overhead Crossings (CNS, 2007).

Underground utility lines such as sanitary sewer, water (potable and HPFL), electricity, and gas cannot be placed under existing or proposed pavements, except when crossing such pavements or when adequate space is not available. To the extent possible, new utility lines would be located within designated utility corridors.

The design would incorporate energy-conservative designs and energy-efficient elements. A complete building controls system would be provided to afford real-time, high-definition view of the facility's operation. HVAC systems that require more than 4,000 cubic ft. per minute of outside ventilation air require heat recovery equipment if economically justified by life cycle cost analysis. Air handling units would be provided with outside air economizer cycle, as applicable, for free cooling during moderate temperatures. An energy performance target in kilo British thermal units per ft^2 (site or source energy use) or energy cost per square ft./year cost would be established.

Strategies associated with each of the following would be assessed:

- Site conditions. Assess shading, exterior lighting, hardscape, landscaping, and adjacent site conditions;

- Massing and orientation. Assess massing and orientation affect HVAC sizing, energy consumption, lighting, and renewable energy opportunities;

- Basic envelope attributes. Assess insulation values, window-to-wall ratios, glazing characteristics, shading, and window operability;

- Lighting levels. Assess interior surface reflectance values and lighting levels in occupied spaces;
- Thermal comfort ranges. Assess thermal comfort range options;
- Plug and process load needs. Assess reducing plug and process loads through programmatic solutions (e.g., equipment and purchasing policies, layout options); and
- Programmatic and operational parameters. Assess multifunctioning spaces, operating schedules, space allotment per person, teleworking, reduction of building area, and anticipated operations and maintenance.

Bulk Tank Storage

The bulk tank storage area would allow for truck unloading of bulk chemicals and truck load-out of waste liquids. Table 2 shows the tanks in the bulk tank storage area, grouped by containment area.

Table 2: Tanks in Bulk Tank Storage Area

Chemical/Process	Quantity
Solvent Storage	
Ethyl Acetate	500-gallon solvent tank
Acetone	500-gallon solvent tank
Toluene	10,000-gallon reclaimed solvent tank
Toluene	15,000-gallon solvent tank
Waste Storage	
PBX Formulation	5,000-gallon waste tank
Amination	10,000-gallon waste tank
Waste Acid	
Nitration	10,000-gallon waste acid tank
Oleum	
Oleum tank	6,000-gallon tank
Nitric Acid	
Nitric acid	1,500-gallon tank
Ammonia	
Ammonia	1,000-gallon anhydrous ammonia tank
Nitrogen	

Chemical/Process	Quantity
Nitrogen	Vendor-supplied nitrogen system

Bulk chemicals would be transported in the piping systems listed in Table 3.

Table 3: Bulk Chemicals and Associated Piping Systems

Piping ID	Chemical	Use Points	Piping Material
1	Ethyl Acetate	PBX Large/Small-Scale Formulation and Mock Formulation	Threaded Carbon Steel
2	Acetone	PBX Large/Small-Scale Formulation and Mock Formulation	Threaded Carbon Steel
3	Toluene	Amination	Threaded Carbon Steel
4	Formulation Waste Water	Formulation Waste Accumulation Tank	Threaded Carbon Steel
5	Nitration Waste Water	Nitration Waste Accumulation Tank	Teflon-Coated Stainless Steel
6	Amination Waste Water	Amination Waste Accumulation Tank	Teflon-Coated Stainless Steel
7	Oleum	Nitration	Teflon-Coated Stainless Steel
8	Nitric Acid	Nitration	Teflon-Coated Stainless Steel
9	Ammonia	Amination	Fully-Welded Stainless Steel
10	Nitrogen	All Process Bays	Welded Carbon Steel

Air Emission Control Systems – The processes within the HESFP facility have the potential to emit three vapor streams. The formulation, amination, and solvent recovery processes are all capable of emitting volatile organic compounds (VOCs). To control emissions, all VOC emission points in the process would be fed to an exterior thermal oxidizer that would convert the VOCs to carbon dioxide prior to emission. The nitration processes have the potential to produce caustic vapor streams potentially containing nitric acid, sulfuric acid, and sulfur trioxide vapors. These vapor streams would be piped to an exterior caustic scrubber that would remove caustic vapors prior to air emission. The final potential vapor emission would be anhydrous ammonia used in the amination process. The potential emission points in the amination reaction would be piped to an ammonia scrubber that would remove the vaporous ammonia prior to emission.

Process task exhaust systems would be provided in the production bays at unit operation locations that have the potential for dust generation. The task exhaust system would collect particulate emissions and incidental vapor emissions. Systems would be separated based on exhaust constituents. Exhaust ducts would be routed across the roof from the bays to the scrubber room(s). Wet scrubbers would be provided

with distilled water and would be located in the mechanical room(s) for freeze protection. Scrubber exhaust would discharge up to exhaust stacks, sized to prevent entrainment of exhaust air into building intakes. Ductwork would be stainless steel and provided with cleanouts for inspection and cleaning. All task exhaust within the HESFP Main Building would be connected to the main scrubber system; however, the exterior blending facility would be supported with a dedicated dust collector. This dust collector would be a dry dust collector that would be used when the blending operation is performed. The blending operation would be performed intermittently and the local dust collector would only be used during the process.

Material Transport

Within the HESFP facility Main Building, production bays, and the HESFP Blending Building, a hazard class-rated material lift would be required. Material moving from staging into production bays would use an electric forklift or a pallet jack.

A 3-hour fire rated door located within a structurally-independent portal within a 4-hour fire wall would be required to facilitate material transport through the building. This door would automatically return to and remain in a closed position when not in use. During a fire event, it would be possible to open this door to allow HE in transit to return to the original safe haven or complete movement to the planned destination.

Leadership in Energy and Environmental Design (LEED) Certification

The "Guiding Principles for Sustainable Federal Buildings for New Construction and Modernization" (Guiding Principles, 2016) were developed to guide transformation in performance of the federal building inventory. The Guiding Principles reinforce the importance of sustainable development through the planning, design, construction, and operation of facilities. These policies were enacted to reduce total building ownership costs, improve energy and water efficiency, promote sustainable resource and environmental stewardship, enhance energy and water security while balancing building performance with occupant comfort, health and wellness, safety, and productivity. Additional sustainable design policies and best practices incorporated into the project include the following:

- Executive Order 13834: Efficient Federal Operations,
- EISA 2007 and EPA Section 438 for Low Impact Development (LID),
- Laboratories for the 21st Century (Labs21),
- 10 CFR 433: Energy Efficiency Standards for the Design and Construction of New Federal Commercial and Multi-Family High-Rise Residential Buildings, and
- 10 CFR Part 436: Federal Energy Management and Planning Programs.

Design strategies focus on compliance with the Guiding Principles including site development, water savings, energy efficiency, materials and resources selection and indoor environmental quality specific to the site and programs of the HESFP facility. The goal is to achieve LEED Gold, dependent on further refinement of unregulated energy loads. If mission criticality, cost, and/or security requirements prohibit achievement of the Gold certification level, a waiver may be requested. Based on size and occupancy, the Blending Building is not anticipated to meet minimum program requirements and shall be exempt from third party certification requirements.

4.0 OTHER ALTERNATIVES CONSIDERED

A total of 21 alternatives were developed for consideration, and are arranged under the following four categories: Build a New Material Production Facility at the Pantex Plant, Renovate/Refurbish Existing HE Facilities at the Pantex Plant, Distribute HE Operations, and Non-Material Approaches. These alternatives and their descriptions are listed in Table 4.

Table 4: Alternatives for Further Analysis

#	Alternative	Description
Build a New Material Production Facility at the Pantex Plant		
3	New single facility with continuous flow at the Pantex Plant	Build a single synthesis/formulation/blending facility using continuous flow process for synthesis in Zone 11
4	New split facilities with batch process at the Pantex Plant	Build new formulation/blending facility and separate synthesis facility using batch process in Zone 11
5	New split facilities with continuous flow at the Pantex Plant	Build new formulation/blending facility and separate synthesis facility using continuous flow process in Zone 11
Renovate/Refurbish Existing HE Facilities at the Pantex Plant		
6	Refurbish Zone 11 facilities for batch full scale synthesis	Refurbish the Synthesis Pilot Plant (11-55) to do full-scale synthesis using batch process
7	Refurbish Zone 11 facilities for continuous flow synthesis	Refurbish the Synthesis Pilot Plant (11-55) to do full-scale synthesis using continuous flow process
8	Refurbish Zone 12 facilities for formulation	Refurbish formulation facilities within Zone 12 (12-19E/12-62)
Distribute HE Operations		
9	New formulation at the Pantex Plant	Build new formulation/blending facility at the Pantex Plant, continue full-scale synthesis with current domestic vendor

#	Alternative	Description
10	New formulation at the Pantex Plant with batch synthesis at Los Alamos National Lab (LANL), Lawrence Livermore National Lab (LLNL), or Sandia National Laboratories (SNL)	Build new formulation/blending facility at the Pantex Plant, develop full-scale synthesis batch process at LANL, LLNL, or SNL
11	New formulation at the Pantex Plant, with continuous flow synthesis at LANL, LLNL, or SNL	Build new formulation/blending facility at the Pantex Plant, develop full-scale synthesis using continuous flow process at LANL, LLNL, or SNL
12	New formulation at the Pantex Plant, with batch synthesis at the Kansas City National Security Complex (KCNSC) or the Savannah River Site (SRS), or Y-12	Build new formulation/blending facility at the Pantex Plant, develop full-scale synthesis using batch process at KCNSC, SRS, or Y-12
13	New formulation at the Pantex Plant, with continuous flow synthesis at KCNSC, SRS, or Y-12	Build new formulation/blending facility at the Pantex Plant, develop full-scale synthesis using continuous flow process at KCNSC, SRS, or Y-12
14	Formulation at LANL, LLNL, or SNL	Build new formulation/blending facility at LANL, LLNL, or SNO, continue full-scale synthesis with other vendors
15	Formulation at LANL, LLNL, or SNL, synthesis at the Pantex Plant	Build a new formulation/blending facility at LANL, LLNL, or SNL, develop full-scale synthesis at the Pantex Plant
Non-Material Approaches		
16	All synthesis and formulation with outside vendors	Purchase synthesized and formulated products from outside vendors
17	Memorandum of Understanding between the Department of Defense (DOD) and DOE	Create a Memorandum of Understanding between DOD and DOE to optimize prioritization and purchasing with current domestic vendor
18	Establish priority agreements with Army/current domestic vendor	Create priority agreements with the Army/current domestic vendor to optimize prioritization and purchasing with current domestic vendor for current scope of operations
19	Bridging strategies	Implement and maintain current and planned bridging strategies

#	Alternative	Description
20	New commercial entity	Qualify a new commercial entity for products currently made at the Pantex Plant and current domestic vendor to provide redundancy for HE productions
21	Purchase from a foreign provider	Purchase HE products made by current domestic vendor and the Pantex Plant from a foreign supplier to provide redundancy for HE productions

4.1 Alternatives Considered But Dismissed From Further Consideration

The following alternatives were considered but rejected because they did not meet the mission need and program requirements for the project (Table 5).

Table 5: Initial Screening of Alternatives Considered But Not Analyzed in Detail

#	Alternative	Reason Alternative Dismissed From Further Consideration
Renovate/Refurbish existing HE facilities at the Pantex Plant		
8	Refurbish Zone 12 facilities for formulation	Safety requirements (including wall thickness given standing distance from other facilities) have changed since these facilities were constructed; therefore, they could no longer perform work on the scale required. Attempting to refurbish the facilities could trigger the requirement to bring them completely up to current codes and standards. Given their current construction, bringing them up to current code does not appear feasible.
Distribute HE Operations		
10	New formulation at the Pantex Plant with batch synthesis at Los Alamos National Lab (LANL), Lawrence Livermore National Lab (LLNL), or Sandia National Laboratories (SNL)	LANL would likely require protracted review under NEPA and new documentation (e.g., a new/revised site-wide Environmental Impact Statement (EIS)) and has only small-scale synthesis experience. Construction for additional HE storage/staging may be required. LLNL would likely require protracted review under NEPA and has only small-scale synthesis experience. Construction for additional HE storage/staging may be required. SNL would likely require protracted review under NEPA and new documentation (e.g., a new/revised site-wide EIS) and has only bench-scale propellant work. Construction for additional HE storage/staging may be required.

#	Alternative	Reason Alternative Dismissed From Further Consideration
11	New formulation at the Pantex Plant, with continuous flow synthesis at LANL, LLNL, or SNL	LANL would likely require protracted review under NEPA and has only small-scale synthesis experience. Construction for additional HE storage/staging may be required. LLNL would likely require protracted review under NEPA and has only small-scale synthesis experience. Construction for additional HE storage/staging may be required. SNL would likely require protracted review under NEPA and has only bench scale propellant work. Construction for additional HE storage/staging may be required.
12	New formulation at the Pantex Plant, with batch synthesis at the Kansas City National Security Complex (KCNSC) or the Savannah River Site (SRS), or Y-12	KCNSC would likely require protracted review under NEPA and does not have HE experience in support. Construction for additional HE storage/staging may be required. Site likely does not have a suitable location. SRS would likely require protracted review under NEPA and does not have HE experience. Construction for additional HE storage/staging may be required. Y-12 would likely require protracted review under NEPA and does not have HE experience. Construction for additional HE storage/staging may be required. Site likely does not have a suitable location.
13	New formulation at the Pantex Plant, with continuous flow synthesis at KCNSC, SRS, or Y-12	KCNSC would likely require protracted review under NEPA and does not have HE experience. Construction for additional HE storage/staging may be required. Site likely does not have a suitable location. SRS would likely require protracted review under NEPA and does not have HE experience. Construction for additional HE storage/staging may be required. Y-12 would likely require protracted review under NEPA and does not have HE experience. Construction for additional HE storage/staging may be required. Site likely does not have a suitable location.

#	Alternative	Reason Alternative Dismissed From Further Consideration
14	Formulation at LANL, LLNL, or SNL	LANL would likely require protracted review under NEPA and has only small-scale formulation experience. Construction for additional HE storage/staging may be required. LLNL would likely require protracted review under NEPA and has only small-scale formulation experience. Construction for additional HE storage/staging may be required. SNL would likely require protracted review under NEPA and has only bench scale propellant work. Construction for additional HE storage/staging may be required.
15	Formulation at LANL, LLNL, or SNL, synthesis at the Pantex Plant	LANL would likely require protracted review under NEPA and has only small-scale formulation experience. Construction for additional HE storage/staging may be required. LLNL would likely require protracted review under NEPA and currently has only small-scale formulation experience. Construction for additional HE storage/staging may be required. SNL would likely require protracted review under NEPA and has only bench scale propellant work. Construction for additional HE storage/staging may be required.
Non-material approaches		
20	New commercial entity	Would likely not support a timeline to meet production requirements. Would not have experience in HE synthesis and formulation. Would not have existing NEPA analysis to produce HE and HE precursor materials in high quantity.
21	Purchase from a foreign provider	Would not provide the capability and capacity to support long-term HE synthesis and formulation requirements. Would not support all safety, security, and environmental policies and directives.

Based on the AoA team's findings and results, on April 24, 2019 DOE/NNSA elected to move forward with Alternative 2, the Preferred Alternative, discussed in section 3.2.

5.0 SCOPE AND METHODOLOGY OF THE ENVIRONMENTAL ASSESSMENT ANALYSIS

This section includes an analysis of the potential environmental consequences or impacts that could result from the Proposed Action and No-Action Alternative. The aspects with greater potential for impacts are

discussed in more detail. Those aspects of the action judged to have little potential for impact are the following:

Environmental Justice: Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs Federal agencies to address the environmental justice impacts of their actions on minority and low-income populations. Information provided in 2010 census data provided that 243 people resided within a five-mile radius of the Pantex Plant, 7.2 percent were living below the poverty line in Carson County and there were no minorities or low-income families living within that five-mile radius of the Pantex Plant. It is likely that the 2020 census will report an increase in the number of people that reside within a five-mile radius of the Pantex Plant and there will be minorities and low-income families included in that number.

Floodplains/Wetlands: The Pantex Plant area is subject to precipitation/storm water runoff from a sudden deluge or prolonged heavy rainfall. Storm water from the Pantex Plant drains to playas, several of which are located onsite and several just offsite. The proposed project site is located outside the 0.2 percent annual chance floodplain and therefore the natural hazard impact of flooding is minimal.

6.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

6.1 Regional Setting

The Pantex Plant is centered on approximately 17,503 acres including Pantex Lake, land east of Farm-to-Market (FM) Road 2373, and Texas Tech University (TTU) leased land in western Carson County of the Texas Panhandle, north of U. S. Highway 60 and 17 miles northeast of downtown Amarillo. The Plant consists of land that is owned and leased by the DOE/NNSA. A safety and security buffer zone south of the main Plant consists of 5,800 acres leased from TTU.

The Pantex Plant is located on the Southern High Plains portion of the Great Plains, at an elevation of approximately 3,500 ft. Topography is relatively flat, characterized by rolling grassy plains and numerous natural playa basins. The region is a semi-arid farming and ranching area. The Pantex Plant is surrounded by agricultural land, but several industrial facilities are also located nearby.

The primary surface deposits in the project area are the Pullman and Randall soil series, which grade downward to the Blackwater Draw Formation. This formation consists of approximately 50 ft. of interbedded silty clays with caliche and very fine sand with caliche (ASER, 2018).

The closest riverine water feature on the Southern High Plains is the Canadian River, which flows southwest to northeast approximately 17 miles north of the Plant. The Canadian River valley defines the northern boundary of the Southern High Plains. Plant surface waters do not drain into this system, and primarily discharge into onsite playas. Storm water from agricultural areas at the periphery of the Plant drains into Playa 1 as well as offsite playas. From the various playas, water either evaporates or infiltrates the soil.

Two principal subsurface water-bearing units exist beneath the Pantex Plant and adjacent areas: the Ogallala Aquifer and the underlying Dockum Group Aquifer. The vadose or unsaturated zone, above the Ogallala Aquifer consists of as much as 460 ft. of sediments that lie between the land surface and the aquifer (ASER, 2018).

7.0 SITE-SPECIFIC DESCRIPTION AND ANALYSIS

7.1 Land Use

Affected Environment: The primary surface deposits at the Pantex Plant are the Pullman and Randall soil series, which grade downward to the Blackwater Draw Formation. This formation consists of approximately 15 ft. of interbedded silty clay with caliche, and very fine sand with caliche. Underlying the Blackwater Draw Formation, the Ogallala Formation consists of interbedded sand, silt, clay, and gravel. 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 approximately 394 ft. at the southwest corner to approximately 889 ft. at the northeast corner of the Plant. Underlying the Ogallala Formation is sedimentary rock of the Dockum Group, consisting of shale, clayey siltstone, and sandstone (ASER, 2018).

The Pantex Plant 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, pastureland, rangeland, and forestland. Soil types classified as prime farmland cover the majority of Pantex Plant. The proposed project site would be located in a historically industrial area previously disturbed by utility and road installations. The area was farmed until 1996, when it was reseeded with buffalograss (*Buchloe dactyloides*) and blue grama (*Bouteloua dacilis*) as the dominant plant species.

Shortgrass prairie, consisting of buffalograss, blue grama, and, in mesic sites, western wheatgrass (*Agrophyron smithii*), represents the primary habitat for species of concern in the area, such as Texas Horned Lizard (*Phrynosoma cornutum*), Ferruginous Hawk (*Buteo regalis*), Western Burrowing Owl (*Athene cunicularia hypugaea*), and song birds.

The Pantex Plant is comprised of 11,703 acres of DOE-owned land, including 9,100 acres in the main Plant area. Four tracts totaling 1,526 acres were purchased in 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.

Current land use on the 11,703 acres of DOE-owned land at the Pantex Plant includes 2,630 acres for operations, 4,387 acres of cultivated land, and 4,549 acres of rangeland/grass land. The rangeland/grass land includes 534 acres of wetlands. These acreages include ten acres removed from cultivation and added to operations for permanent use by the wind turbine construction completed in 2014. The current area of 11,703 acres is the legal description that extends to the center of all public roadways surrounding the Plant. The land use categories do not extend into those surrounding public roadways and accounts for the 137-acre difference between the total of the land use categories and the Plant area total (DOE, 2012).

A site-specific topographic survey is not available at the time of this report, but would be performed in accordance with the CNS Master Design Criteria Division 5 – Civil/Site Design, Section 5.4, Surveying. All geotechnical investigations must comply with the CNS Master Design Criteria Division 5 – Civil/Site Design, Section 5.3, Subsurface Investigation (CNS, 2007).

Colonies of Black-tailed Prairie Dog (*Cynomys ludovicianus*) provide habitat for some special status species such as Ferruginous Hawk, Bald Eagle (*Haliaeetus Ieucocephalus*), Golden Eagle (*Aquila chrysaetos*), Western Burrowing Owl, and some songbirds. Prairie dog colonies are found on the Pantex Plant, but not within the proposed project area.

The Texas Horned Lizard is the only State threatened or endangered species that is a year-round resident in areas of the Pantex Plant. It could be found at the proposed project site. The American and Artic Peregrine falcons (*Valco peregrinus anatum* and *Falso peregrinus tundruis*), as well as the Bald Eagle and Whooping Crane (*Grus America*), are migratory, and may be observed along the project route during the fall through spring migratory and wintering periods. There is no designated Critical Habitat on the proposed project site or the Pantex Plant, nor is the habitat on the Pantex Plant considered unique compared to adjacent portions of the same grass stand.

Environmental Consequences of Proposed Action: Approximately 19 acres would be affected by both permanent and temporary features of the proposed project. Of the total area affected, approximately seven acres would remain in industrial use after HESFP facility construction is completed, including access roads.

Any disturbed land not occupied by the proposed facility would be reseeded with the appropriate seed mix of native grasses (blue grama or buffalograss) for the soil type and land use. According to Construction Management Master Specifications Division 1 (CNS, 2014), a nurse crop would be planted followed by a second planting of native grass mix. Controls to install and maintain must be in place to protect the newly seeded areas. The grasses are best planted between February and April. Native grasses can be planted in the spring. If project construction were completed in May or June, the native grasses could still be planted, but would not be ideal for establishment.

Excess soil generated as a result of construction activities would be handled in accordance with applicable rules and regulations. Depending on characterization, the excess soil may be sent to the onsite borrow pit for reuse, or to an applicable landfill or disposal facility.

If nests of birds were discovered in the proposed project site, the Pantex Plant Wildlife Biologist would be contacted for assistance in mitigating disturbance of these nests. Nests could possibly be encountered during the March through August nesting season.

If Texas Horned lizards were encountered at the proposed HESFP site and were in immediate danger, the Pantex Plant Wildlife Biologist would be contacted for assistance. Horned lizards could possibly be encountered from March through October. It is possible that the acreage of temporary disturbance left

from the construction would be of use to the Texas Horned lizards and other species including invasive plant species such as noxious weeds that utilize bare, soft, or recently disturbed ground.

Impact to transient species would be minimal, because the habitat disturbance area would be geographically small-scale, temporary, and not a critical or unique habitat.

Environmental Consequences of No Action Alternative: Under the No-Action Alternative, the HESFP facility would not be constructed. There would be neither beneficial nor adverse impacts to socioeconomic resources. There would be no environmental, health, and occupational safety impacts, therefore there would be no disproportionately high or adverse impacts on environmental justice populations.

7.2 Water Resources

Affected Environment: The major riverine water source near the Pantex Plant is the Canadian River, located about 17 miles northwest of the Plant, which flows in a generally eastward direction into Lake Meredith, a constructed reservoir. Plant surface waters do not drain into this system, but mostly discharge into onsite playas. Storm water from agricultural areas at the periphery of the Plant drains into onsite and offsite playas. Ponded water in the various playas either evaporates or infiltrates the soil.

Groundwater beneath the proposed site is first encountered approximately 265 ft. deep, and is perched above a low permeability fine-grained zone. The Ogallala Aquifer is present beneath the proposed site about 410 ft. below ground surface. Due to the depth of these aquifers, none of the construction surface work would result in contaminants directly contacting either the perched groundwater or the Ogallala Aquifer. Spills of contaminants to surface soils during construction and operation would be reported to the Operations Center upon discovery and addressed by the Plant's spill response group according to Plant procedure.

Environmental Consequences of Proposed Action: Good engineering practices, including soil erosion and sediment control measures, spill prevention, and waste management practices would minimize any suspended sediment and pollutant transport that could result in potential water quality impacts; however construction of the various structures and the installation of permanent access roads has the potential to affect surface water drainage patterns. The access roads would be all-weather and the design would require proper-sized culverts to allow for drainage and support the weight of equipment. Storm water drainage has been designed to drain away from the proposed HESFP facility site pavements, and would utilize the existing drainage pattern of the site. Elevating the proposed site would allow for positive drainage into a detention basin. The storm water detention basin would be designed to accommodate a 2,000-year, 24-hour rainfall event (BMD, 2019).

Sediment control devices would need to be placed down-slope of disturbed areas and in drainage swales where sheet erosion can possibly occur, and around all existing and newly-installed storm drain inlets.

Any domestic wastewater would be treated at the wastewater treatment facility onsite. The Pantex Plant is authorized to discharge wastewater to an underground irrigation system pursuant to a Texas Land Application Permit, however onsite playa lake discharge is still permitted pursuant to a Texas Water Quality Permit issued by the Texas Commission on Environmental Quality (TCEQ). In June 2017, the irrigation system failed and repair efforts are currently underway. In September 2019, the Pantex Plant submitted a permit renewal and modification application to TCEQ. In the application, the Pantex Plant requested authorization to install and use an aboveground center pivot irrigation system for disposal of treated wastewater and treated water from the perched aquifer located above the Ogallala Aquifer. Operation of the new HESFP facility would not affect capacity of the wastewater treatment facility, because the new HESFP facility is consolidating operations in current facilities and not adding new employees or new operations.

Environmental Consequences of No Action Alternative: There would be no changes to surface water drainage patterns or surface water quality.

7.3 Air Quality and Climate Change

Affected Environment – Air Quality: Historical modeling results of concentrations for criteria and toxic pollutants using Plant emissions for ongoing operations indicated that none of the National Ambient Air Quality Standards (NAAQS) would be exceeded at the Pantex Plant boundary. All of the toxic air pollutants were estimated to be below their respective annual Effect Screening Levels (ESLs) at the Plant boundary. Modeling performed during the period 1996-2001 indicated that no NAAQS or annual ESLs were exceeded during that time. Similarly, concentrations at the Pantex Plant boundary are estimated to continue to remain within all NAAQS and annual ESLs based on projected emissions for continued operations since the Pantex Plant is in an area of attainment or unclassified status of attainment for NAAQS.

The Pantex Plant is a designated minor air emission source. The proposed facility emission potential individually would be evaluated with respect to impact to the Pantex Plant's overall emission source status.

Affected Environment – Climate Change: Texas is in the Southern High Plans climate region of the U.S. and temperatures in Texas have increased by almost 2°F in the last century (EPA 2016). In Texas, climate change is expected to contribute to increased heat stress, flooding, and drought. Climate-related challenges are expected to involve:

- Resolving increasing competition among land, water and energy sources;
- Developing and maintaining sustainable agricultural systems;
- Conserving vibrant and diverse ecological systems; and
- Enhancing the resilience of the region's people to the impacts of climate extremes (NCA 2014).

It is unknown how the frequency and severity of tornadoes will change with changes in climate. Rising concentrations of greenhouse gases tend to increase humidity, and positively correlate with increasing atmospheric instability, which would increase the likelihood of tornadoes. However, wind shear is likely to decrease, which would discourage tornadoes. Research is ongoing to determine whether tornado frequencies will increase or decrease in the future (EPA 2016).

Environmental Consequences of Proposed Action: The proposed project would be reviewed with respect to air construction permitting and operating permit requirements in accordance with federal and state regulations. Existing permits for the facility and potential emissions from the proposed project, as well as overall facility emissions, would be reviewed to determine an appropriate air permitting strategy for the proposed project. Permit application documents would be prepared and filed as necessary. Air construction permits would be in place prior to the start of construction.

The permitting strategy for the HESFP facility would require either an amendment to the current air permit or development of an application for a new permit. It is expected that the permitting process would take from 9 to 12 months to complete, and would be considered in the overall project schedule.

Environmental Consequences of No Action Alternative: There would be no changes to air quality because there would be no short-term emissions from construction or operational activities.

7.4 Visual Resources

Affected Environment: The topography of the project area is relatively flat. The office and production buildings at the Pantex Plant are visible to surrounding landowners and to traffic along Highway 60 and FM 2373, 683, and 293.

Environmental Consequences of Proposed Action: Heavy equipment and hauling operations, staging areas, site preparation activities, trenching, construction, and operation of the concrete batch plant, and construction traffic would denude over 5 acres of revegetated prairie and create temporary adverse visual effects.

Environmental Consequences of No Action Alternative: There would be no changes to visual resources with this alternative.

7.5 Noise

Affected Environment: Sources of environmental noise offsite consist of background sounds from vehicular traffic on Highway 60 and FMs, county roads, airport traffic, railroad traffic, and the operations of heavy equipment during agricultural activities. Sources of environmental noise at the Pantex Plant include background sounds from industrial processes, vehicular traffic, and routine operations, occasional HE testing, firearms training of security police officers, and ongoing construction and demolition.

Environmental Consequences of Proposed Action: The temporary increase in noise levels from proposed construction activities and traffic would be similar to other construction activities and vehicular noise at

the Pantex Plant, as well as offsite vehicular traffic, airport traffic, railroad traffic, and agricultural activities. Temporary increases would not be expected to cause sufficient change in noise levels to result in more than a temporary annoyance to employees or adjacent landowners. Temporary, intermittent noise levels could result from the use of heavy equipment like backhoes, large trucks, and cranes during construction activities. These levels attenuate rapidly with distance, and would not likely impact neighboring landowners because construction activities would be confined to the central portion of the Plant, away from residential populations. Noise levels would return to pre-construction levels following completion of proposed construction activities.

Environmental Consequences of No Action Alternative: There would be no changes to the current ambient noise levels.

7.6 Cultural Resources

Affected Environment: A major thrust of the Plant's Cultural Resources Program has been systematic survey coverage of all areas surrounding playas located on DOE-owned land plus a substantial sample of non-playa areas. Based on these surveys, a prehistoric archeological site location model was developed and confirmed. This site location model holds that prehistoric archeological sites at the Pantex Plant, and throughout the Llano Estacado, are likely to be located within approximately 1/4 mile of playas or their major drainages and such sites are not likely to occur in the inter-playa upland areas.

Environmental Consequence of Proposed Action: This site location model was included in formal consultation with the Texas State Historic Preservation Office (SHPO), and is included in the *Pantex Plant Programmatic Agreement/Cultural Resource Management Plan* (PA/CRMP, 2004). Features related to more permanent occupations such as hearths, tipi rings, fire-cracked rock concentrations, architectural evidence, or human burials have not been found at any of the Pantex Plant sites, as either surface or subsurface expressions. Since at least the early 1900s, historic agricultural activities such as plowing and grazing have extensively and aggressively modified virtually all of the Llano Estacado. Consequently, most surface or shallow prehistoric archeological sites are seriously disturbed, lacking the original spatial relationships of their artifacts and features. The NNSA Production Office (NPO) and the SHPO have agreed that the disturbed sites lack the integrity required for consideration of inclusion in the National Register. It is not anticipated that any activities from this project would occur within 1/4 mile of a playa.

Environmental Consequences of No Action Alternative: There would be no changes to the current Cultural Resources.

7.7 Human Health

Affected Environment: the Pantex Plant workers and subcontractors involved in potentially hazardous operations are protected by administrative and engineering controls, and are required to wear appropriate personal protective equipment. Workers receive training that is required to identify and avoid or correct potential hazards typically found in the work environment, and to respond to emergency situations. Even

though Occupational Safety and Health Administration (OSHA) does not exercise its jurisdiction at the Pantex Plant, DOE requires that the Pantex Plant contractors must adhere to all OSHA standards in performing all work by complying with 10 CFR 851, the Worker Safety and Health Plan.

The Pantex Plant's Operational Center reports any detrimental weather in the area. Workers are informed of lightning within 35 miles of the Plant and personnel safety announcements of lightning within 10 miles of the Plant. Personnel safety announcement alerts the workers that no work is allowed outdoors, everyone is to remain indoors.

Environmental Consequences of Proposed Action: The types of activities during the construction of the HESFP facility include building an access road to the facility and normal construction of the buildings. There would be no radiological impacts or radiological hazards within the facility. Potential chemical and explosive hazards are acknowledged as part of the Pantex Plant's day-to-day operations. Some chemical hazards are burns, release of high pressures that could cause bodily injury, and/or spontaneously react on its own. Explosive hazards could include instability, bodily injuries, and burns. There are administrative and engineering controls in place to ensure all workers remain safe while working in the proximity of HE hazards. Because personnel presently have to transport material between the different buildings, consolidating the operations into the proposed HESFP would increase worker safety.

Environmental Consequences of No Action Alternative: There would be no changes to the current human health impacts.

7.8 Transportation/Traffic

Affected Environment: Local highways, interstates, and site transportation routes are the primary methods used to transport Pantex Plant employees. These roadways are also used to transport hazardous and radioactive materials. Inter-zonal transfers are carried out on paved roads. Transportation between buildings in various zones is frequently carried out via enclosed ramps. Unpaved roads are sometimes used for production and monitoring well access and utility access. Onsite transfer of radioactive material is governed by DOE orders and Pantex Plant-specific standards (DOE, 1996).

Offsite, Highway 60 and FMs 683, 2373, and 293 are paved roads that are most heavily used within the project area. There are also unpaved county roads offsite that are less heavily used.

Environmental Consequences of Proposed Action: There would be a temporary increase in traffic from proposed construction, and potential rerouting of onsite traffic. Construction activities are not expected to cause significant change in traffic patterns resulting in more than a temporary inconvenience to Plant employees or adjacent landowners.

Environmental Consequences of No Action Alternative: There would be no change to current transportation or traffic activities.

7.9 Waste

Affected Environment: Waste at the Pantex Plant is generated from ongoing weapons operations, HE production, and support operations such as medical services, vehicle maintenance activities, general office work, construction activities, environmental monitoring, laboratory activities, and environmental restoration activities (DOE, 1996).

Environmental Consequences of Proposed Action: Waste management for the processes would need to be evaluated to conform to the current handling and disposal of similar materials. Waste from the following processes would need to conform to appropriate waste management procedures:

Particle Modification

- Wet scrubber slurry - offsite disposal; and
- Option - Particulates separated from slurry with wastewater discharged into sanitary drain and solids detonated onsite

Formulation

- Solvent capture and disposal/recycling;
- Process water discharge - offsite disposal or onsite sanitary sewer; and
- Powder separated in scrubber - onsite open burn / detonation

Nitration

- Reaction acids - offsite disposal; and
- Wet scrubber - onsite disposal of water and onsite detonation of powder

Amination

- Toluene - distillation for reuse;
- Process water discharge - separate power and offsite disposal or onsite sanitary sewer; and
- Powder separated - onsite open burn / detonation

Fire Deluge System

- Deluge fire water will contain process chemicals that would be discharge to an unlined capture area outside the facility. Surface and subsurface impacts will be assessed following removal.

Environmental Consequences of No Action Alternative: There would be no changes to the current generation of waste.

7.10 Socioeconomic Resources

Affected Environment: the Pantex Plant employs approximately 4,750 people, including DOE/NNSA, CNS personnel, subcontractor personnel, Sandia, Lawrence Livermore, and Los Alamos National Laboratories staff, consultants, and oversight personnel.

The Pantex Plant is the major employer in Carson County and is one of the largest employers within the four county regions of influence that includes Carson, Armstrong, Potter, and Randall counties, and the Amarillo metropolitan area.

Environmental Consequences of Proposed Action: The majority of construction materials and temporary construction workers would most likely be drawn from the local community. Permanent increases in population would not occur and housing and community services would not be permanently impacted. The increase in economic activity would be temporary and would subside with project completion. It is not anticipated that the construction and operation of the new facility would lead to a reduction in jobs, or Environmental Justice connections to employment.

Environmental Consequences of No Action Alternative: The current socioeconomic resources would not change with this alternative.

8.0 CUMULATIVE EFFECTS

Actions that could contribute to cumulative impacts include those conducted by Federal or non-Federal agencies or persons on lands adjacent to the Pantex Plant, within a 50-mile area of influence. Actions in the Area of Influence include:

- New construction projects within the Plant,
- Demolition projects within the Plant,
- Construction of power grid transmission lines in Carson, Potter, and Gray counties (offsite), and
- Private development of wind turbine generators.

Resources which could potentially experience cumulative effects are land use, water resources, biological resources, air quality and climate change, visual, noise, cultural resources, human health, transportation, waste, and socioeconomic.

The resource areas which are not considered under Cumulative Effects have a small potential for impact. These areas were discussed in Section 3.4 "Scope and Methodology of the Environmental Assessment Analysis." There would be no additional impacts to the Area of Influence from the proposed project.

Actions in the Area of Influence are mostly temporary and short-term. Most of the acreage that is needed for the construction phases of these projects would be returned to the original condition of open space or cultivation. For the long-term impacts of these projects, only the footprint of the facilities would remain and the land not necessary for the footprint would be restored. Pipelines and some electrical connections are underground, so after installation, the surfaces would be returned to the original condition. Regarding the demolition projects, the footprints would be removed and the site returned to open space. Therefore, the incremental impact of the proposed action, when added to those from actions of a similar nature, would be minor.

8.1 Water Resources

Water use during construction is generally associated with dust suppression, soil compaction, and the mixing of concrete. These uses are temporary and short-term. Occupancy of buildings would require long-term use of water resources similar to the normal use of office buildings.

8.2 Air Quality and Climate Change

Actions in the Area of Influence are intermittent and short term for air quality and, in a region with an average annual wind speed of 13.5 miles per hour, would not degrade the local air quality of the Plant.

8.3 Noise

Sounds produced by construction equipment are attenuated by winds, distances, and by their temporary nature. The incremental impact of the proposed action, when added to those from actions of a similar nature, would be minor.

8.4 Cultural Resources

Existing buildings have not yet been evaluated for D&D in accommodation for the new HESFP facility footprint. NEPA documentation would needed for each building scheduled for D&D; Cultural Resources would be addressed at that time.

8.5 Construction Waste

The identified negligible cumulative impacts associated with waste management, as well as with health and safety, are due to the generation of demolition waste, possibly containing asbestos and other

hazardous materials. No wastes are expected to remain at the proposed project site. All wastes would be handled appropriately in accordance with the approved waste management plans and applicable procedures. The waste would not require special handling beyond the capabilities of licensed disposal facilities.

9.0 ACCIDENT ANALYSIS

Construction

The proposed action consists of activities that are performed on a routine basis in construction. Therefore, specialized accident types that are considered at NNSA facilities are not a consideration. The most serious potential accident considered for the Proposed Action would be a fatality, although none are likely to result from the proposed construction. Potentially, serious exposures to various hazards or injuries are possible during the construction phase of the Proposed Action. Adverse effects could range from relatively minor (e.g., lung irritation, cuts, or sprains) to major (e.g., lung damage, broken bones, or fatalities).

The *Occupational Injuries and Illnesses and Fatal Injuries Profile* from the U.S. Department of Labor - Bureau of Labor Statistics, found that a total of 5,250 workers died from a work-related injury in the U.S. in 2018, up two percent from the 2017 total of 5,147 (BLS, 2019). Potential worst case industrial accident scenarios from the construction of the proposed HESFP facility could include: excavation collapse, wall collapse, crane collapse, chemical exposure, contact with an electrical current, or grassfire from a welding spark. CNS, the current Management and Operation Contractor at the Pantex Plant, has stringent safety requirements for all employees and contractors; the safety statistics for the plant are lower than national averages. In 2019 CNS Pantex Plant total recordable injury cases rate was 0.75.

Security for the HESFP facility would involve using existing fence within the periphery of the proposed HESFP facility location. The existing fencing would not be relocated or removed. Additional fencing and the installation of a personnel and vehicle barrier gate would be constructed to separate the Property Protection Area (PPA) and Limited Area (LA) and designate the HESFP facility boundary during and after construction. The new security fencing would encompass the HESFP facility and be installed in accordance with DOE Order 437.3A (Protection Program Operations) to maintain DOE standards for Security Fencing. Coordination with Pantex Plant Security would be required to ensure compliance with the separation of the PPA and the LA throughout the project.

Operation

The *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components* (Site-wide Environmental Impact Statement [SWEIS]) (DOE, 1996) analyzed two accident scenarios that involved HE detonation. One scenario initiated from an internal process involving HE development, manufacturing, testing, evaluation, and treatment, and the other scenario initiated from an external event or natural phenomena. Both types of potential accidents were analyzed in the *High Explosive Synthesis, Formulation, and Production Facility Process Preliminary Hazard Analysis* (PHA) for the proposed HESFP facility. The 1996 SWEIS

concluded that the likelihood of the internal event could occur at a frequency greater than or equal to 10^{-2} per year (*anticipated)*. The scenario involving an external event or natural phenomena would be *unlikely* – or probability of occurrence in a given year of 10^{-2} to 10^{-4}. Either scenario could fatally injure a single worker; however, members of the public and non-involved workers would not be at risk.

HE operations require careful consideration of the facility design to provide a safe environment for employees and adjacent Plant personnel and functions. The HESFP Main Building would be designed to mitigate blast effects. Explosive bays would be explicitly designed to contain explosive hazards within the bay. Due to the size and classification of operations, the facility would be divided into separate structures providing isolation between administrative and hazardous classified spaces. The Blending Building would be used intermittently for blending batches and does not require direct adjacency to HESFP facility functions. The Blending Building has been sited away from the HESFP Main Building and other facilities and site features to provide a safe distance allowing for non-blast resistant structural elements to be used.

Process interlocks would be provided in specific rooms where necessary to activate warnings when processes are taking place that require such warnings. Some process functions would be controlled remotely to limit risk to employees. Process equipment controls would be designed to return the process to safe and stable condition should power or other system losses occur.

A project-specific Integrated Safety Manual would be developed during the preliminary design phase consistent with CNS site Integrated Safety Management system described in the Enterprise "Integrated Safety Management Program" (E-SD-2009). Where applicable, ISM requirements would be integrated into the final design of the facility.

A preliminary Fire Hazards Analysis (FHA) was prepared to ensure that fire protection and life safety features are incorporated into the design of the proposed HESFP facility. A preliminary FHA is a comprehensive evaluation of the risks from fire and its related risks in this facility. This document identifies major fire protection and life safety features required for this facility and the necessary codes and standards to correctly design and install those features. In addition, this document identifies key occupancy and hazard classifications. It also identifies key design criteria (i.e., sprinkler system densities/remote area and hose streams, etc.). The potential for catastrophic accidents would be reduced due to safety features built into the design of the proposed new facility.

10.0 AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED

Special Status/Wildlife and Plants: To be determined after a Draft EA can be provided to the Texas Parks & Wildlife Department and the U.S. Fish & Wildlife Service for review.

Water Quality Management Plan, WQMP #156-030044: To be determined after a Draft EA can be provided to the Texas State Soil and Water Conservation Board for determination of changes to land use at the Pantex Plant.

Water Resources: Subject Matter Experts from the Environmental Compliance Department (Puroff, C. and Schoenhals, M. 2020) were contacted concerning sections 7.2 and 8.1, Water Resources. The Subject Matter Experts provided revised information for section 7.2.

Cultural/Historic:

The Pantex Plant Historian from the Environmental Compliance Department (Braughton, K. 2020) was contacted concerning sections 7.6 and 8.4, Cultural Resources. The Historian reviewed and confirmed that the information in the respective sections was correct. Additionally, the Historian confirmed the following information:

The Pantex Plant has a Programmatic Agreement/Cultural Resource Management Plan that involved extensive consultation with the State Historic Preservation Office so additional consultation for the site location or demolitions for this project were not necessary. Based on contact in the past and a Native American Treaty search in 1996, no Native American tribes have an interest in the area of the Pantex Plant.

Air Quality and Climate Change:

Subject Matter Experts from the Environmental Compliance Department (Griffis, D. and Roulston, B. 2020) were contacted concerning sections 7.3 and 8.2, Air Quality and Climate Change. The Subject Matter Experts confirmed that information provided in both respective sections was up-to-date and correct.

Accident Analysis:

A Subject Matter Expert from the Safety and Industrial Hygiene Department (Lacy, P. 2020) was contacted concerning Section 9.0, Accident Analysis. A Subject Matter Expert confirmed information provided in section 9.0 was up-to-date and correct.

Land Use:

A Subject Matter Expert from the Environmental Compliance Department (Ray, J. 2020) was contacted concerning section 7.1, Land Use. The Subject Matter Expert provided updated information and confirmed existing information was correct.

11.0 REFERENCES

7 CFR 657	U.S. Code of Federal Regulation, Title 7, Agriculture, Part 657, *Prime and Unique Farmlands*
10 CFR 851	U.S. Code of Federal Regulations, Title 10, Energy, Part 851, *Worker Safety and Health Program*
40 CFR 61.92	U.S. Code of Federal Regulations, Title 40, Protection of the Environment, Chapter I, Environmental Protection Agency, Subchapter C, Air Programs, Part 69, Special Exemptions from Requirements of the Clean Air Act, Subpart A, Guam, Section 69.12, *Continuing Exemptions*
40 CFR 1500-1508	U.S. Code of Federal Regulations, Title 40, Protection of the Environment, Parts 1500-1508, *Council on Environmental Quality*
ASER, 2018	U.S. Department of Energy, NNSA, Pantex Site Operations, Amarillo, Texas, *2018 Annual Site Environmental Report for Pantex Plant*, September, 2019
BLS, 2019	U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Injuries and Illnesses and Fatal Injuries Profile*, https://www.bls.gov/ Accessed February, 2020
BMD, 2019	Burns and McDonnell, *Critical Decision 1 and Conceptual Design for the High Explosives Synthesis, Formulation, and Production (HESFP) Facility Project*, June, 2020.
Braughton, K.	Personal communication with the Pantex Plant Historian, CNS Pantex, February 2020
CNS, 2014	*Construction Management Master Specifications Division 1 (Environmental Protection),* Chapter 3 – Vegetation, Rev. 13, December 4, 2014
CNS, 2019	*Functional & Operational Requirements for the High Explosives Synthesis, Formulation, and Production Facility,* July 2019
CNS, 2020	Pantex Design Criteria Manual 293059, Issue 3, April, 2020
DOE, 2012	U.S. Department of Energy, NNSA, NPO, Amarillo, Texas, *Supplement Analysis for the Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*, November 2012. https://energy.gov/nepa/downloads/eis-0225-sa-05-supplement-analysis

DOE/NNSA, 2019 *High Explosives Synthesis, Formulation, and Production (HESFP) Analysis of Alternatives Study*, May 2019

DOE, 2019 U.S. Department of Energy, DOE Standard, DOE-STD-1212-2019, *Explosives Safety*, November 2019 https://www.standards.doe.gov/standards-documents/1200/1212-astd-2019

EIS, 1996 U.S. Department of Energy, Washington, D.C., *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*, November 1996

EPA 2016 "What Climate Change Means for Texas." Available online: https://www.epa.gov/sites/production/files/2016-09/documents/climate-change-tx.pdf . Accessed February, 2020.

Griffis, D. Personal communication with Pantex Plant air quality and climate change Subject Matter Expert D. Griffis, CNS Pantex, February 2020

Lacy, P. Personal communication with Pantex Plant safety and industrial hygiene Subject Matter Expert P. Lacy, CNS Pantex, February 2020

NCA 2014 National Climate Assessment (NCA). "Climate Change Impacts in the U.S., Great Plains Region." http://nca2014.globalchange.gov/report/ regions/greatplains#intro-section-2. Accessed February 2020

PA/CRMP, 2004 U.S. Department of Energy, NNSA, NPO, *Programmatic Agreement Among the U. S. Department of Energy/National Nuclear Security Administration/Pantex Site Office, The Texas State Historic Preservation Office, and the Advisory Council on Historic Preservation, Authorizing the Pantex Plant Cultural Resource Management Plan*, April 2004

PLN-SSP, 2019 Safeguards & Security Plan, CNS Pantex, FY19, Issue 4

Puroff, C. Personal communication with Pantex Plant water use Subject Matter Expert C. Puroff, CNS Pantex, February 2020

Ray, J. Personal communication with Pantex Plant land use Subject Matter Expert J. Ray, CNS Pantex, February 2020

Roulston, B. Personal communication with Pantex Plant air quality Subject Matter Expert B. Roulston, CNS Pantex, February 2020

Schoenhals, M. Personal communication with Pantex Plant Agronomist M. Schoenhals, CNS Pantex, February 2020