CNS-PLAN-TYSP-FY16R2

Ten-Year Site Plan for the Pantex Plant and Y-12 National Security Complex

Fiscal Years 2016–2025

YGG-15-0124R2

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Ten-Year Site Plan for the Pantex Plant and Y-12 National Security Complex

Fiscal Years 2016–2025

April 30, 2015

Prepared by
Consolidated Nuclear Security, LLC
Management & Operating Contractor
for the
Y-12 National Security Complex and Pantex Plant
under Contract No. DE-NA0001942
with the
U.S. Department of Energy
National Nuclear Security Administration

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ACRONYMS

APM	Acquisition and Project Management
CBI	Capabilities-Based Investments
CD	critical decision
CNS	Consolidated Nuclear Security
CoE	Center of Excellence
CSA	canned subassembly
CWG	Construction Working Group
DA	design agency
DM	deferred maintenance
DNS	Defense Nuclear Security
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DHS	U.S. Department of Homeland Security
DP	Defense Programs
DPP	Defense Programs Package
DSW	Directed Stockpile Work
EM	Office of Environmental Management
EOC	Emergency Operations Center
ESPC	Energy Savings Performance Contract
ETTP	East Tennessee Technology Park
EU	enriched uranium
FBI	Federal Bureau of Investigation
FCI	facility condition index
FIMS	Facility Information Management System
FPU	first production unit
FY	fiscal year
FYNSP	Future Years Nuclear Security Program
GSF	gross square footage or gross square feet
HE	high explosive
HE CoE	High Explosive Center of Excellence
HEPF	High Explosive Pressing Facility
HEU	highly enriched uranium
HEUMF	Highly Enriched Uranium Materials Facility
HEWO	High Explosives and Weapons Operations
HPFL	High Pressure Fire Loop
HVAC	heating, ventilating, and air-conditioning
JTA	Joint Test Assembly
LANL	Los Alamos National Laboratory
LEP	Life Extension Program
LX	Livermore explosive
M&O	management and operating
MAA	material access area
MAR	material at risk
MC	mission critical
MD	Material Disposition
MDNC	mission dependent, non-critical

MSF	Material Staging Facility
NDE	nondestructive evaluation
NE	Office of Nuclear Energy
NERC/FERC	North American Electric Reliability Corporation / Federal Energy Regulatory Commission
NFRR	Nuclear Facilities Risk Reduction
NN	nuclear nonproliferation
NNSA	National Nuclear Security Administration
NPO	National Nuclear Security Administration Production Office
NSE	U.S. Nuclear Security Enterprise
P&PD	production and planning directive
P&S	Packaging and Staging
PA	protected area
PBX	plastic bonded explosive
PCD	Program Control Document
PDRD	Plant Directed Research, Development, and Demonstration
PIDAS	Perimeter Intrusion Detection and Assessment System
PREP	Pantex Renewable Energy Project
PSS	plant shift superintendent
R&D	research and development
RAMS	Radiation Alarm Monitoring System
ROD	record of decision
RTBF	Readiness in Technical Base and Facilities
S&E	Science & Engineering
S&S	Safeguards and Security
SABER	Security Area Boundary Enhancement and Reduction
SC	Office of Science
SCIF	Sensitive Compartmented Information Facility
SNM	special nuclear material
SPEIS	Supplemental Programmatic Environmental Impact Statement
SPP	Strategic Partnership Projects
TATB	triamino trinitrobenzene
TSC	Technical Support Center
TYSP	Ten-Year Site Plan
UPF	Uranium Processing Facility
WEPAR	West End Protected Area Reduction
WFO	Work for Others
WR	War Reserve
XTX	extrudable explosive
Y-12	Y-12 National Security Complex

1. EXECUTIVE SUMMARY

U.S. Department of Energy Strategic Goal: Secure Our Nation

Goal 2: Nuclear Security: Strengthen national security by maintaining and modernizing the nuclear stockpile and nuclear security infrastructure, reducing global nuclear threats, providing for nuclear propulsion, improving physical and cybersecurity, and strengthening key science, technology, and engineering capabilities.

Consolidated Nuclear Security, LLC (CNS) manages and operates the Pantex Plant (Pantex) and Y-12 National Security Complex (Y-12) on behalf of the National Nuclear Security Administration (NNSA). Together, these two sites are a core element of a sustainable and robust national nuclear deterrent and are modernizing their scientific, technical, and engineering infrastructure to meet future national security missions.

Charged with maintaining the safety, security, and effectiveness of the U.S. nuclear weapons stockpile, Pantex in Amarillo, Texas, and Y-12 in Oak Ridge, Tennessee, are key facilities in the U.S. Nuclear Security Enterprise (NSE) (Fig. C1). These sites also serve vital nuclear nonproliferation (NN) missions for NNSA and provide broader national security support to NNSA strategic partners. As the nation's primary site for assembly and disassembly of nuclear weapons, the Pantex mission includes maintenance and surveillance of nuclear weapons and weapon components in the stockpile; dismantlement of retired nuclear weapons; sanitization and disposition of components from dismantled weapons; manufacturing of specialty explosives; fabrication and testing of explosive components; interim staging and storage of nuclear components from dismantled weapons; pit requalification; pit surveillance; pit packaging; and materials, equipment, and technical services to strategic partners and other U.S. Department of Energy (DOE) laboratories. Y-12 is a premier manufacturing facility dedicated to making our nation and the world a safer place. The Y-12 mission includes the retrieval and safe, secure storage of nuclear materials; processing and manufacturing operations; the supply of feedstock to fuel the nation's naval reactors; and other nuclear nonproliferation and global security efforts.

Fig. C1. Y-12 National Security Complex, left, and Pantex Plant.

Since 1945, both Pantex and Y-12 have played key roles in strengthening our country's national security and reducing the global threat from weapons of mass destruction.

This Ten-Year Site Plan (TYSP) presents the fiscal years (FYs) 2016–2025 facility and infrastructure plans to maintain progress in achieving the overall modernization vision for the Pantex and Y-12 sites. The requirements expressed herein are consistent with the Future Years Nuclear Security Program (FYNSP) targets, multiple records of decision (RODs), the 2010 Nuclear Posture Review, and the 2016 Stockpile Stewardship and Management Plan.

2. Pantex Site Overview and Snapshot

Pantex Site Overview

Location: Amarillo, Texas	**Contract Operator:** Consolidated Nuclear Security
Type: Single-Program Site	**Responsible Field Office:** NNSA Production Office
Web site: http://www.pantex.com	**NPO Manager:** Geoff Beausoleil

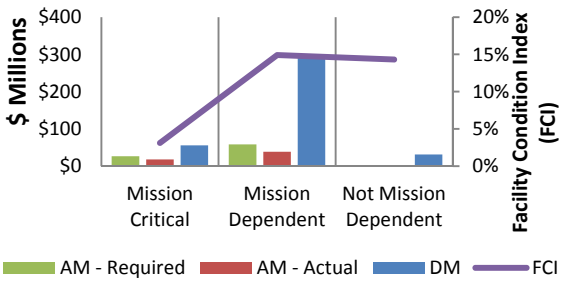
Pantex activities support the core mission of nuclear weapons stockpile stewardship. The Pantex mission includes manufacture of specialty explosives; fabrication and testing of high explosive (HE) components; assembly, disassembly, refurbishment, maintenance, and surveillance of stockpile nuclear weapons and weapon components; interim staging and storage of nuclear components from dismantled weapons; and pit requalification, surveillance, and packaging. Additionally, Pantex is instrumental in providing capabilities for other mission/program requirements, including surveillance of weapon components used for certifying weapons, and in providing scientific, technical, engineering, and safety bases for HE (Figs. P1 and P2).

Capabilities

- C1.5 – Surveillance
- C5 – High Explosives
- C7 – Weapons Assembly/Disassembly
- C9 – Special Nuclear Material Accountability, Storage, Protection, Handling, and Disposition
- C10 – Enabling Infrastructure
- C12 – Support of Other Missions/Program Capability
- C15 – Security

Real Property (as of 9/30/2014)

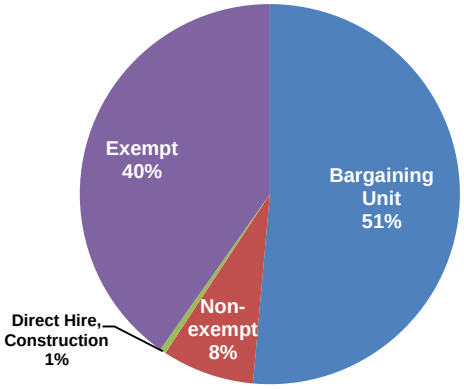
- 17,512 acres
  - 11,703 owned by DOE
  - 5,809 leased from Texas Tech University
- 617 buildings/trailers
  - 2,999,852 gross square footage (GSF) active and operational
  - 35,493 GSF non-operational
  - 84,754 GSF leased
- Replacement Plant Value: $4.068B
- Deferred Maintenance (DM): $388M
- Facility Condition Index (FCI):
  - Mission critical: good (3.0%)
  - Mission dependent non-critical: fair (15.0%)
  - Site-wide FCI: adequate (9.5%)
  - Asset utilization index (overall): 96.8%



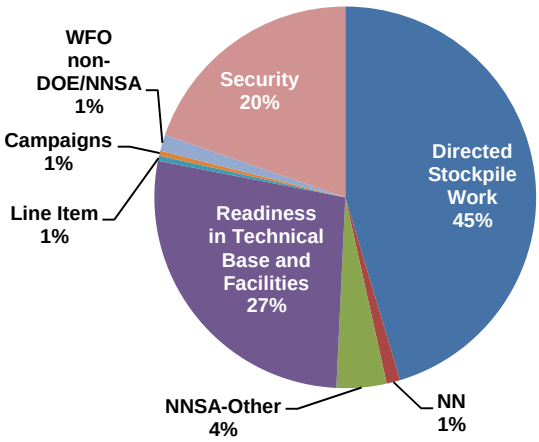
DM and FCI by Mission Dependency

FY2015 Funding by Source ($M)

FY2015 Total Site Operating Funding:	$700.8
FY2015 Total NNSA/DOE Funding:	$691.3
FY2015 Total Non-NNSA Work:	$9.5



FY2015 Pantex Personnel Profile



FY2015 Funding by Source

Nuclear Nonproliferation (NN)
Work for Others (WFO)

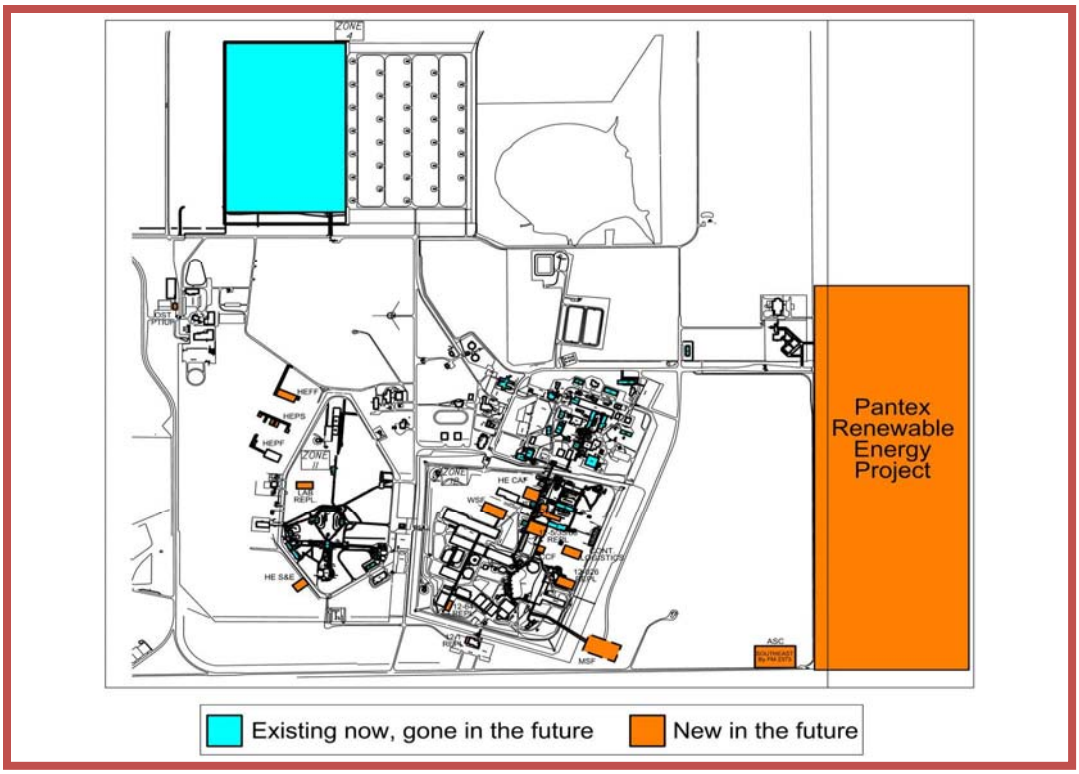


Fig. P1. Graphical representation of future Pantex Plant.

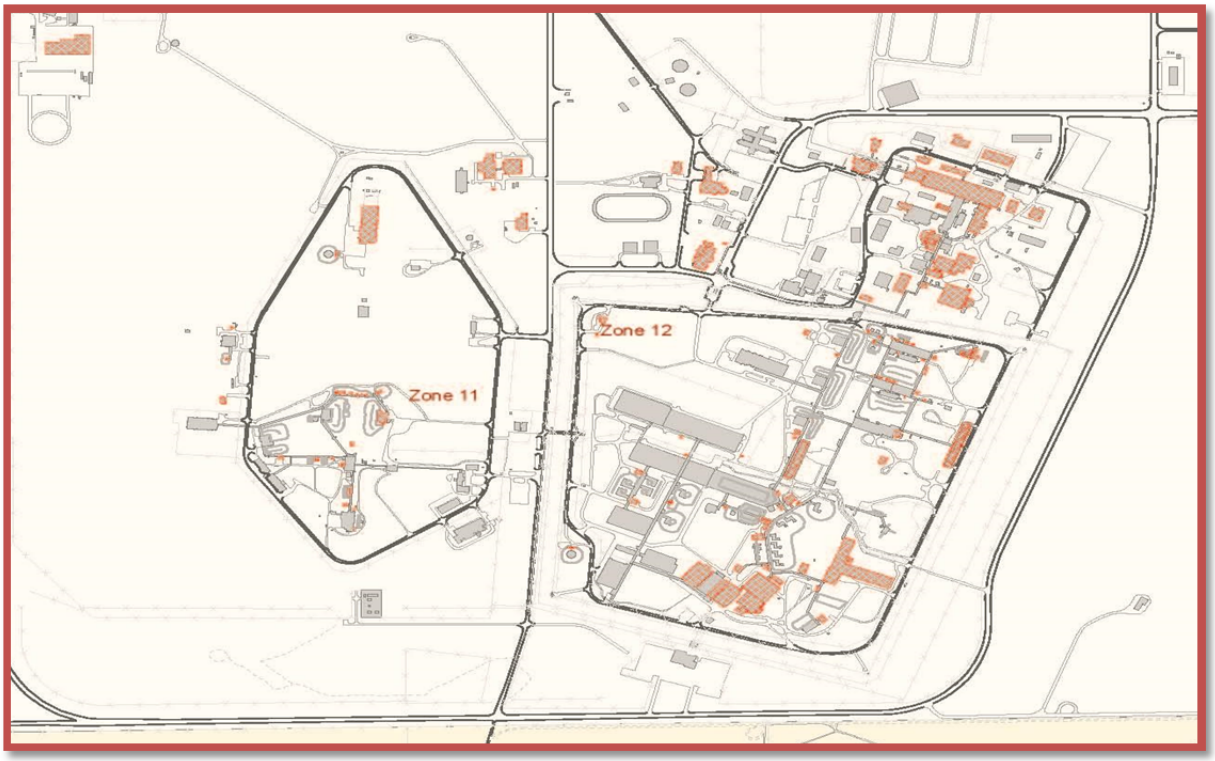


Fig. P2. Production support facilities.

2.1 CURRENT STATE AND ACCOMPLISHMENTS

Pantex activities support the core NNSA mission of nuclear weapons stockpile stewardship. The Pantex mission includes manufacture of specialty explosives; fabrication and testing of HE components; assembly, disassembly, refurbishment, maintenance, and surveillance of stockpile nuclear weapons and weapon components; dismantlement of retired stockpile nuclear weapons; sanitization and disposal of components from dismantled weapons; interim staging and storage of nuclear components from dismantled weapons; pit requalification; pit surveillance; and pit packaging (including container surveillances and recertifications). These activities are directed through the Production and Planning Directive (P&PD), Program Control Document (PCD), and the Development and Production Manual. Pantex supports Stockpile Systems by performing disassembly, inspection, and rebuild of weapon evaluation cycle units; stockpile refurbishment [i.e., Life Extension Programs (LEPs)]; assembly of Joint Test Assemblies (JTAs) and post-mortem analysis, assembly, and disassembly of testbed units; Limited Life Component Exchange; programmatic alterations (usually defined as Alts or Mods); weapon repairs; weapon and component radiography and nondestructive evaluation (NDE); HE testing and explosive component evaluation; pit and non-nuclear evaluations; electrical and mechanical tests; and surveillance/evaluation testing in support of Quality Evaluation Reports. A viable, efficient, and right-sized infrastructure is essential for obtaining the capacities required to meet the directed nuclear weapons stockpile stewardship activities.

Approximately 54% of Pantex's mission-critical (MC) facilities and 56% of the mission dependent, non-critical (MDNC) facilities are more than 40 years old (Fig. P3) and will require some type of refurbishment or replacement in the planning horizon. To address this situation, Pantex has been consolidating operations, modernizing facilities and infrastructure, and reducing the legacy footprint for more than a decade. These actions are consistent with and supportive of NNSA enterprise transformation planning. Through modernization projects, deferred maintenance (DM) reduction, enhanced security measures, technology enhancements, infrastructure reduction, and innovative business practices, Pantex is becoming a more responsive and cost-effective enterprise, as evidenced by the infrastructure accomplishments presented herein.

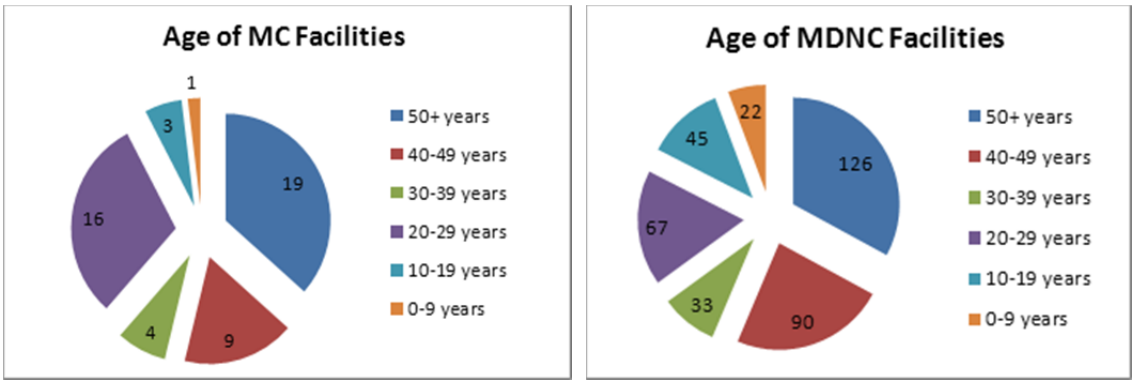


Fig. P3. Age of Pantex's mission-critical and mission dependent non-critical facilities.

2.1.1 Future State

This TYSP defines an overall path for modernizing the Pantex Plant over the 25-year planning horizon. Pantex supports NNSA's long-term vision to provide the nation a modern infrastructure ready to accomplish the NSE mission. This plan features infrastructure investments necessary to implement the strategies directed by the guiding documents to support a strong, healthy nuclear safety culture.

Future plans for Pantex include reinvestments to become smaller and more responsive to the country's needs in accordance with the strategies delineated in the Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS) ROD and the nation's nuclear posture. Those reinvestments include programs, initiatives, and projects as described herein.

2.1.1.1 Capabilities-Based Investments Program

The Capabilities-Based Investments (CBI) Program is a subprogram of Readiness in Technical Base and Facilities (RTBF) with the mission to provide strategic investments for life extension of programmatic capabilities required to meet Defense Programs (DP) capabilities and capacities across the NSE. Initial funding from CBI (FY2015) supports the facility modifications required to provide additional Vacuum Chamber Bay capacities required at Pantex to support LEP activities. Pantex will continue to utilize the CBI Program to provide lifecycle replacement of equipment supporting weapons assembly/disassembly and HE operations and to mitigate an existing risk to the capacities and capabilities required to support the DP mission.

2.1.1.2 Program Readiness Program

The Program Readiness Program is a subprogram of RTBF with the mission to implement multi-year strategies to modernize and sustain capabilities (skilled worker expertise, advanced technologies, and innovative approaches) that support the programmatic needs of DP. Consistent with that mission, a Critical Skills Plan for Pantex and Y-12 was developed to maintain readiness in personnel. The Critical Skills Plan focuses on the recruitment, retention, and specialized training of engineering and scientific resources to address gaps resulting from increased demand for those resources. The Program Readiness Program supports execution of projects to attract and develop engineering and scientific resources as well as modernize capabilities supporting the DP mission.

2.1.1.3 Upgrade of Production Bays/Cells

Systematic lifecycle replacements in nuclear production bays/cells reduce risk to operability and ensure the capacities exist to meet projected workload schedules. Initial focus will be placed on the replacement of the Flame Detection System, Radiation Alarm Monitoring System (RAMS), and Fire Protection Lead-ins. The Flame Detection System and RAMS are safety class and radiological safety systems, respectively, and due to obsolescence, failures of those systems continue to impact production. There have been several lead-ins replaced, and the majority will be replaced with the bay/cell upgrade. Eventually, failure to address end-of-life systems and equipment will render the nuclear production bays/cells inoperable.

2.1.1.4 Balance of Plant Initiatives

The Balance of Plant infrastructure supports a healthy, well-maintained work environment that is conducive to the principles of a strong and healthy nuclear safety culture while supporting MC facilities. Mature renewable energy systems take advantage of the geographical attributes and incorporate facility sustainability strategies that have responsible, enduring environmental and energy management policies for long-term viability. The safety and environmental compliance endeavors have the established maturity, external oversight confidence, and status to maintain the NSE benchmark. Additionally, key facility reutilization and unique reinvestment strategies have consolidated functions/operations in a manner that utilizes the modern infrastructure while minimizing costs and operating footprint.

2.1.1.5 High Explosive Center of Excellence

The HE Center of Excellence (CoE) is managed and operated in a manner consistent with NNSA needs. A modern infrastructure maximizes productivity while minimizing operating costs. Essential capabilities are maintained in a continuous state of readiness to meet projected HE production demands. The HE CoE will have mature productivity modeling facilitates matching operationally ready capacities with manufacturing demands.

The cornerstones of the HE CoE are the HE Pressing Facility (HEPF), HE Science and Engineering (S&E) facility, HE Packaging and Staging (P&S) facility, HE Development Machining Center, HE Formulation facility, Inert Machining facility, and the HE Component Assembly facility. These facilities support elements of the HE mission, including research and development (R&D). HEPF general construction was completed in 2014 under budget. Pantex is pursuing line-item underruns of the HEPF to fund the HE P&S facility. The HE S&E critical decision (CD)-1 was made by Acquisition and Project Management (APM) (NA-19) in CY2014 with a CD-4 date of 2020. The remaining facilities are supported by the NNSA Construction Working Group (CWG) and will require continued programmatic support to fully complete the transformation to a modern HE CoE capable of reliably producing and performing surveillance activities in support of the Stockpile Stewardship Program.

2.1.1.6 Facilities and Infrastructure Sustainment/Modernization

Pantex has identified the near-term, intermediate, and long-term investments needed to recapitalize and sustain the infrastructure at Pantex required to support the NNSA mission. The common theme of these needs is that the infrastructure requires recapitalization and sustainment of the capabilities to arrest the decline in facilities and infrastructure. Infrastructure includes real property, installed equipment, and related real property that is supporting multiple program missions at a single-program site. Of concern are the systems and equipment that are reaching the end of their useful life or that the manufacturer no longer supports. Table P1 lists a few of the critical systems and equipment that will require replacement over the planning period.

Advances in technology are accelerating the need for replacement before systems and equipment become obsolete. The lack of availability of replacement parts and supported software is decreasing system maintainability and reliability. As examples, manufacturers of the Ultraviolet Flame Detection System, RAMS, and HE Synthesis process control equipment have notified Pantex that the systems are or soon will be no longer supported.

Table P1. Systems at End-of-Life or Obsolete

Flame Detection System	Thermal Monitoring
High Pressure Fire Loop (HPFL) Lead-Ins	Emergency Vehicles
RAMS	On-site Transportation Trailers
Building Systems (heating, ventilating, and air-conditioning [HVAC]/Chillers/Electrical)	Water Distribution System
High Mast Lighting	Sewer Collection System
Fire Alarm Control Panels	Process equipment:
Blast Door Interlocks	• Linear Accelerators/Manipulators • Leak Check Manifolds
Boiler Controls	• Computer systems

Pantex has met mission deliverables with an aging infrastructure; however, risks are increasing due to system failures and constrained and inconsistent budgets limiting recapitalization and modernization initiatives. The FYNSP is not adequate to support end-of-life and technically obsolete equipment replacement of essential systems and infrastructure.

Pantex committed maintenance and project resources to exceed the $2M goal to refurbish general workplace improvements, and additional efforts will support a strong and healthy nuclear safety culture in the future.

2.1.1.7 Special Nuclear Material Component Testing and Storage

Category I special nuclear material (SNM) storage, as well as weapon staging, is consolidated and accessibly adjoined to the weapon assembly area, thus achieving more modern, efficient, secure, and effective operations at a lower overall cost.

SNM component environmental testing capabilities (relocated from Lawrence Livermore National Laboratory as directed by the Complex Transformation SPEIS ROD) are fully functional and competently staffed to meet corresponding surveillance and LEP requirements.

Comprehensive nondestructive diagnostics for weapon and weapon components' evaluation, as well as reacceptance and refurbishment, are mature and responsive, thus minimizing overall NSE costs and more effectively supporting increased surveillance and stockpile life extension demands.

2.1.1.8 Material Staging Facility

A new Material Staging Facility (MSF) will provide the capability and capacity for safe and efficient staging of weapons and nuclear weapon components while enhancing the site's security posture at a reduced infrastructure cost. The facility supports the consolidation of the Pantex site and reduces the future recapitalization mortgage related to Zone 4 West and the associated Perimeter Intrusion Detection and Assessment System (PIDAS) replacements.

2.1.1.9 B61 LEP

The successful implementation and delivery of the first production unit (FPU) of the B61 Mod 12 LEP by the planned 2019 date will require addressing multiple challenges at Pantex in the immediate future. The procurement and configuring of needed SNM equipment, as well as new projects and equipment in the HE facilities, will require negotiation with other critical plant initiatives for resources and priority. Funding for many of these new projects, particularly in the Component Manufacturing Development (Readiness) and RTBF funding, will be crucial to success.

2.1.1.10 Administrative Support Complex

A new facility will provide significant progress toward the goals of Complex Transformation and DP Strategic Framework for consolidation, modernization, and the elimination of Pantex footprint. The new facility will address the immediate need for technological and infrastructure enhancements and personnel synergy currently unavailable in existing facilities.

2.1.1.11 Mission Operations (Weapons Surveillance Facility)

Based on FY2015 funding, Pantex is proceeding in accordance with the workload as defined by the NNSA Office of Stockpile Management Programs (NA-12). Future workload projections suggest enhanced testing and corresponding support activities will be necessary to satisfy basic stockpile stewardship and LEP requirements. Depending on requirements for each program, this would include increased nondestructive and destructive evaluation, explosive component manufacturing, and pit requalification/reuse processes, as well as canned subassembly (CSA) surveillance/reacceptance. The increase in surveillance work will be addressed through the construction of a new Weapons Surveillance Facility, existing facility modifications, and installation and qualification of essential diagnostic and support equipment.

2.1.1.12 Enterprise-Wide Planning and Scheduling

Pantex serves as an integrated hub for the Production Planning & Scheduling System, which coordinates enterprise-wide planning, provisioning, and inventory management. As an element of provisioning and inventory management efforts, the NSE Container Stewardship & Logistics Center is efficiently managing container provisioning, maintenance, routing, and staging. The center acts as “Mission Control” for container-related operations and logistics via interactive databases and business systems that employ both reach-in and reach-out features. Critical information and assets are therefore available to sites when needed to support transportation activities. The center optimizes application of critical NSE assets, enhancing enterprise productivity and minimizing operating costs.

2.1.2 Accomplishments

CNS successfully transitioned the management and operating (M&O) contract from B&W Pantex while staying focused on a bedrock set of ‘5 Absolutes’ and ‘4 Core Values’ that ensured delivery of FY2014 commitments with safety, security, quality, and cost efficiency.

FY2014 was a year of challenges and commitment to improving the nuclear safety culture at Pantex. The challenges experienced can be categorized as: (1) aging and failing infrastructure, (2) technical

issues, (3) acts of nature, and (4) impacts from inter-site dependencies. Some of these challenges remain outside the control of Pantex and have had an affect on operations. Pantex has balanced the impacts of each issue while maintaining a level of production with an appropriate level of risk. Pantex has prioritized work based on the fiscal and program guidance provided by NNSA while maintaining safety, security, and quality.

Pantex exceeded expectations in many areas, including the W76-1 LEP, where Y-12 surpassed production requirements by 4% and Pantex met all shipment requirements despite encountering a 20% impact from lightning delays. Both Pantex and Y-12 exceeded dismantlement requirements and met all significant surveillance requirements. CNS is aggressively re-establishing B61-12 LEP processes not used in 20 years.

The HEPF project has completed construction work and is going through post-construction/startup activities. The project is on schedule and under budget, and the facility is scheduled to be operational in September 2016. HEPF, as a cornerstone of the HE CoE, is instrumental in sustaining HE component manufacturing essential for stockpile stewardship mission requirements.

PIDAS CD-0 packages were revised and resubmitted to the NNSA Production Office (NPO) for both the Zone 4 PIDAS and Zone 12 PIDAS. The Program Requirements Documents and Mission Need Statements for both of these projects are with NA-APM for review and concurrence.

Pantex updated the MSF CD-0 packages and resubmitted to NPO to meet their request for updated documents for expedited review. MSF is needed to meet the weapon/component staging requirements projected to meet mission needs at Pantex over the next 50 years.

The HE S&E completed all CD-1 activities and received approval in 2014, with special accolade from NA-APM as “the most well developed CD-1 package they had ever reviewed.”

In FY2014, Pantex finished construction of the Pantex Renewable Energy Project (PREP), the first wind farm in the NNSA enterprise. PREP consists of five 2.3-mW turbines located on 1,500 acres of government-owned property east of Pantex. With PREP, Pantex is credited with greenhouse gas reduction, renewable energy production (electricity), and energy intensity reduction, while providing as much as 60% of the site’s annual electricity need. The credit for energy intensity reduction will keep Pantex on track to meet or exceed the FY2015 goal to reduce energy intensity 30% by the end of the fiscal year. Pantex is also on track to reduce potable water intensity by 26%, and to meet the DOE goal, as compared to the 2007 Pantex baseline water intensity.

General workplace improvement investments are an integral part of the CNS Key Initiative in “Enhancing Performance Culture and Operational Excellence.” These investments use existing resources to support ongoing actions that improve the workplace environment and support a strong and healthy safety culture. In FY2014, Pantex committed approximately $6.3M related to general workplace improvement activities, including outdoor lighting and plumbing improvements, guard station refurbishments, and window replacements.

General plant, expense, and capital equipment projects came primarily from RTBF but relied heavily on supplemental funding provided by the Facilities and Infrastructure Recapitalization Program and

Congressional plus-up funding. Expense and general plant project completions in FY2014 are included in Table P2.

Table P2. FY2014 Expense and General Plant Project Completions

11-007 HPFL Lead-in Replacement	Zone 12 Steam Line Replacement
12-099 Bays 5, 7, & 9 HPFL Lead-in Replacement	12-068 HVAC Coil Replacement
Gas Lab Equipment (Gas Chromatographs) Replacement	12-061 Warehouse Ceiling Fan
Exterior Fiber Network for Bay/Cell Upgrade	11-059 Hanel Lift Fire Protection
Breath Alcohol/Drug Testing Facility Upgrade	Electrostatic Discharge Floor Repairs
HPFL Pump and Tank Startup	LINAC Manipulator Replacement
12-044 Cells Roof Vents	B61-12 PBX-9502 Formulation Development/Qualification

Four operating bays in an existing nuclear facility have been converted to pit staging vaults to meet expanding capacity demands. The current conversions are projected to satisfy pit staging requirements until 2017. Additional bays will be converted during the next several years to keep up with expected accumulations beyond 2017.

CNS successfully executed the Science, Technology, and Engineering mission through Plant Directed Research, Development, and Demonstration (PDRD) projects aligned directly with the technology focus areas of the technology roadmaps. Projects and collaborations are funded by both PDRD and DOE/NNSA programs. CNS scientists and engineers guide research in cutting-edge, high-profile scientific and engineering areas through projects involving computed tomography, HE synthesis and testing, nanostructured materials, molecular recognition systems, advanced computational chemistry and physics, and novel approaches to radiation detection and analysis.

CNS launched the Container Process Improvement Project as a cross-site and cross-organizational pilot for the larger Enterprise Process Improvement Plan to integrate Pantex and Y-12 container planning and information and reduce cost. A value stream mapping event was completed, and a report was issued that included an estimate of approximately $1.5M in potential annual cost savings.

A second laser gas sampling system has been implemented and qualified to address increasing annual pit surveillance requirements. The system employs next generation hardware and software implementations to increase accuracy and efficiency. According to the vendor, the new laser will require replacement every 10 years as opposed to twice a year for the currently deployed system. This longevity will significantly reduce down-time and recurring recalibration efforts.

Pantex executed an effective reimbursable Work for Others (WFO) Program that fully supports NSE HE initiatives and increased FY2014 total WFO Program new income by 90% over FY2013.

These Pantex accomplishments were the result of the support received from NPO and the shared philosophy of "*One Plant, One Mission, One Team—Different Roles, Same Goals*" and our partners at the national laboratories and other production sites working together under the theme "*Mission First; People Always.*"

2.1.3 Changes, Issues, and Concerns

In support of NNSA, Pantex has identified facility and infrastructure gaps that require resolution to ensure implementation of NNSA's Strategic Plan. These gaps will continue to be refined, communicated, and collectively resolved to support continued progress and ultimately the modernization of Pantex.

2.1.3.1 Integrated Funding to Sustain Peak Operations

Integrated funding of Directed Stockpile Work (DSW), RTBF, and Safeguards and Security (S&S) is needed to accomplish the overall mission-related work scope.

Funding profiles for Pantex show the DSW, RTBF, and Security budgets are adequate to sustain current mission capability in FY2015. The current funding does not arrest the growth of DM.

2.1.3.2 Interim Pit Staging

The conversion of existing nuclear facilities into interim pit staging vaults will begin to displace critical container maintenance and packaging operations, putting stockpile component transportation at risk beginning in FY2018. When Pantex prepared and submitted the Pit Staging Solution in 2009, a Container Stewardship Facility was identified as necessary to sustain these critical operations; however, funding to address this need has not been available.

2.2 ASSUMPTIONS

This TYSP is based on various assumptions concerning projected budget targets, projected workload, regulatory environment, available facilities, technology, productivity, the work environment, and NNSA's transformation (Fig. P4). In some cases, operating-basis assumptions are interdependent, and one may affect another.

Fig. P4. Pantex Plant.

Noteworthy assumptions:

- Prioritization will be driven by mission need and ability to continue safe and secure operations in support of the P&PD and PCD.
- Budget data for operations of facilities are based on the FY2016 President's Budget Request.
- HEPF and other facilities are key infrastructure components of current and future LEPs. These facilities have been submitted for NNSA support through the CWG process and captured in the Nominal Schedule of Current and Proposed Line-Item Construction Projects.
- Infrastructure and Safety funding of $11.4M was provided in FY2015 to support the 7-year Bay/Cell Reinvestment Strategy. Continued investments (~$40M per year) through 2021 are required to complete Flame Detection, RAMS, and HPFL Lead-in replacements.
- Land use is expected to remain constant.
- The ability to meet energy sustainability goals set forth by Executive Order resides in the electricity production from PREP and execution of projects identified in the Pantex Site Sustainability Plan.

- Reinvestment to address aged and limited-life equipment and systems will be required. Modernization with new construction will provide for operational efficiencies and disposition of legacy facilities.
- Detailed planning data are provided by the Facility Information Management System (FIMS).

Planning for the enterprise of the future and the modernization that will occur over the next several decades will require constant revision to match changing missions, priorities, funding, and implementation impacts at the NSE sites.

2.3 CHANGES FROM PRIOR-YEAR TYSP

Major changes from the FY2013 TYSP include:

- The new M&O contract was awarded to CNS, and the Pantex and Y-12 TYSPs are being combined into one document.
- The list of mission capabilities was replaced with the mission capabilities used during the recent determinations of the Mission Dependency Index.

2.4 FUTURE VISION AND CORE CAPABILITIES

NNSA has a number of core capabilities required to perform its primary missions. Table P3 crosswalks the capabilities and missions applicable to Pantex.

Table P3. NNSA Capabilities and Missions Applicable to Pantex

Capability	Applicable NNSA Missions					
	M1. Managing the Stockpile	**M2. Preventing Proliferation**	**M3. Powering the Nuclear Navy**	**M4. Emergency Response**	**M5. Continuing Management Reform**	**M6. Recapitalizing Our Infrastructure**
1.1 Design and Certification						
1.2 Experiments						
1.3 Simulation						
1.4 Testing						
1.5 Surveillance	**X**					
2. Plutonium						
3. Uranium						
4. Tritium						
5. High Explosives	**X**					**X**
6. Non-nuclear						
7. Weapons Assembly/ Disassembly	**X**					**X**
8. Transportation						
9. Special Nuclear Material Accountability, Storage, Protection, and Handling	**X**					**X**
10. Enabling Infrastructure	**X**					**X**
11. Counterterrorism and Counter-Proliferation						
12. Support of Other Missions/Program Capability		**X**				**X**
13. Federal Management and Oversight						
14. Nonproliferation						
15. Security	**X**					
16. Emergency Response						
17. Work for Others						
NA Reserve Real Property Assets						

2.4.1 High Explosive Production (C1.5, 5, 15)

Pantex HE synthesis operations are performed in an existing moderate-scale production facility. Pantex is currently the only national supplier of War Reserve (WR)–quality hexanitrostilbene, booster- and detonator-grade high melting explosive and pentaerythritol tetranitrate as well as booster-grade ultra-fine triamino trinitrobenzene (TATB), Research Department Explosive, plastic bonded explosive (PBX)-9012, and Livermore Explosive (LX)-07.

Pantex formulates up to 200-pound batches and must blend the batches to reduce inconsistencies and variations. Quality testing is performed on each of the smaller batches. Pantex is the only producer of WR–qualified HE Extrudable Explosive (XTX) 8003 and 8004, LX-16, LX-07, PBX-9012 and Mock 900-24 for test flights. Pantex provides industry with support capability for PBX-9501 and PBX-9502.

Pressing operations are being maintained in the current World War II facility until HEPF, currently undergoing commissioning and startup activities, is available in FY2016.

Pantex produces precision-machined parts for use in nuclear weapons assembly. Unique machining operations include producing HE test samples to support core and enhanced surveillance, fabricating components used in JTAs, performing required safety inspections on as-pressed HE parts, producing specially fabricated HE parts for NNSA labs and other off-schedule customers, and sanitizing HE main charges resulting from weapon disassembly.

Main charge explosive materials recovered from dismantled weapons are made available to the U.S. Department of Defense (DoD) for use in conventional munitions (after sanitization), transformed into commercially viable products, or destroyed by suitable means on-site.

Key projects supporting HE CoE production efforts include:

- HEPF,
- HE S&E,
- HE P&S,
- HE Development Machining Center,
- HE Formulation,
- Inert Machining,
- Zone 11 HPFL Replacement, and the
- HE Component Assembly Facility.

The HE R&D efforts are supported by the HE CoE. The HE S&E project received CD-1 approval and should result in design efforts being started in FY2015.

Future Vision

The ROD for the Complex Transformation SPEIS selected Pantex as the CoE for HE production. The Pantex HE production mission is required to support nuclear weapons stockpile stewardship while continuously improving levels of safety and productivity. Major activities include:

- manufacturing special stockpile chemical explosives,
- fabricating explosive components,
- performing comprehensive destructive/nondestructive testing of explosive products/components, and
- providing explosives asset stewardship.

When the HE CoE is fully implemented, Pantex will have the sustainable infrastructure in place to support the HE need for the foreseeable future. Production will be performed in modern, sustainable buildings with efficient, effective processes to minimize costs and maximize operability. Pressing will

be done with nearer-net-shape precision, and machining will be minimal, thus reducing fabrication and disposal costs. Figure P5 shows the Pantex planning horizon, based on requirements for HE surveillance and production. The production requirements will average slightly higher than the FY2014 level through FY2022, and surveillance requirements are expected to remain steady until FY2019 and increase through FY2022.

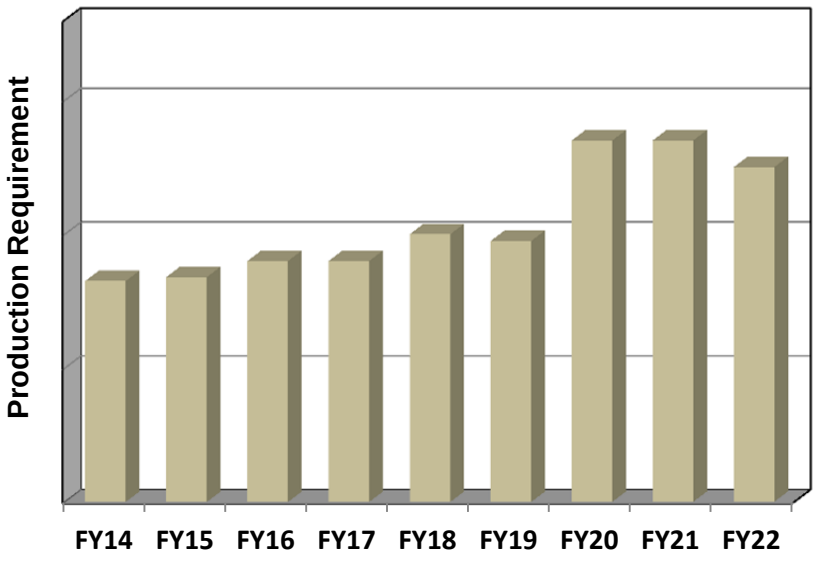


Fig. P5. Pantex planning horizon.

The physics laboratories will have validated aging models developed through the accumulation of surveillance and testing data that will allow historical materials to be minimized to reduce the footprint currently required for long-term storage. Pantex will continuously manage its explosive inventory to ensure sufficient storage space to meet future stockpile stewardship requirements.

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Stockpile LEP support
  - Commence and sustain two-shift operations for main charge fabrication (pressing and machining) to satisfy W76-1 and B61-12 LEP schedule demands.
  - Develop and implement appropriate Insensitive HE main charge fabrication processes.
  - Modernize extrudable HE loading and testing capability.
- Implement a tracking and inventory system to enhance productivity and to prevent potential HE overload and incompatibility issues in operations.
- Implement 900 17/LM Mock HE capability for production setups and JTA applications.
- Develop and implement virtual training methods.
- Implement design-to-manufacture explosives fabrication and acceptance processes.
- Deploy Nondestructive Density determination production system for main charge hemispheres pending completion of prove-in and design agency (DA) approval.

- Actively pursue replacement of experienced personnel (who retired) with talented scientists and engineers willing to commit to the NSE. Invest in employees' future through education and training, including a formal mentoring process.
- Modernize HE pressing and machining capabilities to maintain WR production levels and support national laboratory off-schedule requests related to stockpile stewardship, LEP, and national hydrodynamic testing programs.
- Capitalize on existing Pantex core HE competencies to expand and improve the HE production and testing work for NNSA, other government agencies, and non-governmental organizations.
- Establish project management discipline for explosives operations to ensure production, project, and development deliverables are provided on time, safely, securely, and with a high degree of quality.
- Complete the next phase of the HE CoE transformation (Fig. P6) with the construction and startup of the HE S&E facility, HE P&S facility, and HE Development Machining Center.
- Evaluate options for environmentally contained explosives testing and disposition.

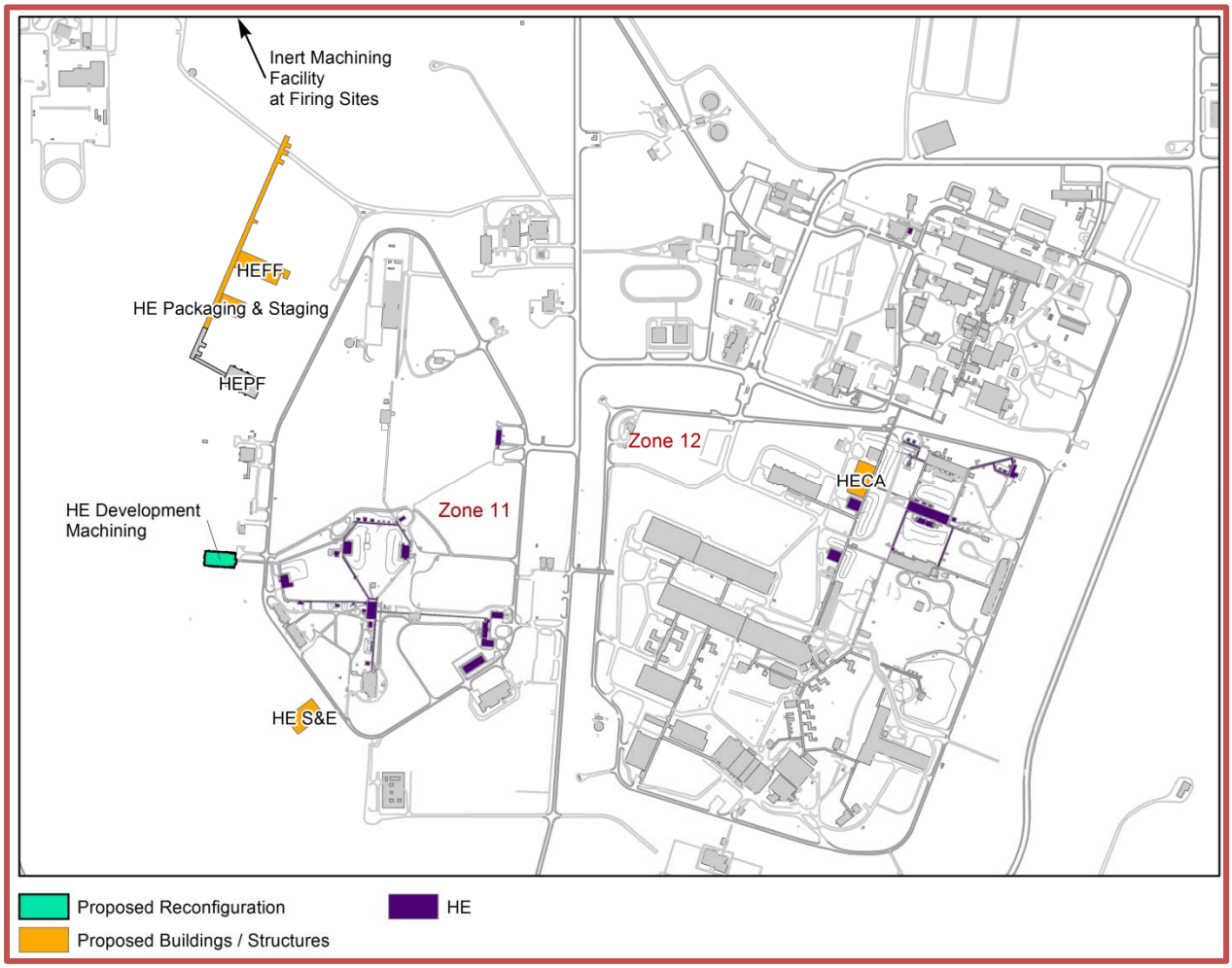


Fig. P6. Future High Explosive Center of Excellence.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Sustain and recapitalize the infrastructure to support development and production demands related to the Inter-operable Warhead Initiative. This also may require support of individual production requirements for a W78 and/or a W88 LEP.
- Align resources and infrastructure required to support future Alts and/or Mods to the existing stockpile.
- Implement environmentally contained testing and disposition of explosives—if necessary and feasible.
- Complete the HE CoE transformation with the construction and startup of the HE Formulation, Inert Machining (Fig. P7), and HE Component Assembly facilities.

Fig. P7. Inert component HEM saw.

2.4.2 High Explosive Research and Development (C1.5, 5, 15)

Explosive production and associated development is concentrated within the elements of the programmatic explosives mission categories of synthesis, formulation, pressing, precision explosives machining and assembly, component fabrication and assembly, mechanical testing, chemical materials characterization, and performance testing. Much of this work supports production qualification, stockpile-related surveillance, or process improvement initiatives.

Future Vision

Pantex, as the HE CoE for explosives production for the NSE, ensures that essential mission capabilities are sustained, including the ability to support HE R&D initiatives by the national laboratories and other federal and commercial customers. In the future, development information will be communicated in near-real time via appropriately secure data transmission systems. Results of simulations and actual test data are shared, validated, and used to facilitate weapon improvements to maintain a high confidence in the nuclear stockpile. Planned consolidation of HE functions will reduce the plant footprint. The newer facilities will reduce maintenance and operating costs and will substantially improve operating efficiencies. In most cases, the capabilities most in demand—related to R&D—are synthesis, formulation, and testing (both destructive and nondestructive).

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Capitalize on existing Pantex HE core competencies to expand and improve the HE-related work for NNSA, other government agencies, and non-governmental organizations.
- Integrate HE R&D work in conjunction with the DAs with hydro-testing, detonation systems, and surveillance of the legacy stockpile by updating test diagnostics to characterize chemical, physical, and performance parameters.
- Maintain the capability to functionally test programmatic HE systems for acceptance and surveillance activities.
- Actively pursue replacement of experienced personnel (who retired) with talented scientists and engineers willing to commit to the NSE. Invest in employees' future through education and training, including a formalized mentoring process.
- Build on work for other government agencies and commercial opportunities to maintain the intellectual vitality of personnel and to exercise HE processes and stockpile stewardship by being the low-cost, high-quality provider of materials and services.
- Continue the HE CoE transformation with the construction and startup of the HE S&E facility, HE P&S facility, and HE Development Machining Center.
- Replace individual machine tools with Lean manufacturing machines that combine processes now performed by two or three separate cutting and machine tools.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Develop and sustain HE expertise necessary to support the essential HE mission through annually directed stockpile work. This expertise spans the range of synthesis, formulation, fabrication and production, surveillance, analysis, shock physics, materials characterization (Fig. P8), experimentation, modeling, and simulation.

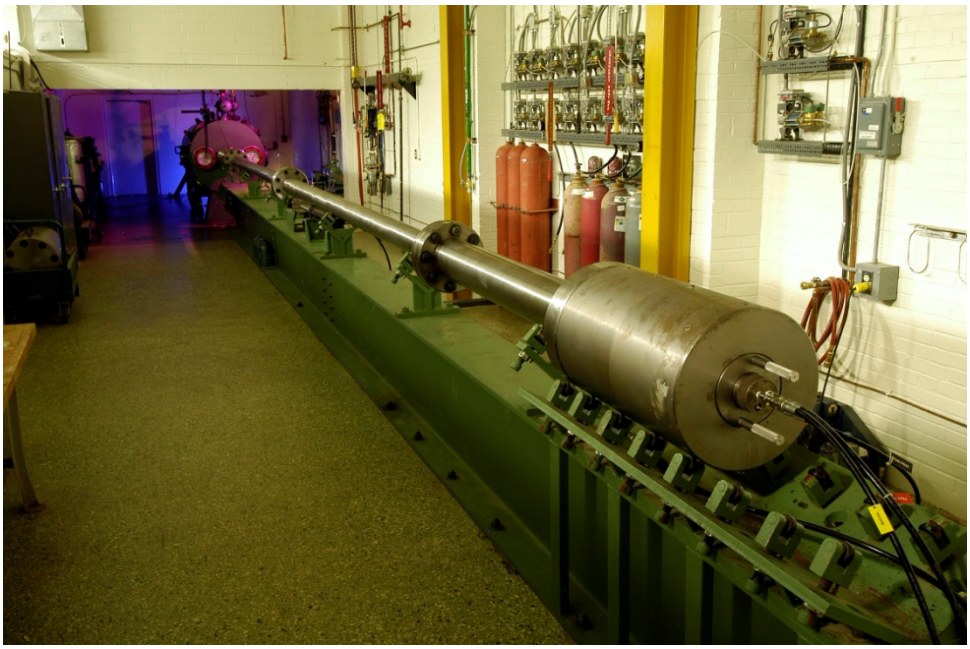


Fig. P8. Light gas gun.

- Be the provider of choice to appropriate customers for HE material and related intellectual services—through effective leveraging of available resources as realized by overall reduction in product cycle time and reduced direct costs to the customer.
- Provide sufficient HE capacities and capabilities to efficiently support current and proposed NSE demands.
- Position Pantex to be the NSE preferred site for HE analysis and programmatic HE performance testing.
- Increase WFO contributions to the site budget by maintaining a reputation as HE experts and customer service–oriented partners and, in doing so, defray the cost of sustaining associated critical competencies.
- Establish a responsive infrastructure and work processes that enable quick reactions to DOE/NNSA mission changes or new developments in the HE manufacturing business environment.
- Increase collaboration with universities, DAs, NNSA plants, and the Atomic Weapons Establishment to facilitate technical exchange and research opportunities.
- Manage and operate the HE CoE in a manner consistent with NNSA and other national needs. Modern infrastructure maximizes productivity while minimizing operating costs. Projected HE production demands are continually assessed and addressed while maintaining essential capabilities in a continuous state of readiness to meet existing needs responsively. Mature productivity modeling ensures available capacities always satisfy manufacturing requirements.
- Complete the HE CoE transformation with the construction and startup of the HE Formulation, Inert Machining, and HE Component Assembly facilities.

2.4.3 Weapons Assembly/Disassembly (C1.5, 7, 15)

Under the Complex Transformation SPEIS ROD, Pantex remains the Weapons Assembly/Disassembly CoE (Fig. P9) with the following capabilities:

- Performing stockpile surveillance, retrofitting and repairing weapons in support of LEPs, and certifying weapon systems' safety and reliability.
- Requalifying/refurbishing pits for use in LEPs.
- Dismantling weapons surplus to enduring stockpile needs.
- Sanitizing and disposing of components from dismantled weapons.

Fig. P9. B83 workstation.

Future Vision

Recognizing that the nuclear weapons stockpile is surpassing its original design life, NNSA is undertaking new surveillance initiatives that increase the projected Pantex workload (Fig. P10). This includes augmented sampling, increased testing, and deployment of new diagnostics to meet enhanced testing requirements. More diagnostic tests are being conducted on components than ever before. As the Enhanced Surveillance Initiative establishes new capabilities and a more predictive approach to stockpile evaluation is applied, many of these new testing techniques are incorporated into the Core Surveillance Program.

Fig. P10. B61.

In addition, potential options to perform nondestructive surveillance on CSAs at Pantex can be considered by NNSA and the NSE. In cases where CSA disassembly is not required, this approach will yield timely, less expensive, more logistically efficient data acquisition for stockpile certification purposes.

Tactical Horizon (FYNSP of President's Budget + 5 years)

Planning for the B61 LEP (FPU scheduled at Pantex in FY2019) is under way. In preparation for this LEP, the site will be required to refurbish/requalify pits used during the primary assembly. Although the effort will be similar to that performed for the W76 LEP, some degree of process development and formalized process implementation will be required. Applying nonintrusive processes similar to those used for W76-1 pit requalification offers efficient component recovery and essentially eliminates inter-site transport of large quantities of CSAs during the term of the LEP.

As planning proceeds, the site stands ready to provide necessary cost and schedule estimates related to such activities upon request. The following mission-related challenges will be addressed over the next decade.

- Plan and secure resources and infrastructure required to support the FPU of the B61 LEP and sustain production schedule commitments.
- Plan and apply pit pre-screening and refurbishment capabilities as necessary to support B61 LEP requirements.
- Sustain multi-shift operations on plant radiography systems to maintain existing surveillance schedule and NDE activities.
- Dispose of backlogged legacy components resulting from previous dismantlement operations.
- Support NNSA commitments to Congress for dismantling retired warheads.
- Apply automated tracking and inventory systems, as appropriate.
- Plan, secure, and apply resources and capabilities required to support the FPU of the Inter-operable Warhead Initiative and prepare to sustain production schedule commitments.
- Plan and apply pit pre-screening and refurbishment capabilities, as necessary, to support LEP requirements.
- Upgrade vacuum chambers to provide additional capacity and backup capabilities.
- Upgrade Production bays/cells to support nuclear explosive operations.
- Complete the transformation and modernization with the line-item construction and startup of the NDE Facility, Production Support Fire Protection Lead-ins, and MSF projects.
- Upgrade current facilities to support lower electrostatic discharge environments.
- Implement the CBI Program, and execute the required infrastructure reinvestment to address limited-life equipment and systems.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Plan and align resources and infrastructure required to support the Inter-operable Warhead Initiative.
- Plan and apply pit pre-screening and refurbishment capabilities, as necessary, to support additional LEP requirements.
- Maintain, sustain, and recapitalize the infrastructure to support production commitments related to additional LEPs.
- Complete the production modernization with the construction and startup of the Weapon Surveillance Facility line-item project.
- Continue CBI Program execution by recapitalizing and sustaining the infrastructure.

2.4.4 Campaigns (C1.5, 7, 15)

The Campaigns and the PDRD program will develop and implement new capabilities for weapon-related production and surveillance.

Future Vision

Enhanced Surveillance continues to provide new or improved diagnostic techniques for detection and quantification of age-related degradation and other potential defects in the stockpile. Enhanced Surveillance works with DSW core surveillance to develop and deploy new diagnostic tests that enable evaluations to be more sensitive to these concerns.

Implementation of many of the new diagnostic tools does not require new facilities; however, diagnostic tools such as neutron or high-energy radiography will require new facilities. A new Weapon Surveillance Facility will provide the needed infrastructure for these new diagnostic tools as well as agile surveillance facilities that can respond to a variety of unanticipated conditions.

The High Explosives and Weapon Operations (HEWO) Readiness Campaign is currently using carryover funds for FY2014 and is not funded in the future. However, discussions are under way to identify FY2016–FY2021 funds to meet future process capability demands in support of current program LEP planning. HEWO is vital to Pantex to deliver these capabilities, as well as process improvements, and to sustain essential mission competencies that otherwise would become obsolete. As a result of past HEWO sponsorship, capabilities that meet evolving stockpile demands—while substantially reducing production costs and delivery times within the enterprise—have been planned and delivered in an integrated and cost-effective fashion.

PDRD remains an invaluable part of the plant's process improvement effort by continuously evaluating new manufacturing-related approaches. The PDRD program provides feedstock for the technology maturation process. With declining campaign budgets, PDRD is essential to maintain a minimal investment in technologies that may ultimately mature into fundamental production processes. Investments in technology will enable Pantex to establish enhanced production capabilities that are key to performing more work within constrained budgets.

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Implement improved HE performance diagnostics.
- Implement improved NDE diagnostics to obtain the relevant data on more samples without costly destructive tests pending completion of prove-in and DA approval.
- Implement new and expanded capabilities for thermal performance, sensitivity, and mechanical properties testing of explosive materials and components.
- Establish sustainable provisions for TATB and TATB–based insensitive explosives supplies.
- Implement enhancements to explosive component fabrication processes that ensure the enduring capability to support B61, W78, and W88 primary design requirements (i.e., near-net-shape pressing, E-fabrication, extrusion processes, etc.).
- Develop additional pit pre-screening and refurbishment capabilities to support B61 LEP requirements.

- Develop and implement sustainable manufacturing processes for specialty explosive and mock formulations.
- Implement design-to-manufacture explosives fabrication and acceptance processes.
- Facilitate an enterprise-wide interactive production planning and scheduling system.
- Implement a comprehensive automated tracking and inventory system.
- Develop and implement comprehensive pit and explosives surveillance diagnostics.
- Develop and implement additional pit pre-screening and refurbishment capabilities to support the Inter-operable Warhead Initiative requirements based on NNSA decisions.
- Implement a new test apparatus for qualification of materials used to mitigate insults to explosives.
- Design and implement a new gas gun firing mechanism.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Implement paperless manufacturing, assembly, and acceptance processes.
- Implement contained testing and disposition of explosives.
- Apply remote-sensor technology for weapon/component surveillance based on NNSA decisions.
- Deliver virtual training methods site-wide to improve efficiencies and reduce costs.
- Develop and implement additional pit pre-screening and refurbishment capabilities to support the Inter-operable Warhead Initiative requirements based on NNSA decisions.
- Evaluate the potential to develop and implement pre-screening and reacceptance processes for CSAs to support the W88 LEP based on NNSA decisions.

2.4.5 Special Nuclear Material – Components (C1.5, 9, 15)

This SNM program provides for receipt, storage, inventory, and surveillance of nuclear weapon components from dismantled weapons and disposition of legacy components. Sub-elements conducted at Pantex include:

- storage and monitoring of SNM;
- pit inspection and surveillance;
- disposition of legacy items, including identification of legacy population, identification of currently available disposition processes, development of new disposition processes, and off-site shipment of items/material to ultimate disposition sites;
- execution of container surveillance programs (Type B and on-site storage containers);
- pit pre-screening for LEP reacceptance and routine surveillance capabilities;
- environmental control and physical security for the pits;
- safety and reliability of nuclear components, as specified in DA requirements documents; and
- packaging and transportation of components, as required, to Los Alamos National Laboratory (LANL) for D-testing and material recovery;

Future Vision

- Develop and implement process for Defense Programs Package (DPP)-1 container pit packaging for off-site shipment (Fig. P11).
- Execute container surveillance programs (Type B and on-site storage containers).
- Establish and implement Type B container processes for packaging and shipping Radioisotopic Thermoelectric Generators to accommodate surveillance and disposition activities.
- Establish a Type B container logistics center to provide NSE–wide stewardship capabilities for nuclear shipping containers.
- Improve the technology for dimensional inspection, laser gas sampling (Fig. P12), and micro-focus computed tomography for nondestructive pit surveillances (Fig. P13).
- Use Zone 12 MSF to improve operational efficiencies and reduce PIDAS maintenance and recapitalization costs currently planned.
- Develop and implement Colossis data reconstruction/interpretation.

Fig. P11. Storage containers.

Fig. P12. Laser gas sampling station.

Fig. P13. Micro-focus X-ray.

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Implement SNM environmental testing capability at Pantex.
- Provide environmental control and physical security for pits.
- Initiate design of the MSF in Zone 12 South for pit capacity established in the Complex Transformation SPEIS ROD.
- Develop procedures using a DPP-1 container as a breached pit contingency that contains the component locally and facilitates shipment to LANL.
- Efficiently administer NSE Type B container logistics system.
- Ensure pit storage samples meet safety and reliability requirements, as specified in DA requirements documents.
- Establish DPP-2 and DPP-3 packaging lines for inter-site transport of uranium components.
- Package and facilitate transport of components, as required, to LANL for D-testing and material recovery.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Provide environmental control and physical security for pits.
- Ensure pit storage samples meet safety and reliability requirements, as specified in DA requirements document.

2.4.6 Special Nuclear Material – Pits (C1.5, 9, 15)

2.4.6.1 Material Disposition

The Office of Fissile Material Disposition (MD) (NA-26) provides safe, secure, and environmentally sound storage of legacy fissile components; thermal monitoring; storage sampling surveillance; development of processes to use the new surplus pit shipping container (MD-2); special pit shipments; and the ultimate disposition of non-weapons grade unusable fissile materials declared surplus to national security needs.

2.4.6.2 Core Capability

Pantex performs pit repackaging activities for surplus pit off-site shipment to the DA to support storage sample surveillance requirements and Advanced Recovery and Integrated Extraction System demonstrations and continuing disposition, as directed via appropriate scheduling and authorizations.

Pantex monitors the thermal environments of pits in Zone 4 and Zone 12 interim storage. The project includes retrieval and reporting of thermal data, instrumentation of storage areas containing pits, and monitoring/characterization of storage facilities.

Pantex inspects surplus pit storage samples, selected by the DA, to ensure they continue to meet safety and reliability requirements, as specified in DA requirements.

Future Vision

Pantex will develop and implement a process for MD-2 container pit packaging and off-site shipment; implement enhanced pit thermal monitoring technology; and package and ship surplus pits to pre-stage items, supporting pit disposition and conversion.

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Develop and implement a process for MD-2 container pit packaging. Package and ship surplus pits to pre-stage areas, supporting the Pit Disposition and Conversion Project.
- Package surplus pits for off-site shipment to the DA to support storage sample surveillance requirements.
- Perform pit repackaging activities for surplus pit off-site shipment supporting Advanced Recovery and Integrated Extraction System demonstrations and disposition, as directed.
- Implement enhanced thermal monitoring of pits in interim storage. The project includes retrieval and reporting of thermal data, instrumentation of storage areas containing pits, and monitoring/characterization of storage facilities.
- Inspect surplus pit storage samples, selected by the DA, to ensure they continue to meet safety and reliability requirements, as specified in DA requirements.
- Support planning and design of a new MSF.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Continue pit storage, thermal monitoring, and surveillance activities as defined previously.
- Transition operations to the new MSF.
- Package and ship surplus pits, supporting pit disposition and conversion.

2.4.7 Infrastructure (C10)

Pantex infrastructure capabilities include weapons assembly/disassembly bays and cells, HE synthesis, pressing, machining, firing site facilities, and the Production Support infrastructure that directly sustains the capabilities and mission operations in the MC facilities.

Future Vision

A key aspect of the 2010 Nuclear Posture Review is "modernization of the infrastructure, including major capital projects, needed to ensure safe, secure, sustainable and cost-effective operations in support of scientific and manufacturing activities." Pantex, with the support of NNSA, intends to sustain and recapitalize the infrastructure to perform the Pantex mission while supporting the plant consolidation and energy and sustainability goals of NNSA.

Tactical Horizon (FYNSP of President's Budget + 5 years)

Modernization projects are required to ensure reliable facilities and infrastructure to sustain long-term benefits to NNSA. Near-term, HE CoE and NDE projects will require support. CBI projects will enable Pantex to sustain operations and minimize disruptions to production by upgrading individual areas.

PREP was awarded as an Energy Savings Performance Contract (ESPC). This project plays a key role in achieving the President's national objectives and the Secretary of Energy's priorities and goals for energy conservation. As a result, Pantex reported reductions in the amount of Scope 2 Greenhouse Gases. Energy generated and used by the plant reduces electrical costs and helps meet federal goals to reduce energy intensity. The five 2.3-mW turbines will reduce the plant's annual cost by approximately 55% and generate as much as 60% of Pantex's annual electricity requirements.

Initiatives from other NNSA programs include site-wide wireless, Homeland Security Presidential Directive-12 badge authentications added to unclassified networks, and cyber security operations centers. These initiatives are being evaluated for potential future funding requests.

Several other line-item projects—such as Bay and Cell Fire Suppression Lead-ins, Cells Upgrade, Zone 11 HPFL, Weapon Surveillance Facility, and other replacement/refurbishment projects—will require support to ensure a safe, secure, and fully functional infrastructure is available to support the plant mission.

Strategic Horizon (FYNSP of President's Budget + 20 years)

Long-term line-item projects are required to address previously identified projects to recapitalize enduring facilities and ensure reliable facilities and infrastructure to sustain long-term benefits to NNSA.

The Administrative Support Complex is proposed to consolidate administrative functions, improve operational efficiencies, reduce energy consumption, and eliminate obsolete deteriorated square footage at the site. When the complex is complete and the identified vacating facilities are demolished, the new facility is expected to reduce the plant footprint and maintenance and utility costs.

2.4.8 Alternative – Mission Transition to New Work (12)

Pantex products and services provided to other DOE and NNSA organizations, other government agencies, and the private sector are managed through the Global Security and Strategic Partnerships organization. This organization is made up of multiple directorates that manage work for Defense Nuclear Nonproliferation (NA-20), Nuclear Incident Response (NA-40), Field Intelligence Element, Strategic Partnership Projects (SPP), and DOE-Reimbursable.

2.4.8.1 Strategic Partnership Projects and DOE-Reimbursable Projects

SPPs provide unique DOE/NNSA contractor goods or services to other government agencies and the private sector. DOE-Reimbursable projects provide Pantex's products and services to other facilities within DOE. These projects are fully funded by the requesting organization. Work is performed on a non-interference basis with plant mission work. Projects in support of the U.S. Department of Homeland Security (DHS) also are performed on an equal basis with plant mission work. Pantex's external mission work scope includes but is not limited to: NN, special projects, HE products and services, Nuclear Incident Response, consultation, and other specialized training. As NNSA funding continues to decline, Pantex will leverage Global Security and Strategic Partnerships programs as an avenue to increase funds-in, maintain headcount for mission support, and cultivate critical skills. Specific strategic growth initiatives will be developed to leverage site strengths in the areas of energetic material qualification and acceptance, incident response support and training, engineering, and technical support.

2.4.8.2 Nuclear Nonproliferation

Pantex has several NA-20 projects involved in arms control and the nonproliferation of nuclear warheads, materials, and technologies in the former Soviet Union, including the impact of future arms control treaties on Pantex and the prevention of the proliferation of nuclear warhead technologies. The current presidential administration is in advanced planning to determine the capability and technology to support the Bilateral Implementation Commission of the Strategic Offensive Reduction Treaty (Treaty of Moscow) for a verification regime. If a warhead-elimination regime were to be negotiated and ratified, there exists the possibility that, sometime in the future, a Russian delegation could visit Pantex as part of a verification regime.

2.4.8.3 Field Intelligence Element

The Pantex Field Intelligence Element interfaces and supports other government agencies, as requested.

2.4.8.4 Counterintelligence

The Pantex counterintelligence program mission is to prevent foreign intelligence and international terrorist organizations from successfully targeting Pantex or other DOE/NNSA assets. Strong

relationships are maintained with NPO, the Federal Bureau of Investigation (FBI), the U.S. intelligence community partners, and local law enforcement to identify and mitigate foreign threats to Pantex.

2.4.8.5 High Explosive Products and Services

The Pantex Explosives Technology Division provides HE support to NNSA's national laboratories, as directed on a cost-reimbursable basis, and provides products and services to DoD and private industry. As an added benefit, the activities will help maintain capabilities and threshold capacities for synthesis, formulation, pressing, machining, and analytical/performance testing of NNSA explosives, as necessary to meet stockpile acceptance, surveillance, rebuild, JTA, and LEP requirements. These activities also support related elements, such as component development, component replacement, component aging studies, and sanitization. By maintaining these critical capabilities at the site, Pantex has much potential for future growth through support of the HE needs of both the DoD and other government agencies.

2.4.8.6 Nuclear Incident Response Program

Pantex provides qualified technical and professional personnel and equipment for the Accident Response Group, Accident Response Group disposition, Joint Technical Operations Team, and Radiological Assistance Program. These personnel and equipment enhance DOE's capability to respond to accidents and significant incidents involving nuclear weapons or components. Pantex has critical skills and assets not available elsewhere in the community, which provides the site with the unique opportunity to expand training offerings to the counterterrorism community and, in turn, enhance national security.

2.4.8.7 Secure Transportation Asset Program

Pantex provides services to the Office of Secure Transportation, which include performance of inspections, maintenance, and modifications of trucks/tractors, escort vehicles, Safe Secure Trailers, Safeguard Transporters, and associated electronics and communications equipment.

2.4.8.8 Environmental Management

The DOE Office of Environmental Management (EM) and NNSA have initiated the closeout of the Pantex Plant Environmental Restoration program and have transitioned to Long-Term Stewardship. In FY2011, NNSA became responsible for Pantex Long-Term Stewardship management. In early 2008, Pantex entered into an interagency agreement with the U.S. Environmental Protection Agency, Region 6; DOE; and the Texas Commission on Environmental Quality. The interagency agreement is pursuant to Section 120(c) of the Comprehensive Environmental Response Compensation and Liability Act; describes the process by which DOE/NNSA will complete cleanup activities to address impacts from legacy operations at Pantex; and defines the roles and responsibilities of each party. NNSA will be responsible for continuing to meet the regulatory requirements documented in the ROD and amended compliance plan.

Tactical Horizon (FYNSP of President's Budget + 5 years)

- Continue to develop and/or upgrade reimbursable systems and processes to ensure increased efficiencies and lower costs associated with the Pantex reimbursable work program. Examples include:
  - Make the WFO program as seamless as possible such that the private sector wants to and can do business with Pantex without undue paperwork and bureaucracy.
  - Maintain a site-wide integrated project baseline management system to ensure project managers can properly monitor project costs against schedule, while enabling Pantex sponsors to access the same unclassified data.
  - Maintain an intellectual property function in which ideas from plant-specific activities can be patented and actively marketed for licensing potential with the commercial sector.
  - Maintain the capability to support HE projects for other governmental agencies with respect to the fabrication and testing of HE assemblies and evaluation of HE issues.
  - Provide DOE/Headquarters with training and training aids for other government agencies with respect to Weapons Incident Response.

Strategic Horizon (FYNSP of President's Budget + 20 years)

- Develop an external E-Business capability, enabling potential Pantex reimbursable sponsors to:
  - identify the plant capabilities and services desired,
  - communicate with the responsible management,
  - enter into appropriate contractual instruments electronically, and
  - enable the sponsor to update project status and receive unclassified summary reports.

2.5 REAL PROPERTY ASSET MANAGEMENT

Pantex has developed a long-range plan that balances new construction, energy conservation, and facilities disposition and is aligned with workload projections to ensure support of the mission. Based on the planning assumptions, square footage at Pantex is expected to increase, as shown in Fig. P14.

Over the past several years, Pantex has been chronically underfunded to sustain facility and infrastructure requirements to support NNSA objectives. Because of these funding constraints, available resources were focused to ensure MC facility availability—at the expense of the balance of plant. This is evidenced by the increased rate of degradation of facilities and equipment over the past several years.

The FY2016 President's Request and FYNSP funding profiles (February 2016) for Pantex show the Infrastructure and Safety budget (Table P4) to be adequate to support base operations in FY2016. In FY2017–FY2021, the Infrastructure and Safety budget does not meet base requirements. The current FY2016 funding level supports the DSW mission deliverables. It also provides funding to support base program nonlabor costs for utility services, regulatory compliance contracts, direct material, minimum unplanned expenditures and/or emerging issues, and onboard headcount. It does not fully maintain operations or arrest the growth of DM. The immediate challenge is to increase the site funding for critical infrastructure improvements and to stabilize the growth of DM.

The funding target for FY2017–FY2021 is $60M per year below the operational capability level. The DSW mission deliverables may be at risk due to resultant projections of onboard headcount and base operations.

Table P4. FY2015–FY2021 Infrastructure and Safety Budget

$ in Millions

	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Operations of Facilities	58.4	58.0	57.3	57.1	57.1	58.7	57.1
Maintenance	46.1	46.1	47.2	53.9	59.9	62.2	66.9
Recapitalization	31.0	63.3	15.0	2.0	2.0	2.0	2.0
Target Funding	135.5	167.4	119.5	113.0	119.0	123.0	126.0
Over-target Requirement		60.0	60.0	60.0	60.0	60.0	60.0

2.5.1 Site Footprint (Current and Future)

Pantex has identified facility and infrastructure line-item projects to support the site mission. NNSA evaluates and selects line-item construction projects to satisfy the program requirements and funding targets identified in the FYNSP. Planned major construction includes six new HE-related facilities, a staging facility, an evaluation facility, a maintenance facility, a new administrative consolidation complex, and a backup computer facility.

Historically, funding for general plant, expense, and capital equipment projects came primarily from RTBF. The RTBF budget did not allow adequate recapitalization of the Pantex infrastructure. Recapitalization projects relied heavily on supplemental funding provided by the Facilities and Infrastructure Recapitalization Program and Congressional plus-up funding. Current funding levels remain inadequate to recapitalize the Pantex infrastructure and arrest the growth of DM. There is a backlog of unfunded minor construction, expense, and capital equipment projects. Some of the key projects in the backlog are uninterruptible power supplies, blast door interlocks, lightning protection, security capital improvements, storm water drainage improvements, disposition of excess facilities, and general workplace improvements.

The M&O contract awarded in 2014 included provisions for a financial structure that broadened the potential sources of funds for recapitalization and sustainability projects. Indirect funding pools generated from overheads charged to directly funded programs will create funding for such projects. Indirect funding for expense and institutional general plant projects also will be the vehicle for reinvesting cost savings generated by the M&O contractor.

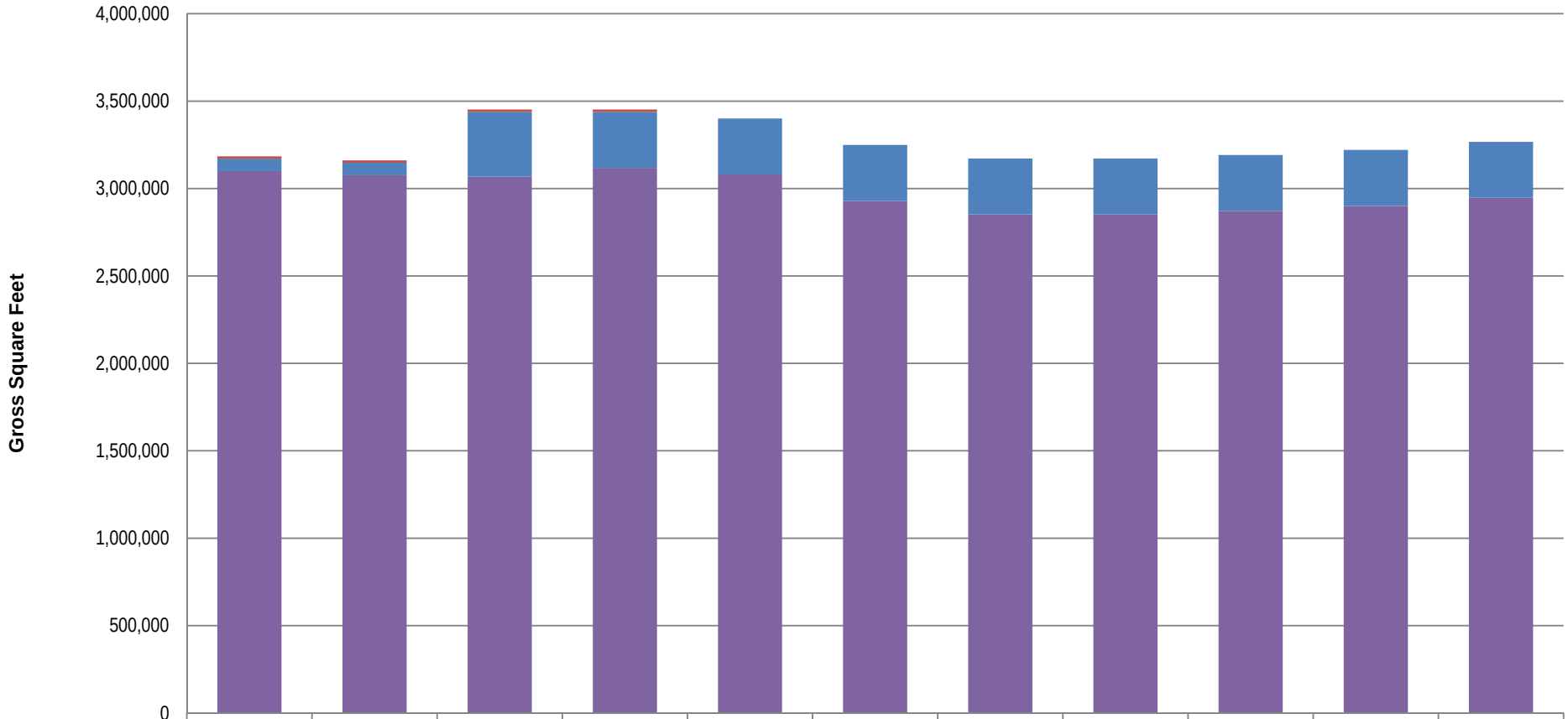
2.5.2 Deferred Maintenance Reduction

The DM backlog at the end of FY2014 was $388M, which is $9M more than at the end of FY2013. DM buy down in FY2014 was $10M, while new growth from Condition Assessment Survey inspections was $9M. A significant portion of the increase, $10M, resulted from inflation of the backlog to current year dollars. DM reduction since FY2003 is approximately $289M. The projected DM reduction for FY2015 is approximately $2M, and projected growth is $7M, assuming an inflation rate of 1.9%.

Pantex DM estimates for deficiencies identified during Condition Assessment Survey inspections are derived from the Condition Assessment Information System database. Future DM backlog projections are based on a mathematical model that includes factors for plant deterioration, inflation, and plant growth. The model also is used to estimate required maintenance based on funded and approved projects.

Because of RTBF funding limitations, there is currently no funding available to arrest the growth of DM, which impacts the ability to maintain an adequate condition for all facilities and infrastructure. The result is evident in Fig. P15, which reflects the imbalance in the FCI for MC and MDNC facilities and infrastructure.

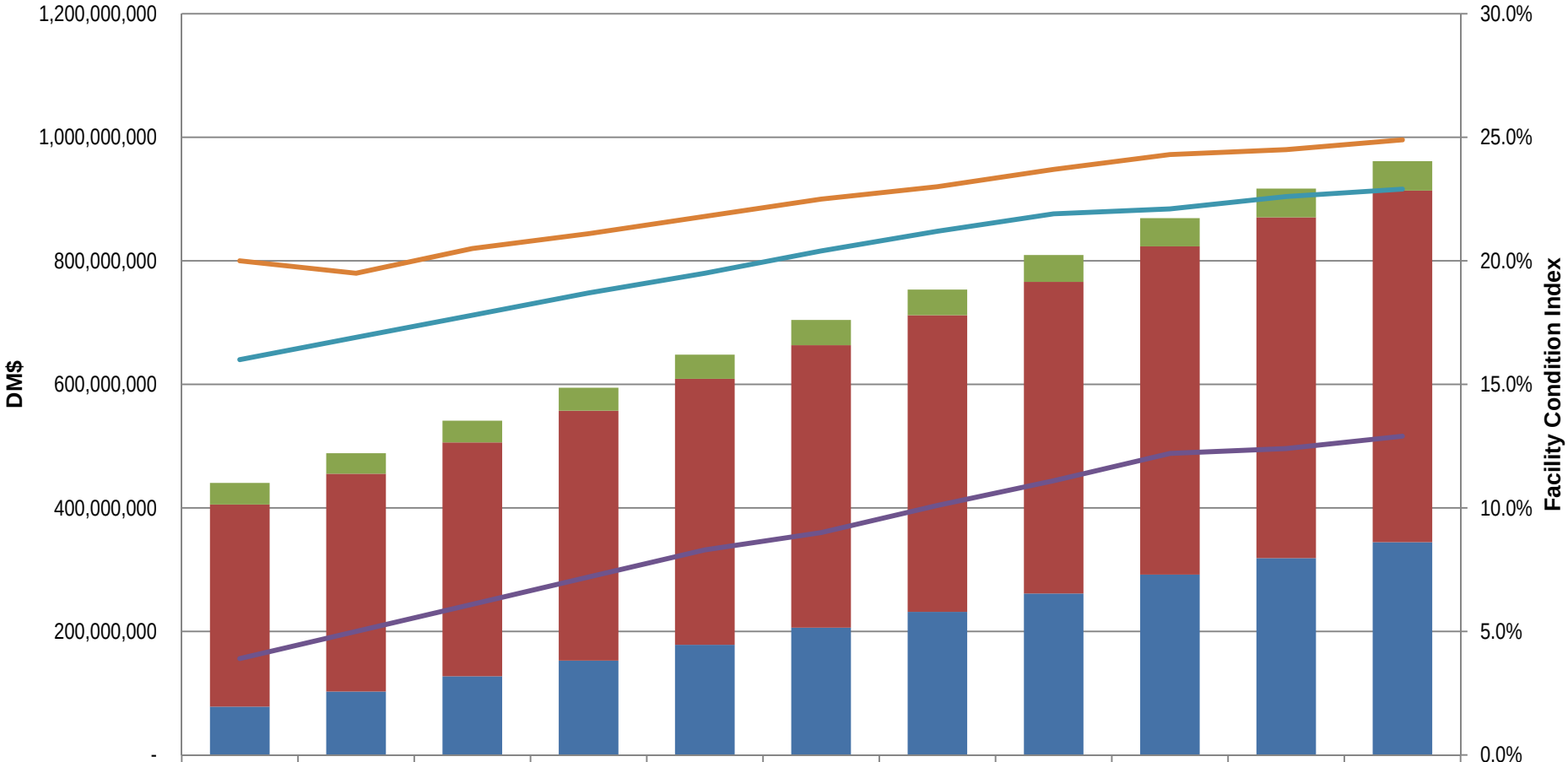
The Operations of Facilities funding is not adequate to arrest the growth of backlog DM. The CBI Program may allow Pantex to modernize/recapitalize and sustain the infrastructure for current and future weapon programs with secondary benefits of a reduction of DM.



	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025-2040
Outgranted	0	0	0	0	0	0	0	0	0	0	0
DOE/NNSA Leased	13,387	13,387	13,387	13,387	0	0	0	0	0	0	0
Contractor Leased	71,367	71,367	371,367	320,040	320,040	320,040	320,040	320,040	320,040	320,040	320,040
NNSA Owned	3,099,495	3,076,155	3,067,016	3,118,343	3,080,403	2,929,049	2,851,812	2,851,812	2,871,812	2,900,955	2,947,335

Assumption: Based on the guidance to include approved construction, only those projects currently funded or included on the CWG Nominal Schedule and demolition associated with those projects are included in the table. The Administrative Support Complex is included based on CD-1 approval in April 2015.

Fig. P14. Pantex Plant footprint projection (buildings and trailers).



	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
DM NMD	35,018,137	33,276,785	35,286,147	37,128,505	39,019,541	40,978,375	41,563,796	43,560,194	45,634,242	46,455,321	47,635,177
DM MDNC	327,411,567	352,705,152	378,546,456	404,582,329	430,673,639	457,333,204	480,202,196	504,578,668	531,500,925	551,824,576	569,234,366
DM MC	78,079,466	102,608,727	127,366,551	152,736,835	178,355,483	206,009,909	231,668,707	261,340,876	291,888,953	318,686,830	344,552,290
NMC FCI	20.0%	19.5%	20.5%	21.1%	21.8%	22.5%	23.0%	23.7%	24.3%	24.5%	24.9%
MDNC FCI	16.0%	16.9%	17.8%	18.7%	19.5%	20.4%	21.2%	21.9%	22.1%	22.6%	22.9%
MC FCI	3.9%	5.0%	6.1%	7.2%	8.3%	9.0%	10.1%	11.1%	12.2%	12.4%	12.9%

Fig. P15. Pantex Projected Deferred Maintenance and Facility Condition Index by mission dependency.

The estimated FCI in the chart is based on planned projects. As shown in Fig. P15, the FCI for MC facilities increases from 3.9% in FY2015 to 12.9% in FY2025, and the FCI for MDNC facilities increases from 16.0% in FY2015 to 22.9% in FY2025.

NNSA has provided Site-Wide Level 2 Milestones for MC and MDNC facilities for FCI at 5% and 8.45%, respectively. Because of limited funding, Pantex will not meet the MC facilities goal of FCI below 5% or the MDNC facilities goal of FCI below 8.45%. Pantex will not meet the goals until additional funding is provided. Table P5 shows the FCI and asset utilization index by category.

Table P5. Pantex Plant (NNSA) FY2014 Facility Condition Index and Asset Utilization Index by Category

Replacement Plant Value		$4,068	Million			
Total Deferred Maintenance		$388	Million			
Site-wide Facility Condition Index		9.5%				
		Facility Condition Index (%)	**Asset Condition Index** (%)	**Asset Utilization Index** (%)	**Number of Assets**	**Buildings and Trailers (GSF thousands)**
Mission Dependency	Mission Critical	3.1	96.9	98.1	52	994
	Mission Dependent	14.9	85.1	98.3	462	1,813
	Not Mission Dependent	14.3	85.7	84.3	209	313
Facility Use	Office	7.3	92.7	94.9	46	482
	Warehouse	6.6	93.4	97.2	229	722
	Laboratory	6.8	93.2	99.9	7	76
	Housing	N/A	N/A	N/A	0	0

Assumptions: Content in the table above is based on information as of September 30, 2014. The number of assets in the Mission Dependency section includes Other Structure and Facilities. Laboratory space at Pantex has a FIMS usage code of manufacturing/production-related laboratories. The Warehouse category includes staging magazines and trailers (400-series FIMS usage codes).

2.5.3 Space Utilization and Consolidation

Space management encompasses all real property owned or leased by DOE. The RTBF Program is responsible for the overall management of space. However, to support the site mission, individual facilities are assigned to functional organizations based on space requirements and specialized construction. The functional organizations are responsible for the day-to-day use of their assigned buildings. Space utilization remains high at Pantex, with usage at 96% for FY2014. Because of this high use, site planning efforts are closely coordinated with mission and support needs so that operations are in facilities appropriate for their use, and changes in facility requirements are coordinated and implemented in advance.

2.5.4 Sustainability

Pantex uses a whole-building concept to consider all facets of environmental and energy sustainability. Actions and activities for sustainability encompass the many issues of environmental protection, pollution prevention, resource conservation, waste management, energy and water management, and the reduction

of greenhouse gases resulting from plant processes and the use of petroleum fuels. Any project can be properly developed to support sustainability, whether it is a specific project to upgrade the efficiency of a building's heating, cooling, and ventilation units; construct a new building; replace a roof; or even decommission and deconstruct retired buildings. Pantex is striving to replace finite energy sources with sustainable and renewable wind-generated energy and, as practical, solar power. Sustainability is a popular concept that will drive improvements in plant operations for years to come.

2.5.5 Freeze the Footprint

The Freeze the Footprint policy requires agencies not to increase the square footage of space predominately used for offices and warehouses compared to the FY2012 baseline. New office or warehouse space must be offset with corresponding reductions in office or warehouse space to ensure no net increase in the size. Facilities used for weapons, SNM, explosives, programmatic components, and general storage are included in the warehouse category. Pantex completed construction of a Zone 12 HE storage facility in FY2013 and HEPF in FY2014, and construction is under way for additional HE storage facilities associated with HEPF, to be completed in FY2015. Pantex currently has office and warehouse facilities available to demolish, which could be used to offset the new storage space. However, not having a funding source for facility disposition will make it challenging for Pantex to meet the Freeze the Footprint policy.

3. Y-12 Site Overview and Snapshot

Y-12 Site Overview

Location: Oak Ridge, Tennessee	**Contractor Operator:** Consolidated Nuclear Security
Type: Multi-Program Site	**Responsible Field Office:** NNSA Production Office
Website: http://www.y12.doe.gov	**Site Manager:** Geoff Beausoleil

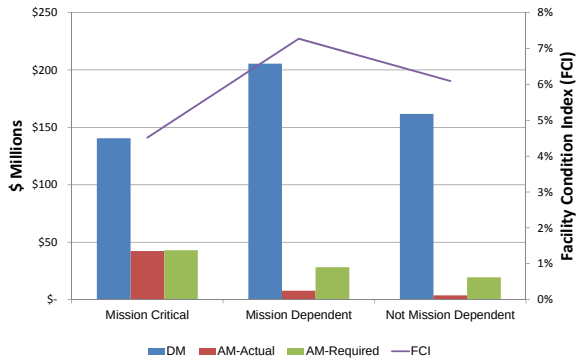
As an enduring national asset, Y-12 plays a vital role in DOE's NSE. Y-12's core mission is to ensure a safe, secure, and reliable U.S. nuclear deterrent, which is essential to national security. Every weapon in the U.S. nuclear stockpile has components manufactured, maintained, or ultimately dismantled by Y-12. Through LEP activities, Y-12 produces refurbished, replaced, and/or upgraded weapon components to modernize the enduring stockpile. Y-12 also processes highly enriched uranium (HEU) for use by the Naval Reactors program. Over the past 10 years, working with the Naval Reactors program, Y-12 has supplied feedstock from weapons removed from the nation's nuclear weapons stockpile to the U.S. Navy to fuel nuclear-powered submarines and aircraft carriers. As the nation reduces the size of its arsenal, Y-12 has a central role in decommissioning weapons systems and providing weapons material for non-explosive, peaceful uses. Y-12 provides the expertise to secure HEU; store it with the highest security; and make material available for non-weapons uses (e.g., in research reactors that produce cancer-fighting medical isotopes and commercial power).

Capabilities

- C1.5 – Surveillance
- C3 – Uranium
- C9 – SNM Accountability, Storage, Protection, Handling, and Disposition
- C12 – Support of Other Missions/Program Capability
- C14 – Nonproliferation
- C15 – Security
- C16 – Emergency Response
- C17 – Work for Others

Real Property

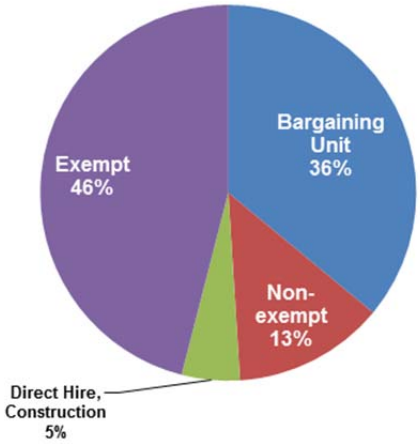
- 3,024 acres (owned)
- 350 buildings/trailers
  - 3,950,346 GSF active and operational
  - 1,146,111 GSF non-operational
  - 774,659 GSF leased
- Replacement Plant Value: $8.913B
- Deferred Maintenance (DM): $509M
- Facility Condition Index (FCI):
  - Mission critical: good (4.52%)
  - Mission dependent non-critical: adequate (7.27%)
  - Site-wide FCI: adequate (5.65%)
  - Asset utilization index (overall): 95.2%



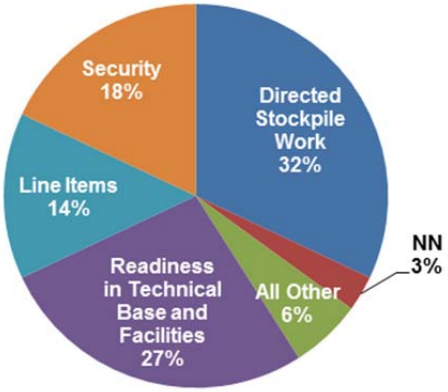
DM and FCI by Mission Dependency

FY2015 Funding by Source ($M)

FY2015 Total Plant Operating Funding:	$1,450
FY2015 Total NNSA Funding:	$1,321
FY2015 Total DOE (non-NNSA) Funding:	$90
FY2015 Total Other Funding:	$39



FY2015 Y-12 Personnel Profile



FY2015 Funding by Source

Nuclear Nonproliferation (NN)

3.1 Y-12 Infrastructure and Mission Commitment

Y-12 serves as NNSA's Uranium Center of Excellence. The following sections describe the key NNSA strategic goals supported at Y-12.

3.1.1 Maintain the Stockpile

Y-12's core manufacturing and processing operations are housed in decades-old buildings near or past the end of their expected life spans. An integral part of Y-12's long-term transformation, the Uranium Processing Facility (UPF) and the recently constructed Highly Enriched Uranium Materials Facility (HEUMF) are two facilities at Y-12 whose joint mission will be to store and process all enriched uranium (EU) in a much smaller, centralized area. Safety, security, and flexibility are key design attributes of UPF, which will be built to modern standards and engage new technologies through a responsive and agile design. Upon completion, UPF will replace the highest-hazard uranium processing facility to ensure the United States can maintain existing weapons, dismantle weapons that are removed from the stockpile, fuel the Nuclear Navy, and convert material to non-weapons uses.

3.1.2 Reduce Global Nuclear Threats

Nuclear nonproliferation—stopping the spread of nuclear materials—is a critical part of creating a safer world. Since the early 1990s, Y-12 has executed nonproliferation work in more than 25 countries.

As the nation reduces the size of its arsenal, Y-12 has a central role in decommissioning weapons systems and providing weapons material for peacetime uses. It is a leader in implementing technology and training to ensure materials are protected with the highest degree of confidence. Y-12 trains nuclear industry professionals, emergency responders, and security forces from around the world to safeguard vulnerable materials, and the innovations engineered at Y-12 have applications for allies, other government agencies, and the private sector. Y-12 ensures safe, secure, and compliant storage of the nation's strategic reserve of nuclear materials. The Nuclear Materials Management and Storage Program receives, stores, protects, dispositions, and manages strategic and special nuclear materials and provides programmatic planning, analysis, and forecasting for national security material requirements supporting Stockpile Stewardship and other DOE programs.

3.1.3 Naval Reactor Fuel

Y-12 processes EU from retired weapons and other excess materials, including nuclear materials from other countries. This mission ensures that excess materials from Y-12 and other parts of the world are processed to a safer form for long-term storage or reuse. Former weapons material is used, for example, as feedstock for the Naval Reactors program and for research reactors that produce medical isotopes.

3.1.4 Science, Technology, and Engineering

In the course of its work for DOE, Y-12 develops useful new technologies that have commercial applications. Through Cooperative R&D Agreements, Y-12 works with private-sector industries on R&D projects of mutual interest.

3.1.5 Modernize the Infrastructure

Most of Y-12's MC facilities are more than 60 years old (Fig. Y1). To address this situation, for more than a decade Y-12 has been consolidating operations, modernizing facilities and infrastructure, and reducing the legacy footprint. In FY2014, NNSA commissioned a Project Peer Review Team to assess the progress and opportunities for the UPF project. This evaluation produced a number of recommendations to refocus the project to a smaller footprint and relocate various processes to existing facilities. This effort is vital to the long-term mission for Y-12. Efforts are under way to implement the revised strategy and incorporate bridging plans to maintain the integrity of the aged infrastructure.

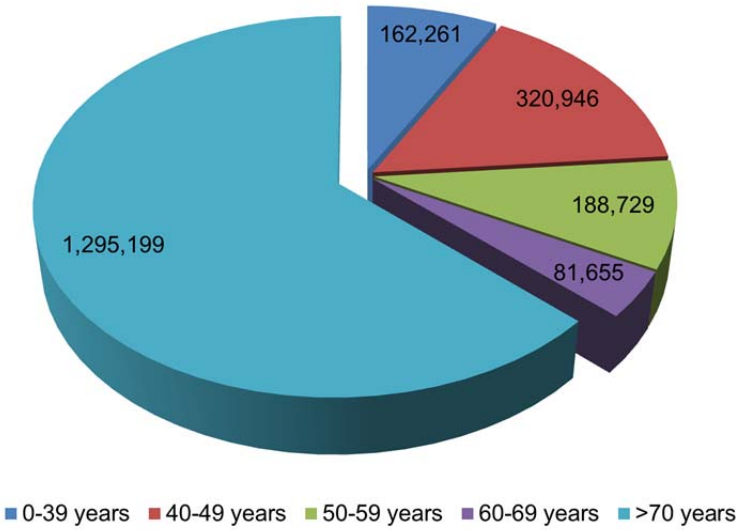


Fig. Y1. Mission-critical facilities' age by gross square footage.

In response to the changes in UPF strategy, NNSA directed the development of an EU infrastructure strategy, which establishes the framework to safely maintain the uranium mission capabilities in the Y-12 aging EU infrastructure while taking into account the changing UPF scope and schedule. The Enriched Uranium Infrastructure Strategy (Fig. Y2) is a four-pronged approach to reduce mission and safety risk, relocate EU processes, replace EU capabilities with a new facility (i.e., UPF), and sustain mission support infrastructure. With UPF being smaller and only addressing limited EU capabilities, there is an increased need for facility and infrastructure improvements to support extended operations in Buildings 9215 and 9204-02E. Facility and infrastructure sustainment will include execution of previously identified risk-reduction activities such as ventilation upgrades and replacements,

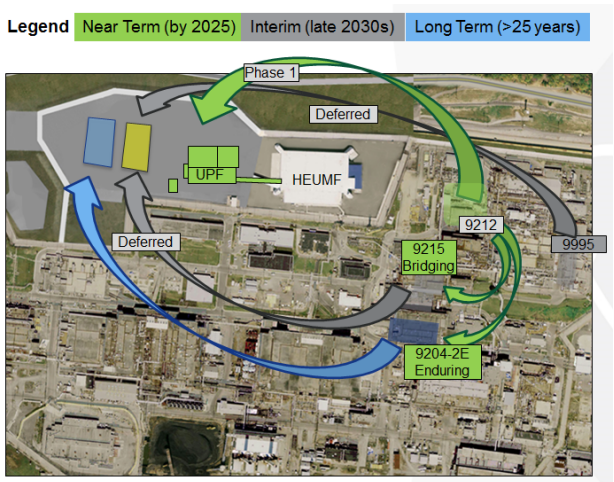


Fig. Y2. Enriched uranium infrastructure strategy.

fire sprinkler head replacements, electrical improvements, humidity control improvements, and key utility system refurbishments and replacements. Additional items may be identified when Y-12 takes a more in-depth look at the risk of greatly extended operations in these facilities, as operations will continue until at least the late 2030s.

3.2 CURRENT STATE AND ACCOMPLISHMENTS

The following four major elements define the planned physical transformation activities at Y-12 over the 10-year horizon and beyond. Accomplishments toward these elements from the past year are provided.

3.2.1 Replacement/Revitalization

Replacement and revitalization are key elements of the modernization strategy at Y-12. As previously stated, a significant number of facilities at Y-12 are at or beyond design life. At present, several facilities are in the early construction or critical design process. When UPF is complete (Fig. Y3), it will replace a portion of HEU production functions. The remaining HEU production capability will be transitioned to Buildings 9215 and 9204-02E, which must be sustained to achieve the HEU mission strategy. The strategy includes:

Fig. Y3. Future UPF facilities.

- accelerating transition out of Building 9212 by 2025 to reduce nuclear safety and operational risk while maintaining EU capabilities;
- integrating evaluation of alternatives for delivery of UPF that prioritizes replacement capabilities by risk to nuclear safety, security, and mission continuity;
- substantially improving the needed Y-12 infrastructure over the next decade at a risk-based annual funding level that supports safe and secure operations; and
- prioritizing replacement capabilities by risk-to-mission continuity, nuclear safety, and security.

Additional investment in electrical and mechanical infrastructure for Buildings 9215 and 9204-02E is being developed. Originally planned as a line-item project, the investment strategy is now focusing on general plant projects and expense funding.

The on-site Emergency Operations Center (EOC) is housed in a 1950s-vintage building that has recently sustained damage from water intrusion and deterioration. A new EOC is planned, with construction to begin in 2018. Additionally, a new Fire Hall is planned, with construction to begin in the 2017 timeframe. It will replace the existing 1950s-vintage facility.

Accomplishments

- In FY2014, NNSA commissioned a Project Peer Review Team to assess the progress and opportunities for the UPF project. Y-12 is implementing a number of recommendations from this evaluation, such as refocusing the project to a smaller footprint and relocating various processes to existing facilities.
- UPF site readiness activities have been completed. Work included relocation of Bear Creek Road (Fig. Y4), including a new bridge; relocation of several potable water lines; rerouting of overhead electrical lines; construction of a new haul road; mitigation for wetlands impacted during road construction; development of the west borrow and wet spoils areas to receive soils for later project phases; demolition of a parking lot, guard tower, and other structures; and construction of sediment basins to protect Y-12's natural resources from erosion and sedimentation.

Fig. Y4. NNSA Admin. Frank Klotz and Congressman Chuck Fleischmann attend ribbon-cutting ceremony for site readiness completion of Bear Creek Road.

- Approval was granted to include funding for a 161-kV replacement substation within the scope of the UPF project. Previous discussions had omitted full site-wide capacity within the design of the substation. This new requirement will align the plant for future capacity and remove the existing North American Electric Reliability Corporation/Federal Energy Regulatory Commission (NERC/FERC) issues at Y-12.
- During FY2014, Y-12 continued to execute the Facilities and Infrastructure and Enriched Uranium processes Aging Management programs. The 9212 Nuclear Facilities Risk Reduction (NFRR) project reached >90% completion, resulting in more than $80M in improvements to Building 9212's electrical, ventilation, process, and support systems key to maintaining an acceptable safety risk while UPF is designed and constructed.
- CD-0 approval for the EOC was granted in July 2012 for a multi-site line item. In 2014, the strategy changed to each site having a standalone line item. The Y-12 EOC CD-1 package was submitted in December 2014. An independent project review was held in February.
- The CD-0 approval for mission need of the proposed fire station was approved in April 2015. The CD-1 package is expected to be submitted in late FY2015.
- The CD-0 package for the Lithium Capability Project has been approved and authorization provided to conduct alternative selection, develop Title I and II engineering estimate, and refine a construction range estimate.
- The CD-0 package for calciner was approved in August 2014. The CD-1 package was submitted in March 2015.
- The CD-0 package for electrorefining was approved in September 2014. The CD-1 package was submitted in April 2015.

3.2.2 Security Downsizing and Consolidation

Completion of the proposed Security Area Boundary Enhancement and Reduction (SABER) line-item project could enable Y-12 to significantly reduce the site's Protected Area (PA) from today's 150-acre PA. The proposed reduction and security upgrades would revitalize the security infrastructure while supporting the modernization of the Y-12 site. By coordinating with overall site modernization and strategic planning activities, S&S could ensure all upgrades proposed in support of the security mission are considered in the Y-12 Complex integrated strategy. Currently, initiatives are needed to:

- replace outdated technology that is increasingly expensive and difficult to maintain,
- replace equipment with increasing failure rates and high maintenance costs, and
- deploy modern technology to enhance capabilities or mitigate weaknesses.

Y-12 strives to achieve full compliance with the programmatic priorities as defined by Defense Nuclear Security (DNS) and NPO. However, it is expected that if out-year funding targets remain at the current projected levels, the continued sustainability, as well as the overall viability, of the Y-12 S&S program is at risk. Potential impacts based on the current funding target levels identified in the FY2017–2021 DNS FYNSP include the:

- inability to sustain lifecycle upgrades needed for security systems/equipment, resulting in increased risk of system failures;
- inability to reduce false and nuisance alarm rates to as low as reasonably achievable;
- inability to adequately protect against potential lower-level threats to the site;
- inability to evaluate and deploy technology as a force multiplier to allow for reduction in protective force staffing levels and achieve significant cost savings; and
- reduced public credibility for protection of national security assets.

Accomplishments

- The Security Improvements Project successfully achieved CD-4 on March 28, 2014. The project was completed $21M under budget and 4 months ahead of schedule.
- The SABER CD-0 package was submitted in March 2014, requesting pre-Energy Systems Acquisition Advisory Board/Energy Systems Acquisition Advisory Board approval to proceed with the development of the CD-1 package. In January 2015, the Chief of DNS indicated intent to recommend CD-0 for approval; however, the decision is still pending.

3.2.3 Enduring Facilities

A significant element of the site modernization vision includes sustainment of enduring facilities and bridging strategies for facilities identified with an out-year replacement. Many facilities are approaching end of design life, and substantial investments are required to ensure they remain viable for the near future. Recent changes to the investment and design strategy for UPF have significantly modified the approach previously identified for several production facilities. Once identified for transition to UPF, these facilities must now be repurposed and sustained for an indeterminate time. In 2014, failure of a section of the concrete ceiling in Building 9204-02 (Fig. Y5) was an indicator of the age and deterioration encountered in many facilities. Efforts to mitigate deterioration are being accomplished via ongoing efforts (noted below).

Fig. Y5. Concrete delamination in Building 9204-02.

Accomplishments

- The NFRR project received CD-4 approval and was completed in January 2015. The project successfully finished more than $5M under budget and 10 months ahead of schedule without a lost-work-day accident or incident of security concern. During 2014, the project team completed the following activities in Building 9212:
  - Replaced two Motor Control Centers.
  - Modified Stack 27 and Stack 28 ventilation and exhaust systems.
  - Replaced 7 steam stations.
  - Modified Stack 110 ventilation and exhaust system, to include tie-in of Stack 43 systems.
  - Demolished Stack 43.
- Y-12 replaced two large air-handling units in Building 9201-05N.
- General workplace improvements completed within balance of plant enduring facilities included:
  - Removed carpet and replaced with tile in several buildings, eliminating mold issues.
  - Renovated shower areas in two change houses.
  - Replaced steam heating systems with new, efficient gas-fired units as part of the ongoing ESPC.
  - Made significant improvements to indoor air quality in Building 9119 by installing variable frequency drives, installing return air diffusers in all offices, and rebuilding the steam station to the building. Also replaced carpet with tile and painted common areas with low-volatile organic compounds paint.

- Accomplishments for the ESPC in support of sustainment of enduring facilities included:
  - Installed ~8,200 linear ft of natural gas line; replaced inefficient steam heating units with new, efficient gas-fired units in two facilities; and replaced one steam-water heater with new gas-fired heater.
  - Replaced 3 chillers and 4 pumps in Building 9767-10.
  - Retrofitted 13,005 T-12 fluorescent light fixtures with energy-efficient T-8 lamps and ballasts in 24 facilities.

3.2.4 Legacy Facility Deactivation and Demolition

At present, Y-12 has 63 facilities that formally have been declared excess to the site. These facilities consist of a mixture of Office of Science (SC), Office of Nuclear Energy (NE), EM, and NNSA responsibility. Since 2002, Y-12 has demolished more than 1.4 million ft^2 of excess facilities; however, an overwhelming need for funded demolition projects remains. Many facilities are process contaminated and awaiting an approved transfer mechanism to EM; three of these facilities are on the NNSA high-risk-facility list. In 2014, the Inspector General declared Building 9201-05 "the worst of the worst."

During the past year, the site has experienced roof failures (Fig. Y6), electrical fires, and oil and water leaks within two of the high-risk contaminated facilities. The risk to personnel and the environment will continue to escalate as the facilities decline. Without a commitment to eliminate excess facilities, Y-12 will continue to expend limited resources in an attempt to safely maintain facilities that no longer have missions.

Fig. Y6. Roof/ceiling collapse in Building 9201-05.

Accomplishments

- Y-12 recently demolished Building 9744, a former utilities and maintenance facility in the PA. The demolition proved challenging because of the deteriorating facility conditions, precluding the standard approach of entering the facility to abate hazards and remove hazardous waste before the structural demolition. Demolition of this building addressed one of Y-12's highest risks for structural degradation, reduced the footprint by 9,081 ft^2, and eliminated $343K of DM.
- Activities for risk management of Building 9201-05 included the following:
  - Initiated foam roofing for portions of the roof at risk for water intrusion.
  - Removed and dispositioned two high-risk stacks.
  - Drained the diesel fuel tank for the emergency generator.
  - Removed oil from the hydraulic room.
  - Removed, stabilized, and disposed of saw fines and eliminated the remaining pyrophoric hazard.

- Activities for risk management of Building 9204-04 included the following:
  - Removed and properly disposed of legacy chutes and drums of material from previous depleted uranium oxide grit-blasting equipment.
  - Disposed of 70 B-25 boxes of non-classified waste and 12 B-25 boxes of classified waste at the Environmental Management Waste Management Facility.
  - Removed and disposed of 412 containers of chemicals, approximately 100 pallets of tooling for retention, and 1,060 ft^3 of miscellaneous combustibles.
- Activities for risk management of Building 9206 included the following:
  - Performed repairs in multiple locations on the roof.
  - Demolished and removed deteriorated supply fan (AJ100) and approximately 20 ft of duct, eliminating an environmental and structural concern.
  - Completed repair of AJ-28 radiological exhaust fan duct system, including sealing ductwork, bolt replacement, and duct joint repair.
  - Completed removal of 111 containers of slag and liner material, removed miscellaneous waste and safe bottles, and demolished and removed a legacy vacuum and aerial platform.
  - Completed visual inspections and repairs to Dry Pipe System 2 and replaced approximately 80 ft of piping.
- Successfully removed, characterized, and transported 48 sea-land containers from around the exterior of Building 9720-05. The removal accounted for more than 1.1 million pounds of unneeded parts for disposal, which were shipped to Nevada National Security Site for final disposal. This effort reduced the risks and costs associated with storing that material and eliminated the unsightly and no-longer-necessary barrier around Building 9720-05.

Funding remains a significant challenge to all aspects of the Y-12 modernization strategy. A change in the focus of the UPF project will require more resources for sustainment of Buildings 9204-02E, 9215, and 9995. Minimal funding for demolition activities leaves 63 facilities with no funded disposition pathway, and process-contaminated excess facilities continue to deteriorate with minimal resources available to stabilize the degradation.

3.3 ASSUMPTIONS

Y-12's planning documents are based on assumptions concerning mission deliverables, capabilities, capacity, and infrastructure. This TYSP is consistent with the 2016 Stockpile Stewardship and Management Plan and Y-12's recognition as NNSA's CoE for uranium manufacturing and R&D. Significant investment will be required to implement transformation while continuing to meet annual programmatic deliverables safely, securely, and effectively. Only through the continued reconfiguration of Y-12 can the required security, safety, and operational cost goals be achieved.

The following assumptions concern Y-12's future workload:

- LEP production will remain steady around current levels or will be adjusted as directed by NNSA schedules.
- The production of JTA units will be sustained at current levels.
- Quality evaluation (surveillance) rates will remain steady around current levels.

- Dismantlement will sustain the high-throughput levels established in recent years.
- Naval Reactors work will remain steady.
- Work associated with global security and interagency initiatives and NNSA's nonproliferation mission will increase.
- HEU disposition work will decrease over the next 5–10 years as the surplus inventory is dispositioned.
- Research reactor supply of low-enriched uranium downblended from HEU will increase to a steady state.

The following are planning, project, and facility and infrastructure assumptions:

- Land requirements will generally remain stable. Y-12 will continue to require security and emergency response buffers that preclude release of any real estate for public use.
- The scope of the UPF project is early transition of Building 9212 operations, with transition of operations from Buildings 9215 and 9204-02E being deferred.
- New line-item starts supported by the NNSA CWG's Integrated Priority List during the FYNSP period are the EOC, the Fire Hall, and the Lithium Capability Project.
- EM will provide for the demolition of more than 3.8 million ft^2 of NNSA, NE, SC, and EM excess facilities.
- A transition to a smaller, more-responsive Y-12 will require most MC facilities to be operated and maintained beyond design life.
- The initiative to remove 70 acres from the Y-12 PA could be accomplished as a result of the proposed SABER project.

3.4 CHANGES FROM PRIOR-YEAR TYSP

In 2014, the NNSA administrator chartered an independent review team to validate the UPF approach for mission need in 2025. The review team provided recommendations that, when fully implemented, should deliver critical Building 9212 capabilities. Full replacement of EU capabilities now extends beyond FY2039. This change in scope places an increased burden on Buildings 9204-02E, 9995, and 9215 to remain viable for many years. A bridging strategy is being developed for these buildings.

Approval was granted to include funding for a 161-kV replacement substation within the scope of the UPF project. Previous discussions had omitted full site-wide capacity within the design of the substation. This new requirement will align the plant for future capacity and remove the existing NERC/FERC issues at Y-12.

Coordination with EM continues regarding the planned Mercury Treatment Facility. In December 2014, a letter was received from Oak Ridge Operations-EM indicating existing planning activities were to cease, pending approval of the proposed new siting for the facility.

The West End Protected Area Reduction (WEPAR) subproject was descoped from the UPF project because of funding constraints. The proposed SABER line-item project is conceptualized as the replacement for the WEPAR scope. The CD-0 package for SABER was submitted to NNSA in March 2014; approval is pending as of March 26, 2015.

3.5 FUTURE VISION AND CORE CAPABILITIES

NNSA has a number of core capabilities required to perform its primary missions. Table Y1 provides a crosswalk of the Y-12 capabilities to the NNSA missions.

3.5.1 C1.5 Surveillance

The mission of NNSA's surveillance program is to sustain the safety and effectiveness of the nation's nuclear weapons stockpile without returning to the use of underground nuclear tests, as directed by the United States President and Congress per the Stockpile Stewardship Program. For Y-12, the surveillance program involves: (1) the careful disassembly of CSAs in a controlled environment to evaluate their "as is" condition (i.e., the evaluation of the aging phenomena of components and assemblies through a shelf-life program), and (2) the fabrication of components and assemblies to support national laboratory testing and DoD flight tests.

Core surveillance activities involve a crew of specialized laborers and engineers who disassemble and inspect CSAs in Y-12's assembly/disassembly facility and use specialized capabilities, including leak testing and other nondestructive measurement equipment, machining, and a variety of diagnostic equipment within environmental enclosures and laser gas sampling workstations. After a CSA is disassembled, further evaluation is often performed on individual components, involving chemical, metallurgical, and mechanical properties analyses. This work requires skilled laborers and engineers in production areas throughout Y-12. After a CSA is disassembled and an evaluation of its components is completed, skilled engineers provide an assessment of the CSA in a final report to the national laboratories. This information—along with other reports from around the NSE— is used in the national laboratories' annual assessment to the President reporting the state of the stockpile.

Table Y1. NNSA Capabilities and Missions Applicable to Y-12

Capability	Applicable NNSA Missions					
	M1. Managing the Stockpile	**M2. Preventing Proliferation**	**M3. Powering the Nuclear Navy**	**M4. Emergency Response**	**M5. Continuing Management Reform**	**M6. Recapitalizing Our Infrastructure**
1.1 Design and Certification						
1.2 Experiments						
1.3 Simulation						
1.4 Testing						
1.5 Surveillance	**X**					
2. Plutonium						
3. Uranium	**X**	**X**	**X**			**X**
4. Tritium						
5. High Explosives						
6. Non-nuclear						
7. Weapons Assembly/ Disassembly						
8. Transportation						
9. Special Nuclear Material Accountability, Storage, Protection, and Handling	**X**	**X**	**X**			**X**
11. Counterterrorism and Counter-Proliferation						
12. Support of Other Missions/Program Capability		**X**	**X**	**X**	**X**	**X**
13. Federal Management and Oversight	**X**	**X**		**X**		
14. Nonproliferation		**X**		**X**	**X**	**X**
15. Security	**X**	**X**		**X**		**X**
16. Emergency Response				**X**		**X**
17. Work for Others		**X**	**X**	**X**	**X**	
NA Reserve Real Property Assets						

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

In the FYNSP period for Y-12, nondestructive laser gas sampling will factor more prominently in workload projections because this technique can provide the national laboratories valuable compatibility and aging information about the CSA without the need, in some cases, for destructive evaluation. Y-12 recently has deployed the base capability and is in the process of expanding capacity to meet projected future demand. Y-12 also anticipates being directed to perform CSA disassembly activities in support of future LEPs to help guide NNSA and the national laboratories in determining LEP requirements and workload projections. These activities, coupled with a relatively steady core surveillance program, will drive the sustainment of existing Y-12 facilities, processes, and skilled laborers and engineers.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

Beyond the FYNSP period, a continued trend in core surveillance is the deployment of emerging nondestructive methods to provide valuable information to the national laboratories while preserving key assets. This will require R&D, as well as technology maturation investment, to ensure a smooth transition to surveillance operations. Finally, existing core surveillance facilities will have reached their end of life in this time period, and planning for their replacement will be essential.

3.5.2 C3 Uranium

Y-12 continues to support DSW through the LEP refurbishment of secondaries and CSAs, the dismantlement of retired CSAs, the surveillance of CSAs and associated component parts, and the recovery/and or purification of uranium and lithium to support LEP and other customer products. Y-12 continues to drive down risk by reducing material at risk (MAR) in EU processing facilities and pursuing technology changes to replace hazardous and time-consuming processes.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

Y-12 currently expects LEP work to support the W76, B61, W80-4, and the W78/88-1 within the next 10 years. The major facilities for uranium processing are Buildings 9204-02E, 9212, and 9215. The major facilities for non-EU component processing that support secondary and CSA builds are Buildings 9204-02, 9225-03, 9201-01, 9201-05 N/W, and 9998. Material recycle and recovery will operate wet chemistry, the oxide conversion facility, and reduction to produce purified uranium metal in support of national security needs. Additional significant processing efforts will center on support of dismantlement initiatives, lithium processing, and backlog MAR reduction.

UPF, designed to replace most capabilities housed in Building 9212, has been separated into multiple buildings being constructed to safety and security requirements appropriate to each building's function. This separation provides cost-saving opportunities in both building construction and equipment

installation. UPF will be a modern manufacturing facility designed and constructed for health, safety, security, and operational efficiency. Built to today's codes and standards and designed to ensure safe nuclear operations, the facility will leverage new technologies and provide life-cycle cost savings. UPF will be located to the west of HEUMF. The redesigned UPF is to be operational in 2025.

As part of this approach, Y-12 will relocate/replace Building 9212 capabilities not destined for UPF into existing EU processing facilities, relying on Cold War–era buildings and systems to safely support the critical mission. Sustainment projects are necessary to support continued EU operations in Buildings 9204-02E, 9995, and 9215.

A proposed Lithium Capability Project will relocate vital DSW mission functions for the aging Building 9204-02; the planned project start is during the FYNSP period, with completion during the strategic planning horizon.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

Replacement of EU processing capabilities is forecast late in the strategic planning horizon with additional facilities being constructed west of UPF. EU machining and purification capabilities will be replaced first (in approximately 2040), with assembly/disassembly capabilities following. Sustainment projects will continue to be necessary to ensure mission continuity until replacement capabilities are in place.

Building 9212 will be available to be transitioned to EM for demolition around 2030.

At some later time, the Consolidated Manufacturing Complex is proposed to replace depleted uranium, general manufacturing, and other production-support functions. Sustainment efforts will be required to ensure non-SNM production capabilities are maintained until these new facilities are available.

3.5.3 C9 Special Nuclear Material Accountability, Storage, Protection, Handling, and Disposition

At Y-12, SNM consists of Category I, II, and III EU that requires vault or closed-area storage in material access areas (MAAs). This material is primarily stored in three locations. Eventually, all MAA-SNM storage will be consolidated into HEUMF.

Non-nuclear materials and production-related materials not requiring MAA protection are stored in non-MAA storage warehouses. Non-MAA storage consists primarily of Category IV attractiveness levels d and e EU material, depleted uranium, normal uranium, heavy water/deuterium, mercury, strategic special materials, and some other non-nuclear materials. Although storage requirements are less strict than MAA storage, high-security conditions are still a frequent storage requirement for many non-MAA materials because of their classified nature, shape, or quantity. Other classified or MC materials also may be stored in non-MAA warehouses.

MAA and non-MAA stored materials are managed by the Nuclear Materials Management and Storage Program to ensure timely support of DP missions such as replacement of limited-life components for the stockpile, Naval Reactors program requirements, and foreign and domestic research reactors. The program also ensures safe, secure, and compliant storage of the nation's strategic reserve of HEU. Y-12 is designated as DOE's national repository for HEU.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

Since HEUMF became operational in FY2010, all CSAs from long-term storage areas, with the exception of a small working inventory, have been relocated into HEUMF. Now, the focus is to move EU materials from interim and in-process production storage into HEUMF. The deinventory of EU materials from interim and in-process production storage is managed by the Area 5 Deinventory Program. The Area 5 Deinventory Program's priority is the deinventory of the interim and in-process production storage areas during this timeframe to facilitate the closure of Building 9212 and to reduce MAR. In many cases, the materials in the interim and in-process production storage areas will require some kind of processing to meet long-term storage requirements. CSAs awaiting dismantlement will continue to be stored at their current locations.

Regarding non-MAA storage, non-SNM materials have been consolidated on-site to streamline operations, free some storage facilities for demolition, and reduce overall operating costs in preparation for the construction of the Non-MAA Storage Complex.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

During these years, all non in-process MAA-SNM will be stored in HEUMF. UPF will house only limited quantities of interim and in-process storage. Specific plans will be affected by final plans for Phases 2 and 3 of UPF. HEUMF is built for a 50-year life and will be the only long-term MAA-SNM storage facility at Y-12. The location of UPF was chosen to facilitate logistics for interoperability with HEUMF. The PA eventually will contain solely the HEUMF and UPF complexes for SNM storage and operations.

During these years, non-MAA storage will be consolidated into a new Non-MAA Storage Complex. This facility will be designed to handle the various non-MAA production storage needs and will be sized for these needs after the completion of ongoing aggressive disposition campaigns. The facility will be built for a 50-year life and will be the only long-term non-MAA storage facility at Y-12.

3.5.4 C12 Support of Other Mission/Program Capability

Y-12 processes HEU for use by the Naval Reactors program. Y-12's support of the Naval Reactors program began in FY2002 and is planned through FY2050 and beyond. Feed material for Naval Reactors is processed and packed for shipment. The Analytical Chemistry Laboratory in Building 9995 analyzes samples used to certify material properties. Following transfer to HEUMF for interim storage, the material is shipped to the Naval Reactors customer. Material may be stored at Y-12 for a number of years.

As part of the NSE, Y-12 supports interagency efforts to counter threats to U.S. national security. Y-12 works with DHS, DoD, FBI, Environmental Protection Agency, Nuclear Regulatory Commission, Office of Personnel Management, and other agencies to support the removal, detection, and protection of materials, facilities, technologies, and information that could be used for weapons of mass destruction or other nuclear terrorism–related activities.

Y-12 production and support facilities are required to support nuclear forensics, nuclear detection, consequence management, infrastructure security, and other interagency initiatives. Several Y-12 facilities are required for this support, including storage and production facilities, Sensitive Compartmented Information Facilities (SCIFs), Special Access Program facilities, and various training venues.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

These programs at Y-12 will continue to need numerous facilities across the site for manufacturing, development, analysis, forensics, and nuclear detection. Existing buildings will be used for training until they are demolished in accordance with facility disposition plans. A future Global Security Training Campus is under consideration to support this mission.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

During these years, proposed and existing facilities will be needed to provide support to these programs. There will be a continued need to have training and laboratory facilities as well as some specialized facilities.

The Naval Reactors work is expected to remain constant.

3.5.5 C14 Nonproliferation

As the NNSA Uranium CoE and a crucial link in providing a safe and secure U.S. nuclear deterrent, Y-12 comprises facilities, processes, materials, and expertise vital to preventing the proliferation of nuclear materials and technology. The NN programs at Y-12 include Material Management and Minimization programs. Y-12's largest NN program continues to be the HEU Disposition Program, which downblends surplus HEU and supports the supply of low-enriched uranium to ensure commercial and foreign research reactors have a reliable fuel supply instead of developing their own capabilities or resorting to using HEU.

NNSA's NN Material Management and Minimization program is one in which Y-12 develops and produces high-density uranium fuels for the conversion of HEU–fueled research reactors and removes vulnerable weapons-usable nuclear materials from around the globe.

Under NNSA's NN Global Material Security programs, Y-12 provides expertise and training to protect nuclear and radiological material—both domestically and abroad. These programs include the Alarm Response Training, Domestic Protection, and International Nuclear Security programs. Y-12 supports NN's Research and Development and Nonproliferation and Arms Control programs with technical expertise and the site's Nuclear Detection and Sensor Testing Center, where researchers test new technologies to detect nuclear materials with relevant quantities of SNM. Y-12 supports nonproliferation and international security verification and controls programs associated with the Next Generation Safeguards Initiative with safeguards expertise and policy initiatives related to future arms verification activities.

Several Y-12 facilities, both active and excess, are used for these significant programs. For example, uranium materials for NN programs are prepared in Buildings 9212 and 9215, Alarm Response Training is conducted in Building 9109, international material protection workshops are held in Building 9201-03, and the Nuclear Detection and Sensor Testing Center activities take place in Buildings 9204-02E and 9203.

As long as individuals, organizations, or rogue states continue to threaten the U.S. with nuclear terrorism, Y-12 facilities and expertise will be needed to combat their aims. Y-12 production and support facilities are required to support nuclear forensics, emergency response, nuclear counterterrorism, and related

initiatives. Facilities required for this support include many Y-12 applied technology facilities and production areas, SCIFs, Special Access Program facilities, Radiological Assistance Program team facilities, emergency response centers, and various training venues.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

NN programs at Y-12 will continue to need uranium processing capabilities, uranium analysis capabilities, and nuclear-detection activities. HEUMF and other storage facilities will continue to store removed uranium material and to archive samples for nuclear forensics activities. Global security training will be conducted in several buildings across the Y-12 site. Building 9109 has been converted to support Alarm Response Training and is under consideration as part of a larger Global Security Training Campus. Other existing east-end buildings will be needed for NN R&D and detection projects as well as for the development of nonproliferable reactor fuels. General infrastructure areas and support facilities also will continue to be needed.

Counterterrorism programs at Y-12 will need a variety of Y-12 facilities for development, analysis, forensics, and nuclear detection. Training will continue in some buildings until they are required to be demolished under facility disposition plans. A Global Security Training Campus is under consideration to support global security and counterterrorism missions. Many other Y-12 facilities and general infrastructure areas will provide support to counterterrorism efforts.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

During these years, Y-12 will need both MAAs and non-MAA uranium processing facilities to support NN and global security initiatives. UPF will provide the MAA uranium processing needs. However, much-needed non-MAA production areas and a new R&D capability are required to provide the non-MAA uranium processing and R&D needs for NN. Lithium production and processing facilities are needed for nuclear material detectors and other isotopes. Training and laboratory facilities will be essential as the NN and global security programs grow at Y-12.

Both proposed and existing buildings will support counterterrorism programs, and continued training and modern laboratory facilities will be necessary.

3.5.6 C15 Security

Y-12 places the highest priority on maintaining and improving its security posture. Counterintelligence, cyber security specialists, and other S&S personnel continuously monitor local and world events to prepare for potential risks to the site, its information, and its employees. Security personnel also participate in numerous assessments each year to ensure readiness in protecting the site's vital information and materials. Y-12 security experts control site access, maintain nuclear materials accountability, and guard against any potential threats to the site or the nation's nuclear security.

The site's production decisions regarding program requirements and modernization of facilities drive many of the planning decisions for future security initiatives. To achieve the goals, the existing supporting infrastructure must be modernized through an investment program of maintenance, repair, and capital improvement consisting of general plant, plant equipment, and line-item construction projects to meet the security requirements today and in the future.

Several security initiatives, including the proposed SABER line item, are planned or are under way to enhance physical security systems, provide emergency response, and support PA reduction.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

The SABER scope will upgrade the aging legacy PIDAS and will install a new PIDAS section along H Road, consisting of vehicle and pedestrian access control, barriers, sensors, and alarms that use modern technology. These upgrades will enable a future reduction of the PA by approximately 70 acres. The area west of H Road in the PA could then become a Property Protection Area, which will result in improved access, increased productivity, and reduced cost. The CD-0 package for the SABER line-item project was originally submitted in December 2013. HQ requested that Y-12 revise the CD-0 package; it was submitted to HQ in March 2014. In January 2015, the Chief of DNS notified Y-12 of intent to recommend approval of SABER CD-0 after additional revisions were incorporated in the Program Requirements Document. Y-12 completed the requested revisions and resubmitted the document in March 2015.

Pending approval of the SABER line-item project, Y-12 has identified various general plant projects to accomplish life extension for the existing legacy PIDAS components. In addition, as a result of the requirement to redesign UPF, Y-12 must maintain operations in Buildings 9215, 9995, and 9204-02E much longer than originally expected. Life-extension upgrades for access control, sensors, and alarms must be completed for these legacy buildings to ensure continued viability of the systems and enable secure operations within the facilities

Additional security improvements and technology evaluations are under consideration to replace obsolete or aging equipment and to reduce operating and maintenance costs.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

Additional previously proposed projects will require completion after construction of the UPF Phase 1 modular concept. The UPF/HEUMF Entry Control Facilities project will provide vehicle and pedestrian access control to the UPF/HEUMF complex, and the Central Alarm Station Relocation project will move the existing station equipment and capability from its current location outside the PA to its new enduring location constructed in UPF Phase 1. If Y-12 is approved to execute the full SABER scope and achieves PA reduction, the portion of PIDAS located directly south of the UPF footprint also must be upgraded (PIDAS Sensor Modernization).

Requirements for the protection of classified matter mandate numerous upgrades to the physical protection features in areas across the site. Y-12 completed an evaluation of the impact of these requirements and identified the scope and estimated funding for numerous projects needed to achieve compliance in an implementation plan initially submitted to NPO in September 2013. Y-12 updated the implementation plan and submitted it to NPO in March 2015 to reflect the current status and estimated funding requirements.

3.5.7 C16 Emergency Response

The Emergency Services organization incorporates the planning, preparedness, response, recovery, and readiness assurance elements necessary to protect on-site personnel, the general public, the environment, and property in the event of an operational emergency involving Y-12 facilities, activities, or operations. In addition, Emergency Services includes the Plant Shift Superintendent (PSS) organization, which serves as the site operations center for daily operations and the 24-hour point of contact for emergency operations.

Current State

The principal facilities supporting emergency response capabilities at Y-12 are the fire station (Building 9710-02), the Technical Support Center (TSC) and PSS (Building 9706-02), and the Emergency Response Center located in Building 9105. When the Emergency Response Cadre is activated, the TSC, the Emergency Response Center, and the EOC, located off-site at the East Tennessee Technology Park's (ETTP's) Building K-1650, are used. The TSC provides site command and control, and the off-site EOC provides command, control, and communications/coordination with other off-site government agencies.

The fire station is in a 27,673-ft^2 building constructed in 1948. It is located within the PA, which is surrounded by the PIDAS. The PA has very strict access-control requirements that restrict entry and exit.

PSS operations are housed in a 3,000-ft^2 facility built in 1948. In 1980, a 3,000-ft^2 TSC addition was built. This building also housed the medical center until its relocation to the Jack Case Center in August 2007. The PSS and TSC operations contain aging technology, and operations cannot be effectively supported indefinitely in this 60-year-old building. Besides the two main facilities, the Emergency Services organization has annexed other space throughout the site as it has become available—primarily for the storage of fire apparatuses and equipment and for training areas.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

A new EOC and Fire Hall are needed to replace aging facilities. At NPO's request, the Office of Emergency Management Oversight conducted a review to determine the capability of the current Y-12 emergency response facilities to support emergency response operations and provided some alternatives when considering future Y-12 improvement projects. The final report was issued in May 2011. The conclusion stated, in part:

Because of its importance to the response operation and concerns regarding habitability and construction, addressing the vulnerabilities of the ECC [PSS] should be a priority.

The backup EOC is in a fully equipped, well-engineered facility capable of supporting the backup response operation for several years.

A proposed EOC (Fig. Y7) facility line-item project is scheduled to begin in 2018. The scope of this line-item project includes the replacement of the PSS/TSC and the emergency response center. Until the EOC is completed, mitigation of identified vulnerabilities includes an increased emphasis on planning, drills, and exercises.

Fig. Y7. Rendering of new Emergency Operations Center.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

After the new Fire Hall and EOC are constructed, the backup EOC at ETTP will continue to be used. These three facilities will continue to function as the primary emergency response facilities for Y-12. No additional construction is expected.

3.5.8 C17 Work for Others

Y-12 processes HEU for use by the Naval Reactors program. Y-12's support of the Naval Reactors program began in FY2002 and is planned through FY2050 and beyond. Feed material for Naval Reactors is processed and packed for shipment. The Analytical Chemistry Laboratory analyzes samples used to certify material properties. Following transfer to HEUMF for interim storage, the material is shipped to the Naval Reactors customer. Material may be stored at Y-12 for a number of years.

As part of the NSE, Y-12 supports interagency efforts to counter threats to U.S. national security. Federal agencies supported by Y-12 for these efforts include DHS, DoD, FBI, Environmental Protection Agency, Nuclear Regulatory Commission, Office of Personnel Management, and other agencies to support the global security initiatives and the removal, detection, and protection of materials, facilities, technologies, and information that could be used for weapons of mass destruction or other nuclear terrorism-related activities.

Y-12 facilities are required to support the nuclear forensics, nuclear detection, consequence management, infrastructure security, and other interagency initiatives. These initiatives include storage, production SCIFs, Special Access Program facilities, and various training venues.

Tactical Planning Horizon (FYNSP of President's Budget + 5 years)

These programs at Y-12 will continue to need numerous facilities across the site for manufacturing, development, analysis, forensics, and nuclear detection. Existing buildings will be used until they are demolished in accordance with facility disposition plans. During this period, WFO, SPP, and support to other DOE laboratories are expected to remain constant or potentially could grow as opportunities arise.

Strategic Planning Horizon (FYNSP of President's Budget + 20 years)

Although no specific new construction is expected during the post-FYNSP period, existing facilities will be used to provide support to these programs. There will be a continued need to have training and laboratory facilities as well as some specialized facilities.

3.6 REAL PROPERTY ASSET MANAGEMENT

Key decisions regarding the future of Y-12 are reflected in the Complex Transformation SPEIS ROD. As a result of those decisions, it was determined that Y-12 will undergo a consolidation, downsizing, and revitalization effort to achieve a future state that is modern, more responsive, and cost-effective while providing the most efficient responses for health, safety, and security requirements. Over the past several years, these decisions have been further defined in NNSA's Stockpile Stewardship and Management Plan.

The four major elements that define Y-12's future infrastructure are:

1. Replacement/revitalization of key facilities and infrastructure.
2. Consolidation of SNM and SNM facilities and the downsizing of the high-security footprint.
3. Site consolidation and sustainment of "enduring" facilities.
4. Decontamination and decommissioning of legacy facilities as they are declared excess to Y-12 missions.

Table Y2 provides facility condition and asset utilization details about the Y-12 site collectively.

Table Y2. Y-12 Site (NNSA) FY2014 Facility Condition Index and Asset Utilization Index by Category

Replacement Plant Value		$8,590	Million			
Total Deferred Maintenance		$507	Million			
Site-wide Facility Condition Index		5.91%				
		Facility Condition Index (%)	**Asset Condition Index** (%)	**Asset Utilization Index** (%)	**Number of Assets**	**Buildings and Trailers (GSF thousands)**
Mission Dependency	Mission Critical	4.43	95.5	90.76	19	2,090
	Mission Dependent	6.92	92.7	93.99	151	1,417
	Not Mission Dependent	5.89	93.9	45.84	170	1,587
Facility Use	Office			92.73		658
	Warehouse			99.37		539
	Laboratory			100		382

3.6.1 Current Site Footprint

The Y-12 site has multi-program facility ownership with a site presence for the NNSA and DOE offices of NE, EM, and SC. Table Y3 shows facility ownership by square footage for each program and leased facilities.

Table Y3. Y-12 Facility by Program

Number of Buildings (does not include trailers or sheds)	Program	Gross Square Feet
336	National Nuclear Security Administration	5,098,573
1	DOE Office of Nuclear Energy	255,656
15	DOE Office of Environmental Management	578,463
15	DOE Office of Science	895,110
9	Leased	723,411
376	**TOTAL**	**7,551,213**

NNSA serves as the site landlord and is the primary tenant at Y-12. Responsibility for day-to-day operations and management belongs to NNSA. In support of site modernization and directives for more efficient facility management, facilities are continually evaluated to maximize utilization and consolidate personnel. Y-12 currently has 56 facilities listed as excess to the site, accounting for 1,160,971 ft^2. No additional consolidation activities occurred during FY2014. Y-12 uses several contractor-leased facilities, with the bulk being the main administration facilities at the site. An off-site records storage facility, laboratory, and warehouse also are leased. Additionally, the UPF project maintains three off-site leased office buildings.

NE has management responsibility for Building 9204-03. It has been vacated and is in cold standby; this facility is designated a National Historic Landmark and is included in the Manhattan Park project.

EM has responsibility for landfills and waste removal activities at Y-12. Additionally, Buildings 9213, 9401-02, and 9201-04 are shut down, awaiting cleanup and demolition. In total, EM has more than 550,000 ft^2 of space available for demolition. The remaining facilities are active and are supporting the EM mission for Y-12.

SC continues to actively pursue shutdown of its facilities at Y-12. Building 9201-02 is being readied for eventual demolition, with the exception of a small office area. Building 9204-01 and the biology complex are shut down, awaiting demolition. Y-12 still has daily management responsibility for Building 9401-01 but is working to transition the building back to SC. After it is transferred, it also will be readied for demolition. In total, more than 870,000 ft^2 of SC space is available for demolition. These facilities have no future mission relevance to the Oak Ridge National Laboratory and will be transitioned to EM for demolition.

3.6.2 Future Site Footprint

Over the next 10 years and beyond, Y-12 will continue to consolidate personnel and processes in support of the long-range footprint reduction. The smaller Y-12 proposed in the modernization plan will eliminate many of the World War II–vintage operations buildings that currently house the nuclear operations. The 25-year plan envisions a smaller future site, which represents about 2.7 million ft^2 of building space and comprises the following new capable, responsive, and sustainable facilities.

Projects initiated during FYNSP period

- EOC
- Fire Hall
- Lithium Capability Project
- UPF and associated support facilities

Projects planned for beyond FYNSP

- West End Change House
- Applied Technologies Laboratory
- Consolidated Manufacturing Complex
- Maintenance Complex
- Non-MAA Storage Complex
- Warehouse/Shipping and Receiving Facility
- Waste Management Complex

The transition plan will provide for a smaller footprint that is more energy efficient and has technologically capable facilities to fully support the ongoing mission for the site.

Leased Facilities

The existing contractor-leased facilities will remain largely intact for the foreseeable future. The UPF project will transition from off-site leased space to an on-site construction facility after the project migrates from design to construction activities. The Jack Case and New Hope centers are long-term leased facilities that will continue to house administrative functions for the site. The off-site shipping and receiving warehouse will remain in place until a new, on-site warehousing facility can be constructed. The off-site records storage warehouse has a long-term lease that will continue for the 10-year horizon.

Freeze the Footprint

Y-12 fully supports the demolition and new construction off-set requirements established for both the 2003 banking memo and the 2012 Freeze the Footprint initiative. Table Y4 depicts Y-12's banked square footage by program.

Table Y4. Y-12 Banked Square Footage

Program	Disposition	New Construction	Waivers	Banked Square Footage
NNSA	1,220,982	318,466	200,000	1,102,516
EM	18,919	0	0	18,919
SC	118,927	0	0	118,927
Total	**1,358,828**	**318,466**	**200,000**	**1,240,362**

The Freeze the Footprint initiative places an emphasis on warehousing/storage and office facilities. At present, UPF is planning to construct an office building for use during construction. The facility may

be transferred to the site in the 2025 timeframe, after construction is complete. No on-site office or warehouse facility is currently planned within the 3-year window.

As noted in Fig. Y8, the Y-12 NNSA footprint will remain fairly stable until UPF is constructed. This profile reflects planned transfers to EM of several high-risk, contaminated facilities. At present, there is no approved memo of agreement in place for the transfers. The site is working to develop an agreement to move forward with the transfer.

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025-2040
NNSA Owned	5,072,903	5,052,305	5,047,115	5,103,784	5,105,385	5,125,481	5,087,597	5,087,597	5,087,597	5,087,597	6,154,871
Outgranted	0	0	0	0	0	0	0	0	0	0	0
DOE/NNSA Leased	0	0	0	0	0	0	0	0	0	0	0
Contractor Leased	772,141	767,218	621,430	592,630	592,630	592,630	592,630	592,630	592,630	592,630	592,630
With funded dispostion Plan	5,072,903	5,052,305	5,045,319	5,061,188	5,059,789	5,385,885	5,348,001	4,996,243	4,382,601	4,324,789	3,838,277

Fig. Y8. Y-12 NNSA footprint projection (buildings and trailers).

3.6.3 Facility Condition

MC operations are scattered across multiple 40- to 60-year-old facilities. The facilities are oversized, contain obsolete equipment of low reliability, and require excessive upkeep to maintain minimum capability. Much of the critical infrastructure is approaching or is beyond the expected design life. New construction and recent initiatives for life-cycle replacement and maintenance, such as the NFRR project, have resulted in an improved condition for these facilities. Projections beyond 2020 reveal that with planned construction activities, the condition of MC infrastructure will remain constant or improve. The FCI for MC facilities is already below the 5% threshold established by NNSA. Y-12 fully expects this FCI to remain at less than 5% for the foreseeable future and then to improve when UPF is operational. The continued investment in equipment and facility improvements for the aging MC infrastructure is necessary to prevent a potential decline in condition for select facilities. For example, Building 9204-02E and the MC capability it provides will be needed to support production operations for another 10 to 15 years. Life-extension investments in facilities such as Building 9204-02E must be a priority.

The FCI for MDNC facilities is less than 8% and will remain fairly stable for the near-term. As facilities are consolidated and excessed, continued life-cycle sustainment efforts will further improve the facility condition. Much-needed facility and utility infrastructure upgrade projects would ensure the future viability of Y-12 operations.

3.6.3.1 Deferred Maintenance Reduction

In FY2014, the Secretary of Energy requested that all sites fund infrastructure and maintenance budgets at a level sufficient, at least, to avoid increasing the DM backlog. Additional guidance was provided for NNSA in the Energy and Water Development and Related Agencies Appropriations Act, 2015: “NNSA is directed to submit to the Committees on Appropriations of the House of Representatives and the Senate not later than 120 days after enactment of this Act a ten-year strategic plan that would reduce the DM backlog below FY2014 baseline levels and dispose of unneeded facilities.” [1]

Y-12 continues to credit DM reduction in a timely manner for all projects and will continue to investigate possible savings opportunities. The site has evaluated the historical DM and noted that, although reductions in DM are credited in the system ($23M in FY2014), increases resulting from new deficiency identification and inflation growth are offsetting any reduction efforts. Significant reductions in DM will not be realized without additional investment strategies. Similar to a Facilities and Infrastructure Recapitalization Program, additional investments above current funding are required to significantly reduce DM. Opportunities to redirect funds for DM reduction and over-target funding requirements are being provided in the FY2017 budget call.

Figure Y9 provides an out-year projection of the expected changes in DM and associated FCI. Future new construction and demolition/transfer activities could have an impact on the FCI, but DM, as a whole, is expected to remain fairly stable. The long-range condition in MC facilities will significantly improve as new facilities are constructed and the old facilities are transferred to EM.

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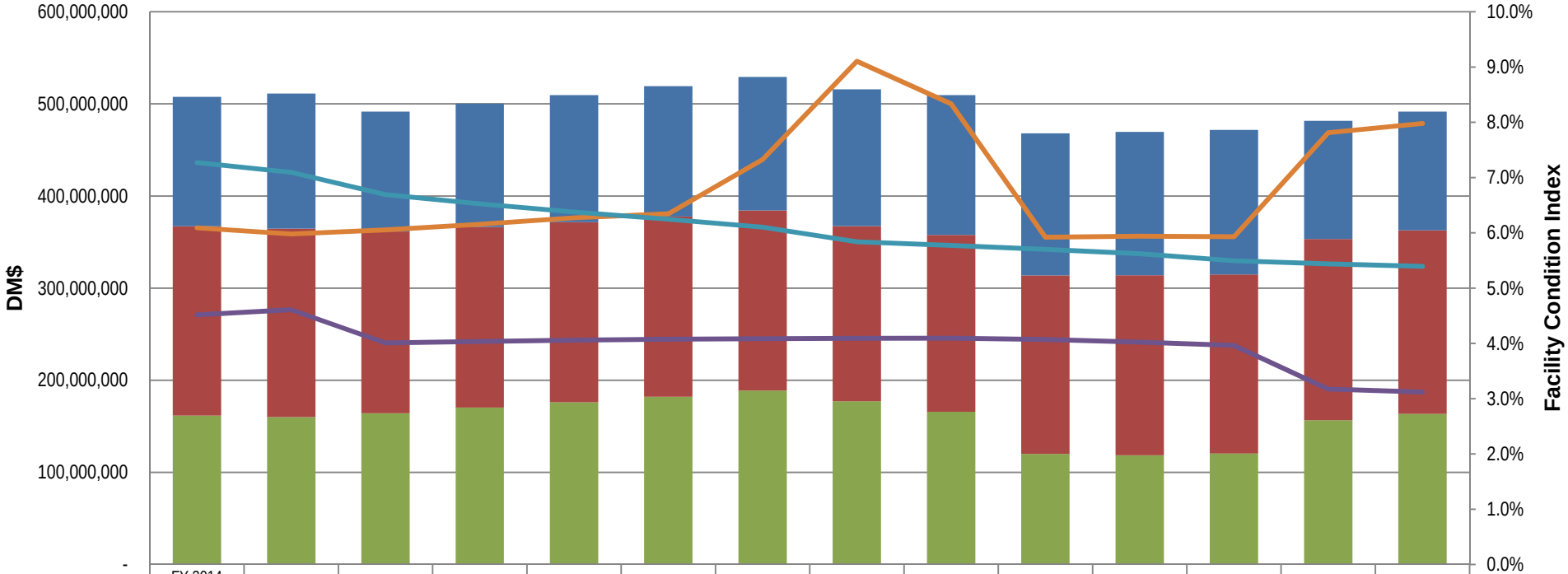
[1] Energy and Water Development and Related Agencies Appropriations Act, 2015, Explanatory Statement, p. 46.



	FY 2014 (Actual)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
DM MC	140,549,289	146,649,087	130,273,676	134,068,748	137,776,099	141,389,138	144,915,696	148,346,665	151,672,733	154,139,313	155,674,852	156,797,636	128,278,023	128,859,300
DM MDNC	205,497,635	204,469,415	197,111,820	196,001,701	195,530,044	195,677,997	195,455,256	190,064,096	192,011,269	193,781,694	195,300,371	194,463,025	196,669,038	199,267,677
DM NMC	161,646,337	160,107,197	164,289,771	170,332,834	176,135,691	182,113,330	188,835,797	177,300,683	165,794,097	120,050,034	118,680,821	120,447,545	156,664,891	163,548,244
NMC FCI	6.1%	6.0%	6.1%	6.2%	6.3%	6.3%	7.3%	9.1%	8.3%	5.9%	5.9%	5.9%	7.8%	8.0%
MDNC FCI	7.3%	7.1%	6.7%	6.5%	6.4%	6.2%	6.1%	5.8%	5.8%	5.7%	5.6%	5.5%	5.4%	5.4%
MC FCI	4.5%	4.6%	4.0%	4.0%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.0%	4.0%	3.2%	3.1%

Fig. Y9. Y-12 Projected Deferred Maintenance and Facility Condition Index by mission dependency.

3.6.3.2 Space Utilization and Consolidation

In concert with the Laboratory Operations Board initiative, Y-12 evaluated space and utilization data for all facilities on-site. The resulting utilization data will be included in future consolidation assessments. As budgets continue to decline, it is vitally important to efficiently use all available space. Various programmatic modernization initiatives are under way to vacate space for reuse or demolition. Currently under evaluation are both computing and warehousing spaces. The Information Technology organization is evaluating new technology that will significantly reduce the footprint requirement for computing. Additionally, in conjunction with the UPF construction effort, the site is evaluating a new warehouse facility to replace several on-site, outdated facilities.

In concert with the master site planning effort, space type and utilization information is maintained in the Y-12 Area Mapping System, a geographical information system. Each night, data are extracted from the site-wide personnel database to allow almost real-time assessment of office space. This effort allows for easy access to information for each facility, including available office space, storage capacity by type, and specific details regarding size and technical capability for each area. Buildings are evaluated based on current use, occupancy, and long-term viability and are incorporated into site-wide consolidation or renovation planning.

The mapping system is being used for master site planning to evaluate areas for future renovation and impact of site changes as well as to identify organizational use of space.

3.6.4 Sustainability/Energy

Y-12 is committed to achieving the sustainable energy and transportation goals established in Executive Orders 13423 and 13514. Although complete accomplishment of the present goals would exceed existing funding levels, Y-12 will continue to execute projects as funding becomes available or as projects can be accomplished incrementally within current funding profiles. All efforts will be made to integrate energy and sustainability initiatives with ongoing site mission objectives.

Dedicated funding for energy and water projects is provided via the ESPC mechanism. ESPC delivery order #2 is in the third period of performance at Y-12; delivery order #3 was awarded in September 2013. Efforts from delivery order #2 have greatly contributed to both energy reduction and efficiency gains for the projects implemented. Delivery order #3 will result in an estimated annual energy and water savings of $2.8M and an estimated operations and maintenance savings of $2.3M. The site will continue to work with NNSA to successfully accomplish these efforts.

During FY2014, five buildings and one trailer were demolished, which resulted in 9,609 ft^2 removed from the Y-12 inventory, contributing to the reduction of the site energy intensity. Other FY2014 factors that potentially had negative impacts on the reporting include an increase in travel resulting from the new contract implementation and a change in the UPF work schedule. Because the new M&O contract did not begin until July 2014, the impact will not be fully realized until FY2015.

Y-12 is currently meeting or has exceeded 10 of the 20 sustainability goals. Several of the remaining goals are on track and are fully expected to be met before the established deadlines. Some ongoing Y-12 initiatives that have had a significant impact on sustainability at the site and have helped reduce energy and water intensity during the past few years include:

- ESPC projects,
- pollution prevention and recycle/reuse programs, and
- site-wide consolidation and transformation.

Recent initiatives that demonstrated significant progress toward the goals include:

- continued energy reduction from steam pressure reduction on distribution system (165 psi to 135 psi);
- site-wide lighting upgrades;
- diverted 93% of construction and demolition and 58% of municipal waste from the landfill through reuse and recycle;
- Three Star Partner in Tennessee Green Star Partnership;
- Federal Green Challenge Program member;
- implemented more than 90 pollution prevention initiatives, which eliminated more than 23.8 million pounds of waste, creating a projected cost avoidance of more than $1.6M;
- Unneeded Materials and Chemicals Program received Solid and Hazardous Waste Award from the Tennessee Chamber of Commerce and Industry and a Defense Programs Award of Excellence; and
- hosted the Tennessee Department of Environment and Conservation East Tennessee Regional Tennessee Green Star Partnership Workshop to promote sustainable practices and facilitate benchmarking among members.

For the eleventh consecutive year, Y-12 was recognized by NNSA for award-winning activities. Y-12 received a 2014 Best in Class Award for “Y-12’s Clarence Hill Cultivates the Seeds of Change” in the Exceptional Service/Sustainability Champion Category. NNSA Environmental Stewardship Award Certificates were received for “Y-12 Unneeded Materials and Chemicals Program” in the Waste Reduction and Pollution Prevention Category, “Y-12 Sweeping It Clean” in the Innovation and Holistic Approach Category, and “WhY-12 Must Communicate” in the Sustainable Communications Category.

During FY2015, the site will continue to focus on employee awareness and incorporation of sustainability into maintenance efforts and modernization planning, which will further enable site progress toward meeting the goals.

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