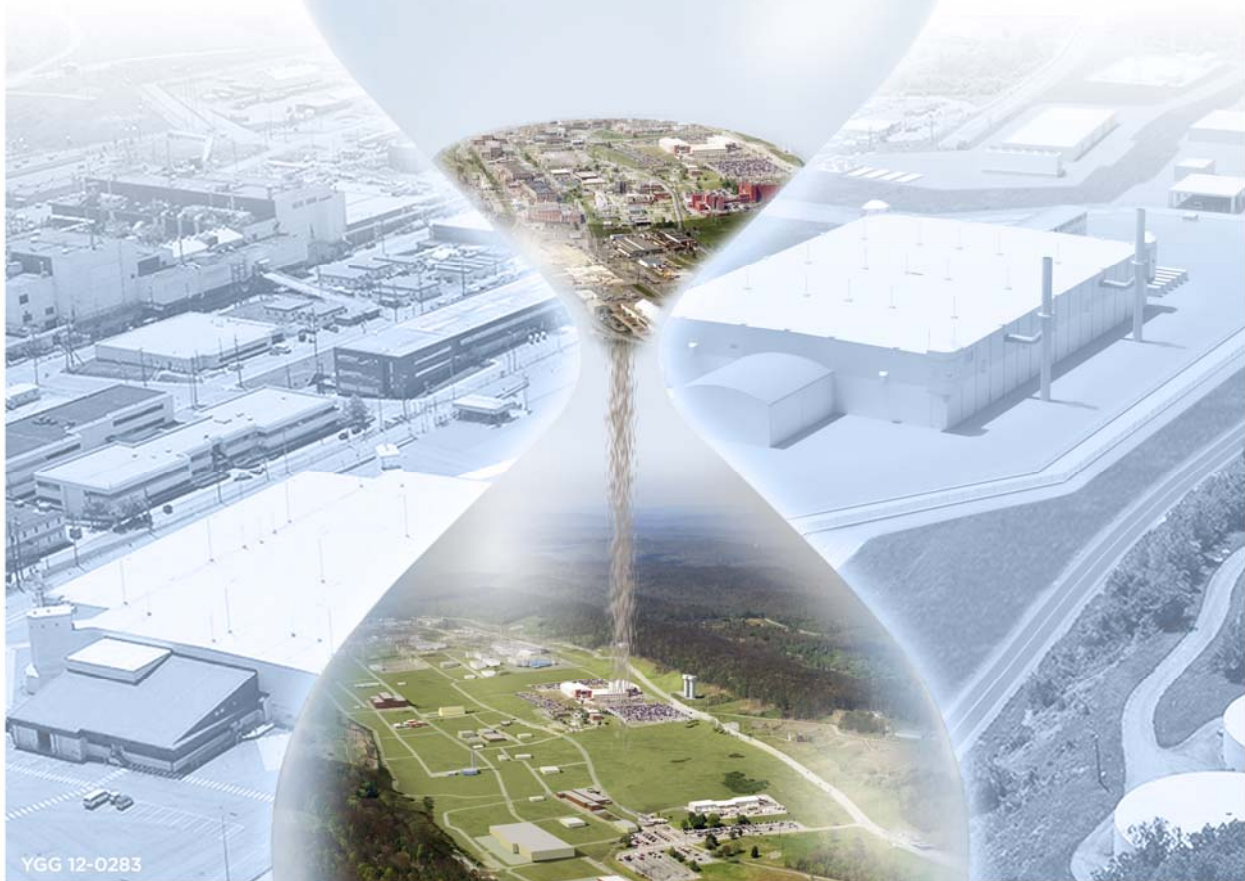


Y/MOD-012, Rev. 12
JULY 2012



Twenty-five Year Site Plan

FYs 2013-2037



YGG 12-0283

Y - 12 NATIONAL SECURITY COMPLEX

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Y-12 NATIONAL SECURITY COMPLEX TWENTY-FIVE YEAR SITE PLAN

FYs 2013–2037

July 2012

Prepared by
Babcock & Wilcox Technical Services Y-12, LLC
Management & Operating Contractor
for the
Y-12 National Security Complex
under Contract No. DE-AC05-00OR22800
with the
U.S. Department of Energy
National Nuclear Security Administration

A handwritten signature in black ink, reading "Dan Hoag".

Dan Hoag, Manager, NPO Y-12

A handwritten signature in black ink, reading "Darrel P. Kohlhorst".

Darrel P. Kohlhorst, President and General Manager,
B&W Y-12, LLC

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ACRONYMS

ARRA	American Recovery and Reinvestment Act
CAS	central alarm station
CMC	Consolidated Manufacturing Complex
CSA	canned subassembly
DM	deferred maintenance
DOE	U.S. Department of Energy
DSW	Directed Stockpile Work
EM	Office of Environmental Management
EU	enriched uranium
FCI	facility condition index
FY	fiscal year
FYNSP	Future Years National Security Program
GSF	gross square feet
GSP	graded security protection
GTRI	Global Threat Reduction Initiatives
HEU	highly enriched uranium
HEUMF	Highly Enriched Uranium Materials Facility
HPSB	High Performance and Sustainable Building
HVAC	heating, ventilating, and air-conditioning
LEED	Leadership in Energy and Environmental Design
LEP	Life Extension Program
MAA	material access area
MDNC	mission-dependent, not critical
MRR	material recycle and recovery
NN	nuclear nonproliferation
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
PA	Protected Area
PAMS	Physical Asset Management Solutions
PIDAS	Perimeter Intrusion Detection and Assessment System
ROD	Record of Decision
SCIF	Sensitive Compartmented Information Facility
SNM	special nuclear material
TYSP	Twenty-five-Year Site Plan
UPF	Uranium Processing Facility
WEPAR	West End Protected Area Reduction
Y-12	Y-12 National Security Complex

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1. EXECUTIVE SUMMARY

This Twenty-five-Year Site Plan (TYSP) presents the fiscal year (FY) 2013–2037 facility and infrastructure requirements to maintain progress in achieving the overall transformation vision for the Y-12 National Security Complex (Y-12). The requirements expressed herein are within the Future Years National Security Program (FYNSP) targets for Y-12. The long-range vision is consistent with multiple Records of Decision (RODs), issuance of the 2010 *Nuclear Posture Review*, and the latest version of the *Stockpile Stewardship and Management Plan*. Continued transformation at Y-12 will be a challenge from a budget and schedule perspective.

The preferred alternative from the 2008 ROD established the following Y-12–specific goals:

- a 90% reduction in the high-security area,
- a 60% reduction in the nuclear operations footprint, and
- a 50% reduction in the total building footprint [an approximate 3.1 million gross square feet (GSF) reduction].

1.1 CURRENT STATE

Most of Y-12's mission-critical facilities are more than 60 years old (see Fig. 1). To address this situation Y-12 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 National Nuclear Security Administration (NNSA) enterprise transformation planning. Through modernization projects, deferred maintenance (DM) reduction, enhanced security measures, technology enhancements, infrastructure reduction, and innovative business practices, Y-12 is becoming a more responsive and cost-effective enterprise, as evidenced by the 2011 and 2012 infrastructure accomplishments presented herein.

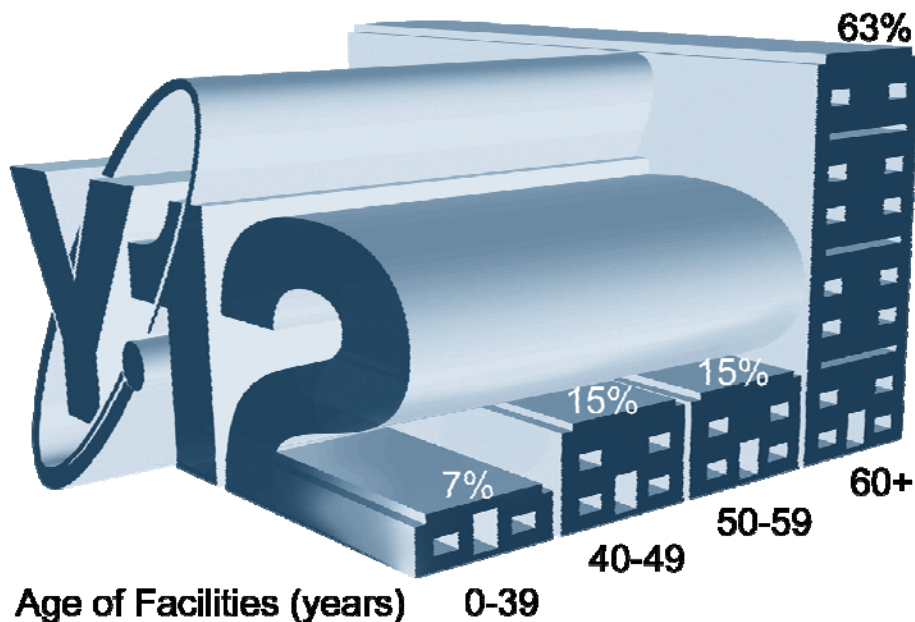


Fig. 1. Age of Y-12's mission-critical facilities.

1.2 FUTURE STATE AND ACCOMPLISHMENTS

The following four major elements define the planned physical transformation activities at Y-12 over the 25-year horizon. Accomplishments toward these elements from the past 2 years are provided.

1. *Replacement/Revitalization*

The Uranium Processing Facility (UPF) will replace all of the highly enriched uranium (HEU) production functions for the site. UPF and the Highly Enriched Uranium Materials Facility (HEUMF) are designed for security and are a more cost-effective approach to safeguards and security. A third facility, the Consolidated Manufacturing Complex (CMC), will consolidate Y-12's non-HEU production functions into a modern facility. In aggregate, these facilities represent an opportunity for a dramatic reduction in the site's annual operating costs.

Accomplishments

- The UPF project has been replanned to prioritize and accelerate the replacement of Building 9212 capabilities into UPF. A revised Critical Decision (CD)-1 submittal was approved in June 2012.

2. *Security Downsizing and Consolidation*

With UPF operational, Y-12 will complete projects to reduce the high-security footprint of the site from 150 acres to approximately 15 acres (see Fig. 2). The migration to this ultimate footprint began in 2005, when Y-12 began consolidation of special nuclear material (SNM) into fewer locations and simultaneously began physical security improvements to meet the stringent graded security protection (GSP) requirements. Interim consolidation of material and physical security improvements are mitigating security cost increases, and the completion of the new high-security footprint will provide a significant decrease in annual security cost. The previously proposed Y-12 Accelerated Transformation initiative to remove 70 acres from the Y-12 Protected Area (PA) will be accomplished within the UPF line-item project as the West End Protected Area Reduction (WEPAR) subproject. Implementation of WEPAR will facilitate future operational activities and remediation actions.



Fig. 2. Depiction of HEUMF and UPF.

Accomplishments

- Construction of the new Bear Creek Road bypass enabled closure of the old Bear Creek Road on the north side of the PA to provide additional Protective Force tactical support.
- Classified material was dispositioned and relocated from Buildings 9720-18 and 9720-12 in September 2011; the buildings are scheduled for demolition.
- Loading of HEUMF continued.

3. Enduring Facilities

Y-12 has a number of existing “enduring facilities” that must remain operational throughout the long-term horizon. A facility’s categorization as enduring is a factor in the prioritization of repairs and maintenance. Facility assessments, facility risk reduction initiatives, DM analyses, and funding prioritization ensure these facilities will continue to operate.

Accomplishments

- The Jack Case Center was recently certified as Y-12’s first High Performance and Sustainable Building (HPSB) facility.
- Forty-five enduring buildings have been modeled, and the cost profiles have been added to master planning efforts. The cost profile is used to develop and prioritize projects based on FYNSP and FY funding allocations.

4. Legacy Facility Deactivation and Demolition

Since 2002, Y-12 has demolished more than 1.4 million ft² of excess facilities. The NNSA’s Facilities Disposition Program for FY 2014 is under development and will identify and evaluate excess assets, prioritize their disposition, and propose the budget resources required for their disposition. Without a defined program to eliminate excess facilities, the NNSA sites will continue to use limited resources to safely maintain those facilities that no longer have a mission use. The American Recovery and Reinvestment Act (ARRA) funding secured at Y-12 through 2011 implemented early actions to deactivate and demolish some of these facilities.

Accomplishments

- Almost 185,000 ft² has been demolished since FY 2011 in support of footprint reduction efforts. Of this, approximately 84,000 ft² was demolished under ARRA funding.
- With ARRA funding Y-12 removed all legacy material in Building 9201-5 and the second-floor of Building 9204-4. The filter house of Building 9206 was also demolished.

1.3 CHANGES, ISSUES, AND CONCERNS

The extended schedules for replacement facilities requires the development and implementation of sustainment and risk mitigation strategies to ensure the availability of required capabilities to meet mission requirements until new facilities can be realized.

The UPF project has been replanned. Building 9212 capabilities will have priority and be operable in UPF by the end of FY 2023. Other HEU capabilities (machining, assembly, disassembly, quality evaluation) have been deferred to a later date

On July 20, 2011, NNSA issued a ROD for Y-12 based on information and analyses contained in the *Final Site-Wide Environmental Impact Statement for the Y-12 National Security Complex*, DOE-EIS-0387. NNSA selected Alternative 4: to continue operation of Y-12, and to construct and operate one new facility—a capability-sized UPF. The construction of UPF and other site transformation activities identified in this TYSP are consistent with that ROD.

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2. SITE OVERVIEW AND SNAPSHOT

Location: Oak Ridge, Tenn.

Type: Multi-Program Site

Web site: <http://www.y12.doe.gov/>

Site Overview:

The Y-12 National Security Complex is a 5,239-acre site in Oak Ridge, Tenn., operated by B&W Y-12 for the National Nuclear Security Administration. Since 1943, Y-12 has played a key role in strengthening our country's national security and reducing the global threat from weapons of mass destruction.

The site's long-range vision is consistent multiple Records of Decision (RODs), the 2010 *Nuclear Posture Review*, and the latest version of the *Stockpile Stewardship and Management Plan*. The preferred alternative from the 2008 ROD established the following goals for Y-12:

- 90% reduction in the high-security area,
- 60% reduction in the nuclear operations footprint, and
- 50% reduction in the total building footprint.

Capabilities

C3—Uranium

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

C10—Enabling Infrastructure

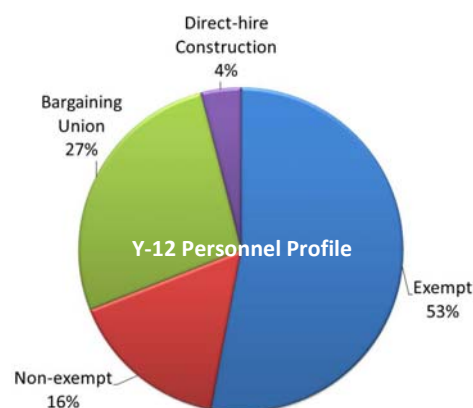
C11—Counterterrorism and Counterproliferation

C12—Support of Other Missions/Program Capability

Contractor Operator: B&W Y-12

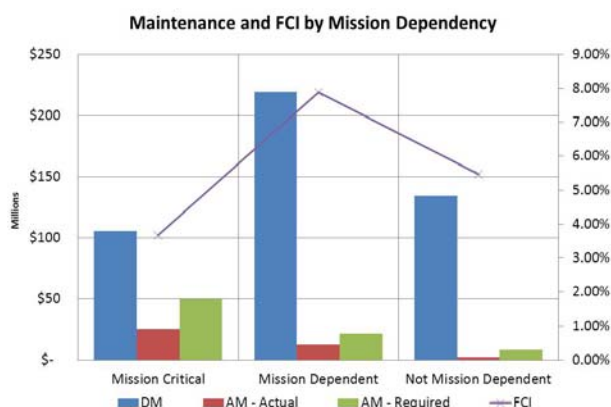
Responsible Field Office: NPO Y-12

Site Manager: Steven C. Erhart



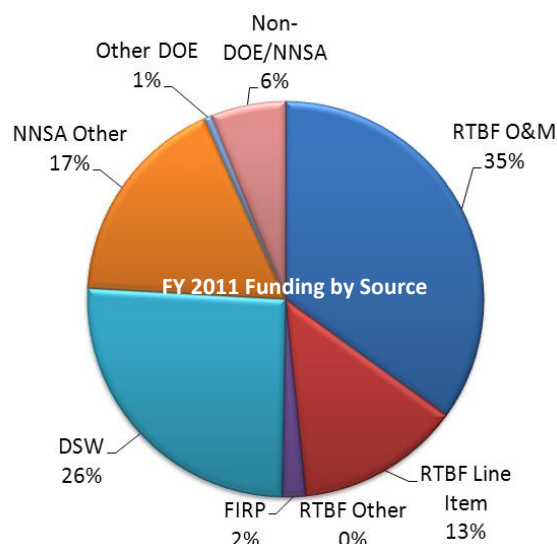
Real Property

- 5,239 Acres (Owned)
- 344 Buildings/Trailers
 - 3,920,956 GSF Active and Operational
 - 1,167,886 GSF Nonoperational
 - 718,448 GSF Leased
- Replacement Plant Value: \$ 9,153M
- Deferred Maintenance: \$ 532M
- Facility Condition Index:
 - Mission Critical: 3.70%
 - Mission Dependent: 8.0%
 - Asset Utilization Index (Overall): 77.08%



FY 2011 Funding by Source (in millions)

- FY 2011 Total Site Operating Cost \$1,011.9
- FY 2011 Total NNSA Funding \$798.5
- FY 2011 Total DOE (Non-NNSA) Funding \$5.6
- FY 2011 Total Other Funding \$52.3



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3. ASSUMPTIONS

Y-12's planning documents are based on assumptions concerning capabilities, capacity and work scope, and infrastructure. This TYSP is consistent with multiple RODs, which recognize Y-12 as NNSA's center of excellence for uranium manufacturing and research and development. Significant investment will be required to implement transformation while continuing to meet annual programmatic deliverables and meet safety and security requirements. Only through the continued reconfiguration of Y-12 can the required security, safety, and operational cost reductions be achieved.

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

- Life Extension Program (LEP) production will remain steady around current levels or will be adjusted as directed by NNSA schedules.
- The production of joint test assembly 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 Reactor work will slightly decrease during 2017–2022 and then remain steady at that rate.
- Work associated with global security and interagency initiatives and NNSA's nonproliferation mission will increase significantly.
- 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 highest scope priority for the UPF project is early transition of Building 9212 operations with transition of operations from Buildings 9215 and 9204-2E into UPF as lower priorities.
- Facility deactivation and demolition through the U.S. Department of Energy (DOE) Office of Environmental Management (EM) will continue.
- The Security Improvements Project will complete current scope and a substantial portion of the balance-of-plant Argus implementation previously identified as a line-item project. The remaining scope for Argus implementation will be achievable through one or more security-funded general plant projects.
- Three line-item projects previously proposed are still needed to allow full realization of the total cost savings associated with consolidation of nuclear operations. The projects are Perimeter Intrusion Detection and Assessment System (PIDAS) Sensor Modernization, UPF Entry Control Facilities, and Central Alarm Station (CAS) Relocation. The schedules and scope for these projects are updated to be consistent with the revised planning for UPF.
- Sustainment of mission-critical facilities and utility systems will be the primary driver in the prioritization of Capability-Based Facilities and Infrastructure projects.
- DOE will provide for the deactivation and demolition of more than 3.8 million ft² of NNSA, Office of Nuclear Energy, Office of Science, and EM excess facilities.
- A transition to a smaller, more responsive Y-12 will require most mission-critical facilities to be operated and maintained beyond design life.

- The previously proposed Y-12 Accelerated Transformation initiative to remove 70 acres from the Y-12 PA will be accomplished as the WEPAR subproject within the UPF line-item project.
- Continued upgrades and replacements of safeguards and security systems and equipment will be completed in accordance with UPF and other line-item project planning documents.

4. CHANGES FROM PRIOR YEAR TYSP

The UPF project has been replanned. Building 9212 capabilities will have priority and be operable in UPF by the end of FY 2023. Other HEU capabilities (machining, assembly, disassembly, quality evaluation) have been deferred to a later date.

The Security Improvements Project will complete current scope and a substantial portion of the balance of plant Argus implementation previously identified as a line-item project. The remaining scope for Argus implementation will be achievable through one or more security-funded general plant projects.

The previously proposed Y-12 Accelerated Transformation initiative to remove 70 acres from the Y-12 PA will be accomplished as the WEPAR subproject within the UPF line-item project.

The functions proposed for the Complex Command Center will be accomplished with smaller, individual projects. A new emergency response center and a new fire hall are currently planned.

The extended schedules for replacement of major mission-critical facilities require the development and implementation of sustainment and risk mitigation strategies.

The Critical Nuclear Utilities Upgrade Project has been replaced by a series of general plant and plant equipment projects to address maintenance, repair, and capital improvement needs.

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5. FUTURE VISION AND CORE CAPABILITIES

5.1 URANIUM (C3)

The Directed Stockpile Work (DSW) program provides resources to perform maintenance and retrofit activities on stockpile weapon systems. LEPs direct the production of refurbished, replaced, and/or redesigned weapons components, and activities include producing War Reserve materials and parts, supporting direct manufacturing specifications and procedures, and training personnel to meet steady-state production rates. LEPs depend on Y-12's capability to sustain and refurbish all nuclear weapons in the active and active reserve stockpile. In addition to the LEP effort, DSW consists of Stockpile Systems (quality evaluation and joint test assembly production), Dismantlement and Disposition, and Stockpile Services.

Applicable NNSA Missions

- M1 Managing the Stockpile*
- M2 Preventing Proliferation*
- M3 Powering the Nuclear Navy*
- M6 Recapitalizing Our Infrastructure*

Material recycle and recovery (MRR) activities are integral to DSW and include the recycling/recovery of enriched uranium (EU) from the production, dismantlement, or quality evaluation of weapons parts; performing chemical conversion of lithium; and storing in-process materials until they can be further processed for long-term reuse, storage, or disposition. For example, high uranium content materials, such as HEU oxide and liquids, are recycled and low uranium content salvage materials such as slag, ash, filters, and combustibles are processed for off-site disposal.

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

LEPs for the W76, B61, and W78 are scheduled within the next 10 years. The major facilities for uranium processing are Buildings 9204-2E, 9212 and 9215, and the major facilities for non-EU component processing that supports secondary builds are Buildings 9204-2, 9201-1, 9201-5 N/W, and 9998. MRR will operate wet chemistry, the oxide conversion facility, and reduction to produce purified uranium metal in support of national security mission needs. Additional significant processing efforts will center on support of dismantlement initiatives, lithium processing, and backlog reduction.

Sustainment projects will be a focus for the EU processing buildings and production systems in these buildings over the next ten years to ensure these Cold War-era buildings/systems are able to safely support the critical mission until UPF is operational. In addition to sustainment activities, process transformation activities (e.g., microwave casting, calciner, electrorefining) are being investigated and pursued as a means to improve productivity and longevity of the EU mission.

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

A newly constructed UPF will replace all existing HEU production operations at Y-12. UPF will be a modern manufacturing facility designed and constructed for health, safety, security, and operations 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 and will be contained within a much smaller PA to achieve a 90% reduction in the security footprint. The goal is to complete the main UPF structure by FY 2018, and operational readiness for Building 9212 capabilities is to start in FY 2022. All Building 9212 capabilities will be operable in UPF in FY 2023. Other HEU capabilities (machining, assembly, disassembly, quality evaluation) will be transitioned later. Additional line-item construction for these HEU capabilities is anticipated in the 20-year planning horizon to complete the transition of all HEU capabilities into UPF. Sustainment efforts will ensure these capabilities remain viable in existing facilities until that time.

Building 9212 will be available to be transitioned to EM for demolition around 2027. Areas of Building 9215 will be available for transition to other mission work after the complete HEU UPF scope is operational. Reuse options or disposition pathways (i.e., included in EM, funded by another program) for Building 9204-2E remain to be determined.

CMC will consolidate Y-12's non-HEU production functions into a modern facility designed and constructed for health, safety, security, and operational efficiencies to ensure life-cycle cost savings. CMC will house special materials, general manufacturing, and depleted uranium operations and will be built in two phases. CMC-Lithium will be constructed by 2023 and CMC-Canned Subassembly (CSA) Support will be constructed by 2035. Sustainment efforts will ensure non-SNM production capabilities are maintained.

5.2 SPECIAL NUCLEAR MATERIAL ACCOUNTABILITY, STORAGE, PROTECTION, HANDLING AND DISPOSITION (C9)

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

Stored materials are managed to ensure timely support of the Defense Programs mission for replacement of limited-life components for the stockpile, the Naval Reactors Fuel Program requirements, Foreign and Domestic Research Reactors, and other missions. 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.

Applicable NNSA Missions

- M1 Managing the Stockpile*
- M2 Preventing Proliferation*
- M3 Powering the Nuclear Navy*
- M6 Recapitalizing Our Infrastructure*

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

By the end of FY 2011, MAA-SNM that was primarily stored in CSAs from long-term storage areas was moved into HEUMF, which became operational in FY 2010. Movement of EU materials from interim and in-process storage into HEUMF is ongoing. Loading of HEUMF will be complete when all EU material requiring MAA storage from Building 9212 is removed and Building 9212 is replaced by UPF. CSAs awaiting dismantlement will continue to be stored at their current location.

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

During these years, all MAA-SNM will be stored in HEUMF. UPF will house only limited quantities of interim and in-process storage. 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 will eventually solely contain the HEUMF and UPF complexes.

5.3 ENABLING INFRASTRUCTURE (C10)

Y-12 has approximately 1.5 million ft² of infrastructure support facilities that house operations supporting mission-critical and Complementary Work programs. Although this support space is only about 25% of Y-12's total floor area, support infrastructure houses more than 80% (~3500) of workers. Support facilities house workers for a variety of functions including administrative, security, warehousing, emergency management, maintenance, development laboratories, waste management, change houses, and information technology.

Many of these support facilities were constructed during World War II or the early days of the Cold War and are extraordinarily expensive to operate and do not meet current codes. Several facilities, such as the Plant Laboratory, Maintenance Operations, and the Plant Shift Superintendent's office, require major modernization or replacement.

The construction of the Jack Case and New Hope centers has largely met future needs for technical and administrative support space.

Applicable NNSA Missions

- M1 Managing the Stockpile*
- M2 Preventing Proliferation*
- M3 Powering the Nuclear Navy*
- M4 Emergency Response*
- M6 Recapitalizing Our Infrastructure*

Multiple facilities, totaling approximately 120,000 ft², store a variety of nuclear and nonnuclear materials primarily associated with defense missions; these non-MAA materials include depleted uranium, low-equity EU, lithium, mercury, and heavy water. Non-MAA storage also provides compliant long-term storage for classified materials required for Defense Programs missions. Non-MAA uranium materials (depleted uranium and low-equity EU) were consolidated into Building 9720-5 in FY 2011 to address security requirements, operational efficiencies, and transformation goals and objectives. Non-MAA lithium materials will continue to be stored in Buildings 9720-46, 9720-59, and 9811-1. These storage facilities are projected to reach capacity by FY 2013. As a result, Building 9720-33 is planned to be approved for lithium storage in FY 2012. In addition, planned disposition of elemental mercury has been halted, and transfer of the mercury to a DOE-EM facility is pending further evaluation.

Several proposed security initiatives affect Y-12's support infrastructure: implementation of the 2008 GSP, reduction of the PA by 70 acres, reduction of the overall security area footprint, and modernization of the security infrastructure. Completion of the security upgrades, enhancements, and efficiency projects will allow NNSA to integrate security infrastructure requirements. Further analyses will ensure that the most cost-effective means are used to address security challenges and may result in project modifications to ensure a balanced security posture.

The Security Improvements Project will complete current scope and a substantial portion of the balance of plant Argus implementation previously identified as a line-item project. The remaining scope for Argus implementation will be achievable through one or more security-funded general plant projects.

The site's production decisions regarding program requirements and modernization of facilities drive the planning decisions for future utilities. To achieve the goals, the existing utility infrastructure must be modernized through an investment program of maintenance, repair, and capital improvement consisting of general plant projects, plant equipment projects, and line-item construction projects to meet the utilities services requirements today and in the future. Steam, compressed air, and potable water systems have benefitted from recent upgrades.

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

An emergency response center will replace the current Plant Shift Superintendent's operation and the technical support center that provides on-site emergency response. The current facility was constructed in the 1940s and is not suitable for sustained emergency management support. Funding for this emergency response center will be requested between FYs 2014 and 2019.

A new fire station will replace today's 1940-era station, which is confined within the PA and located in close proximity to EU and other hazardous operations. The new fire station will be in a location to ensure a timely, safe response to all site emergencies as well as the consolidation of fire protection operations. Funding of this project is planned within the next 5 years.

With completion of in-progress and planned security upgrade projects, Y-12 remains on track to achieve full GSP-compliance certification by the end of September 2012.

The Security Improvements Project is the leading initiative to upgrade Y-12's aging security systems. Currently in construction, the project will install Argus access control and alarm management systems in the CAS and Secondary Alarm Station by FY 2014 and will convert HEUMF and the Jack Case Center closed areas to integrate alarm management and access control. Implementation of integrated alarm management and access control for the remaining Y-12 facilities is not included in the project's scope.

The UPF WEPAR subproject will install barriers, access control, and complementary sensors and alarms that use modern technology to provide effective perimeter detection at lower initial capital cost and lower overall life-cycle cost. These upgrades will enable reduction of the PA by approximately 70 acres. The area west of H Road in the PA will become a Property Protection Area, which will result in improved access, increased productivity, and reduced cost. Consolidating classified processes in smaller, discrete limited or closed areas will generate further efficiencies.

Additional security improvements and technology 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)

The Materials Receiving and Storage Facility will support consolidation of non-EU materials staged in multiple deteriorating buildings and the disposition of an off-site leased facility where the bulk of Y-12 procurements and supplies are received. The proposed facility would consolidate receipt and storage functions to increase the efficiency of operations and reduce the annual cost of the combined functions. Construction is planned for 2030, and sustainment efforts will ensure that capabilities are maintained. The Materials Receiving and Storage Facility will consist of two facilities: the Warehouse/Shipping and Receiving Facility on the east end and the Non-MAA Storage Complex on the west end.

- The Warehouse/Shipping and Receiving Facility will be a new, on-site warehouse with shipping and receiving and storage capabilities. A small number of general storage facilities will provide additional space in various locations around the site.
- The consolidation of the non-MAA uranium materials into Building 9720-5 is an interim measure. The new Non-MAA Storage Complex will be designed to handle the various non-MAA storage needs and will be sized for these needs after the completion of ongoing aggressive disposition campaigns. The scope of non-MAA storage is to store nuclear materials that are required for support of Y-12’s missions. Specifically, the function provides storage for low-enriched uranium that does not require MAA security, depleted and normal/natural uranium, enriched lithium, and heavy water. The facility will be built for a 50-year life and will be the only long-term Y-12 non-MAA storage facility. Given the physical condition and the warehouse capabilities of Building 9720-5, consolidation of non-MAA uranium materials into this facility provides a level of mitigation for schedule risk associated with constructing the new Non-MAA Storage Complex. Storage requirements will continue to be evaluated as inventories change and site transformation continues.

Three previously proposed security line-item projects are still needed to allow full realization of the total cost savings associated with consolidation of nuclear operations. The projects are PIDAS Sensor Modernization, UPF Entry Control Facilities, and CAS Relocation. The schedules and scope for these projects are updated to be consistent with the revised planning for UPF.

The Applied Technologies Laboratory will be constructed in 2030. Sustainment efforts will ensure production support capabilities are maintained.

The Plant Maintenance Facility will replace an existing oversized facility that was constructed in 1944. The proposed facility would consolidate satellite maintenance facilities into one modern and efficient location.

5.4 COUNTERTERRORISM AND COUNTERPROLIFERATION (C11)

As the NNSA Uranium Center of Excellence and a crucial link in providing a safe and secure U.S. nuclear deterrent, Y-12 comprises facilities, processes, materials, and expertise that are vital to preventing the proliferation of nuclear materials and technology. The nuclear nonproliferation (NN) programs at Y-12 include Global Threat Reduction Initiatives (GTRI), through which Y-12 develops and produces high-density uranium fuels for the conversion of HEU-fueled research reactors, removes vulnerable weapons-usable nuclear materials from around the globe, and provides expertise and training to protect nuclear and radiological material, both domestically and abroad. At the site’s Nuclear Detection and Sensor Testing Center, researchers test new technologies to detect nuclear materials with relevant quantities of SNM. Y-12 supports nonproliferation and international security verification and controls programs with HEU experts as transparency monitors in Russia, the Next Generation Safeguards Initiative with safeguards expertise, and policy initiatives on future arms verification activities. Y-12 continues to support the International Material Protection

Applicable NNSA Missions

- | | |
|-----------|--|
| <i>M2</i> | <i>Preventing Proliferation</i> |
| <i>M4</i> | <i>Emergency Response</i> |
| <i>M5</i> | <i>Continuing Management Reform</i> |
| <i>M6</i> | <i>Recapitalizing Our Infrastructure</i> |

and Cooperation programs with subject matter experts serving on teams and providing training workshops for Russians in all areas of nuclear material security and control.

The HEU Disposition Program continues to be Y-12's largest NN program. This program ensures the downblending of surplus HEU and supports the supply of low enriched uranium to ensure that foreign research reactors have a reliable fuel supply instead of developing their own capabilities or resorting to using HEU again.

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, GTRI Alarm Response Training is conducted in Building 9706-2, international material protection workshops are held in Building 9201-3, and the Nuclear Detection and Source Test Center activities take place in nuclear facilities.

As long as individuals, organizations, or rogue states continue to want 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, Sensitive Compartmented Information Facilities (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. Training will be conducted in several buildings across the Y-12 site. A new facility for GTRI alarm response training is under consideration as part of a larger Global Security Training Campus. Other existing east-end buildings will be needed for NN research and development and detection projects and 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. A new SCIF with manufacturing capability may be required as well.

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 initiatives. UPF will provide the MAA uranium processing needs, and CMC and the new Applied Technologies Laboratory development facility will provide the non-MAA uranium processing and manufacturing needs for NN. Lithium production and processing facilities are needed for nuclear material detectors as the shortage of Helium-3 worsens. Good training and laboratory facilities will be essential as the NN and global security programs increase at Y-12.

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

5.5 SUPPORT OF OTHER MISSIONS/PROGRAM CAPABILITY (C12)

Y-12 processes HEU for use by the Naval Reactors Program for Naval Nuclear Propulsions. Y-12's support of the Naval Reactors program began in FY 2002 and is planned through FY 2050 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 nuclear security enterprise, Y-12 supports interagency efforts to counter threats to U.S. national security. Federal agencies supported by Y-12 for these efforts include the Department of Homeland Security, Department of Defense, Federal Bureau of Investigation, Environmental Protection Agency, Nuclear Regulatory

Commission, and Office of Personnel Management 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, 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 Global Security Training Campus is under consideration that will be available to support this mission. Additional SCIFs will be needed as will some existing Y-12 buildings and general infrastructure areas.

During this period, Naval Reactors work scope is expected to slightly decrease.

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 good training and laboratory facilities as well as some specialized facilities.

It is anticipated that Naval Reactors work will be slightly reduced from near-term levels.

Applicable NNSA Missions

- M2 Preventing Proliferation*
- M3 Powering the Nuclear Navy*
- M4 Emergency Response*
- M5 Continuing Management Reform*
- M6 Recapitalizing Our Infrastructure*

6. REAL PROPERTY ASSET MANAGEMENT

Significant changes have occurred at Y-12 during the past decade: More than 300 facilities and structures, totaling approximately 1.4 million ft², have been demolished, and some of the remaining slabs have been converted to much-needed parking areas and/or managed storage areas. Infrastructure reduction efforts coupled with the Facilities and Infrastructure Recapitalization Program have enabled the demolition of many old and deteriorated facilities, and these programs have infused the site with the necessary funding to upgrade and replace deteriorated equipment. The direct and indirect benefits of these and other actions have enabled Y-12 to reduce its footprint in the following ways.

- Through FY 2011, Y-12 demolition activities “banked” 815,768 ft².
- ARRA provided demolition efforts for several large facilities as well as cleanout and deactivation activities.
- More than 1 million ft² of space is available for demolition, and an estimated 3 million ft² has been identified site-wide as future excess space.

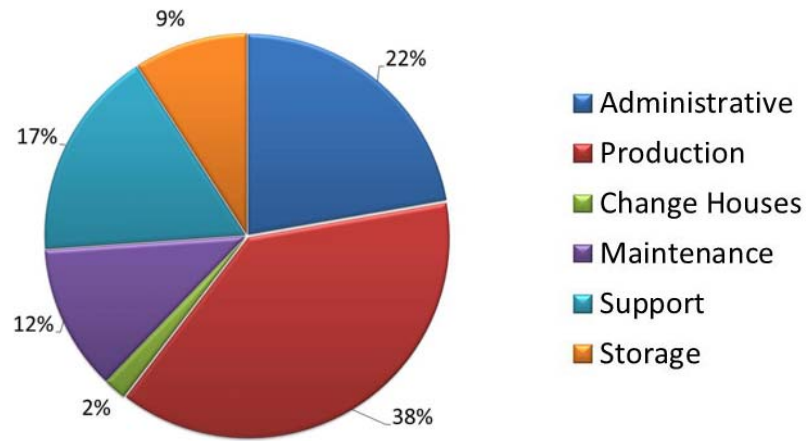
6.1 SITE FOOTPRINT

Y-12 fully supports the one-up/one-down milestone as well as any footprint reduction goals that NNSA may implement. The site has been tracking square footage for many years to ensure that new construction does not outweigh demolition activities. In support of transformation activities and site improvement, many facilities have been identified for demolition. As evidenced by past efforts, the site is ready to use any funding sources identified for this much-needed effort. See Fig. 3 for current and future site attributes. Figure 4 depicts the construction year for all Y-12 buildings, and Fig. 5 depicts construction years for enduring facilities. Figure 6 illustrates the breakdown of enduring facilities by functional usage.

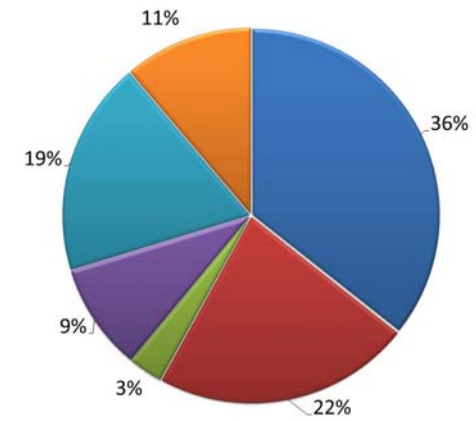
Current: Table 1 summarizes the Y-12/NNSA real property. A modern gas-fired steam plant has replaced the aged coal-fired plant. The new steam plant encompasses a much smaller footprint and has significantly reduced the greenhouse gas production at the site. HEUMF provided a significantly improved materials storage facility, and the Jack Case and New Hope centers provided much-needed, modern administrative facilities, which enabled the demolition of outdated and deteriorating facilities.

Table 1. Y-12 Site (NNSA) Facility Condition Index and Asset Utilization Index by Category

Replacement Plant Value		\$9,153		Million		
Total Deferred Maintenance		\$532		Million		
Site Wide Facility Condition Index		5.82%				
		Facility Condition Index (%)	Asset Condition Index (%)	Asset Utilization Index (%)	No. of Assets	Buildings and Trailers (GSF)
Mission Dependency	Mission Critical	3.89	96.11	90.760	13	2,048,790
	Mission Dependent	4.2	95.8	93.99	145	2,201,869
	Not Mission Dependent	6.28	93.72	45.84	186	1,556,631
Facility Use	Office	3.17	96.83	96.04	40	743,799
	Warehouse	5.75	94.25	90.26	63	538,523
	Laboratory	68.89	31.11	93.87	14	1,268,037
	Hospital	100.00	0.00	N/A	0	0
	Housing	100.00	0.00	N/A	0	0



NNSA Y-12 GSF in 2011 (5,807.290)



NNSA Y-12 GSF in 2040 (2,690,000)

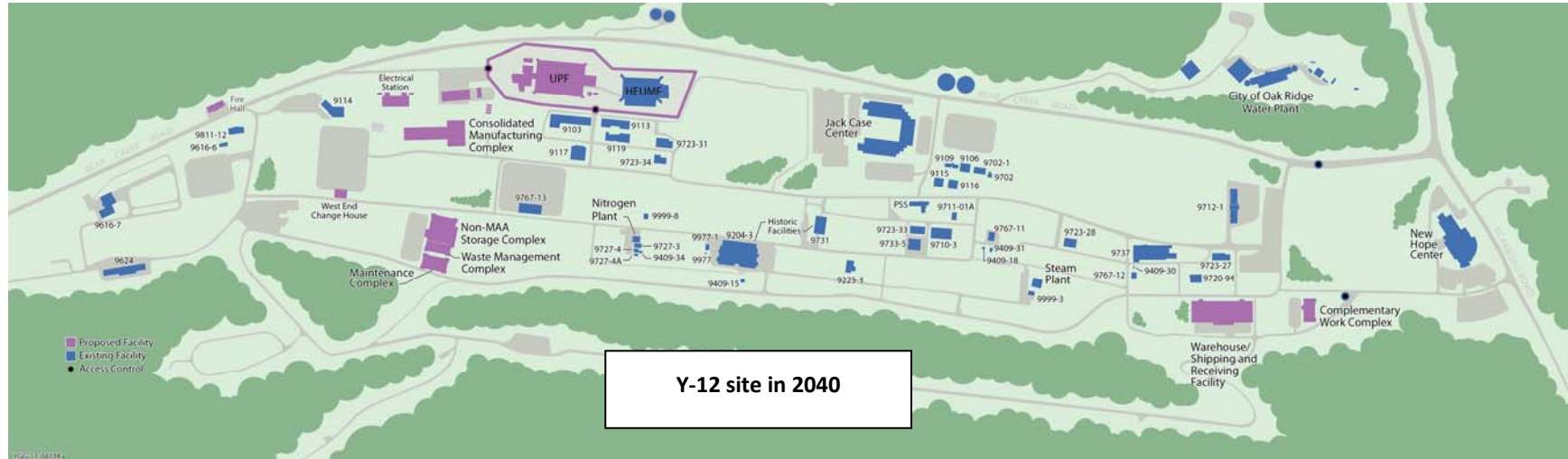


Fig. 3. Current and future site attributes.

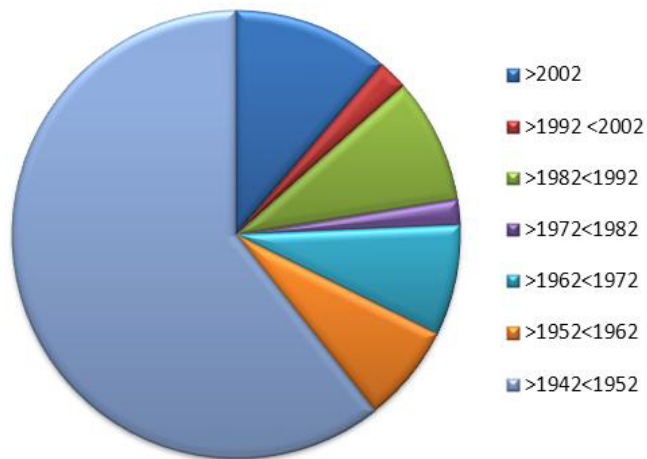


Fig. 4. All Y-12 buildings, depicted by construction year.

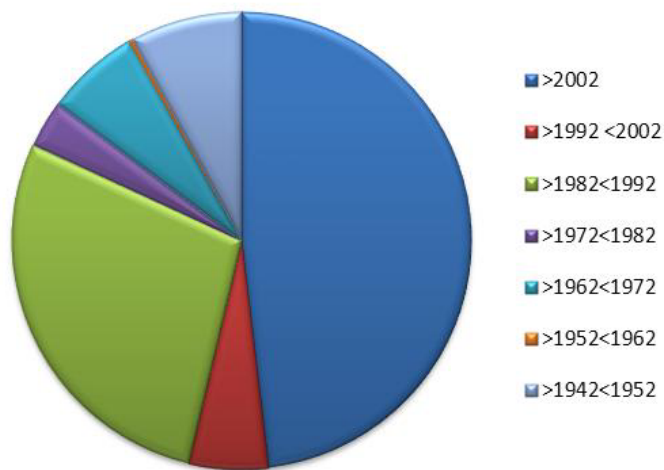


Fig. 5. Y-12 enduring facilities, depicted by construction year.

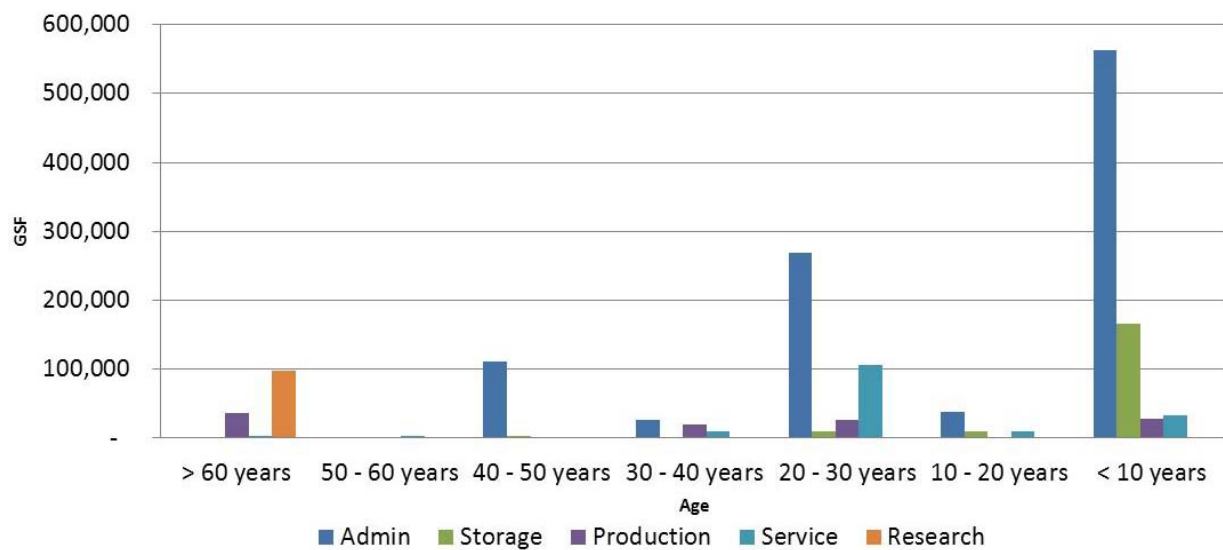


Fig. 6. Enduring facilities, by age and function.

PA reduction is a high priority for Y-12. The UPF WEPAR subproject will reduce the existing PA from 150 acres to approximately 80 acres. This reduction in area will not only provide an improved security posture but also significantly reduce demolition costs and support activities including maintenance; emergency services; and environmental, safety and health support. The consolidation of classified processes in smaller, discrete limited or closed areas will generate further efficiencies. Design is in progress, and construction is scheduled to begin in FY 2013.

Y-12 has approximately 1 million ft² of space already excessed or ready to be excessed. Long-range planning will provide additional square footage eligible for demolition. To ensure the vision for the future site, and as expressed in previous site plans, a focused funding for demolition of large, process-contaminated facilities is needed. ARRA provided funding to clean out and decontaminate several facilities. However, the demolition of these and other excessed facilities still needs to be addressed in the very near future. If left unaddressed, continued deterioration of the facilities will again strain site funding to ensure the facilities remain in a safe standby status.

Y-12 has 718,448 ft² of leased space. During the next fiscal year, the UPF project team will begin an effort to move on-site and terminate two leases. The shipping and receiving warehouse will be evaluated with the goal of being relocated to Y-12 within the next 5 years. These efforts will reduce the leased space by 125,818 ft². The Jack Case and New Hope facilities are long-term leases. Additionally, 200 Summit Place is Y-12's long-term records storage facility, and 113 Union Valley is the off-site laboratory. Both of the leases will remain in place for the foreseeable future, until replacement facilities are located at Y-12. All options will be evaluated, with a preference for use of on-site facilities, before off-site leases are renewed.

Future: Future site plans support the latest version of NNSA's *Stockpile Stewardship and Management Plan* and the Readiness in Technical Base and Facilities key tactical and strategic milestones. The uranium mission is accomplished at Y-12, and the construction of UPF is vital to sustaining that mission. The transfer of 9212 EU functionality is planned to start in 2023, which in turn leads to the demolition of aged Manhattan Project-era production facilities that have increasing maintenance needs.

The new facilities planned for Y-12 will provide modern, streamlined processes and equipment that will significantly decrease the hands-on maintenance requirements. Physical Asset Management Solutions (PAMS) analyses are performed as facilities are completed and provide the guide for preventive and predictive maintenance activities. These analyses optimize life-cycle cost, equipment availability, and reliability to support sustained operations and to ensure an asset meets its mission requirements in its operational environment in a safe and cost-effective manner. This effort significantly reduces the corrective maintenance currently encountered in existing facilities.

Y-12's high security footprint will be much smaller in the future (see Fig. 7). The footprint for mission-specific facilities will also decline. The loadout of HEUMF has greatly enhanced consolidated storage, and the impending construction of UPF will significantly reduce the footprint of process-related space. Additional planning efforts focus on the remaining mission-critical capability, and the consolidation of the remaining production processes will be the final phase of Y-12's transformation. Mission-support infrastructure will also continue to be consolidated as facilities are modernized and/or demolished.

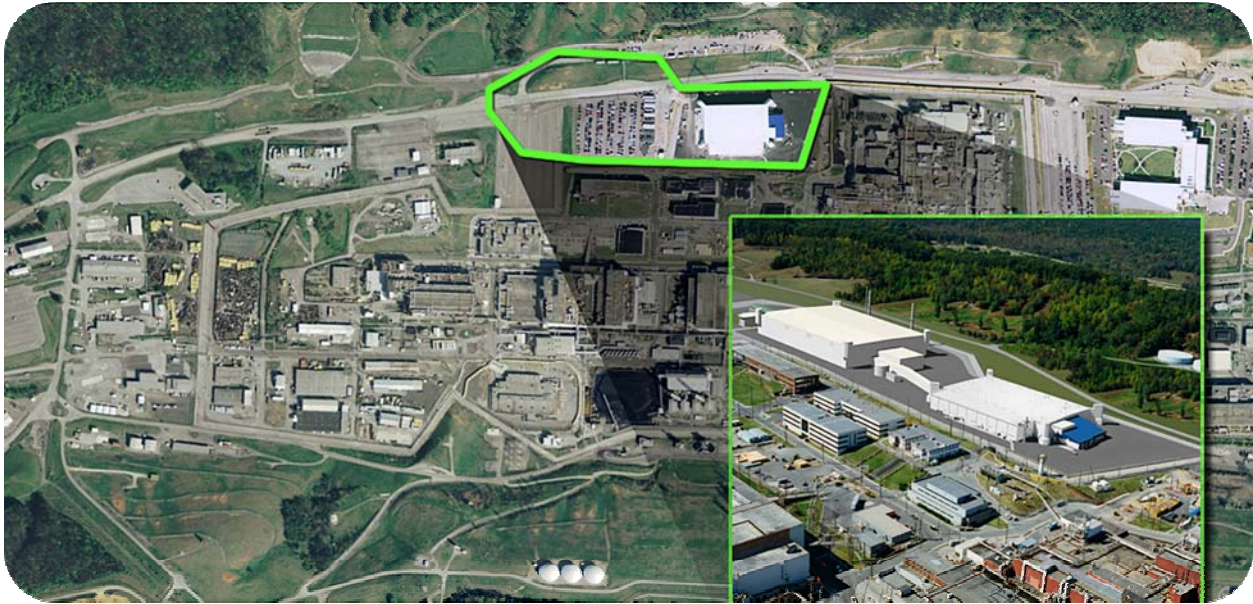


Fig. 7. Y-12's future high-security footprint (inset depicts UPF and HEUMF).

6.2 FACILITY CONDITION

The facility condition index (FCI) for mission-critical facilities is already below the 5% threshold established for 2017. Y-12 fully expects this FCI to remain less than 5% for the foreseeable future, and it should improve further when UPF is operating and the existing facilities are removed from the list. Similarly, the FCI for mission-dependent, not critical (MDNC) facilities is expected to be less than 8% by 2015, and it will remain fairly stable beyond this milestone. As facilities are renovated for HPSB and others are consolidated and excessed, the resultant DM will decrease and the overall FCI will improve.

Mission-critical operations are scattered across multiple 40- to 60-year-old facilities. The facilities are oversized, contain technologically obsolete equipment of low reliability, and require excessive maintenance 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 Nuclear Facilities Risk Reduction project, have resulted in an improved condition for these facilities. Projections beyond 2020 reveal that with planned construction activities, the condition of mission-critical infrastructure will remain constant or improve. However, the ability to invest in equipment and facility upgrades for the aging infrastructure will result in a potential decline in condition for select facilities. Building 9204-2 and the mission-critical capability it provides will be needed to support production operations for another 10 to 15 years. Life-extension investments in facilities like Building 9204-2 must be a priority.

Projections for the MDNC FCI for FY 2012 indicate a slight decrease to 6.5%. The new steam plant and potable water towers went online in 2010. When coupled with the existing infrastructure, an improvement in the MDNC FCI has been realized. Continued life-cycle sustainment efforts will further improve the facility condition. Much-needed utility infrastructure upgrade projects would ensure the future viability of Y-12 operations.

The Condition Assessment Survey program has been incorporated at Y-12 to support the DM reporting requirements of DOE Order 430.1B. Condition Assessment Survey inspections are performed on a 3-year cycle and include integration from the facility and operations managers. The resulting DM data are annually reported to the Facility Information Management System.

Figure 8 provides an out-year projection of the anticipated reduction in DM and associated FCI. Future new construction and renovation activities can significantly impact the FCI. Although DM as a whole is expected to remain fairly stable or slightly increase over the next 5 years, the long-range condition in both mission-critical and MDNC categories will significantly improve as facilities are constructed and renovated.

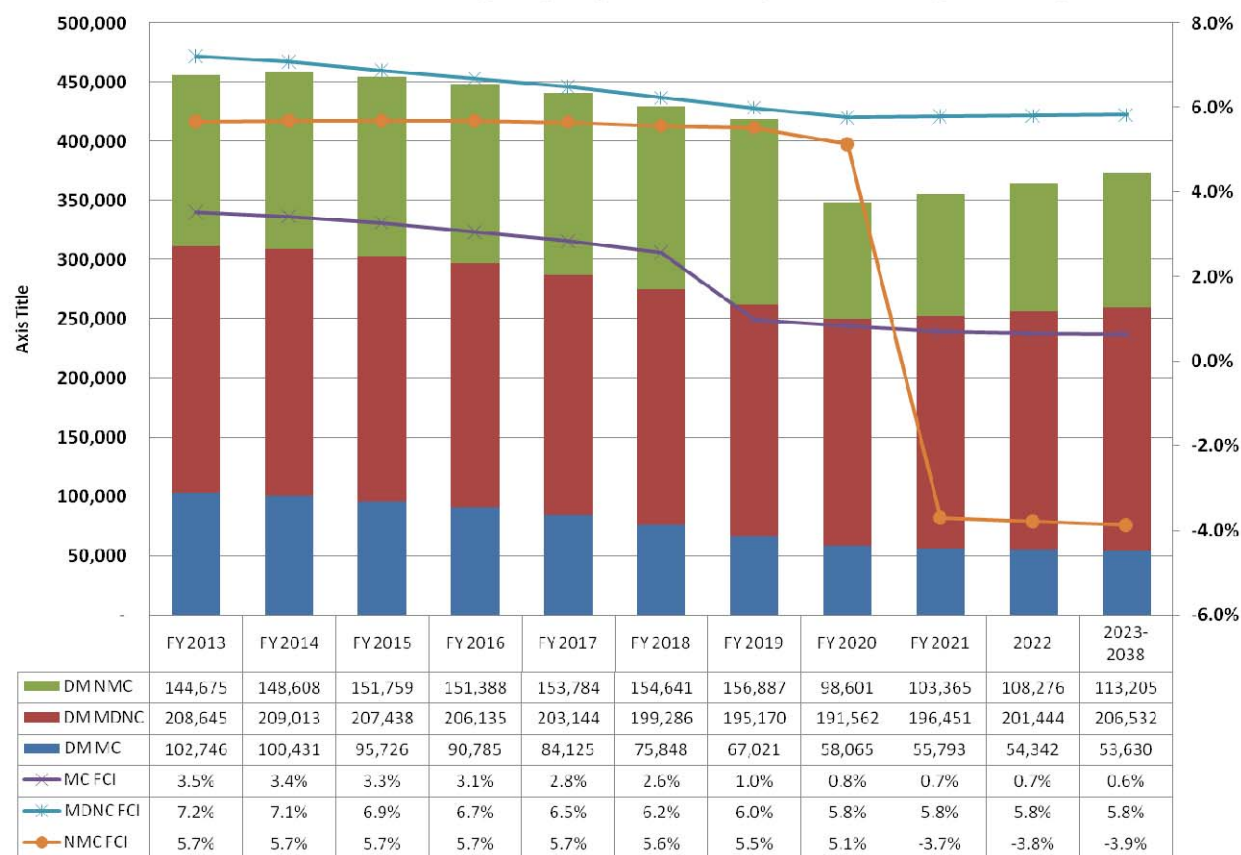


Fig. 8. Planned real property expenditures by mission dependency.

Projections in maintenance and repair activities are necessary to maintain facilities and infrastructure in good working order over their planned service life. Life-cycle planning should include preventive and predictive maintenance, PAMS, and like-for-like replacement of facility components. Through analyses of the life-cycle projections for buildings, funding shortfalls can easily be identified and additional funding requests can be submitted. Y-12 is using the R.S. Means CostWorks life-cycle sustainment model to aid in identifying recommended maintenance requirements for the enduring facilities.

Forty-five enduring buildings were modeled, and the cost profiles were added to master planning efforts. The cost profile is used to develop and prioritize projects based on FYNRP and FY funding allocations. The project listing will also be used as a boots-on-the-ground listing from which plus-up funding can be readily applied. Items on the list include energy saving enhancements; heating, ventilating, and air-conditioning (HVAC) and plumbing replacements; exterior and interior painting; and roofing.

An additional effort to incorporate process-related equipment into the sustainment profile is being implemented. The funding necessary to sustain programmatic equipment has typically been underestimated. Through the incorporation of these items to the life-cycle model and their inclusion in the funding profile, a more holistic approach to sustainment modeling will be incorporated into master planning efforts.

Figure 9 depicts the 10-year funding profile for 45 enduring facilities and is based on the actual maintenance expenditure from FY 2011. The purple line represents the annualized budget for the remaining years, which is significantly less than the annualized corrective maintenance requirements depicted by the blue line. The drastic increases are life-cycle replacements that are not included in typical budget scenarios, which results in failure to replace equipment and may result in critical breakdowns and increased DM costs.

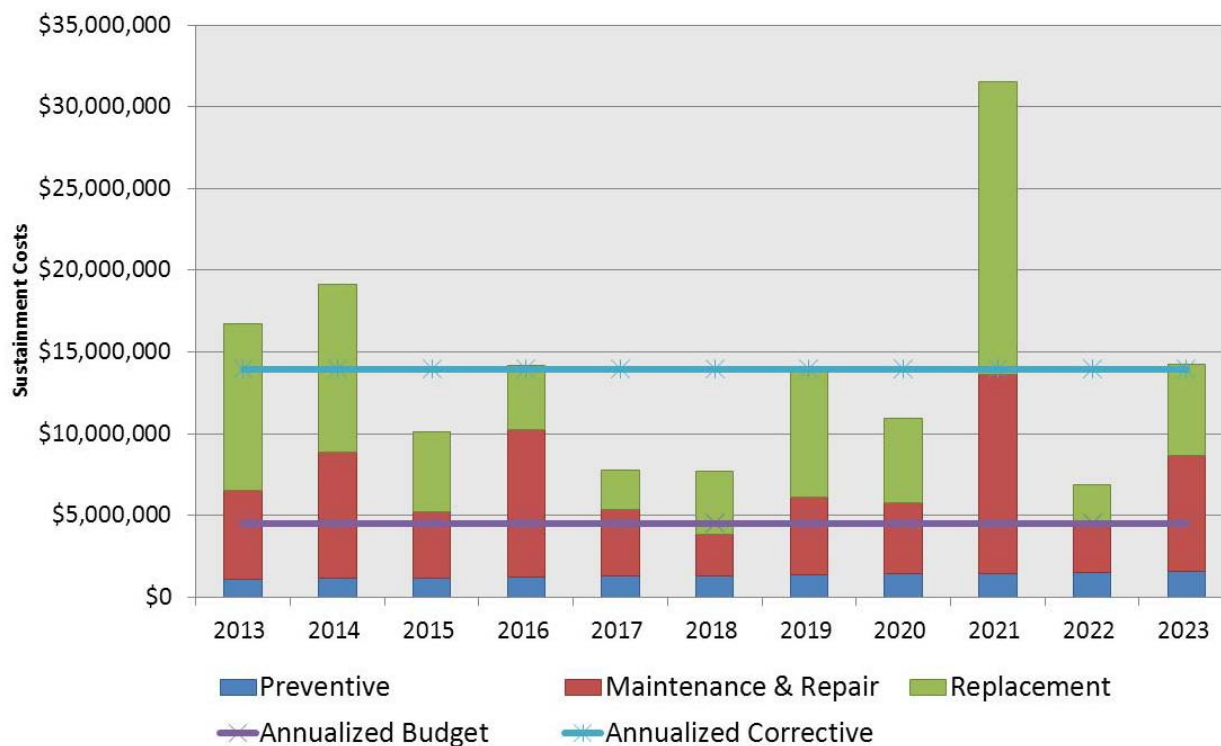


Fig. 9. Life-cycle sustainment projections for 45 enduring facilities.

6.3 DM REDUCTION

By the end of FY 2011, Y-12 had reduced DM by more than \$298 million from the original FY 2003 baseline. The results of the reduction are evident site-wide, as the physical condition of facilities is improving and the site is looking significantly better due to new construction and facility demolition efforts. With respect to FCI, Y-12 met the complex-wide goal to reduce FCI to less than 5% for mission critical assets. The FY 2011 mission-critical FCI was 3.7%, and the FY 2012 FCI is projected to remain fairly stable at 3.8%.

6.4 SPACE UTILIZATION AND CONSOLIDATION

A Y-12 site consolidation team evaluates and prioritizes all site space requests, requirements for demolition and construction, and consolidation activities against long-term transformation plans. An intensive effort to verify existing space began during FY 2012. In concert with the master site planning effort, enduring facilities were identified, space type and utilization were documented, and the facilities were loaded into a geographical information system. This effort allows the team access to information on each facility: available office space, storage capacity by type, and specific details regarding size and technical capability for each area. Data are extracted from the personnel database each night to allow real-time assessment of usage. Future plans are to incorporate enhanced capabilities to allow space management of each area.

This system is used to evaluate areas of major renovation, locate surge space during transition, and identify organizational use of space. Current efforts include the consolidation of maintenance organizational space and crew break areas, the identification of on-site space for the UPF project team, and the consolidation of storage areas.

6.5 SUSTAINABILITY/ENERGY

Renovations of enduring facilities support the EAct 2005 goals for HPSB. The Jack Case Center was recently certified as Y-12's first HPSB facility. This effort not only ensures compliance with energy reduction but also verifies that HVAC and facility equipment are operating at optimum efficiency, which ultimately reduces corrective maintenance activities. This effort, coupled with the focus maintenance centers and PAMS, will continue to streamline maintenance expenditures at the site.

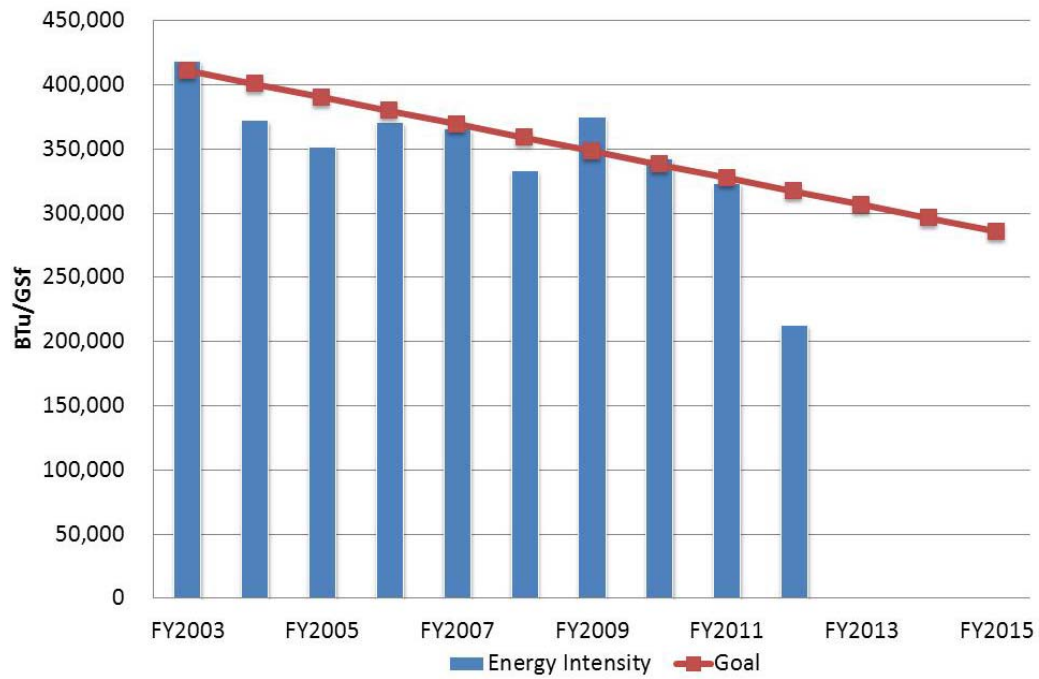
The Y-12 vision supports the environment, safety, and health requirements in DOE Order 436.1, *Departmental Sustainability*, and the DOE Strategic Sustainability Performance Plan while promoting overall sustainability and reduction of greenhouse gas emissions. Y-12's energy management mission is to incorporate renewable energy and energy-efficient technologies site-wide and to position Y-12 to meet the NNSA energy requirement needs through 2025 and beyond. Recent efforts to support this mission include the following:

- Y-12 joined the U.S. Green Building Council and the Green Building Certification Institute, which provides a mechanism for Y-12 personnel to pursue Leadership in Energy and Environmental Design (LEED) certification and seek LEED professional training.
- The UPF project team is seeking to meet HPSB standards and to incorporate Leadership in Energy and Environmental Design to the maximum extent practicable on all facilities.
- Sustainability projects are included in funding profiles for balance of plant and production facilities.
- Several renovation projects that will meet HPSB goals and the associated guiding principles are planned for enduring facilities.
- Y-12 is pursuing a phase II Energy Savings Performance Contract.
- Fleet and petroleum reduction efforts continue to surpass the stated goals.

The following DOE goals are being met. With continued emphasis on energy and water reductions and ongoing transformation efforts, Y-12 expects to stay on track to meet the following targets:

- Water intensity reduction: 33.8% reduction against 26% goal from 2007
- Construction and nonhazardous waste recycling: 57% diversion against 50% goal
- Sustainable acquisition: 100% against 95% goal
- Electronic stewardship: 100% of computers have power management
- Alternative fuel consumption: 342% increase against 10% per year goal
- Fleet petroleum reduction: 48% reduction against 2% per year goal
- Alternative-fueled vehicle purchases: 100% against 75% goal

Significant progress has been made in all areas. Y-12 will continue to monitor commodity consumption and implement measures for continued reduction. The Y-12 site is making good progress toward this goal; see Fig. 10.

**Fig. 10. Energy intensity.**

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7. DISTRIBUTION

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