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United States Government **National Nuclear Security Administration (NNSA)**
Savannah River Field Office (SRFO)

Memorandum

DATE: **July 15, 2013**

REPLY TO
ATTN OF: SV (Stanley Pyram, 803-208-1122)

SUBJECT: National Nuclear Security Administration (NNSA) Savannah River Field Office (SRFO) Fiscal Year (FY) 2014 - 2023 Ten Year Site Plan (TYSP)

TO: Mr. Jefferson Underwood, Director of Office for Infrastructure and Capital Planning (NA-00-20)

Attached is the NNSA-SRFO Ten Year Site Plan for FY 2014 – 2023 for the NNSA facilities at the Savannah River Site (SRS) for your acceptance. The document gives an overview of the NNSA missions at SRS during the next ten years and is in compliance with the requirements of the FY 2014 – 2023 Ten Year Site Plan Guidance.

Sincerely,

Douglas J. Dearolph
Manager

SV:SP:acr

COR-SRFOFP-7.12.2013-522459

Attachment: NNSA-SRFO Ten Year Site Plan for FY 2014-2023

cc w/attach: Ann Walls, NA-00-20

NNSA-SRFO
Ten-Year Site Plan
FY 2014 – FY 2023

Revision 0
May 2013

UNCLASSIFIED

DOES NOT CONTAIN UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

Reviewing Official: Susan Arnold, Project Integration Mgr
(Name and Title)
Date: June 4, 2013

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SRS Tritium Facilities

SRS Nuclear Nonproliferation Facilities Under Construction (January *2013*)

1.0 Executive Summary

NNSA Core Capabilities and Missions at SRS

At the Savannah River Site (SRS), the two largest NNSA programs are focused on the integrated tritium supply chain and plutonium disposition supporting the capability for storage, protection, and handling of nuclear material and weapon components. The tritium core capabilities at SRS include tritium research and development, tritium extraction, purification and storage, and reservoir processing. These are administered by the Savannah River Field Office (SRFO) as part of the Infrastructure and Operations organization (NA-00). The SRS Plutonium Disposition Program is managed by the Office of Fissile Materials Disposition (OFMD) as part of the Defense Nuclear Nonproliferation organization (NA-20).

The facilities and infrastructure supporting the integrated tritium supply chain activities at SRS are the central focus of this document. These facilities have been operational for a number of years (beginning in 1955) and are readily evaluated based on the TYSP guidance. The Plutonium Disposition Program facilities are currently in various phases of construction and are scheduled to begin operations over the next 10 years. The mission and related program plans associated with plutonium disposition at SRS will be presented to illustrate the expansion of NNSA missions at SRS. Savannah River National Laboratory (SRNL) infrastructure, which supports these programs, is discussed within SRNS-RP-2013-00005, Savannah River Site Ten Year Site Plan, FY 2014 – FY 2023.

The NNSA missions presented in this plan include:
Tritium Supply – extraction of tritium from irradiated target rods and management of the tritium inventory for the nuclear stockpile.
Nuclear Stockpile Maintenance – loading of tritium and deuterium into reservoirs that are used in the gas transfer system of a nuclear weapon.
Nuclear Stockpile Evaluation – surveillance of gas transfer systems to assure reliability in the absence of nuclear testing.
Helium-3 Recovery – recovery of this byproduct of tritium's radioactive decay for use in neutron detectors and various commercial applications.
Fissile Material Disposition (Nuclear Nonproliferation) – disposition of special nuclear materials including highly enriched uranium (HEU) and surplus weapons-usable plutonium (referred to as "surplus plutonium") into fuel for commercial nuclear reactors and/or conversion of the material into a form that cannot be used in a nuclear weapon.

Program of Record documents emphasize retaining required production and experimental capabilities sustained with physical infrastructure evolving into more efficient, modernized facilities with reduced footprint, less environmental impact and improved operational costs. Consistent with this vision, NNSA facilities at SRS will construct facilities supporting tritium modernization and new plutonium disposition capabilities, implement the Tritium Responsive Infrastructure Modifications (TRIM) program portfolio of projects, including relocation of tritium manufacturing processes resulting in reduced risk and deferred maintenance, and will begin disposition of surplus tritium facilities over the 10-year planning horizon.

FY 2012 Accomplishments

<u>Savannah River Tritium Enterprise</u>

For over half a century, excellent performance in the supplying of tritium, a radioactive hydrogen gas that is an integral part of our nation's nuclear defense, has been central to the Savannah River Site's identity. The Savannah River Tritium Enterprise (SRTE) continued that proud tradition in 2012, with service to four main missions: tritium supply, nuclear stockpile maintenance, nuclear stockpile evaluation, and helium-3 recovery.

SRTE continued its more than half a century of successfully delivering reservoirs and other components to military customers. In weapons stockpile surveillance, SRTE completed all of the FY 2012 required gas transfer system function testing, which is a key component of the continued certification of the nuclear weapons stockpile.

Several of the FY 2012 accomplishments equip SRTE to continue providing its needed services to the nation well into the future. One such achievement was the completion of a project to design, build and relocate a new system for separating and capturing helium-3 gas, which is used – among other purposes - in radiation detectors employed by the U.S. Department of Homeland Security. The need to update and relocate the recovery process out of the previous Cold War-era facility led to the new state of the art system that is more reliable, more cost effective, and less hazardous to operate.

In addition, SRTE completed replacement of the Uninterruptible Power Supply systems for one of its major facilities. Additionally, one of the most significant outages in the history of the facility, requiring over a year to fully implement, was completed to replace piping and zeolite beds in the Purge Stripper / Zeolite Bed Recovery system. This replacement will allow the continued tritium processing to support the weapons stockpile without releases to the environment.

Also helping to prepare SRTE for the future was the progress achieved on the new Automated Reservoir Management System (ARMS), a modern computer system that manages all aspects of reservoir processing through every phase of their lifecycle. Three major deliverables were accomplished, including implementation of the first operational function, which allows receipt, re-verification, and shipment of H1616 reservoir-shipping containers.

All of this work was achieved while maintaining a focus on safety and security. In 2012, SRTE surpassed a major safety milestone: 3 million safe work hours; the last injury resulting in time away from work was more than four years ago.

Other notable Tritium Programs accomplishments for FY 2012 include:

- Tritium work was accomplished safely in FY 2012, as evidenced by a Total Recordable Case rate of zero for Operations. The last recordable injury to a Tritium worker occurred on October 2, 2009.
- SRNS provided full support of all assigned tritium-related missions:
  - *Nuclear Stockpile Maintenance:* Delivered all required reservoirs and other Limited-Life Components (LLCs) to military customers. This included planning and executing without incident the "Reservoir Acceleration Project," completing four months of reservoir-loading commitments in a single month (November 2011). SRNS' responsiveness enabled the Office of Secure Transportation to field new aircraft.
  - *Nuclear Stockpile Surveillance:* Completed all required function tests and post-function test evaluations of gas transfer systems, and delivered reports with data to the Design Agencies that support their annual certification of the nuclear weapons stockpile.
  - *Tritium Supply:* SRNS extracted tritium from irradiated Cycle 10A Tritium Producing Burnable Absorber Rods (TPBARs) received from the Tennessee Valley Authority. The Tritium Extraction Facility received a new 174,000-pound waste container designed for storage and disposal of previously extracted TPBARs. Throughout the year, SRNS unloaded tritium reservoirs returned from the field, and then purified the gas and recycled the tritium.
  - *Helium-3 Recovery:* SRNS supplied all required cylinders of helium-3, a valuable byproduct of tritium's radioactive decay.
- SRNS enabled future deactivation of 236-H by completing de-inventory of the Analytical Laboratory in the H Area Old Manufacturing (HAOM) facility and disconnecting the process lines between 236-H and HAOM.
- Other notable FY 2012 TRIM program accomplishments:
  - Delivered ongoing communications that were effective in conveying the value of this strategic initiative. In FY 2012, NNSA elected to pull forward the start of the TRIM line item project scope by three years (from FY 2020 to FY 2017). The Tritium Centric Operations line item project is one primary element of the overall TRIM program. It will relocate remaining functions in HAOM to the more modern Tritium facilities.
  - Provided strong support to NNSA in their construction of the new Tritium Engineering and Process Support buildings, which will enable relocation of personnel currently housed in HAOM.
  - Advanced the HANM-centric control strategy by aggressively cross training personnel and completing two key projects: HAOM Remote Alarm Monitoring (Y600) and TEF Tie-In Distributed Control System (DCS) to HANM (Y587).

- Completed other General Plant Projects, technical studies, design work, and planning. These accomplishments have enabled SRNS to move forward efficiently on the TRIM program and be well-positioned to utilize additional funding.

- SRNS also completed an electricity metering project (Y671) in FY 2012. As a result, all electricity consumption billed to Tritium facilities inside the security fence is now metered.
- A major FY 2012 highlight was earning a National Security Administration certification letter that approved SRNL's wireless sensor network design for transmission of classified wireless data. This accomplishment enabled significant future cost savings across the Nuclear Security Enterprise, and required four years of perseverance to achieve.
- The nuclear disaster caused by an earthquake and tsunami in Fukushima, Japan brought to light the importance of an integrated response to natural phenomenon hazards. Tritium led the site in arranging and conducting an integrated site Emergency Preparedness drill that simulated multiple incidents in multiple facilities, involving multiple contractors and both Federal offices. The magnitude of this drill was unprecedented at SRS, but there were no major findings. This effort earned positive comments from the Defense Nuclear Facilities Safety Board (DNFSB).
- SRNL acquired for Tritium components from a mass spectrometer that was previously used at the Mound Plant and has been stored at the New Brunswick Laboratory since 2002. This was important because the vendor no longer manufactures or supports this equipment. By funding the packaging and shipping of these components for approximately $30K, SRNS potentially saved the government over $1.5M because the parts are projected to defer the need for new spectrometry equipment until after FY 2020.
- By participating in 41 continuous improvement projects in Tritium during FY 2012, SRNS achieved a total of $2.144M in validated productivity savings, exceeding the FY 2012 goal of $2.125M.
- SRNS completed the FY 2012 Governance Plan, which established Tritium's Joint Operating Requirements Review Board processes and an improved Management Assurance System (MAS). The FY 2012 MAS improvements were essential to the goal of achieving Line Oversight Contractor Assurance System (LOCAS) Affirmation in FY 2013.
- SRNL completed important research and development scope in support of the Tritium plant, including development of next-generation TECH mod hydride beds and a "mini-TCAP" (Thermal Cycling and Absorption Process) system that are very promising.

Fissile Materials Disposition

To reduce the threat of nuclear weapons proliferation, the U.S. Department of Energy (DOE) is engaged in a program to disposition U.S. surplus plutonium in a safe, secure, and environmentally sound manner, by converting such plutonium into proliferation-resistant forms that can never again be readily used in nuclear weapons. NNSA is responsible for implementing this nonproliferation approach which commits the U.S. and Russia each to render at least 34 metric tons (MT) of weapons-grade plutonium unsuitable for use in nuclear weapons. The facilities across the U.S. DOE complex that may have a role in this approach include the Pantex Facility (Texas), Los Alamos National Laboratory (New Mexico): SRS-H Canyon/HB-Line Facility, K-Area Facility and the Mixed Oxide Fuel Fabrication Facility (South Carolina).

In FY 2012, SRNS accomplished the following in support of the Fissile Materials Disposition Program:

- SRNS Nuclear Nonproliferation Programs (NNP) serves as integrator for NNSA's fissile material disposition program, a program to disposition U.S. surplus, weapons-usable plutonium in a safe, secure, and environmentally sound manner, by converting it into proliferation-resistant forms that can never again be readily used in nuclear weapons. As part of this program, NNSA is constructing the Mixed Oxide (MOX) Fuel Fabrication Facility at SRS, to blend this material into mixed oxide fuel for irradiation in existing nuclear power plants.
- In 2012, SRNS began dissolution of up to 3.7 metric tons of non-pit Alternate Feedstock (AFS-2) plutonium in H Canyon and made good progress toward preparations to convert the resulting AFS-2 solution to an oxide suitable for MOX feed. In addition, SRNS successfully closed out the Pit Disassembly and Conversion line item project.

- SRNS successfully integrated other assigned work in support of the MOX Fuel Fabrication Facility Project, including tasks such as waste sampling, handling and disposal; training services; material testing; design review of the MOX physical security system; and interactions with regulatory agencies.
- As integrator for NNSA's Fissile Material Disposition Program, SRNS NNP supported the Program's financial, technical, and programmatic planning activities, such as budget profiles, shipping and transportation, and document support.
- SRNS NNP was actively engaged supporting NNSA with the preparation of the Surplus Plutonium Disposition (SPD) Supplemental Environmental Impact Statement (EIS). The support included development of SRS data calls to support the document, review and comment resolution on technical comments associated with the draft versions of the document, coordination of a web-based public meeting, and participation in public meetings across the country to inform, answer questions, and gather feedback from the public on the SPD Supplemental EIS.
- In addition, SRNS is constructing the Waste Solidification Building (WSB), which will treat the liquid waste streams from the MOX Fuel Fabrication Facility, converting these wastes into a cement form for disposal. In 2012, progress continued on the construction and startup of the WSB. A major milestone was achieved with the installation of the cementation gloveboxes, which form the heart of the waste treatment process. Construction is now more than 70% complete. This progress was achieved while realizing a safety record – 1.89 total recordable cases per 200,000 hours worked for FY 2012 – that is significantly better than the U.S. construction industry.

Current State and Future Plans

In 2012 SRS released a new strategic plan for increased mission impact on three principal business segments: environmental stewardship, national security, and clean energy. The plan projected work scope in these segments through 2041, and NNSA missions for Defense Programs and Defense Nuclear Nonproliferation are the largest components of the national security efforts. The current state and future plans of these programs are discussed below.

Savannah River Tritium Enterprise

SRS' current Mission Critical footprint is comprised of older, Cold War-legacy facilities and more modern facilities that will endure throughout the 10-year planning horizon. The older facilities and associated infrastructure are expensive to maintain, larger than necessary to support the current stockpile, and energy-inefficient. The vision for the next ten years is to expedite relocation and right-sizing of the remaining functions from these older facilities into the more modern facilities via an initiative known as the Tritium Responsive Infrastructure Modifications (TRIM) program. Implementing the TRIM program effort is noted as a risk mitigating action for ensuring future capability in the Program of Record. TRIM program enabling activities in FY 2012 included the construction phases of new buildings for engineering and process support personnel.

The TRIM program portfolio of projects have many discrete elements that can be accomplished with available funding via capital equipment / general plant projects (CE/GPPs), but relocation of some of the remaining functions in the H-Area Old Manufacturing (HAOM) facility cannot. A line item project that would complete the TRIM program scope, Tritium Centric Operations Project, is preauthorized by the Construction Working Group (CWG) to start in FY 2017.

Aside from the TRIM program, the Tritium facilities face challenges with sustaining the infrastructure with increasing deferred maintenance that jumped to $96.9M in FY 2012. Much of this is associated with 35 HANM facility glovebox oxygen monitors that need replacing. Steps to address these have begun and will take several years to complete. There are over 60 funded and unfunded projects for sustaining tritium capabilities that are listed in Attachment A of the Infrastructure Data Analysis Center (IDAC) that supplements this plan.

Fissile Materials Disposition

NNSA is establishing the capability to disassemble surplus plutonium pits and process weapons grade plutonium as feedstock for the production of MOX fuel and subsequent irradiation in commercial nuclear power

reactors. The production of MOX fuel assemblies at SRS aligns with the SRS mission to support national priorities and builds on the existing site core competencies and assets. Two major projects at SRS are in various stages of implementation to establish the required infrastructure for production of MOX fuel from weapons grade plutonium.

SRS' current mission is four-fold: store surplus plutonium materials pending their transfer to the Mixed Oxide Fuel Fabrication facility (MFFF, K-Area Facility), convert plutonium materials into an oxide form as feed suitable for MFFF (H Canyon/HB-Line Facility), produce a "mixed fuel" suitable for nuclear commercial reactors (MFFF), and disposition low/high activity waste generated by MFFF (Waste Solidification Building). This mission relies on the continued operation and maintenance of EM facilities', K-Area and H Canyon/HB-Line through FY 2025 and FY 2020, respectively. This mission also relies upon most of the EM infrastructure at SRS.

K-Area Facility currently stores surplus non-pit plutonium material and will continue to store these type of materials pending their disposition. This facility has the capability and capacity to store additional materials.

H Canyon/HB-Line Facility will be utilized to convert up to 3.7 metric tons of non-pit plutonium materials, known as Alternate Feed Stock (AFS), to an oxide suitable as feed for the MFFF. The oxide production is expected to begin in calendar year 2013 and continue until 2017 (or potentially beyond). The oxide product will be stored in K-Area along with other feed stock from across the complex pending their disposition to MFFF. In addition, pit plutonium materials could be processed through these facilities pending their utilization in years 2018 through 2020.

MFFF is currently in the construction phase of the project and will finish construction, conduct start-up testing, and begin operations in October 2016 per the DOE-approved baseline. The MFFF processing rate will increase over the first several years of operations. Operations are expected to continue through 2032 for the initial 34 metric tons of surplus weapons grade plutonium. Construction of the WSB started in December 2009, and is scheduled to begin operations by 2015 to support MFFF water runs.

It is acknowledged that both projects currently face out-year budget uncertainty. In April 2013 it was announced "...the Administration is conducting an assessment of alternative plutonium disposition strategies and identifying options for FY 2014 and the outyears... As a result, NNSA will slow down the MOX project and other activities associated with the current plutonium disposition strategy, including the Waste Solidification Building, during the assessment period."

Highly Enriched Uranium Blend Down

The U.S. has declared a total of 374 metric tons of highly enriched uranium (HEU) surplus to future weapons needs. One path for making this material unsuitable for nuclear weapons is through a dilution process called "blend down," which makes this material suitable for use in commercial reactors. Of the 374 metric tons of HEU, a large percentage is planned to be down blended and converted to commercial or research reactor fuel. A smaller amount may be disposed of as waste. The remaining HEU will be used as Naval Reactor fuels; fuels for research and isotope production; and space reactor requirements.

A portion of the HEU identified for manufacture of reactor fuel does not meet the standard commercial nuclear fuel specifications; however, once the HEU is purified and blended with natural uranium, this material has been proven to perform identically to specification fuel. A portion of this off-specification HEU is being down blended at SRS using Environmental Management (EM) facilities in H Area and is then shipped offsite for production of commercial nuclear fuel. Other legacy HEU located at SRS has been shipped directly to a Tennessee Valley Authority vendor (Nuclear Fuel Services) for blend down. To complete the SRS blend down mission, additional surplus HEU (from foreign and domestic research reactor fuel returns and possible surplus pit disassembly) will require processing through H Canyon prior to down blending.

In April 2013 the DOE amended its Record of Decision regarding Spent Nuclear Fuel Management at SRS stating that DOE will manage approximately 3.3 metric tons of heavy metal (MTHM) from the currently projected inventory of 22 MTHM at SRS using conventional processing at the H-Canyon facility. Processing would begin as early as 2014 and continue for approximately four years. HEU recovered from the conventional processing will be down blended to low-enriched uranium (LEU) to create additional feedstock for fuel fabrication for commercial nuclear reactors.

2.0 Site Overview and Snapshot

Location: Aiken, South Carolina
Type: Multi-Program Site
Website: www.srs.gov

Contractor Operator: SRNS & Shaw Areva MOX Services
Responsible Field Office: SRFO
Site Manager: Douglas J. Dearolph, SRFO

Site Overview:

At SRS, NNSA executes Tritium production and plutonium disposition missions in support of U.S. national security.

The Tritium area occupies approximately 29 acres in H Area. Tritium's enduring missions have been executed successfully since operations began in 1955. Savannah River Nuclear Solutions, LLC (SRNS) currently manages and operates the Tritium facilities with a combined (direct and support) staff of approximately 600 full-time equivalents (FTEs). The tritium core capability at SRS includes tritium R&D, manufacturing and storage.

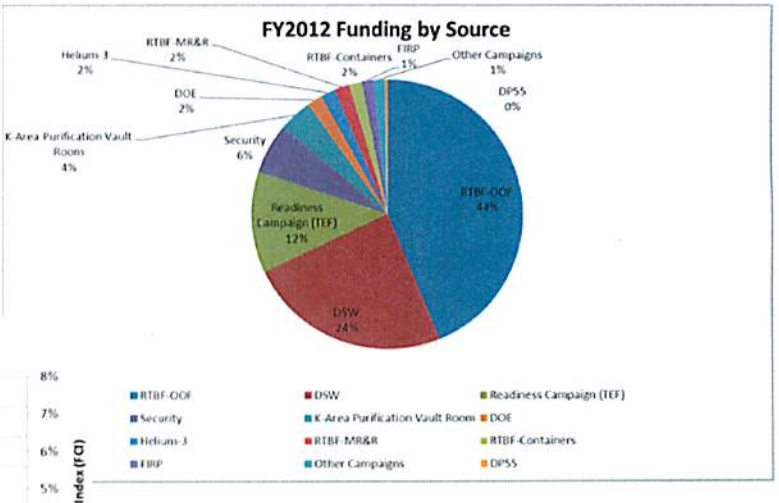
NNSA will establish capability to execute the nuclear nonproliferation objectives aligned with the Plutonium Disposition Program. As part of the nonproliferation mission, the MFFF will use plutonium feedstock from pit disassembly and conversion capability (and smaller amounts from other DOE sources) to manufacture MOX fuel assemblies for use in commercial nuclear power reactors. WSB will process the liquid waste streams from MFFF to generate solid waste forms for disposal. The MFFF and WSB are capital asset projects and are under construction in the F Area at SRS.

All Tritium real property assets exist for the purpose of maintaining core capabilities to execute mission and program requirements. The same will be true of OFMD real property assets when constructed.

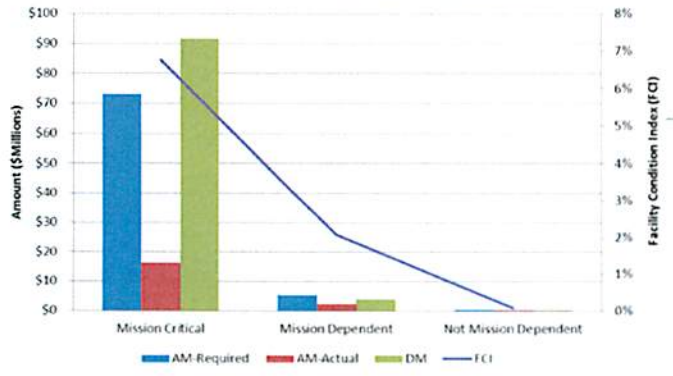
Note: All information shown below is for SRTE (as of the end of FY 2012).

Real Property:
29 Acres (Owned)
39 Buildings/Trailers
304,171 gsf Active & Operational
83,588 gsf Non-Operational
0 gsf Leased
Replacement Plant Value: $1.9B
Deferred Maintenance: $97M
Facility Condition Index (FCI): 5.1%
Mission Critical: 6.8%
Mission Dependent: 2.4%
Asset Utilization Index (Overall): 78%

FY 2012 Funding by Source:
FY 2012 Total Site Operating Cost: $235M
FY 2012 Total NNSA Funding: $231M
FY 2012 Total DOE (non-NNSA) Funding: $4M
FY 2012 Total Other Funding: $0M



Maintenance and FCI by Mission Dependency



AM= Annual Maintenance Costs per FIMS

3.0 Assumptions

Savannah River Tritium Enterprise

1. Tritium has enduring NNSA Defense Programs missions at SRS, and the current site boundary will remain intact and under federal control and management.
2. Tritium will be managed as a defined, severable work activity within the M&O contract structure so that it will be positioned to be responsive to any future direction within the NNSA Nuclear Security Enterprise (NSE).
3. NNSA will approve cessation of Tritium reservoir reclamation operations for the NSE upon completion of B83 PCD requirements (pre-ALT 353 implementation).
4. Line item authorization and funding for the Tritium Centric Operations Project (TCOP) will be received in FY 2017 (CD-1) to support SRS Strategic Plan initiatives and NNSA infrastructure modernization, consolidation, and footprint reduction strategies.
5. The Tritium Responsive Infrastructure Modifications (TRIM) program -- including TCOP -- will be successfully completed by FY 2022.
6. Current and post-TRIM tritium production capacities remain capable of fulfilling requirements from the NNSA Program Control Directive (PCD).
7. The Tritium Extraction Facility (TEF) is required to operate with extended campaigns to maintain tritium supply and inventory requirements.
8. There is a long term, sustainable demand for Helium-3 that exceeds U.S. Government supply capability.
9. NNSA transfers ownership of 232-H and two associated stacks to EM for D&D in FY 2031.
10. Federal sustainability performance goals continue to be managed at the site level through DOE-EM.

Fissile Materials Disposition

1. Funding for the program is consistent with commitments identified in the FY 2012 Project Data Sheets and the approved project baselines.
2. The Surplus Plutonium Disposition Supplemental Environmental Impact Statement (SEIS) Record of Decision (ROD) will be completed in third quarter FY 2013 and supports implementation of the Preferred Alternative, which includes use of MOX to disposition non-pit and pit surplus weapons plutonium and the use of a combination of existing facilities to establish the capabilities for pit disassembly and conversion, including TA-55 at Los Alamos National Laboratory (LANL), H Canyon/HB-Line, K Area and MFFF at SRS.
3. LANL and H Canyon/HB-Line will continue with current scope to provide early feedstock for MFFF.
4. K-Area will provide storage of early feed materials as well as steady state feed materials through at least 2025, until such time that MFFF can accept all plutonium receipts. K-Area and MFFF will be able to support all packaging configurations.
5. The Office of Secure Transportation (OST) will provide transportation of surplus plutonium pits, pit nuclear materials, and by-products to LANL and the Savannah River Site (SRS). OST will also provide transportation of fresh fuel assemblies to the reactor facilities. SRS transportation resources will provide on-site nuclear material transfers to H-Canyon and MFFF. Certified packages will exist throughout program.
6. MFFF will begin hot start-up/nuclear operations in October 2016 (FY 2017) per the current approved project baseline; however, as mentioned earlier, NNSA plans to slow down the MOX project and other activities associated with the current plutonium disposition strategy, including the Waste Solidification Building.
7. Additional surplus plutonium declarations are not included in this planning basis but will be added after appropriate NEPA analysis and Record of Decision is issued.
8. Reactor facilities will be licensed to use MOX fuel and begin irradiation of MFFF product in FY 2018.
9. Regulatory oversight for WSB and site operations is provided by the Defense Nuclear Facilities Safety Board (DNFSB), and Regulatory oversight for MFFF is provided by the Nuclear Regulatory Commission (NRC).

4.0 Changes from Prior Year TYSP

Key changes from the NNSA- SRFO Twenty-Five Year Site Plan, FY 2013 – FY 2022 (issued July 2012) include:

- Headquarters TYSP ownership was shifted to NA-00.
- The current TYSP has returned to a 10-year planning horizon per NNSA guidance.
- This TYSP was prepared under the guidance issued 4/12/2013.
- Execution of TRIM program enabling projects continued in FY2012 with construction of two new buildings: an Engineering Building (246-1H) and a Process Support Building (246-2H).
- Deferred maintenance (DM) for SRTE increased significantly in FY2012 primarily due to identification of $30.1M of DM associated with thirty-five (35) HANM facility glovebox oxygen monitors.
- The line item project supporting the TRIM program received a new title, "Tritium Centric Operations Project" (TCOP).
- Operations within the 236-H facility were relocated to the HANM facility in 2012.
- Building 719-H was locally transferred from DOE-EM to NNSA.
- A schedule revision for the Waste Solidification Building projects facility completion by 2015.

5.0 Future Vision and Core Capabilities

5.1 Tritium R&D and Manufacturing Tactical & Strategic Planning

Tritium processing capabilities are utilized in the SRS Tritium facilities to execute the Program of Record and NNSA's Tritium missions, which are expected to endure throughout the 10-year planning horizon. The table below links Tritium manufacturing capability functions to specific Tritium process facilities (i.e. real property assets). The future vision will transfer HAOM, 238-H and 236-H operations into more modern process facilities via infrastructure modifications described in Section 5.2.

			Tritium Process Facilities (Year Built)					
Mission	Deliverables	Operations	HAOM (1958)	236-H (1966)	238-H (1969)	HANM (1994)	TEF (2003)	234-7H (2003)
Tritium Supply	Tritium gas	Tritium extraction						
		Reservoir unloading						
Nuclear Stockpile Maintenance	War Reserve (WR) - quality reservoirs filled with T2 / D2 or inert gases	WR component receipt						
		Reservoir reclamation						
		Gas processing						
		Reservoir loading	Inert			T_2/D_2		
		Reservoir finishing						
		Final inspection						
		Packaging						
		Reservoir storage						
Nuclear Stockpile Evaluation	Reports containing GTS surveillance data supporting the annual certification of the stockpile	Environmental conditioning						
		Function testing						
		Burst testing						
		Material characterization						
		Life storage (reservoir aging)						
Helium-3 Recovery	Helium-3 cylinders	Helium-3 purification						
		Cylinder loading						

Awaiting Deactivation

SRNL's research and development (R&D) capabilities are also essential to execute the Tritium missions. SRNL applies science and technology to the Tritium plant and to the new gas transfer systems needed for the stockpile Life Extension Programs (LEPs).

Figure 5-1 shows the anticipated DSW-funded workload for the next ten years for Tritium operations. The LEPs are introducing reservoirs that require additional processing time, which is reflected in the workload increase from FY 2017 to FY 2020. LEP reservoirs will continue to be produced thereafter, but workload is expected to gradually decline as the stockpile size is reduced. The planned infrastructure modifications described in Section 5.2 will enable cost-effective operations with a smaller workload.

Figure 5-1: Reservoir Operation Workload

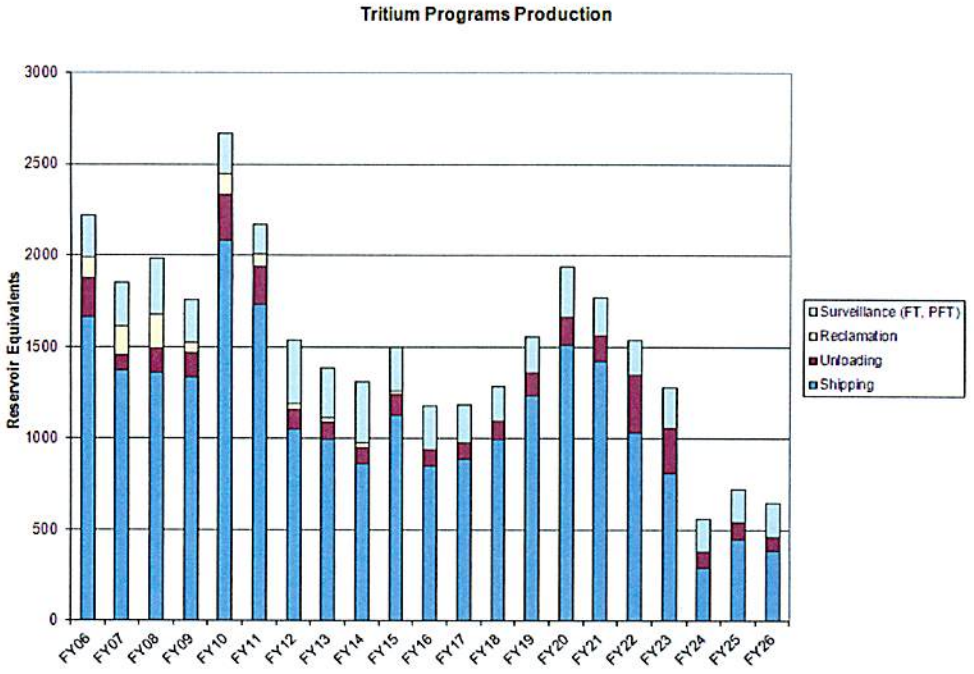
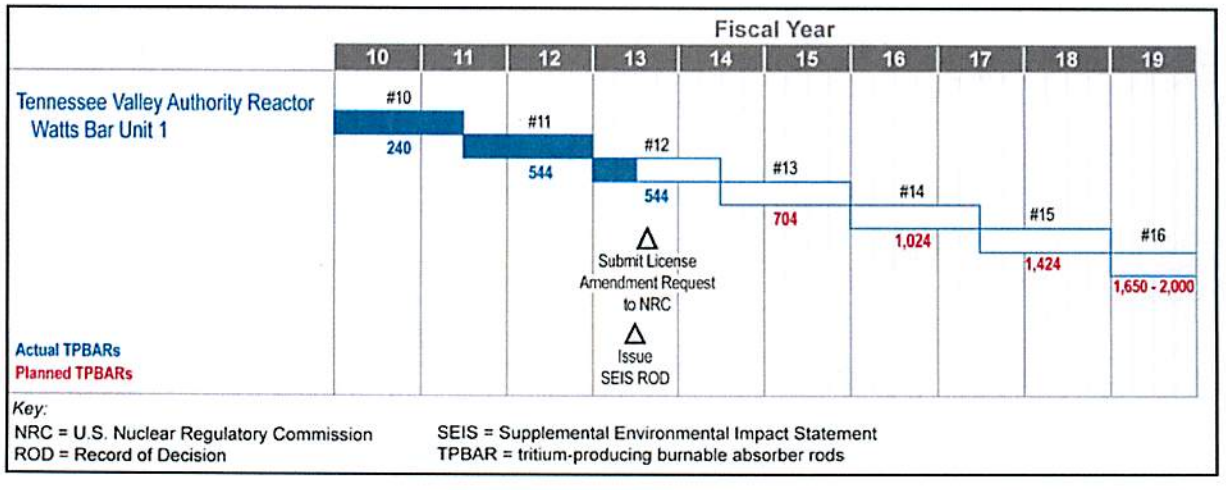


Figure 5-2 depicts both the vision and workload for the Tritium Readiness Campaign-funded extraction activities through FY 2019. Target irradiation and extraction schedules are based on Nuclear Posture Review requirements. To meet future requirements, the number of TPBARS must increase to approximately 1650 to 2000 in the FY 2019 time frame. The ramp up will begin in FY 2014.

Figure 5-2: Tritium Extraction Workload



5.2 Tritium Infrastructure Tactical & Strategic Planning

Continual capability to execute NNSA's enduring Tritium missions depends on having adequate facilities and infrastructure. SRS' current Mission Critical footprint is comprised of older, Cold War-legacy facilities and more modern facilities that will endure throughout the 10-year planning horizon. The older facilities are expensive to operate, larger than necessary to support the current stockpile, and energy-inefficient. Consistent with Program of Record infrastructure goals, the vision for the next ten years is to expedite relocation and right-sizing of the remaining functions from these older facilities into the more modern facilities via an initiative known as the Tritium Responsive Infrastructure Modifications (TRIM) program.

Some of the key benefits include:

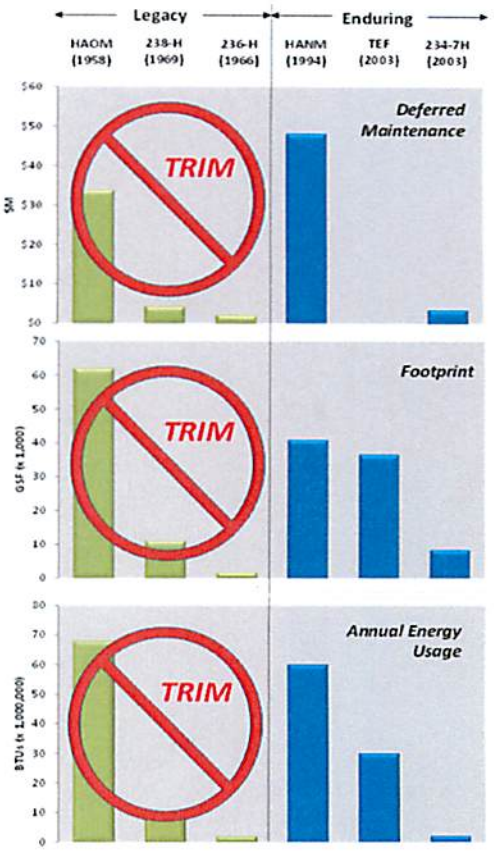
- Reducing annual operating cost by $28M (12%) and avoiding the $145M to $195M cost to maintain the HAOM facility in a minimum safe operating condition for another 20 years
- Reducing active Mission Critical footprint by 44% (160K to 89K GSF)
- Reducing energy usage by 86 billion BTUs per year (43%)
- Reducing the number of mission critical production facilities from 8 to 5 (38%)
- Reducing deferred maintenance by $47M (55%)

To the maximum practical extent, this vision will be realized via CE/GPPs. Several initiatives are being pursued to reduce operating cost and thereby maximize the amount of available funding that can be allocated to these CE/GPPs. Examples include:

- An aggressive Continuous Improvement program
- Performance excellence
- Cross training personnel
- Centralizing control of all operations in the HANM facility

With available funding maximized by cost reductions, most TRIM program scope can be accomplished via CE/GPPs, but relocation of some of the remaining functions in the HAOM facility cannot. A line item that would complete the TRIM program scope: "Tritium Centric Operations Project" is preauthorized by the Construction Working Group (CWG) to start in FY 2017.

Figure 5-3: Current Mission Critical SRS Tritium Facilities



Recent CE/GPP projects have established new office space for personnel who currently reside in the HAOM facility. (See Section 6.1 for more detailed information.) This is the only significant impact of these consolidation plans to real property assets, and it is being adequately addressed.

Because the HANM facility will receive most of the TRIM program-relocated functions and become the control center for all Tritium operations, it will be important to maximize its life via ongoing maintenance and recapitalization / upgrade projects. For this reason, the long-term vision includes a line item project to refurbish the HANM facility (FY 2036 – FY 2041) to extend its life by approximately 20 years.

The Tritium facilities face challenges with sustaining operations with increasing deferred maintenance. As sustainment projects are identified outside of the TRIM program scope, they are added to an existing project list, prioritized, and await funding decisions. Top issues are discussed further in Attachments H-1 and H-2 in the Infrastructure Data Analysis Center (IDAC) that accompanies this plan.

Aerial photographs of the before and current state of the complex and a similar rendering of the future end state following these modifications and subsequent dispositions are shown below. Dispositions are expected to extend beyond the 10-year planning period.

Figure 5-4:

BEFORE

Before TRIM Program Enabling & Portfolio of Projects

Figure 5-5:

CURRENT

March 2013

Figure 5-6:

FUTURE

End State After
TRIM Program &
Facility Dispositions

5.3 Fissile Materials Disposition Tactical & Strategic Planning

Implementation of the NNSA Fissile Materials Disposition Program at SRS focuses on the use and optimization of four facilities, two existing EM facilities (H Canyon/HB-Line and K-Area) and two under construction (WSB and MFFF).

Figure 5-7: Mixed Oxide Fuel Fabrication Facility (March 2013)

H Canyon/HB-Line facilities initiated the dissolution phase of AFS materials during 2012, which precedes the oxide production phase in the HB-Line facility. The oxide phase completed initial preparations during 2013 to begin converting non-pit plutonium AFS materials to an oxide form suitable for feed to the MFFF. These facilities will produce up to 3.7 metric tons of AP-grade oxide during the next five years. In addition, these facilities have the capability to process pit materials and produce oxide feed that could be fed to MFFF mixed oxide unit operations.

In the next five years, two OFMD projects at SRS are anticipated to finish construction, conduct start-up testing, and begin operations.

Construction of the WSB started in December 2009, and is scheduled to be completed by 2015. The WSB will be available as needed to support MFFF water runs, chemical runs, and radioactive waste operations.

Construction of the MFFF started in FY 2007 and is anticipated to begin hot operations in FY 2017. The MFFF will blend plutonium oxide with a uranium oxide to form a fuel pellet, the final oxide product (PuO2) which will be irradiated in commercial nuclear reactors. The MFFF processing rate will increase over the first several years of operation.

Figure 5-8: Waste Solidification Building (January 2013)

Figure 5-9: H Canyon/HB-Line Facilities

6.0 Real Property Asset Management

6.1 Site Footprint (Current and Future)

Prudent management of real property assets is essential to long-term mission success. This section discusses the key aspects of real property asset management, particularly in the Tritium facilities, which will undergo significant transformation in the coming years. The table below provides a summary of key information about the Tritium facilities as of the end of FY 2012.

Replacement Plant Value (RPV)		$1905		Million		
Total Deferred Maintenance (DM)		$96.9		Million		
Site Wide Facility Condition Index (FCI)		5.1%[1]				
		Facility Condition Index (FCI)	Asset Condition Index (ACI)	Asset Utilization Index (AUI)	# of Assets	Gross Square Feet (GSF) Buildings & Trailers (000s)
Mission Dependency	Mission Critical[1]	6.8%	93.2%	100%	8	160.747
	Mission Dependent	2.4%	97.6%	100%	39	138.291
	Not Mission Dependent	0.1%	99.9%	5.8%[2]	8	88.721
Facility Use	Office	6.9%	93.1%	100%	6	39.003
	Warehouse	2.5%	97.5%	100%	5	16.701
	Laboratory	9.0%	91.0%	100%	1	8.392
	Housing	N/A	N/A	N/A	0	0

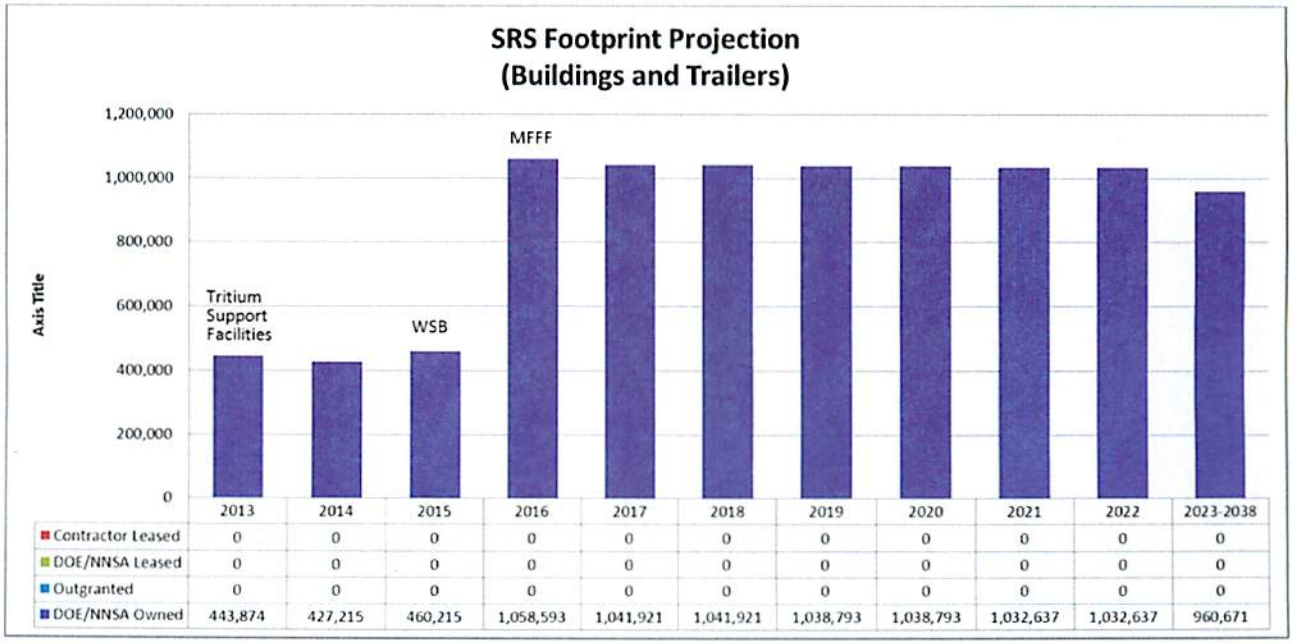
[1] TEF, which has no deferred maintenance and a relatively large RPV, artificially masks the condition of the other Mission Critical facilities.
[2] Includes deactivated buildings 232-H and 232-1H.

As a site, SRS meets and exceeds the Congressional requirement for footprint reduction for current operations and for all projected new construction, and is well situated to offset any new footprint requirements for NNSA new-construction priorities, including the new NN facilities. The total footprint of the Tritium facilities at the end of FY 2012 was 387,759 GSF, including 39 buildings and trailers within 29 acres. When constructed, the NN facilities will have a total footprint of 633,000 GSF. All permanent facilities required to execute the NN mission will be completed by the line item projects. No other facility needs are anticipated throughout the lifetime of the NN mission. The following table and Figure 6-1 provide information about recently completed and upcoming footprint changes.

FY	GSF Δ	Facility Use*	Reason
2011	+14,700	Administrative	Project Building 217-3H constructed – replacement for 1957 Shop Storage Building 232-1H and provides office space for Project personnel (TRIM program enabler).
2011	+14,000	Storage	TEF Warehouse 263-170H constructed – provides needed storage space for TEF equipment and materials.
2011	+720	Service	New Entrance Control "Facility" (3 turnstiles) constructed on west fence.
2012	+4766	Administrative	Building 719-H transferred from EM to NNSA to provide office space for Tritium Programs personnel.
2013	+16,150	Administrative	Engineering Building 246-1H constructed – provides office space for Engineering personnel (TRIM program enabler).
2013	+10,570	Administrative	Process Support Building 246-2H constructed – provides office space for process-support personnel (TRIM program enabler).
2015	+33,000	Industrial	WSB constructed.
2015	0	Industrial	Building 249-H renovated to receive HAOM functions, reclassifying 10,417 GSF of footprint from Mission Dependent Not Critical to Mission Critical.
2016	+600,000	Industrial	MFFF constructed.

*Assumed Building Usage Code category as listed in FIMS.

Figure 6-1: SRS Footprint Projection
(Includes Tritium and NN facilities)



No Plutonium Disposition Program facilities are expected to be eligible for excess and disposition during the 10-year planning horizons.

To take advantage of the radioactive decay of tritium, deactivated facilities are maintained in a cost-effective long-term surveillance and maintenance (LTSM) mode. Building 232-H (71,966 GSF) is currently deactivated, and LTSM costs approximately $250K per year. A similar minimal cost is expected for LTSM of the HAOM Facility when it is deactivated. Because of the LTSM strategy, deactivated buildings are not declared excess until they are funded for disposition. As the TRIM program is executed, other facilities will be deactivated that either were not exposed to tritium or had low levels of tritium and could be demolished with dedicated funding. The TRIM program strategy is to maximize utilization of available funding to relocate remaining functions from the older facilities into the more modern facilities. Facilities that could be declared excess and demolished within the 10-year planning period include:

Building	Earliest FY	Footprint Reduction (GSF)
232-1H	2014	11,622
Modular Offices (4 total)	2014	5037
236-H	2016	1,622
237/238-H	2017	16,672
701-3H	2019	3,128
233-22H	2021	6,156
Total:		**44,237**

As indicated on Figure 6-1, all real property within the Tritium facilities footprint is considered "DOE Owned", with no fee simple land ownings, in-grants, or out-grants. No on-site space is currently leased, and there are no plans to lease on-site space in the future. Shaw-Areva MOX Services is leasing approximately 243,000 GSF of off-site warehouse space to temporarily store process equipment and materials until they can be installed in the facility. This is a cost-effective arrangement because the alternative was to build on-site additional warehouse space that would only be needed for several years.

6.2 Deferred Maintenance Reduction & Facility Condition

The NN facilities have no deferred maintenance (DM) because they are currently under construction, and no DM is projected during the 10-year planning period. DM growth in the NN facilities will be minimized in the following years by ongoing investment in maintenance and facility infrastructure repairs and upgrades. It is anticipated that the overall FCI for NNSA facilities will drop significantly after completion and turnover of the WSB and MFFF facilities due to the corresponding replacement plant value increases (RPV) and no deferred maintenance.

In the SRS Tritium facilities, DM is calculated based on comprehensive facility condition assessments that are performed every five years, primarily by the Engineering staff. The first of these assessments was conducted in FY 2003, and a DM baseline of $52.0M was established. Through the effective utilization of Facilities and Infrastructure Recapitalization Program (FIRP) funding, this "legacy" DM was reduced by approximately 20%. The most recent comprehensive assessment of the Tritium facilities was completed in FY 2008, and overall DM was determined to be $53.7M. DM calculations are updated annually. At the end of FY 2012 Tritium had $96.9M of DM. This includes approximately $30M attributed to 35 glovebox oxygen monitors in the HANM facility.

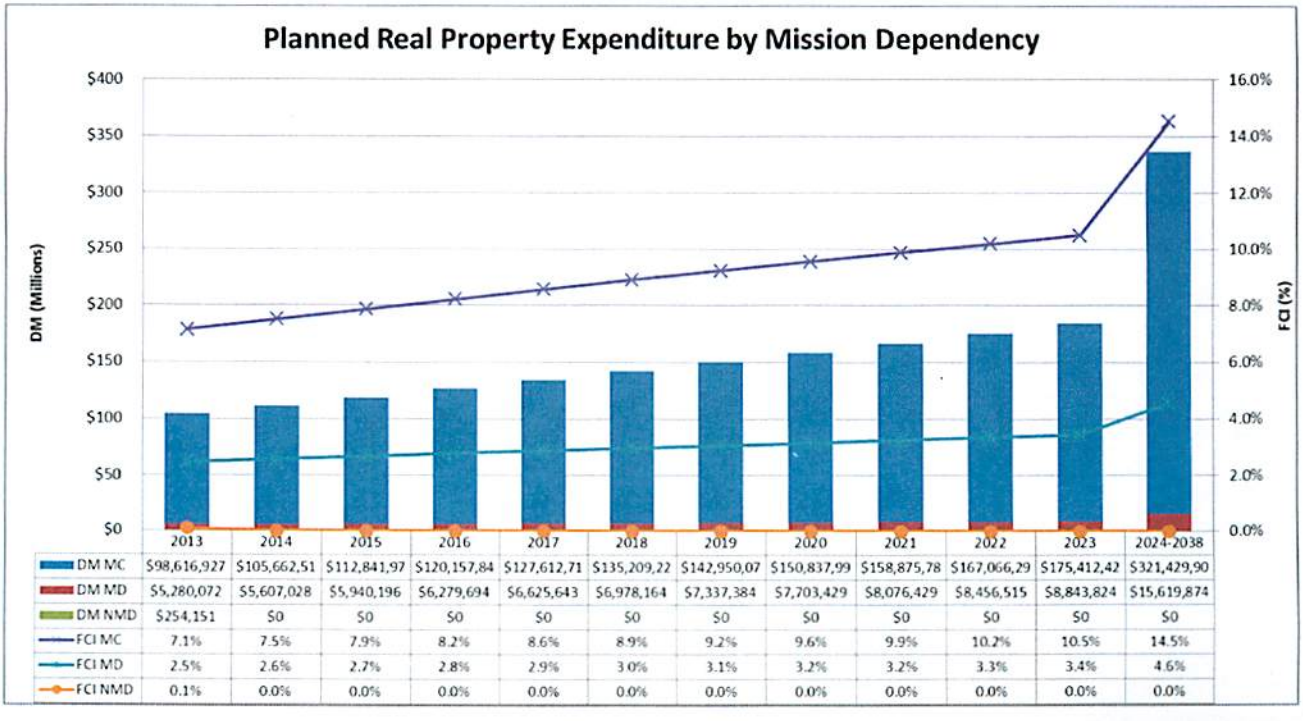
Figure 6-2 shows that Tritium's overall DM and the associated Facility Condition Index (FCI) will grow steadily. This reflects the TRIM program strategy, and should be viewed as the short-term cost of establishing viable facilities and infrastructure for the enduring Tritium missions. Available funding will continue to be allocated to all corrective, preventive, and predictive maintenance required to execute the Tritium missions. Maintenance strategies will be optimized from implementing Reliability-Centered Maintenance (RCM) best practices, where appropriate. However, discretionary recapitalization of obsolete, end-of-life systems will be deferred as long as possible to expedite TRIM program implementation. For example, the Capability Based

Facilities and Infrastructure (CBFI) projects are focused on implementation of the TRIM program portfolio of projects and reduction of risk in the enduring HANM facility. Although these projects will make a modest contribution to DM reduction in the near term, the real goal is to complete the TRIM program, thereby reducing the overall DM by approximately 55%.

The DM for Tritium's Mission Dependent Not Critical facilities is projected to remain stable throughout the 10-year planning period. Tritium's most modern Mission Critical facilities are TEF and 234-7H. DM growth is expected as these facilities mature, beginning within the 10-year planning period. Most of the near-term DM growth will be experienced in the HANM Facility, as more systems become obsolete and reach end of life. The current Tritium operations have little impact on facility condition because they are robust, protected from the environment, and were designed for a much larger throughput. Projected Facility Condition Index (FCI) versus NNSA's RTBF Key Milestones is shown in the following table.

Tactical Milestone	Projection
Mission Critical: FCI<5% by 2017	The current FCI of Tritium's Mission Critical facilities is 6.8%, which is above the goal and is projected to rise to 8.8% in FY 2017. *[It should be noted that TEF, which has no DM and a relatively large RPV, artificially masks the true condition of the other Mission Critical facilities.]*
Mission Dependent: FCI<8% by 2015	The FCI for Tritium's Mission Dependent Not Critical facilities will remain stable at approximately 2.4%, easily meeting this goal.
Not Mission Dependent: (No milestone)	The FCI for Tritium's Not Mission Dependent facilities was 0.1% in FY 2012. *[It should be noted that the DM associated with NMD facilities is relatively small and is planned for elimination by 2014. Also, future facility evolutions from MC/MDNC to NMD due to deactivation/disposition are not shown].*

Figure 6-2: Projection of Tritium Deferred Maintenance and Facility Condition Index



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024-2038
DM MC	$98,616,927	$105,662,51	$112,841,97	$120,157,84	$127,612,71	$135,209,22	$142,950,07	$150,837,99	$158,875,78	$167,066,29	$175,412,42	$321,429,90
DM MD	$5,280,072	$5,607,028	$5,940,196	$6,279,694	$6,625,643	$6,978,164	$7,337,384	$7,703,429	$8,076,429	$8,456,515	$8,843,824	$15,619,874
DM NMD	$254,151	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FCI MC	7.1%	7.5%	7.9%	8.2%	8.6%	8.9%	9.2%	9.6%	9.9%	10.2%	10.5%	14.5%
FCI MD	2.5%	2.6%	2.7%	2.8%	2.9%	3.0%	3.1%	3.2%	3.2%	3.3%	3.4%	4.6%
FCI NMD	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

6.3 Space Utilization and Consolidation

Space utilization and consolidation are key factors of the TRIM program strategy. SRNS carefully plans the movement of people and equipment / infrastructure to ensure a smooth transition with continual mission success. For people, a database is maintained that shows all offices in the facility, who resides in each, and which offices are empty. This planning tool was used to assess the additional office space needed in the new Engineering (246-1H), Process Support (246-2H), and Project (217-3H) buildings when people are moved out of the HAOM facility. Formal Conceptual Design Proposals are completed before moving any equipment / infrastructure.

6.4 Sustainability/Energy

SRS has a single Site Sustainability Plan (SSP) and associated Consolidated Energy Data Report (CEDR) for the entire site that is submitted through DOE (EM). Status of meeting the goals, planned actions, and key issues are documented in the SRS SSP. NNSA sustainability/energy contributions are captured within this SSP. A Tritium-specific program was established in FY 2010 as part of the SSP, including a new Energy Manager role. Initial activities focused on gathering information, establishing metrics, and identifying specific actions to support the site's sustainability performance goals.

Through FY 2012 the Tritium facilities had experienced an 18.2% reduction in energy intensity since FY 2003 and a 26.1% reduction in water intensity since FY 2007. Also, a metering project was completed in FY 2012 for improved electricity billing allocation and data center energy performance monitoring.

Concerning High Performance Sustainable Buildings (HPSB), the SSP lists the existing SRS facilities targeted for HPSB evaluation in FY 2012. Although no Tritium facilities are listed, SRTE will evaluate and pursue HPSB status with three facilities in FY 2013: 246-H, 246-1H, and 246-2H.