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

Memorandum

DATE: **April 30, 2015**

REPLY TO ATTN OF: NA-00-SV (R. Cox, 803-208-3312)

SUBJECT: NNSA-SRFO Ten-Year Site Plan Update, FY2016 – FY2025 Transmittal

TO: Jefferson G. Underwood, NA-521

This memorandum serves as the transmittal of the NNSA-SRFO Ten-Year Site Plan Update, FY2016 – FY2025. This plan includes input and updates from key Savannah River Nuclear Solutions (SRNS) and NNSA personnel associated with the NNSA programs associated with the Savannah River Site.

Douglas Dearolph
Manager Savannah River Field Office

SV:RRC:nwp

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Attachment: NNSA-SRFO Ten-Year Site Plan FY2016-FY2025
Revision 0 dated March 2015

Cc: w/attachment:
D. Alldridge, SRFO
R. Jump, SRFO
J. Allison, NNSA
K. Scaggs, SRNS
R. Cox, SRFO

NNSA-SRFO
Ten-Year Site Plan
FY 2016 – FY 2025

Revision 1
April 2015

Doug Dearolph, Manager
Savannah River Field Office (SRFO)
National Nuclear Security Administration (NNSA)

Wallis Spangler, Senior Vice President
NNSA Operations & Programs
Savannah River Nuclear Solutions, LLC (SRNS)

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Reviewing Official: Susan E Arnold, Acting Program Management Manager
(Name and Title)
Date: 4/28/2015

Points of Contact

NNSA (NN Mission)
Jeffrey Allison
(803)952-6337
Jeffrey.Allison@nnsa.srs.gov

NNSA- SRFO
Ryan Cox
(803)208-3312
robert.cox@nnsa.srs.gov

SRNS
Kevin Scaggs
(803)208-0705
kevin.scaggs@srs.gov

SRS Tritium Facilities

SRS Nuclear Nonproliferation Facilities Under Construction (January 2015)

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 fissile material disposition supporting the capability for storage, protection, and handling of nuclear material. 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 Safety, Infrastructure and Operations organization (NA-50). The SRS Fissile Material Disposition Program is managed by the Office of Material Management and Minimization 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. New Fissile Material Disposition Program facilities are currently in various phases of construction and have an uncertain future. Also, SRS has begun converting a specific inventory of non-pit plutonium, known as Alternate Feedstock 2 (AFS-2) into an oxide form, which prepares it for its final disposition. Infrastructure associated with H-Canyon, HB-Line, K-Area, and Savannah River National Laboratory (SRNL), which support these programs, are discussed within SRNS-RP-2015-00001, Savannah River Site Ten Year Site Plan, FY 2016 – FY 2025.

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.

GTS/Tritium R&D – In partnership with the weapon design laboratories, SRNL scientists conduct research and development that supports new gas transfer system designs and enhances gas processing in the Tritium plant.

Highly Enriched Uranium (HEU) Spent Fuel, Gap Plutonium Removals (Nuclear Nonproliferation) – provide technical expertise and support for the packaging and removal of HEU spent fuel and Gap plutonium material as part of the global threat reduction initiative; develop mobile rapid response systems for the packaging and removal of vulnerable nuclear materials.

HEU Minimization (Nuclear Nonproliferation) – provide cross-cutting support to the conversion of research reactors to low-enriched uranium (LEU) fuel as part of the U.S HEU minimization initiative.

Fissile Material Disposition (Nuclear Nonproliferation) – disposition of special nuclear materials including HEU and surplus weapons-usable plutonium (referred to as "surplus plutonium") into fuel for commercial nuclear reactors and to convert the material into a form that cannot be used in a nuclear weapon.

Program of Record documents emphasize a balanced infrastructure investment strategy to sustain existing infrastructure, replace or refurbish inefficient and unreliable facilities, and deactivate and dispose excess facilities. Over the 10-year planning horizon and consistent with this vision, NNSA facilities at SRS will continue construction of new plutonium disposition capabilities, implement the Tritium Responsive Infrastructure Modifications (TRIM) Program portfolio of projects to consolidate operations into existing newer facilities, and will initiate two line projects critical for sustainment of the H-Area New Manufacturing (HANM) facility.

FY 2014 Accomplishments

Savannah River Tritium Enterprise

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 2014, with service to five main missions: tritium supply, nuclear stockpile maintenance, nuclear stockpile evaluation, helium-3 recovery, and GTS/Tritium R&D.

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 2014 required gas transfer system function testing, which is a key component of the continued certification of the nuclear weapons stockpile. Other notable FY 2014 accomplishments include:

- Completed on schedule 100 percent of the FY14 mission deliverables in support of the nation's nuclear defense - including limited-life components, surveillance function testing, and tritium extraction – despite the impact of severe winter weather that closed SRS for five days and the 16-day lapse in government funding.
- Implemented a comprehensive plan that allowed necessary operations to continue safely while repairs were completed after SRTE facilities suffered infrastructure damage as a result of the loss of steam during Winter Storm PAX.
- Produced and completed function testing of an early prototype Gas Transfer System (designed by Los Alamos National Laboratory [LANL]) two years ahead of the original schedule in support of NNSA's B61-12 Life Extension Program (LEP).
- Added new tritium to the nation's supply by extracting tritium from the Cycle 11A Tritium Producing Burnable Absorber Rods (TPBARS), demonstrating the capability to process 300 TPBARs in a single basket for the first time.
- Exceeded the FY14 requirements for Gas Transfer System Surveillance activities.
- Received positive comments from the first Integrated Baseline Review of the B61-12 LEP project controls system.
- Leading collaborative development of NNSA's Gas Transfer System/Tritium Strategy.
- Added to the usefulness of the new Automated Reservoir Management System, started up in FY13, by deploying training videos, embedded within the system, and by adding a new search engine to expedite searches of reservoir inspections.
- Utilized corporate reach back and benchmarking information from NASA to initiate and lead implementation of Enterprise Risk Management for NNSA Headquarters to enable risk-informed infrastructure investment.
- Launched collaboration with LANL to reduce tritium inventory at their Weapons Engineering Tritium Facility by evaluating and processing legacy items in SRTE.

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 that may have a role in this approach include H Canyon/HB-Line Facility, K-Area Facility and the Mixed Oxide Fuel Fabrication Facility.

In FY 2014, SRNS accomplished the following in support of Nuclear Nonproliferation:

- Successfully initiated operations for the production of plutonium (Pu) oxide by producing and analyzing the first sample from Alternate Feedstock-2, a step in any known path for dispositioning this surplus Pu.
- Developed strategic initiatives with NNSA, DOE-EM and the SRS tank farm contractor for reducing the volume of high-level waste generated in the production of Pu oxide.
- Laid the groundwork for successfully meeting future Pu oxide production goals, incorporating factors like operator training, material characterization and blending and packaging improvements.

- Through increased rigor in construction project management processes, achieved mechanical completion of the construction subcontractor work on the Waste Solidification Building; this involved turnover/acceptance of 96 separate systems with 59 of those in FY14 alone.
- Developed plans for the multi-year layup of the Waste Solidification Building.
- Completed packaging and shipment of Gap plutonium from Italy in support of 2014 White House Nuclear Security Summit deliverable.
- Completed packaging and shipment of Gap plutonium from Belgium in support of 2014 White House Nuclear Security Summit deliverable.
- Completed mock deployment exercise of the Mobile Plutonium Facility in cold weather in Alaska.
- Issued an updated functions and requirements document for the U.S. High Performance Research Reactor (USHPRR) conversion program.
- Completed a Technology Readiness Assessment (TRA) for the USHPRR Convert program.

Current State and Future Plans

The 2015 SRNS strategic plan includes three types of near term operational drivers to support its strategic goals and vision: Product Delivery, Risk Reduction and Mission Development. The Savannah River Tritium Enterprise supports these key drivers with Tritium Operations, the Tritium Responsive Infrastructure Modifications Program, and Tritium Supply Chain. Fissile Materials Disposition also provides support with Spent Fuel Processing and Blend Down, Plutonium Processing and Blend Down, and Waste Solidification Building (WSB) Construction. Construction of the Mixed Oxide Fuel Fabrication Facility (MFFF) and the Waste Solidification Building are two major projects supported by Fissile Materials Disposition. The current state and future plans of these NNSA 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 relocate and right-size 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 in the Program of Record as an action for overcoming limitations associated with ensuring tritium capabilities.

The initial activities of the TRIM Program focus on the next 10 years of improvements and consolidation of enduring infrastructure, operational functions, and resources. Implementation of this effort will result in an overall lifecycle cost reduction while reducing the risk to achieving safe and secure national security tritium mission at SRS. The TRIM plan has two goals: (1) to relocate and right-size the tritium operational functions, and (2) to reduce the cost of the business processes within tritium programs. Completion of the TRIM Program will lead to a combined cost savings and cost avoidance of hundreds of millions of dollars over the next two decades.

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 Production Capability, 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 has risen to $117M. Most of this ($109M) is associated with mission critical facilities. This is significantly increasing mission risk due to the potential loss of facility availability and incurring the cost of safely maintaining facilities that are outdated, costly to operate, and inefficient. Completion of the TRIM Program Line Item and CE/GPPs will be helpful in this respect by allowing SRS to vacate the two legacy facilities, which collectively have almost $40 million in deferred maintenance. The remainder of the deferred maintenance is in the three modern production facilities: $64.6 million in HANM, $3.8 million in Material Test Facility (MTF), and $2.3 million in Tritium Extraction Facility (TEF).

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 began in 2014. The oxide product is 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.

The mission of MOX is to convert at least 34 metric tons of U.S. weapon-grade plutonium to MOX fuel for use in commercial nuclear power reactors. The project implements an international agreement with Russia under which Russia will dispose of the same amount of their material.

The MFFF is a 500,000 sq ft, seismically qualified, steel, reinforced concrete structure. It consists of two major sections: the aqueous polishing portion of the building where the material is cleaned and purified and the fuel manufacturing area, where the actual production of the fuel takes place, from formation of the pellets to assembly of the MOX fuel rods. One MOX fuel assembly can provide enough electricity to power 9,000 homes for one year.

The building structure is approximately 90% complete and the overall project (a complex of 17 buildings including the MFFF) is more than 60% complete. Construction is ongoing and there are about 1600 employees working on the project today, about 600 are construction/craft.

In 2013, unanticipated cost increases at MFFF and lower than expected funding prompted DOE to analyze plutonium disposition strategies and identify options for the out years. The Secretary established a Plutonium Disposition Working Group to conduct the options analysis. The release of the President's FY 2015 budget request in March 2014, indicated reduced funding for MOX ($221M) and further study of plutonium disposition options. During the appropriations process, however, the budget authority was increased to $336.9M. With that, construction is continuing while the Department continues to study other potential plutonium disposition options.

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 began in 2014 and will continue for approximately eight 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, Chicago Bridge & Iron Areva
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 1275 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 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 is a capital asset project under construction in the F Area at SRS. The WSB is a capital asset project planned for completion in 2015.

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.

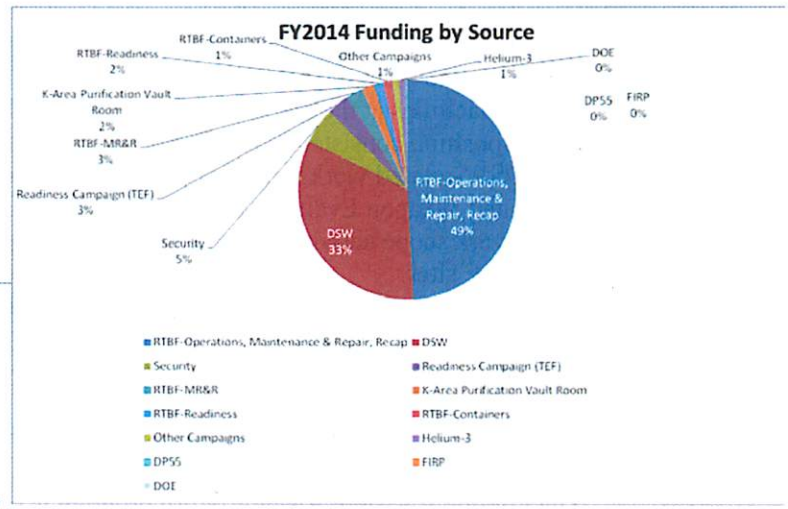
Note: All information shown below is for SRTE (as of the end of FY 2014).

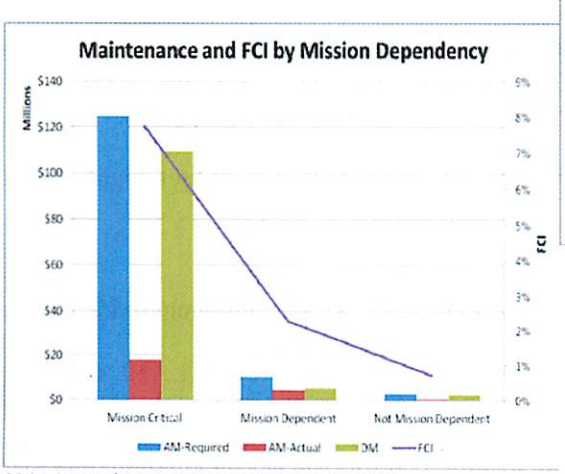
Real Property:

29 Acres (Owned)
39 Buildings/Trailers
380,828 gsf Active & Operational
83,828 gsf Non-Operational
0 gsf Leased
Replacement Plant Value: $2.0B
Deferred Maintenance: $117M
Facility Condition Index (FCI): 5.8%
Mission Critical: 7.7%
Mission Dependent: 2.3%
Asset Utilization Index (Overall): 88%

FY 2014 Funding by Source:

FY 2014 Total Site Operating Funding: $238M
FY 2014 Total NNSA Funding: $252M
FY 2014 Total DOE (non-NNSA) Funding: $0M
FY 2014 Total Other Funding: $0M





AM= Annual Maintenance Costs per FIMS

3.0 Assumptions

Savannah River Tritium Enterprise

1. 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).
2. Line item authorization funding for the Tritium Production Capability will be received in FY2017 (CD-1) to support SRS Strategic Plan initiatives and NNSA infrastructure modernization, consolidation, and footprint reduction strategies.
3. NNSA will approve cessation of reservoir reclamation operations for the NSE upon completion of B83 PCD requirements (pre-ALT 353 implementation).
4. The Tritium Responsive Infrastructure Modifications (TRIM) program - including Tritium Production Capability - will be successfully completed by FY2022. If either the line item or CE/GPPs cannot be completed by FY22, then the consolidation, cost savings, and deferred maintenance reductions will not be achieved.
5. Current and post-TRIM tritium production capacities remain capable of fulfilling requirements from the NNSA Program Control Directive (PCD).
6. The Tritium Extraction Facility (TEF) will operate with extended campaigns to maintain tritium supply and inventory requirements.
7. Tritium will continue to collect and store Helium-3 for current and future needs.
8. NNSA transfers ownership of building 232-H and two associated stacks to EM for D&D in FY2031.
9. Tritium facility infrastructure sustainment planning assumes capital projects of approximately $10M per year are necessary to avoid infrastructure degradation and increased deferred maintenance.
10. Line item funding support will be granted for the "HANM Risk Reduction" project addressing deferred maintenance issues in this key Tritium process facility. This assumes completion in FY 2026 – FY 2030.
11. Funding support will be granted to replace the remaining 33 glovebox oxygen monitors addressing deferred maintenance and obsolescence issues in the HANM facility. This assumes completion in FY 2025.
12. Line item funding support will be granted for the "HANM Chiller EPA Compliance Project" addressing a refrigerant obsolescence issue in the HANM facility or additional funding will be available for stockpiling R-22 Freon to meet the EPA FY2020 regulation.
13. Tritium facilities at the end of their useful life cycle will receive funding for stewardship, risk mitigation, and disposition consistent with NNSA Facility Disposition Program requirements.
14. SRS DSW-related work scope is based upon the current Program Control Documents (PCD), IPSS, Integrated Weapon Evaluation Team (IWET), and various Design Agency documents.
15. DSW work scope activities are contingent upon the timely receipt of reservoirs and related parts from other NSE sites.
16. LLCE requirements will be funded as priority over Surveillance requirements.

Fissile Materials Disposition

1. L-Area and K-Area will provide safe storage and receipt of foreign spent nuclear fuel, highly enriched uranium and gap plutonium.
2. The Foreign Research Reactor return program is scheduled to end in FY 2019.
3. The receipts of foreign gap plutonium are expected to be completed by FY 2020.
4. H-Canyon/HB-Line will continue with the current scope to produce AFS-2 plutonium oxide through FY 2022.
5. SRNL will provide analytical services in support of the AFS-2 mission and for the LANL oxide production mission.
6. K-Area will provide storage of early feed materials in support of NA-23 missions through at least FY 2032, until such time that the MOX Fuel Fabrication Facility (MFFF) can accept all plutonium receipts.

Storage provisions for steady state feed materials for MFFF will be determined after the Record of Decision (ROD) for the Surplus Plutonium Disposition (SPD) Supplemental Environmental Impact Statement (EIS).

7. The Office of Secure Transportation (OST) will provide transportation of surplus plutonium from LANL to SRS and provide transportation of fresh fuel assemblies from the MFFF to the reactor facilities. SRS transportation resources will provide on-site nuclear material transfers to K-Area, H-Canyon and MFFF.
8. Following project completion and start up testing, the Waste Solidification Building (WSB) will be placed in a layup configuration.
9. MFFF and WSB hot start-up/nuclear operations will be determined following approval of a new MFFF project baseline.
10. Additional surplus plutonium declarations are not included in this planning basis but may be added after appropriate NEPA analysis and Record of Decision is issued.
11. Regulatory oversight for WSB is provided by the Defense Nuclear Facilities Safety Board (DNFSB). The 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 Ten-Year Site Plan, FY 2015 – FY 2024 (issued May 2014) include:

- Headquarters TYSP ownership was shifted to NA-50.
- This TYSP was prepared under the guidance issued 5/3/2013.
- NNSA has established a new term to describe an asset's mission dependency – Mission Dependency Index.
- The Waste Solidification Building project forecasts 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 and 238-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						
GTS/Tritium R&D	R&D	Material characterization						
		Life storage (reservoir aging)						
		GTS R&D						

Awaiting Deactivation

SRNL's research and development (R&D) capabilities are integrated within the SRTE and are 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

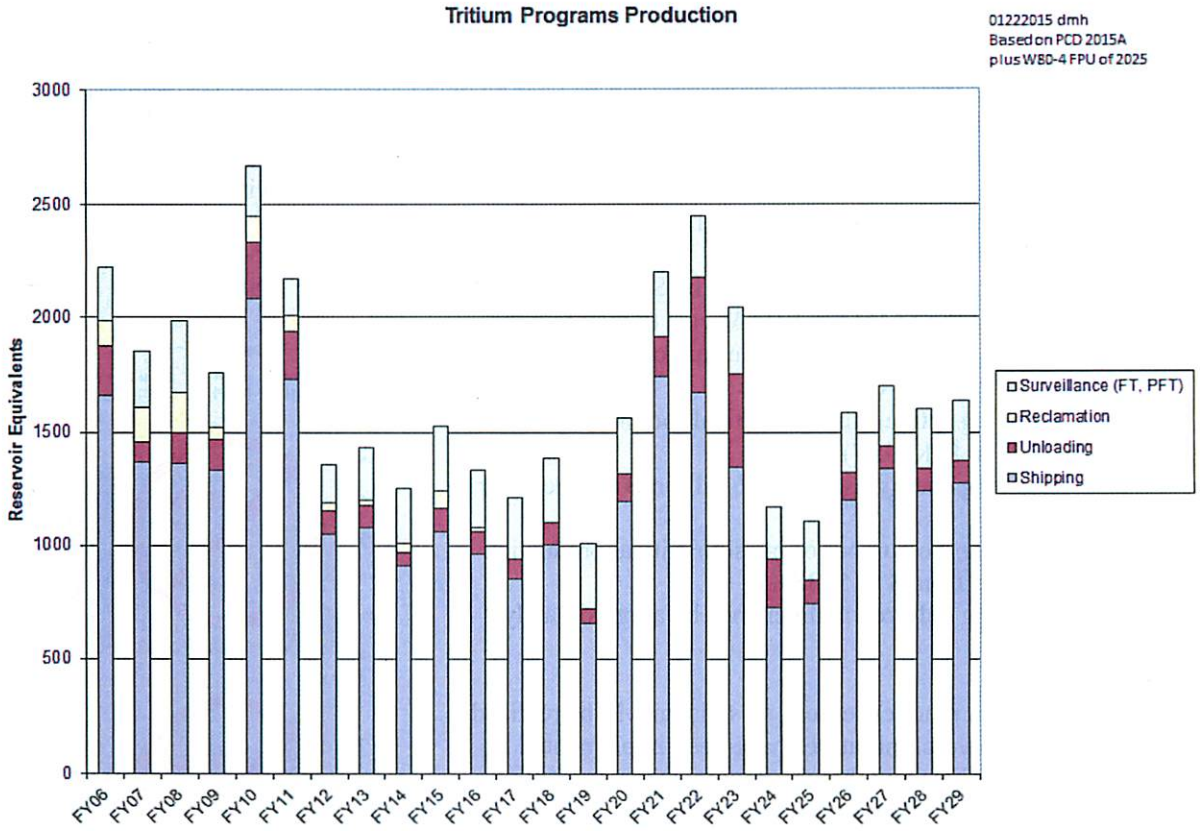
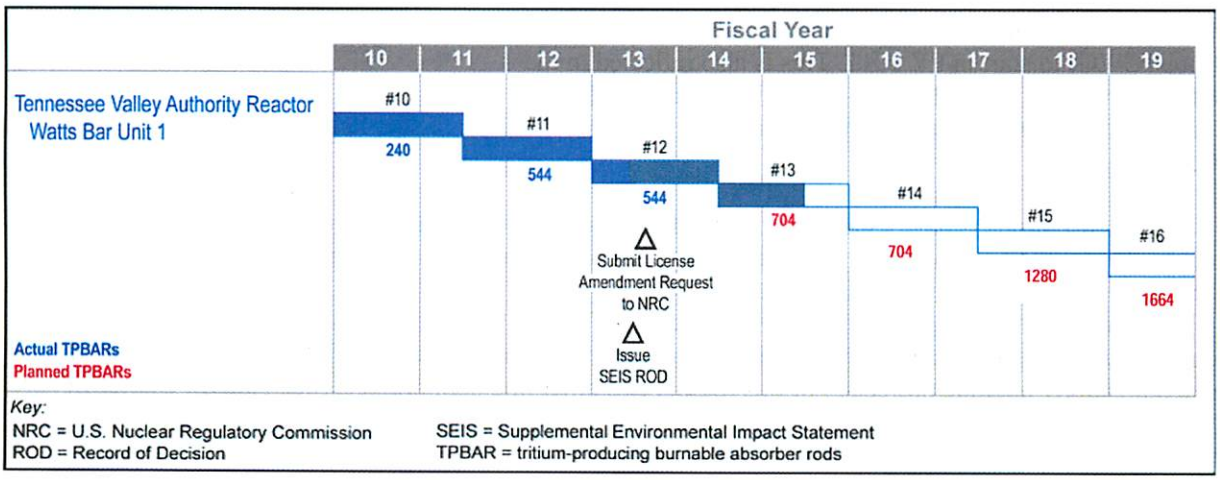


Figure 5-2 depicts both the vision and workload for the Tritium Readiness Campaign-funded extraction activities through FY 2019. Target irradiation and extraction schedules are based on Nuclear Posture Review requirements. To meet future requirements, the number of TPBARS must increase to approximately 1664 in the FY 2019 time frame. The ramp up began in FY 2014.

Figure 5-2: Tritium Extraction Workload



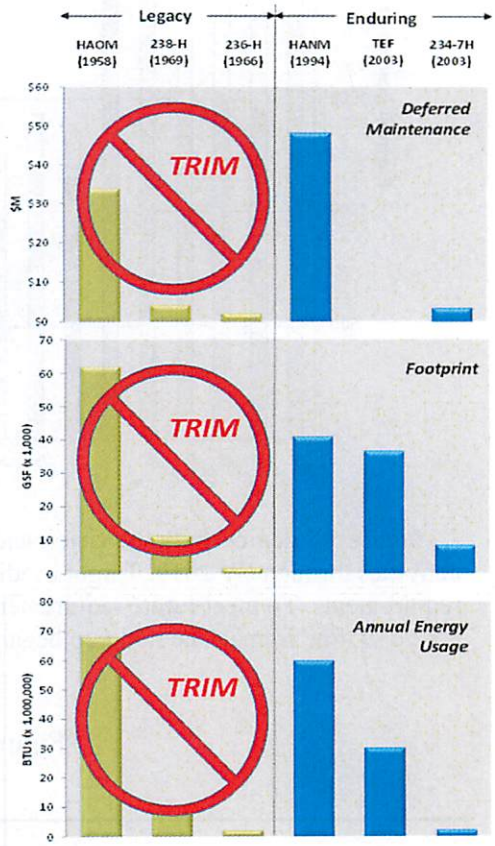
5.2 Tritium Infrastructure Tactical & Strategic Planning

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 approximately $40M

Figure 5-3: Current Mission Critical SRS Tritium Facilities



To the maximum practical extent, this vision will be realized via CE/GPPs. Several initiatives have been implemented 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, some of the TRIM Program scope can be accomplished via CE/GPPs, but relocation of several remaining functions in the HAOM facility cannot. A line item that would complete the TRIM Program scope is preauthorized by the Construction Working Group (CWG) to start in FY 2017. This is also reflected in the Defense Programs FY 2016 – FY 2020 Site Split under RTBF Construction. (NOTE: Changes in out-year labor rates may affect this).

Recent GPP projects have established new office space for personnel who currently reside in the HAOM facility. 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, two other line item projects (i.e., HANM Chiller EPA Compliance and HANM Risk Reduction projects) will extend the life and reduce operating risk in the enduring loading and unloading facility. Both line item projects are planned for FY 2026 – 2030. Also, multiple recapitalization projects addressing HANM oxygen monitor deferred maintenance are planned throughout the planning period.

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

January 2015

- 2 buildings added (246-1H, 246-2H)
- 4 trailers removed

Figure 5-6:

FUTURE

(Long Term)

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: **H Canyon/HB-Line Facilities**

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 began converting non-pit plutonium AFS materials to an oxide form suitable for feed to the MFFF in 2014. 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.

The WSB facility construction began in 2009 and is scheduled to achieve a graded CD-4 in 2015. The facility will transition from a construction project to a facility that is in a modified lay-up state, after completion of a startup testing program. During the modified lay-up period, designated systems will be maintained in an operational state and other systems placed in lay-up. Eighteen months prior to MFFF water runs, WSB will execute a reactivation plan to prepare the facility.

Figure 5-8: Waste Solidification Building (January 2015)

Figure 5-9: Mixed Oxide Fuel Fabrication Facilities (January 2015)

The MFFF construction began in FY2007, and construction is continuing while the Department analyzes plutonium disposition strategies and identifies options for the out years. The start of operations is dependent on the outcome of the strategic analysis and future funding. 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.

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 2014.

Replacement Plant Value (RPV)		$2022		Million		
Total Deferred Maintenance (DM)		$117.3		Million		
Site Wide Facility Condition Index (FCI)		5.8%				
		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]	7.7%	92.3%	90%	7	185.606
	Mission Dependent	2.3%	97.7%	86%	47	193.504
	Not Mission Dependent	0.7%	99.3%	0.1%[2]	8	85.546
Facility Use	Office	3.7%	96.3%	83%	5	52.221
	Warehouse	3.9%	96.1%	99%	6	30.341
	Laboratory	9.7%	91.3%	92%	1	8.392
	Housing	N/A	N/A	N/A	0	0

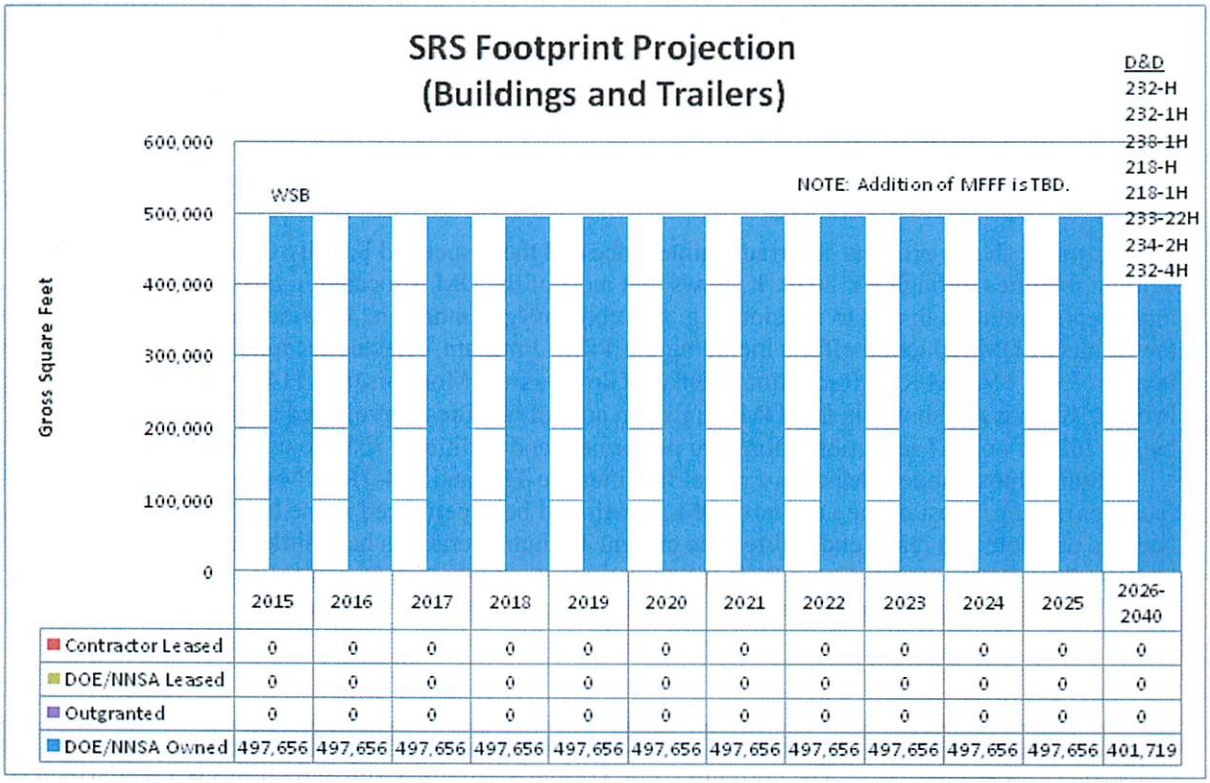
[1] TEF, which has low deferred maintenance and a relatively large RPV, artificially masks the condition of the other Mission Critical facilities.
[2] Includes deactivated buildings 232-H and 232-1H.

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 2014 was 464,656 GSF, including 39 buildings and trailers within 29 acres. An additional 33,000 GSF associated with the new Waste Solidification Building (WSB) will be incorporated into FIMS in FY 2015. 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
2013	-1,496	Office	Trailers 233-20H & 233-21H are removed.
2014	-1,749	Office	Trailer 235-11H is removed.
2015	-1,739	Office	Trailer 235-13H is removed.
2015	+33,000	Industrial	WSB construction is completed.
2021	0	Industrial	Building 249-H renovated to receive HAOM functions, reclassifying 10,417 GSF of footprint from Mission Dependent Not Critical to Mission Critical.
TBD	+600,000	Industrial	MFFF construction is completed..

*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. There are no facilities that are forecasted to be declared excess and demolished within the 10-year planning period.

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.

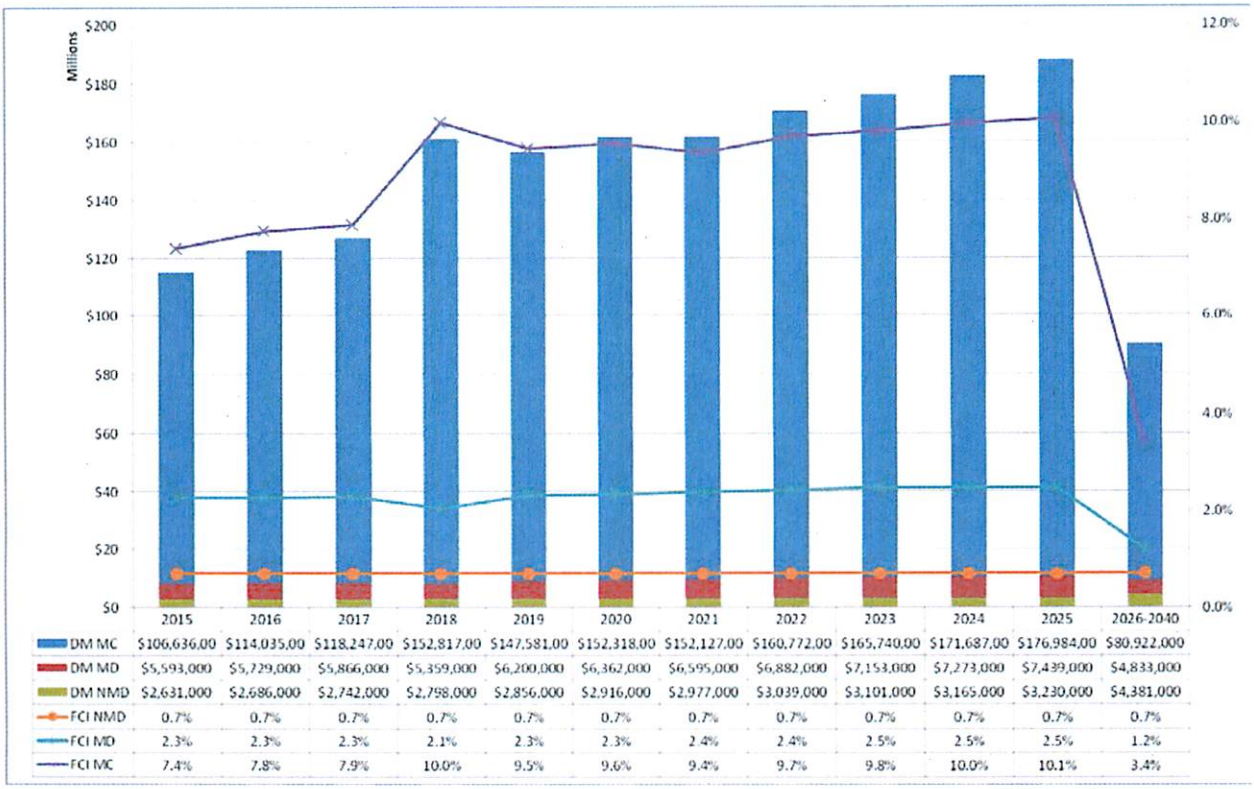
In the SRS Tritium facilities, DM is calculated based on comprehensive facility condition assessments that are performed every five years, primarily by the Engineering staff. The first of these assessments was conducted in FY 2003, and a DM baseline of $52.0M was established. Through the effective utilization 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 2013, and overall DM was determined to be $117M. DM calculations are updated annually. At the end of FY 2014 Tritium DM remained at $117M. This includes approximately $31M attributed to 35 glovebox oxygen monitors in the HANM facility.

Figure 6-2 shows projects deferred maintenance and the associated Facility Condition Index (FCI) for the Tritium facilities through FY 2040. It shows that most of the DM is located in mission critical facilities, including those representing high risk to mission (e.g. glovebox oxygen monitors, hydride bed replacements). It also reflects the results of DM reduction efforts including the TRIM Program, selected recapitalization projects, and three line item projects: HANM Risk Reduction, Replace Glovebox O2 Monitors, and HANM Chiller EPA Compliance Project. What is not shown is that DM in mission critical facilities is projected to grow to approximately $274M by FY 2025 if no DM reduction efforts are performed, and additional risks to mission would be expected, as well.

Tritium's most modern Mission Critical facilities are TEF and 234-7H. DM growth is expected as these facilities mature. 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 7.4%, which is above the goal and is projected to rise to 7.9% in FY 2017. *[It should be noted that TEF, which has low DM and a relatively large RPV, artificially masks the true condition of the other Mission Critical facilities.]*
Mission Dependent: FCI<8.45% in 2015	The FCI for Tritium's Mission Dependent Not Critical facilities will remain stable at approximately 2.3%, easily meeting this goal.
Not Mission Dependent: (No milestone)	The FCI for Tritium's Not Mission Dependent facilities was 0.7% in FY 2014. *[It should be noted that the DM associated with NMD facilities is relatively small. 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



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026-2040
DM MC	$106,636.00	$114,035.00	$118,247.00	$152,817.00	$147,581.00	$152,318.00	$152,127.00	$160,772.00	$165,740.00	$171,687.00	$176,984.00	$80,922,000
DM MD	$5,593,000	$5,729,000	$5,866,000	$5,359,000	$6,200,000	$6,362,000	$6,595,000	$6,882,000	$7,153,000	$7,273,000	$7,439,000	$4,833,000
DM NMD	$2,631,000	$2,686,000	$2,742,000	$2,798,000	$2,856,000	$2,916,000	$2,977,000	$3,039,000	$3,101,000	$3,165,000	$3,230,000	$4,381,000
FCI NMD	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
FCI MD	2.3%	2.3%	2.3%	2.1%	2.3%	2.3%	2.4%	2.4%	2.5%	2.5%	2.5%	1.2%
FCI MC	7.4%	7.8%	7.9%	10.0%	9.5%	9.6%	9.4%	9.7%	9.8%	10.0%	10.1%	3.4%

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 2014 the Tritium facilities had experienced a 28.5% reduction in energy intensity since FY 2003 and a 17.9% reduction in water intensity since FY 2007. Concerning High Performance Sustainable Buildings (HPSB), Building 246-H is the only existing SRS facility to achieve HPSB status by meeting all of the Guiding Principles. The Tritium facilities also include ten buildings requiring EISA energy and water evaluations every four years. FY 2015 marks the completion of the first 4-year cycle, and all will have been evaluated by the end of the fiscal year.