



**Department of Energy**  
Savannah River Operations Office  
P.O. Box A  
Aiken, South Carolina 29802

JAN 19 2017

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Mr. Tom Clements  
Savannah River Site Watch  
1112 Florence Street  
Columbia, SC 29201

Dear Mr. Clements:

**SUBJECT: Freedom of Information Act (FOIA) Requests Savannah River Operations Office  
SRO-2017-00149-F**

This letter constitutes our final response to your November 2, 2016 FOIA request for copies of the 2015 and 2016 Nuclear Materials Management Plans.

The enclosed 2015 and 2016 Nuclear Materials Management Plans (NMMPs) are responsive to your FOIA request. However, U.S. Department of Energy Savannah River Operations Office (DOE-SR) is withholding the information that is blacked out of the 2015 and 2016 NMMPs under Exemption 5 of the Freedom of Information Act (FOIA), 5 U.S.C. § 552(b)(5). Exemption 5 of the FOIA exempts from mandatory disclosure documents that are "inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than an agency in litigation with the agency." 5 U.S.C. § 552(b)(5); 10 C.F.R. § 1004.10(b)(5). This provision exempts "those documents, and only those documents, normally privileged in the civil discovery context." *See NLRB v. Sears, Roebuck and Co.*, 421 U.S. 132, 149 (1975) (*Sears*). The courts have identified three traditional privileges that fall under this definition of exclusion: the attorney-client privilege, the attorney work-product privilege, and the executive deliberative process or pre-decisional privilege. *See Coastal States Gas Corp. v DOE*, 617 F.2d 854, 862 (D.C. Cir. 1980) (*Coastal States*).

The deliberative process privilege protects information that reflects advisory opinions, recommendations, and deliberations comprising part of the process by which government decisions and policies are formulated. *See Sears*, 421 U.S. at 150. This privilege was developed primarily to promote frank and independent discussion among those responsible for making Government decisions. *See EPA v. Mink*, 410 U.S. 73, 87 (1973). The ultimate purpose of the exemption is to protect the quality of agency decisions. *See Sears* 421 U.S. at 151. To withhold information under the deliberative process privilege, the information in question must be both predecisional and deliberative. *See Coastal States*, 617 F.2d at 866.

The 2015 and 2016 NMMPs contain predecisional and deliberative information such as proposed shipments, projection schedule, and recommendations on the spent nuclear fuel, tritium, and nuclear material program activities at the Savannah River Site. Addendum 1 from the 2015 NMMP contains the nuclear material forecast prediction at the SRS and is, therefore, being withheld in its entirety under Exemption 5. Releasing said information would harm the integrity of DOE's decision-making process and would cause a chilling effect to the predecisional and deliberative process which reflects the personal opinions, recommendations, and deliberations of the writer rather than the policy of the agency.



While there may be a public interest in the disclosure of the withheld information, DOE has determined that such public interest is outweighed by the potential chilling effect disclosure would have upon DOE-SR's efforts with ongoing decision-making process. The disclosure of the withheld information would cause foreseeable harm of our employees to make frank, honest, and open recommendations concerning similar matters in the future. Disclosure could stifle the free exchange of ideas and opinions, which could affect the efficiency and quality of decision-making, which is essential to the sound functioning of DOE programs. Therefore, DOE-SR has determined that disclosure of the information withheld from Document 009 is not in the public interest.

This satisfies the standard set forth in the Attorney General's March 19, 2009 memorandum that the agency is justified in not releasing material that the agency reasonably foresees would harm an interest protected by one of the statutory exemptions. This also satisfies DOE's regulations at 10 C.F.R. § 1004.1 to make records available which it is authorized to withhold under 5 U.S.C. § 552 when it determines that such disclosure is in the public interest. Accordingly, we will not disclose this information. DOE-SR has determined that disclosure of the information withheld from documents is not in the public interest.

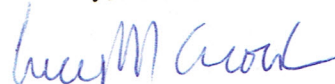
If you wish to challenge the adequacy of the search or the information withheld, a written appeal must be submitted within 90 calendar days after receipt of this letter denying the requested information. Written appeals must be submitted to the Director, Office of Hearings and Appeals, Department of Energy, 1000 Independence Avenue, SW, L'Enfant Plaza Building, Washington, DC 20585, pursuant to 10 C.F.R. § 1004.8, which sets forth the required elements of such appeals. Thereafter, judicial review will be available in the district in which the requester resides or has a principal place of business, or in the district in which the records are situated, or in the District of Columbia. You may also submit your appeal by e-mail to [OHA filings@hq.doe.gov](mailto:OHA filings@hq.doe.gov), including the phrase "Freedom of Information Appeal" in the subject line.

You may contact DOE Savannah River Operations Office's (SR's) FOIA Public Liaison, Lucy Knowles, Chief Counsel, at (803) 952-7618 or by mail at PO Box A, Aiken, SC, 29802 for any further assistance or to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, email at [ogis@nara.gov](mailto:ogis@nara.gov); telephone at (202) 741-5770; toll free at 1-877-684-6448; or facsimile at (202) 741-5769.

Based on your justification for a fee waiver, DOE-SR is waiving all allowable fees associated with processing your request.

As Chief Counsel, DOE-SR, I am the authorizing and denying official for the documents responsive to your request. If you have any questions, please contact Ms. Pauline Conner at (803) 952-8134 or [pauline.conner@srs.gov](mailto:pauline.conner@srs.gov).

Sincerely,



Lucy M. Knowles  
Authorizing Official



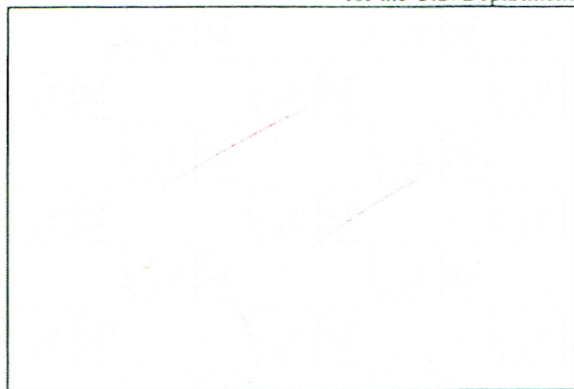
Savannah River Site  
Nuclear Materials Management Plan  
FY 2016-2030



SRNL-RP-2016-00362

June 23, 2016

Prepared by  
Savannah River Nuclear Solutions, LLC  
Savannah River National Laboratory  
Nuclear Materials Management Programs  
for the U.S. Department of Energy



**UNCLASSIFIED**

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NUCLEAR INFORMATION

Reviewing/Denying  
Official V. E. Magoulas, Program Manager, SRNL  
(Name and Organization)

Date: June 23, 2016

**Contract No.:**

This document was prepared in conjunction with work accomplished under Contract No. DE-AC09-08SR22470 with the U.S. Department of Energy.

**DISCLAIMER**

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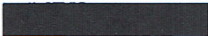
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**ACRONYMS**

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<b>Am</b>	Americium
<b>CNL</b>	Canadian Nuclear Laboratories
<b>DOE</b>	Department of Energy
<b>DOE-SR</b>	DOE Savannah River Operations Office
<b>DP</b>	Defense Programs
<b>DRR</b>	Domestic Research Reactor
<b>DSA</b>	Documented Safety Analysis
<b>EM</b>	DOE Environmental Management
<b>EMO</b>	Environmental Management Operations
<b>EOT</b>	Excess Other
<b>EU</b>	Enriched Uranium
<b>FRR</b>	Foreign Research Reactor
<b>HCA</b>	H-Canyon Area
<b>HEU</b>	Highly Enriched Uranium
<b>HFIR</b>	High Flux Isotope Reactor
<b>LANL</b>	Los Alamos National Laboratory
<b>LEU</b>	Low Enriched Uranium
<b>LWT</b>	Legal Weight Truck
<b>M3</b>	DOE Office of Material Management and Minimization (NA-23)
<b>MTR</b>	Material Test Reactor
<b>MTU</b>	Metric Tons Uranium
<b>NDU</b>	No Defined Use
<b>NMIA</b>	Nuclear Materials Inventory Assessment
<b>NNSA</b>	National Nuclear Security Administration
<b>Np</b>	Neptunium
<b>NRU/NRX</b>	National Research Universal / National Research Experimental
<b>NU</b>	Natural Uranium
<b>ORNL</b>	Oak Ridge National Laboratory
<b>P&amp;PD</b>	Production and Planning Directive
<b>Pu</b>	Plutonium
<b>SEIS</b>	Supplemental Environmental Impact Statement
<b>SNF</b>	Spent Nuclear Fuel
<b>SNM</b>	Special Nuclear Material
<b>SRNL</b>	Savannah River National Laboratory
<b>SRNS</b>	Savannah River Nuclear Solutions
<b>SRS</b>	Savannah River Site
<b>SRTE</b>	Savannah River Tritium Enterprise
<b>TPBAR</b>	Tritium Producing Burnable Absorber Rod
<b>TRM</b>	Target Residue Material
<b>TRU</b>	Transuranic
<b>TVA</b>	Tennessee Valley Authority
<b>WIPP</b>	Waste Isolation Pilot Plant



## 1.0 EXECUTIVE SUMMARY

The purpose of the Nuclear Materials Management Plan (herein referred to as "this *Plan*") is to integrate and document the activities required to disposition the legacy and/or surplus Enriched Uranium (EU) and Plutonium (Pu) and other nuclear materials already stored or anticipated to be received by facilities at the Department of Energy (DOE) Savannah River Site (SRS) as well as the activities to support the DOE Tritium mission. It establishes a planning basis for EU and Pu processing operations in Environmental Management Operations (EMO) facilities through the end of their program missions and for the tritium through the National Nuclear Security Administration (NNSA) Defense Programs (DP) facilities. Its development is a joint effort between the Department of Energy - Savannah River (DOE-SR), DOE - Environmental Management (EM), NNSA Office of Material Management and Minimization (M3), NNSA Savannah River Field Office (SRFO), and the M&O contractor, Savannah River Nuclear Solutions, LLC (SRNS). Life-cycle program planning for Nuclear Materials Stabilization and Disposition and the Tritium Enterprise may use this *Plan* as a basis for the development of the nuclear materials disposition scope and schedule.

This *Plan* assumes full funding to accomplish the required project and operations activities. It is recognized that some aspects of this *Plan* are pre decisional with regard to National Environmental Policy Act (NEPA), in such cases new NEPA action will be required.

### 1.1 Spent Nuclear Fuel, Target Material, and Plutonium Receipts

In response to the Annual Call for Site Nuclear Materials Management Plans from FY 2016-2030 timeframe, SRS is currently scheduled to receive the following spent nuclear fuels (SNF) to L-Basin: [REDACTED] Domestic Research Reactor (DRR) assemblies, [REDACTED] High Flux Isotope Reactor (HFIR) cores, and [REDACTED] Foreign Research Reactor (FRR) assemblies. H-Canyon is scheduled to receive [REDACTED] liquid [REDACTED] HEU target residue material (TRM) in [REDACTED] Legal Weight Truck (LWT) casks between the FY 2016 [REDACTED]. K-Area has enough capacity to receive and store Gap Special Nuclear Material (SNM) within approved shipping containers and additional excess plutonium oxides [REDACTED]

Since completing L-Basin modifications to allow Canadian National Research Universal / National Research Experimental (NRU/NRX) receipts in FY 2015, one of the key goals for L-Area in FY 2016 is to continue FRR SNF receipts into L basin in coordination with other FRR receipts, the DRR receipts, and SNF transfers to H-Canyon (HCA) for processing. H-Canyon is currently installing modifications to allow the receipt of the [REDACTED] TRM from their molybdenum 99 processing. Another key management goal is for HCA to complete the modifications and begin initial receipt of this TRM in FY 2016.

### 1.2 SNF, Plutonium, [REDACTED]

H-Canyon is scheduled to process approximately 1,000 Material Test Reactor (MTR) type bundles and approximately 200 HFIR cores by the end of FY 2024. The uranium from the SNF processing will be combined with the TRM receipts and purified through H-Canyon to make the uranium acceptable for down blending to low enriched uranium (LEU). The resultant ~4.95%



LEU will become part of the DOE/Tennessee Valley Authority (TVA) Interagency Agreement (IA) in which DOE supplies ~4.95% LEU to TVA for use as feed for the fabrication of TVA commercial power reactor fuel. The material, currently approved for processing through H-Canyon, is scheduled to produce ~40 metric tons uranium (MTU) between FY 2018 and FY 2024.

K-Area is scheduled to continue shipments of excess Pu to H-Canyon and HB Line for processing into oxides suitable for mixed oxide fuel fabrication. Once processing is complete, the Pu oxide material will be returned to K-Area for continued interim storage until a final disposition path is confirmed.

By the end of FY 2016, K-Area will establish capability to allow for down blend processing and packaging Pu not suitable for mixed oxide fuel fabrication feed. Processing of the non-suitable Pu is scheduled to begin in early FY 2017 [REDACTED] NEPA action for this activity was completed in FY 2016 (ref. Federal Register notice 80 FR 80348; 12/24/2015). The final disposition path for this material after processing is to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM.

[REDACTED]

### 1.3 Tritium Processing and Recovery

The Tritium Enterprise manages tritium as a defined work activity positioned to be responsive to NNSA needs. The NNSA Tritium Facility is scheduled to continue the supply of mission deliverables in support of the nation's nuclear defense [REDACTED]

[REDACTED]

### 1.4 Nuclear Materials Planning Roadmap

The planning Roadmap, in Figure 1.4-1, shows the integrated processing activities of the EMO, H-Area, K-Area, L-Area, E-Area, and SRNL which allow disposition of legacy and/or surplus nuclear materials. Processing activities for the SRS Tritium Enterprise are not included in the Roadmap because there is no interface between the DP activities and the EMO activities. The Roadmap is a living document that is configuration managed with a formal log to document the basis for each change. It includes the operating and storage plans for the EM and M3 scopes in this Plan [REDACTED]



[illegible]



Figure 1.4-1 Nuclear Materials Planning Roadmap (SRNL-RP-2013-00725 Rev 14d)

## 2.0 SUMMARY INVENTORY

SRS manages a large set of operations for a variety of nuclear materials. Significant projects, accomplishments, and recommendations related to materials production, disposition, and processing are grouped into three areas, SNM Storage, SNM Disposition, and Tritium Supply that are significant to national goals:

1. SNM Storage  
Receive, store, and ship nuclear materials in a safe and secure manner. Operate and maintain L and K area facilities to support consolidation of FRR and DRR fuel returns and consolidate storage of plutonium for processing and disposition.
2. SNM Disposition  
Develop uranium and plutonium throughput improvement and preparation initiatives to allow for continued disposition of SNF from L-Area through H-Canyon and SRNL, and plutonium processing through H-Canyon, HB Line, and K-Area.
3. Tritium Supply  
Manage tritium per the classified Nuclear Weapons Complex directives, including the P&PD to define the work scope and establish a delivery schedule.

### 2.1 Defined Use

The "Defined Use" materials within the SRS inventory consist of materials for tritium operations

The tritium inventory is needed to continue to meet the NNSA demands for defense needs. The tritium items in inventory are managed as defined/scheduled within the classified Nuclear Weapons Complex directives, including the P&PD.



[REDACTED]

The [REDACTED] excess plutonium items in inventory are both metals and oxides whose proposed disposition paths are either to process for use as feed for mixed oxide fuel fabrication or to process for disposition to the Waste Isolation Pilot Plant (WIPP). These items include consolidated plutonium inventories excessed from Rocky Flats, Hanford, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, SRS FB Line facility, and Gap Pu materials.

Of the [REDACTED] excess uranium items in inventory, the vast majority of these items are in [REDACTED] SNF bundles. DOE plans to process 1,000 SNF bundles and up to 200 HFIR cores through the H-Canyon and down blend the resultant uranium for disposition to the TVA for use as feed for commercial power reactor fuel fabrication. [REDACTED]

[REDACTED]

[REDACTED]

### 2.3 Inventory Quantities

Table C-1, in the classified addendum SRNL-RP-2016-00360 (U) *Savannah River Site Nuclear Materials Management Plan FY 2016*, shows a breakdown summary of the SRS NMIA. Other tables in the classified addendum break down each nuclear material type in inventory by disposition pathway and program location (see section 5.0)

## 3.0 MATERIAL DEMAND AND RETENTION

SRS has only two programs that require material as a part of material demand; the Tritium Enterprise and the Mark-18A program. The tritium demand is based on the DP need and is shown in various Nuclear Weapons Complex directives, and the Mark-18A demand is the entire inventory of these Mark-18A targets which are currently in SRS inventory. Table C-2, of the classified addendum SRNL-RP-2016-00360, is not extended beyond current inventories, except as noted for P&PD projections.

### 3.1 Estimated Nuclear Material Demand

The estimated nuclear material demand at SRS is based on the current deliverables for tritium as defined/scheduled in several classified Nuclear Weapons Complex directives, including the current Nuclear Weapon P&PD, Master Nuclear Schedule, Integrated Weapons Activity Plan, and specific weapon Program Control Documents, Component Description Documents, and program planning documents.

There is no demand for any Mark-18A material to be sent to SRS because SRS already has all the Mark-18A material in inventory.

### 3.2 Justification of Retention of Defined Use Materials

The justification for retention of these tritium materials is to allow loading of tritium reservoirs and to support tritium surveillance activities as directed in the Nuclear Weapons P&PD and other classified supporting documents.

[REDACTED]

[REDACTED]

### 3.3 Nuclear Material Shortfalls

NNSA is responsible for ensuring a supply of tritium is produced for the national inventory based on the requirements contained in Nuclear Weapons P&PD and other supporting documents. While tritium is currently produced in a single reactor, tritium needs may demand an additional reactor be placed on line for increased tritium production by the early 2020's.

## 4.0 MATERIAL ADDITIONS AND REMOVALS – RECEIPTS, SHIPPING, AND OTHER REMOVALS

Tables C-3 and Table C-4, in the classified addendum SRNL-RP-2016-00360, show the SRS Nuclear Material Removal/Shipping and Nuclear Material Additions/Receiving projections respectively. Tritium Enterprise additions and removals will not be shown on these tables.

### 4.1 Material Additions (Receipts)

The breakdown of the following receipts are captured in Table C-3, Nuclear Material Additions/Receiving, of the classified addendum SRNL-RP-2016-00360.

For this data call time period of FY 2016 through FY 2030, SRS is scheduled to receive to L-Basin [REDACTED] DRR assemblies, [REDACTED] HFIR cores, and [REDACTED] FRR assemblies. H-Canyon is scheduled to receive [REDACTED] HEU liquid TRM between FY 2016 [REDACTED].

H-Area will receive natural uranium (NU) solutions for down blending HEU to ~4.95% enriched LEU. These tankers will be supplied by TVA as part of the DOE/TVA Interagency Agreement for the HEU Blend Down program from FY 2018 through FY 2024.

K-Area is available [REDACTED] to receive [REDACTED] SNM within approved shipping containers and additional plutonium oxides. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In FY2016, K-area received Gap plutonium materials from Japan, Switzerland, and Germany.



#### 4.2 Material Removals (Shipping)

The details of the following shipping plans are captured in Table C-4, Nuclear Material Removal/Shipping, of the classified addendum SRNL-RP-2016-00360.

The shipping plans for SRS are as follows:

- Resume shipping from H-Area of 40 MTU LEU to TVA in FY 2018 and complete in FY 2024 via the HEU down blend program.
- Resume E-Area shipping of up to 6 MT Pu to WIPP. Shipments of this surplus non-pit plutonium to WIPP, after it is operational, will be placed in the queue of waste to be shipped to WIPP.

[REDACTED]

- K-Area will begin shipping Pu oxides once a facility has been approved to receive or a decision is made for an alternate disposition path.

#### 4.3 Estimated Material Removals (Other)

[REDACTED]

### 5.0 FACILITIES, PROCESSES, AND EQUIPMENT

The facilities within SRS which play major roles in Nuclear Material Management are K-Area, L-Area, H-Area, E-Area, and SRNL.

#### 5.1 K-Area

K-Area was one of the five production reactor areas on the SRS. Since the end of the Cold War when the SRS reactors were shutdown, it has been repurposed for nuclear material storage. It currently has a capacity for [REDACTED] drums of SNM. SRS does not foresee any capacity challenges with drum storage based on the current receipt and disposition plans.



K-Area is also in the process of establishing capability to allow for down blending nuclear material for disposition to WIPP. This glovebox is scheduled to begin operations in FY 2017 and down blend up to 6 MT of plutonium oxide for disposition.

A Documented Safety Analysis (DSA) revision is currently planned which will allow K-Area to expand their capability to receive and store nuclear material in additional types of Type B shipping containers. Some current Type B containers and their content envelopes are currently restricted from storage in K-Area. The revision to include HEU oxide in an ES3100 configuration, such as the HEU-Np material expected from Y-12, is scheduled to complete in FY 2017.

## 5.2 L-Area

L-Area, like K-Area, was also one of the five production reactor areas on the SRS. L-Area has maintained its spent fuel pool basin and now has the capability to receive and store FRR and DRR fuel returns. It has the capability to receive, bundle, and store MTR type fuels (3650 bundle positions) and HFIR fuels (120 full cores). [REDACTED]

L-Area has completed a modification to the Shielded Transfer System (STS) used for LWT cask processing, adding the capability to unload NRU/NRX fuel from Canadian Nuclear Laboratories (CNL) which is longer and heavier than typical MTR fuel.

L-Area also has storage capacity to handle irradiated material in drums.

## 5.3 H-Area (H-Canyon and HB Line)

H-Canyon and HB Line are the only operating full scale radiochemical processing facilities in the United States. H-Canyon's remote operation and versatility, and HB Line's gloveboxes allow for processing various types of nuclear materials with the capability to recover uranium, neptunium, plutonium or other radioisotopes.

H-Canyon dissolving is being used for both uranium separation and plutonium oxide production. The final operational readiness review of the unit operations required to resume uranium separation from the SNF dissolution is nearing completion. Once complete, it will allow for continuous SNF processing. H-Canyon is expected to extract the uranium from 1,000 MTR bundles and 200 HFIR cores from FY 2016 through FY 2024, with the potential to extend the SNF disposition missions longer pending NEPA actions to approve additional material for processing.

Modifications in H-Canyon are scheduled to complete in FY 2016 to allow for the direct receipt, off-loading, and processing of the liquid HEU TRM from the CNL. The CNL processing is scheduled to begin in FY 2016 [REDACTED].

HB Line completed operational readiness reviews and began plutonium processing in FY 2016. HB Line is expected to complete plutonium oxidation processing in FY 2023.


#### 5.4 E-Area

Along with the past and present transuranic (TRU) waste streams, E-Area is where up to 6 MT of plutonium down blended in K-Area will be consolidated and characterized to demonstrate compliance with the WIPP Waste Acceptance Criteria (WAC) prior to shipping to WIPP. Once characterized as acceptable for WIPP, the material will be packaged/loaded into TRU waste transport containers. Shipments of this surplus non-pit plutonium to WIPP, after it is operational, will be placed in the queue of waste to be shipped to WIPP.

#### 5.5 SRNL

SRNL is an applied research and development laboratory for the DOE Office of Environmental Management (DOE-EM). SRNL serves the nation in three business areas: Environmental Stewardship, Clean Energy, and National Security.

SRNL Analytical Laboratories support the various disposition processes by providing high quality analytical, radiometric, and environmental monitoring data. The labs perform analysis to establish chemical flowsheets for the disposition of the array of nuclear materials and the recovery of viable isotopes. SRNL has also established an expertise in tritium processing and its relation to new reservoir design, as well as developing technologies required for modernization of the SRS Tritium Facilities.



#### 5.6 Tritium

The Savannah River Tritium Enterprise (SRTE) consists of five process facilities currently used to execute tritium missions. Two of these are legacy facilities built in the 50s and 60s, while the other three are modern facilities which utilize advanced technologies that have been developed over the years to greatly reduce cost, footprint, and the amount of tritium released to the environment.

1. The Tritium Extraction Facility (TEF) provides the capability to extract tritium from the TPBARs that are irradiated in commercial light water reactors by TVA. Once the tritium is extracted from the TPBARs, it goes through a preliminary purification process.
2. The H-Area New Manufacturing (HANM) Facility was built in 1994 to replace the original Tritium Manufacturing Facility. It provides the capability to unload, separate, and recover the gases (including Helium-3) from the returned reservoirs. It also houses the ability to load reservoirs as well as perform gas transfer system surveillances.



3. The H-area Old Manufacturing (HAOM) Facility has been expanded twice in its long history, and provides reservoir finishing which ensures the loaded reservoirs are safe and meet Design Agency specifications. The reservoirs are also packaged for shipping in this facility.
4. The Reservoir Reclamation Facility is used to repurpose the returned reservoirs to eliminate the need to purchase new-built reservoirs.
5. The final facility is the Materials Testing Facility (MTF) which is primarily run by SRNL personnel providing a facility to conduct studies on different tritium-exposed specimens and collect data on reservoir aging to ensure the integrity of the tritium-loaded reservoirs in the field.

A discussion of the current SRS tritium inventory, components, historical trends, and projections is given in the classified addendum.

## 6.0 STATUS OF PLANS FOR DISPOSITION OF MATERIALS [REDACTED]

Table C-5, in the classified addendum SRNL-RP-2016-00360, shows the SRS Nuclear Material Disposition Processing plans. The disposition plans for SRS [REDACTED] materials include the following paths:

- Disposition of the uranium in the SNF will be through the HEU down blending process. This path processes the off-specification uranium through H Canyon to purify and recover the uranium, and then down blends the uranium with NU to produce a LEU solution product. This LEU solution is transported off-site to a commercial vendor for fabrication into commercial reactor fuel. DOE plans to process approximately 1,000 material test reactor (MTR) type SNF bundles, and up to 200 HFIR cores through H-Canyon for uranium recovery and down blending. These items in the L-Basin inventory have been designated and disposition of this material began in FY 2014 and will continue through FY 2024. The remaining SNF could be dispositioned by either 1) processing the aluminum clad SNF through H-Canyon and shipment of non-aluminum clad SNF off-site or 2) dry storing the aluminum clad SNF and either dry storing the non-aluminum SNF on-site or shipping the SNF off-site. The disposition path for the remaining SNF has not been decided (e.g. processing or dry storage). Funding has not yet been provided to pursue a dry storage option.
- Disposition to WIPP the unirradiated Fast Flux Test Facility (FFTF) Pu and the down blended Pu oxide. DOE approved in March 2016 the Record of Decision for the Surplus Pu Disposition Supplemental Environmental Impact Statement (SPDS EIS) to allow for disposition of up to 6 MT of Pu. The unirradiated FFTF Pu is included in this 6 MT. DOE-EM has responsibility for the disposition of this material which is estimated to



begin in FY 2017 [REDACTED]. This duration is based on the assumption of a single glovebox working a single shift.

- Disposition through the SRS high level waste (HLW) system. This path processes waste materials from H Area processing through H Tank Farm to the Defense Waste Processing Facility (DWPF) where it is encapsulated with a glass log matrix. During the processing of the SNF, various accountable materials, including plutonium, are removed as waste and sent to the HLW system for processing through DWPF. The Liquid Waste System Plan revision 20 supports the disposition of H-Canyon SNF processing waste through FY 2024 and will continue to process the H-Canyon deactivation waste through FY 2027.
- Disposition through the SRS on-site low level waste system. This path processes low level wastes produced during any of the other disposition processes as noted above. DOE-EM has responsibility for the disposition of this material which continues through FY 2065.
- The following are additional [REDACTED] materials at SRS with no finalized disposition path. DOE-EM has responsibility for establishing a disposition path for the following materials:
  - Weapons grade plutonium (not addressed in 3/2016 Record of Decision)
  - Depleted uranium oxide
  - Mark-51 and other Target Material [REDACTED]
  - HEU with U-233
  - Various Standards and Sources
  - Heavy Water

## 7.0 RESTRICTED USE MATERIALS

DOE Order 410.2 defines "Restricted Use" (RU) to be: "Nuclear Material governed by domestic or foreign agreements or obligations that restrict the use of the material to a specific purpose, most commonly restricting nuclear material from utilization in nuclear weapons." These materials are tagged in the NMIA when they are identified and fall into three categories: foreign obligations, International Atomic Energy Agency (IAEA) materials, and materials associated with Presidential declarations. [REDACTED]

### 7.1 Foreign Obligations

SRS holds materials that were transferred to the Site from foreign states, and in most cases those states placed restrictions on the use of the nuclear materials. SRS has also received foreign obligation flags (no actual material transfer) from other DOE facilities to be placed on materials within the SRS inventory. SRS has materials with foreign obligations from the following entities: Australia, Canada, European Atomic Energy Community (Euratom), and Japan. These obligations primarily involve Foreign Research Reactor (FRR) irradiated fuels. The foreign obligations on the uranium materials with HEU down blend as their disposition path will be

transferred from SRS to the fuel fabrication vendor as the resultant uranium material is transported off-site. [REDACTED]

## 7.2 IAEA

SRS also retains SNM that is subject to inspections and surveillance by the IAEA. IAEA surveillance is based on a U.S. Voluntary Offer Agreement consistent with the Nuclear Nonproliferation Treaty (NPT). The disposition for these materials is currently to be determined, but is likely to follow other plutonium disposition paths.

## 7.3 Materials Associated with Declarations

SRS holds material in inventory associated with two of the three Presidential Declarations, designated by codes S94 and E07. SRS does not currently have any materials covered under the E05 declaration designation. Excess plutonium or HEU materials at SRS that do not fall under any of these declarations are shown as EOT, Excess Other.

## 8.0 NATIONAL ASSET MATERIALS

DOE Order 410.2 defines a "National Asset Material" as, "A nuclear material that has no current programmatic use but that is judged to be unique or difficult to reproduce, and that is set aside because of a significant chance that it will be required for future programmatic use."

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] Other potential National Asset candidates in the current SRS inventory [REDACTED]  
[REDACTED] include:

- Heavy Water
- Mark-51 targets (contains Cf-252)
- US1/US2 (contains Am-243)

[REDACTED]  
[REDACTED] The Heavy Water remains in storage in L, K, and C areas, and the target materials are in L-Basin.

## 9.0 MULTIPLE ACCOUNTABLE ISOTOPE MATERIALS

The majority of the SRS inventory has multiple accountable isotopes. There are no current issues for these materials with designated disposition paths, and SRS does not foresee any issues



or other potential interactions these materials may have the subsequent materials during management processing, packaging, or storage.

## 10.0 ISSUES

The most significant issue with respect to the current inventory of SNM at SRS is the lack of an assigned disposition path for certain SNF and plutonium materials.

SRS is approved to disposition only a portion of the SNF currently stored in L-Area via processing through H Canyon. L-Area is planned to continue to receive FRR materials through FY 2019 and DRR materials through FY 2035. [REDACTED]

[REDACTED]

[REDACTED]

There is currently no confirmed disposition path for a portion of the consolidated surplus plutonium being stored in K-Area. Decisions/funding need to be made on the appropriate disposition path; which include processing for: use as mixed oxide fuel, another use, or a waste disposition.

## 11.0 ACCOMPLISHMENTS

SRS manages a large set of operations for a wide variety of nuclear materials. Significant projects, accomplishments, and recommendations related to materials production, disposition, and processing are grouped into four areas that are significant to present owners, programs, and national goals:

- A. Receive, store, ship, and disposition nuclear materials in a safe and secure manner. Operate and maintain facilities to support consolidation and disposition of nuclear materials.
- B. Develop uranium and plutonium throughput improvement and preparation initiatives.
- C. Enable EM and NNSA mission accomplishment through:
  - a. Effective technical leadership for execution of future site missions
  - b. National and regional support in achieving federal and DOE broader goals
- D. Manage tritium as a defined work activity positioned to be responsive to NNSA needs.

Selected accomplishments in these focus areas include:

- A. Receive, store, ship, and disposition nuclear materials in a safe, and secure manner. Operate and maintain facilities to support disposition of nuclear materials.
  - a. Continued processing of the approximately 1,000 MTR bundles of SNF through H-Canyon per the approved March 2013 amended ROD limited processing scope.
  - b. Continued to support "Gap" plutonium missions for the NNSA M3 Remove Program.

- c. Initiated receipt of Canadian NRU and NRX SNF in L-Area and continued design, fabrication, and installation of components for the receipt of Canadian HEU bearing liquid target residue material in H-Area.
- d. Continued production of plutonium oxide acceptable as a potential feed for mixed oxide fuel fabrication or alternate disposition.
- e. Continued achieving readiness for the H-Canyon unit operations for the separation of the uranium in the SNF.
- f. Continued work on the DSA, Procedures, Training, and Equipment installation in a K-Area glovebox for the WIPP blending process to allow disposal of plutonium and uranium as TRU waste to WIPP.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- h. Initiated a project to install a decontamination and conversion glovebox in K-Area to allow for disposition of [REDACTED] plutonium material.
  - i. Continued receiving and safely storing spent nuclear fuel from both domestic and foreign research reactors.
  - j. Maintained a state of readiness for receiving and storing plutonium oxide from the LANL Advanced Recovery and Integrated Extraction System (ARIES) project for eventual disposition. ARIES shipments from LANL to SRS for interim storage are currently suspended.
  - k. Maintained approved supplier status to perform analytical services at SRNL for LANL ARIES oxide production.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- m. Completed formal notification and approval of the method for termination of foreign obligations on associated fuels proposed within the limited processing scope from the four foreign entities involved.
  - n. Finalized a two-phase effort to exchange materials in K-Area Materials Storage (KAMS) under IAEA Safeguards protection to improve coordination of plutonium disposition activities with international safeguards.
  - o. Prepared tables to support U.S. annual reporting to IAEA on U.S. plutonium inventories and management policy.
  - p. Managed and executed DOE-STD-3013 Integrated Surveillance Program. Demonstrated relevance of long-term storage standard and identified inventory groups with increased degradation potential.
  - q. Continued the 9975 Life Extension surveillance program and initiated surveillance of targeted 9975 packages for evaluation.



- B. Develop uranium and plutonium throughput improvement and preparation initiatives.
- a. Provided implementation-planning support for DOE/TVA blend-down program of additional HEU to LEU for transfer to commercial vendors.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

- C. Enable EM and NNSA Mission Accomplishment and Program Support by EM Facilities:

[REDACTED]  
[REDACTED]  
[REDACTED]

- b. Implemented SRS requirements for DOE Order 410.2, Management of Nuclear Materials.
- c. Leveraged SRS materials and facilities by providing direct support to Domestic Nuclear Detection Office, Nuclear Materials Inventory Program, Federal Bureau of Investigation, and Defense Nuclear Non-proliferation activities for emergent receipt analysis, archiving, detector testing, and forensics of nuclear materials.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

- D. Manage tritium as a defined work activity positioned to be responsive to NNSA needs.

- a. Overcame significant challenges to complete 100 percent of the FY15 mission deliverables in support of the nation's nuclear defense [REDACTED]  
[REDACTED]
- b. SRTE stands ready to process LANL'S [REDACTED] Life Extension Program (LEP) reservoirs following a successful two-year development program.
- c. Supported Sandia National Laboratory's (SNL's) planned [REDACTED] efforts, which contributed to a positive Baseline Design Review.
- d. Added new tritium to the nation's supply by extracting tritium from [REDACTED] TPBARs.
- e. Provided leadership in helping NA-197 manage the tritium supply chain.
- f. Enhanced the strategic-investment process to ensure that facility needs are identified, evaluated, acted upon, and communicated for funding.
- g. Innovatively repurposed SRNL's "Big Blue" function tester and unloaded [REDACTED] inert reservoirs for potential reuse.

- h. Achieved ISO/IEC 17025 accreditation for the SRNL F/H Analytical Laboratories, which represents an independent validation of two analytical methods against a set of world-class specifications.
- i. Achieved a major milestone in the development of the wireless Tritium Air Monitoring (TAM) system, with formal endorsement of the stand-alone TAM cart for Safety Significant service; thereby, bringing the advantages of wireless technology to a secure environment.
- j. Safely replaced two spent hydride beds in 233-H via open-glove box maintenance.
- k. Replaced the first of 32 Safety Significant oxygen monitors in 233-H.
- l. Deployed two SRNL-designed and fabricated dry calorimeters that provide many operational advantages over the old water bath calorimeters from Mound Facility.

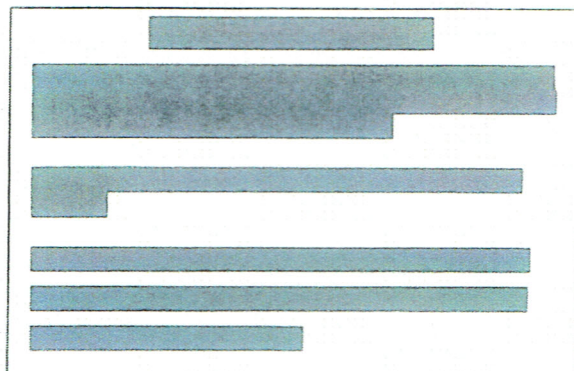


Savannah River Site  
Nuclear Materials Management Plan  
FY 2015



June 30, 2015

Prepared by  
Savannah River Nuclear Solutions, LLC  
Savannah River National Laboratory  
Nuclear Materials Management Programs  
for the U.S. Department of Energy



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**ACRONYMS AND INITIALISMS**

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AFS	Alternate Feedstock
AROD	Amended Record of Decision
CNL	Canadian Nuclear Laboratories
DOE	U.S. Department of Energy
DP	Defense Programs
DRR	Domestic Research Reactor
EM	Environmental Management
FRR	Foreign Research Reactor
HEU	Highly Enriched Uranium
HFIR	High-Flux Isotope Reactor
HLW	High-Level Waste
IAEA	International Atomic Energy Agency
LANL	Los Alamos National Laboratory
LEU	Low-Enriched Uranium
LWT	Legal-Weight Truck (cask)
LWR	Light Water Reactor
MOX	Mixed Oxide (fuel)
MTR	Materials Test Reactor
MURR	University of Missouri Research Reactor
NEPA	National Environmental Policy Act
NMIA	Nuclear Materials Inventory Assessment
NMMP	Nuclear Materials Management Plan
NNSA	(DOE) National Nuclear Security Administration
ORNL	Oak Ridge National Laboratory
P&PD	Production and Planning Directive
RU	Restricted Use
SNF	Spent Nuclear Fuel
SNM	Special Nuclear Material
SRNL	Savannah River National Laboratory
SRS	Savannah River Site
TPBAR	Tritium-Producing Burnable Absorption Rods
TVA	Tennessee Valley Authority
WIPP	Waste Isolation Pilot Plant





## 1.0 EXECUTIVE SUMMARY

### 1.1 PURPOSE

The Nuclear Materials Management Plan (NMMP) (herein referred to as "this *Plan*") integrates and documents the activities to manage Defined Use nuclear materials and to disposition the legacy and/or surplus nuclear materials deemed No Defined Use which are stored or proposed to be received at facilities at the U.S. Department of Energy (DOE) Savannah River Site (SRS). It establishes a planning basis for processing operations in Environmental Management (EM) facilities and National Nuclear Security Administration (NNSA) facilities from fiscal year (FY) 2015 through FY 2029.

This *Plan* summarizes the status, recent accomplishments, and future plans for the management of tritium; special nuclear material (SNM) including enriched uranium and plutonium (Pu); and other isotopes that are accountable for safeguards, security, or asset management purposes.

This *Plan* assumes full funding to accomplish the required project and operations activities. This *Plan* documents the operating strategy for the EM facilities at SRS to receive, store, disposition, and manage DOE legacy and/or surplus nuclear materials and for the NNSA Defense Programs (DP) facilities to support the SRS Tritium Enterprise.

It is recognized that some aspects of this *Plan* are pre-decisional with regard to National Environmental Policy Act (NEPA), in such cases new NEPA action will be required.

SRS manages a large set of operations for a variety of nuclear materials. Significant projects, accomplishments, and recommendations related to materials production, disposition, and processing are grouped into three areas that are significant to national goals:

1. Receive, ship, store, and disposition nuclear materials in a safe and secure manner. Operate and maintain L and K area facilities to support consolidation of Foreign Research Reactor (FRR) and Domestic Research Reactor (DRR) fuel returns and consolidate storage of plutonium for processing and disposition.
2. Develop uranium and plutonium throughput improvement and preparation initiatives to allow for continued disposition of spent nuclear fuel (SNF) from L-Area through H-Canyon, and plutonium processing through HB Line and K-Area.
3. Manage tritium as defined/scheduled within the classified Nuclear Weapons Complex directives, including the Production and Planning Directive (P&PD).



### 1.1.1 Processing Roadmap

SRS is using a Nuclear Materials Planning Roadmap tool to aid in managing its nuclear materials. This NMMP Roadmap, in Figure 1.1, shows the integrated processing activities of the SRS H-Area, K-Area, L-Area, and Savannah River National Laboratory (SRNL) to allow disposition of legacy and/or surplus nuclear materials. Processing activities for the SRS Tritium Enterprise are not included in the Roadmap because there is no interface between the DP processing activities and the SRS processing activities. The Roadmap is a living document that is configuration managed with a formal log to record the basis for each change. It includes the nuclear materials operating and storage plans for the scope of this *Plan* as well as future potential disposition missions.







Figure 1.1 Nuclear Material Planning Roadmap



## 1.2 PLAN STATUS

### 1.2.1 SNF, Target Material, and Plutonium Receipts at SRS

SRS is currently scheduled to receive to L-Basin DRR fuel returns between FY 2015 and FY 2033 from Massachusetts Institute of Technology (MIT), University of Missouri Research Reactor (MURR), and National Institute of Standards and Technology (NIST), as well as spent High Flux Isotope Reactor (HFIR) cores from Oak Ridge National Laboratory (ORNL). L-Basin receipts of FRR fuel returns are scheduled between FY 2015 and FY 2019, [REDACTED]

[REDACTED] These FRR receipts include the [REDACTED] NRX/NRU fuels. H-Canyon is scheduled to receive liquid [REDACTED] Highly Enriched Uranium (HEU) target residue material in Legal Weight Truck (LWT) casks [REDACTED]

[REDACTED] K-Area is available to receive Gap SNM within approved shipping containers [REDACTED]

### 1.2.2 SNF Processing

H Canyon is scheduled to complete processing of approximately 1,000 Materials Test Reactor (MTR) type bundles and approximately 200 HFIR cores by the end of FY 2024 per the approved Amended Record of Decision (AROD), March 2013.

### 1.2.3 Target Residue Material ([REDACTED]) Processing

SRS is modifying portions of H Canyon to allow receipt of the TRM liquid material [REDACTED] [REDACTED] Currently projecting readiness to receive shipments in [REDACTED] 2016, and working with CNL to determine completion date.

### 1.2.4 Plutonium Processing

HB-Line is expected to continue to produce plutonium oxide though at least FY 2022 as feed for mixed oxide fuel or an alternate approved disposition path.

K-Area is scheduled to process and package plutonium oxides that are not amenable for mixed oxide fuel feed, beginning in FY 2016 [REDACTED] for disposition to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM or other geological repository. Some NEPA action will be required to complete this mission.

[REDACTED]

[REDACTED]

[REDACTED]



#### **1.2.6 Tritium Processing and Recovery**

The Tritium Enterprise manages tritium as a defined work activity positioned to be responsive to NNSA needs. The NNSA Tritium Facility is scheduled to continue supply of mission deliverables in support of the nation's nuclear defense, including limited-life components, surveillance function testing, and tritium extraction.



## 2.0 SUMMARY INVENTORY

[REDACTED]

[REDACTED]

[REDACTED]

Table C-1, in the classified addendum SRNL-RP-2015-00409, shows a breakdown summary of the SRS NMIA.

## 3.0 MATERIAL DEMAND AND RETENTION

Table C-2, in the classified addendum SRNL-RP-2015-00409, is not extended beyond current inventories because the SRS Nuclear Material Demand requested for this Plan involves only tritium operations, which are excluded per request from NNSA.

### 3.1.1 Estimated Nuclear Material Demand

The estimated nuclear material demand at SRS is based on the current deliverables for tritium as defined/scheduled in several classified Nuclear Weapons Complex directives, including the current Nuclear Weapon P&PD, Master Nuclear Schedule, Integrated Weapons Activity Plan, and specific weapon Program Control Documents, Component Description Documents, and program planning documents.

### 3.1.2 Justification of Retention of Defined Use Materials

The justification for retention of these tritium materials is to allow loading of tritium reservoirs and to support tritium surveillance activities as directed in the Nuclear Weapons P&PD and other classified supporting documents.

### 3.1.3 Nuclear Material Shortfalls

NNSA is responsible for ensuring a supply of tritium is produced for the national inventory based on the requirements contained in Nuclear Weapons P&PD and other supporting documents. While tritium is currently produced in a single reactor, tritium needs may demand an additional reactor be placed on line for increased tritium production by the early 2020s. This will increase the demand for unencumbered uranium to fabricate Light Water Reactor (LWR) fuels for tritium production.

[REDACTED]



#### 4.0 MATERIAL ADDITIONS AND REMOVALS

Tables C-3 and Table C-4, in the classified addendum SRNL-RP-2015-00409, show the SRS Nuclear Material Removal/Shipping and Nuclear Material Additions/Receiving projections. Tritium Enterprise additions and removals will not be shown on these tables.

##### 4.1.1 Material Additions (Receipts)

[REDACTED]

[REDACTED] H-Canyon is scheduled to receive [REDACTED]  
liquid [REDACTED] HEU target residue material in LWT casks [REDACTED]  
[REDACTED] K-Area is available to receive Gap SNM within approved shipping containers and additional plutonium oxides from LANL.

Per the AROD, H-Area is scheduled to process approximately 1,000 MTR type bundles and approximately 200 HFIR cores by the end of FY 2024.

[REDACTED]

H-Area will receive natural uranium solutions for down blending HEU to ~5% enriched Low Enriched Uranium (LEU). These tankers will be supplied by the Tennessee Valley Authority (TVA) as part of the DOE/TVA Interagency Agreement for the HEU Blend Down program.

[REDACTED]

[REDACTED]

##### 4.1.2 Material Removals (Shipping)

The shipping plans for SRS are as follows:

- Resume shipping of 40 metric tons of down blended LEU from H-Area to TVA in FY 2017 and complete in FY 2024.

[REDACTED]

- Resume down blending of Pu oxides in K-Area and ship to WIPP once waste characterizations are completed, WIPP reopens for receipts, and SRS is scheduled to begin shipments.

- K-Area will begin shipping Pu oxides to the Mixed Oxide Fuel Fabrication Facility once the facility is ready to receive.

#### 4.1.3 Estimated Material Removals (Other)

Does not apply

### 5.0 FACILITIES, PROCESSES AND EQUIPMENT

The facilities within SRS which play major roles in Nuclear Material Management are K-Area, L-Area, and H-Area.

#### 5.1.1 K-Area

K-Area was one of the five reactor areas on the SRS. Since the end of the Cold War when the SRS reactors were shutdown, it has been repurposed for nuclear material drum storage. SRS does not foresee any issues with drum storage based on the current excess nuclear material disposition plans.

K-Area is also modifying the K-Area Interim Surveillance glovebox to allow for down blending nuclear material for disposition to WIPP. This glovebox is scheduled to begin operations in FY 2016.

A Documented Safety Analysis revision is currently planned which will allow K-Area to expand its capability to receive nuclear material in additional types of Type B shipping containers. Some current Type B containers and their content envelopes are currently restricted from storage in K-Area. This revision is scheduled for implementation in FY 2016.

#### 5.1.2 L-Area

L-Area, like K-Area, was also one of the five reactor areas on the SRS. L-Area has maintained its spent fuel pool basin and now has the capability to receive and store FRR and DRR fuel returns. It has the capability to receive, bundle, and store MTR type fuels (3650 spaces) and HFIR fuels (120 full cores).

L-Area is currently undergoing a modification to the Shielded Transfer System used for LWT cask processing, which will add capability to unload NRU/NRX fuel from Canadian Nuclear Laboratories (CNL) which is longer and heavier than typical MTR fuel.



### 5.1.3 H-Area

H-Area is the only operating full scale radiochemical processing facility in the U.S. Its remote operation and versatility allows for processing various types of irradiated materials with the capability to recover uranium, neptunium, or plutonium.

Modifications are currently in progress in H Canyon to allow for the direct receipt, off-loading, and processing of liquid HEU target residue material [REDACTED]

H Canyon and HB Line are undergoing operational readiness reviews to allow for continued SNF and plutonium processing. These facilities are expected to operate through FY 2024 [REDACTED]

## 6.0 STATUS OF PLANS FOR DISPOSITION PROCESSING OF MATERIALS [REDACTED]

Table C-5, in the classified addendum SRNL-RP-2015-00409, shows the SRS Nuclear Material Disposition Processing plans. The Disposition plans for SRS [REDACTED] materials include the following paths:

- Disposition through the HEU down blending process. This path processes the off-specification HEU through H Canyon to recover the HEU, and then down blends the HEU with natural uranium to produce a LEU solution product. This LEU solution is transported off-site to a commercial vendor for fabrication into commercial reactor fuel.
- Disposition through a Pu down blending process [REDACTED]
- Disposition through the SRS high level waste (HLW) system. This path processes high level waste materials from H area processing through H Tank Farm to the Defense Waste Processing Facility where it is encapsulated with a borosilicate glass log matrix.
- Disposition through the SRS on-site low level waste system. This path processes low level wastes produced during any of the other disposition processes as noted above.
- There are additional SNF and targets in SRS inventory [REDACTED]

## 7.0 RESTRICTED USE MATERIALS

DOE Order 410.2 defines "Restricted Use" (RU) to be: "Nuclear Material governed by domestic or foreign agreements or obligations that restrict the use of the material to a specific purpose, most commonly restricting nuclear material from utilization in nuclear weapons." These materials are tagged in the NMIA when they are identified and fall into three categories: foreign obligations, International Atomic Energy Agency (IAEA) materials, and materials associated with [REDACTED]

Presidential declarations. [REDACTED]

#### **7.1.1 Foreign Obligations**

SRS holds materials that were transferred to the Site from foreign states, and in some cases those states placed restrictions on the use of the nuclear materials. SRS has also received foreign obligation flags from other DOE facilities. SRS has foreign obligations with the following entities: Australia, Canada, Euratom, and Japan. These obligations primarily involve FRR irradiated fuel returns. The foreign obligations on the uranium materials with down blend as their disposition path will be transferred from SRS to the fuel fabrication vendor as the resultant uranium material is transported off-site. [REDACTED]

#### **7.1.2 IAEA**

SRS also retains SNM that is subject to inspections and surveillance by the IAEA. IAEA surveillance is based on a U.S. voluntary offer consistent with the Nuclear Nonproliferation Treaty. The disposition for these materials is currently to be determined, but is likely to follow other Pu disposition paths

#### **7.1.3 Material Associated with Declarations**

There have been three Presidential Declarations involving surplus and excess nuclear materials, S94, E05, and E07 declarations. SRS holds material in inventory associated with two of the three, S94 and E07 Presidential Declarations. SRS does not currently have any materials covered under the E05 declaration. Excess materials at SRS that do not fall under any of these declarations are shown as Excess Other, EOT.

### **8.0 NATIONAL ASSET MATERIALS**

DOE Order 410.2 defines a "National Asset Material" as, "A nuclear material that has no current programmatic use but that is judged to be unique or difficult to reproduce, and that is set aside because of a significant chance that it will be required for future programmatic use."

SRS has no designated national asset materials.

### **9.0 MULTIPLE ACCOUNTABLE ISOTOPE MATERIALS**

SRS has numerous items in inventory with multiple accountable isotope materials. SRS does not foresee any issues or other potential interactions these materials may have on material management processing, packaging, or storage plans.

[REDACTED]



## 10.0 ISSUES

[REDACTED]

SRS is approved to disposition only a portion of the SNF currently stored in L-Area via processing through H Canyon. L-Area is planned to continue to receive FRR materials through FY 2019 and DRR materials through FY 2035. [REDACTED]

[REDACTED]

## 11.0 ACCOMPLISHMENTS

- [REDACTED]
- [REDACTED]
- Completed the disposition of Sodium Reactor Experiment SNF by dissolving it in H-Canyon and treating the resulting solution as waste. This material contained thorium and  $^{233}\text{U}$  making the U not suitable for down blending.

- [REDACTED]
- [REDACTED]
  - Completed modifications to HB Line facility and produced Pu oxide product from Alternate Feedstock 2 (AFS-2) materials as feed suitable for mixed oxide fuel feed or an alternate approved disposition path. HB Line processing of AFS-2 material will continue through at least FY 2022.
- [REDACTED]

- Formally requested notification of disposition and approval of termination of foreign obligations on associated fuels proposed within the limited processing scope. To date, three of the four foreign entities have approved.
- Continued a demonstration for NA-241 of Next Generation Safeguards equipment in HB-Line. This testing continues to demonstrate an in-line UV-visible (UV-Vis) spectroscopy cell which is performing real time analysis on radioactive process sampling lines.
- Began installation of components for the receipt of [REDACTED] HEU-target residue material in H-Area.
- Managed and executed DOE-STD-3013 Integrated Surveillance Program. Demonstrated relevance of long-term storage standard and identified inventory groups with increased corrosion potential.
- Completed joint study with ORNL to develop recommendations for the management of heavy isotopes in H-Area irradiated targets.

[REDACTED]



## 12.0 REFERENCES

1. *Management of Nuclear Materials*. DOE Order 410.2, U.S. Department of Energy, August 2009.
2. R. Meehan to Distribution. *Fiscal Year 2015 – 2020 Nuclear Material and Isotope Demand Management Plan*. March 4, 2015.
3. (U) *Savannah River Site Nuclear Materials Management Plan – FY2015 – Classified Addendum*. SRNL-RP-2015-00409, Savannah River National Laboratory, June 30, 2015.
4. *Amended Record of Decision, Spent Nuclear Fuel Management at the Savannah River Site*, Fed. Reg. Vol. 78, No. 66, April 5, 2013.

## 13.0 APPENDICES AND ATTACHMENTS

### ADDENDUM 1 – NUCLEAR MATERIALS FORECAST AND ALLOTMENT REQUEST

The Nuclear Materials Forecast and Allotment report is included as an Addendum to the NMMP, and is provided separately in spreadsheet format to ONMI.



**ADDENDUM 1 – NUCLEAR MATERIALS FORECAST AND ALLOTMENT REQUEST**

**ENTIRE ADDENDUM 1 WAS REDACTED**

