

**Savannah River Site Eastern Transportation Hub: A Concept
For a DOE Eastern Packaging, Staging and Maintenance Center – 13143**

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ABSTRACT

The Department of Energy (DOE) is working to de-inventory sites and consolidate hazardous materials for processing and disposal. The DOE administers a wide range of certified shipping packages for the transport of hazardous materials to include Special Nuclear Material (SNM), radioactive materials, sealed sources and radioactive wastes. A critical element to successful and safe transportation of these materials is the availability of certified shipping packages. There are over seven thousand certified packagings (i.e., Type B/Type AF) utilized within the DOE for current missions. The synergistic effects of consolidated maintenance, refurbishment, testing, certification, and costing of these services would allow for efficient management of the packagings inventory and to support anticipated future in-commerce shipping needs. The Savannah River Site (SRS) receives and ships radioactive materials (including SNM) and waste on a regular basis for critical missions such as consolidated storage, stabilization, purification, or disposition using H-Canyon and HB-Line. The Savannah River National Laboratory (SRNL) has the technical capability and equipment for all aspects of packaging management. SRS has the only active material processing facility in the DOE complex and is one of the sites of choice for nuclear material consolidation. SRS is a logical location to perform maintenance and periodic testing of the DOE fleet of certified packagings. This initiative envisions a DOE Eastern Packaging Staging and Maintenance Center (PSMC) at the SRS and a western hub at the Nevada National Security Site (NNSS), an active DOE Regional Disposal Site. The PSMC's would be the first place DOE would go to meet their radioactive packaging needs and the primary locations projects would go to disposition excess packaging for beneficial reuse. These two hubs would provide the centralized management of a packaging fleet rather than the current approach to design, procure, maintain and dispose of packagings on a project-by-project basis. This initiative provides significant savings in packaging costs and acceleration of project schedules. In addition to certified packaging, the PSMC would be well suited for select designs of 7A Type A packaging and Industrial Packaging.

INTRODUCTION

The DOE Eastern PSMC is part of Enterprise•SRS. Enterprise•SRS is the site strategy for a sustainable future. It is a transformational strategy leveraging existing technical and workforce competencies for future DOE and National Security missions.

The vision for the future has SRS, in an expanded partnership with NNS and others across the DOE complex, providing integrated packaging staging & maintenance support functions. The Energy Facilities Contractors Group (EFCOG) has also endorsed an integrated packaging staging & maintenance support function. The SRNL will continue to provide the administrative and technical support for any packaging without a clear future mission or need. This support includes Certificate of Compliance (CoC), Safety Analysis Reports (SAR) and Safety Analysis Report Packaging (SARP) documentation.

SRNL will continue to provide annual inspection prior to reuse, perform packaging recertification, and required maintenance as needed for package regulatory compliance[1]. SRS will provide an eastern US location for staging unused DOE containers and will work with commercial nuclear packaging providers to provide staging locations to leverage the utilization of DOE assets with resultant lower unit costs for DOE. NNS would provide annual inspection prior to reuse, a western US location for staging DOE containers not in current use, and a disposal capability for containers being permanently retired from service. NNS will also work with owners of commercial nuclear containers to provide a staging and storage location to lower the unit costs of DOE packaging services. SRNL will continue to support new package certification efforts for Type B and Type A Fissile packaging to replace end-of-life packages and provide packaging training to packaging professionals across the globe.

DISCUSSION

The DOE Packaging and Transportation Manager supports improved mission support opportunities for DOE packaging. Currently, projects are implemented by the sites across the complex on a project by project basis with inherent inefficiencies from duplication of effort, lack of leveraged purchasing, and premature retirement of packaging. There are efforts initiated across the complex to identify and reduce these inefficiencies. The PSMC is a concept nested within this EM initiative.

SRS will need to establish and maintain a Radioactive Materials Area for the staging location. Health Physics (HP) capabilities exist on site to survey, and remediate if necessary, staged containers to meet SRS standards. Partnerships with commercial packaging companies (e.g., NAC International, Energy Solutions and AREVA) will be explored regarding potential commercial industry interest in using staging areas for Type B commercial casks and support equipment to increase facility utilization.

There are numerous reusable 7A Type A and Industrial Packagings (e.g., sample cases, intermodals, liquids drums, and freight containers). The PSMC would be well suited for their staging and maintenance/repair for continued use. The two locations could also function as a pre-delivery staging/assembly area for commercially available packaging (e.g., waste boxes shipped flat from the manufacturer and assembled onsite). Examples of casks for staging include the Fort Saint Vrain (FSV)-1 cask and T-3 (see Fig. 1).



Fig 1. The T-3 being used to ship Fast Flux Test Facility sodium bonded fuel.

The SRNL Packaging Technology and Pressurized Systems (PT&PS) group has designed, developed, tested, and procured radioactive material packages for the DOE complex since 1982. PT&PS currently provides expertise to other DOE sites for radioactive material packaging design and certification activities, testing, training, and technical and programmatic support. PT&PS is also a designated regulatory review team for the DOE Packaging Certification Program (PCP) and provides technical assistance to the DOE Complex for the PCP to resolve packaging and regulatory issues[2].

In the late 1980s, SRS formally established a nondestructive examination (NDE) program in accordance with the American Society of Nondestructive Testing. The initiative established the first specialty group in the DOE complex formally certified to Level II and/or III in Helium Mass Spectrometry Leak Testing. Over the last 20+ years, SRNL has provided continuous

maintenance, testing and re-certification packaging support to the DOE Complex, industry and other federal agencies.

SRNL has worked closely with other elements in the complex to provide essential services in package development, design, testing, procurement, and certification. Multiple projects and campaigns have enabled efficient and timely movement of hazardous materials on and between DOE sites.

SRNL manages RAMPAC, the Department of Energy's Website for Information on Radioactive Material Packaging, http://rampac.energy.gov/RAMPAC_Home.htm, so it is always current on licensing, packaging technical information and packaging issues.

SRS has the only operational processing facility (H-Canyon) in the DOE complex. Construction is underway of the only mixed oxide fuel fabrication plant in the DOE complex. Provided H-Canyon continues to operate for processing of legacy materials, the vast majority of DOE shipping packagings will come through SRS during the course of material processing and disposition.

NNSS is also a key player in the DOE consolidation/disposition mission and currently receives radioactive waste and material shipments from twenty-five DOE facilities/programs. In the past few years, NNSS has experienced a significant increase in the number and type of waste shipments arriving in special packaging (Type B, AF, fissile-rated). NNSS combines a near ideal climate for staging shipping packages with existing storage and disposal capability at its location. NNSS establishes and maintains multiple Radioactive Materials Areas for waste disposal operations, with HP technicians to survey staged containers as required to meet DOE storage and free-release standards.

The combination of SRS capabilities, in conjunction with NNSS facilities and services, provides the full range of expertise, personnel, and programs to develop and maintain shipping packages and provide centralized packaging staging, maintenance, and recertification mission support. The current mission provides maintenance, testing, and recertification support to diverse DOE/NSA fleet of packaging and the new mission expands this existing capability.

The DOE is working to de-inventory sites and consolidate hazardous materials for processing and disposition. DOE EM-33 administers a wide range of certified shipping packages for the transport of hazardous materials to include special nuclear material (SNM) and spent nuclear fuel (SNF). The movement of hazardous materials on, and between, DOE sites will increase in the coming years to meet these objectives.

A critical element to successful and safe transportation of these materials is the availability of

certified shipping packages. The fleet of existing certified packages is in excess of 7,000 units and includes the NAC LWT, 10-160B (see Figure 2), GE2000, Hanford Unirradiated Fuel Packages, 9975s, ES 3100s, 9977s, 9978s, as well as many other packagings. In order to meet projected DOE Complex schedules and comply with regulatory and programmatic requirements, the DOE fleet of shipping packages must be adequate in number, maintained, and certified to meet programmatic needs.



Fig 2. Energy Solutions 10-160B has current NRC and DOE Certificates

The following factors significantly impact DOE's ability to move hazardous materials efficiently:

- De-certification of 6M/6L specification packagings
- Increased use and availability of Type B packagings
- Consolidation of DOE Complex specialty packaging at a PSMC

Establishment of the PSMC function would:

- Build on decades of experience and knowledge of the SRNL Packaging Certification Program,
- Provide centralized locations for staging, maintaining and testing of the DOE fleet of packagings,
- Enable SRNL to expand its capability to keep pace with the demand for recertification services in the DOE complex, and

- Provide an easily-accessible inventory of mission-ready packagings available for use by a particular program or site, from central storage/staging locations in reasonable proximity to the requesting organizations.

SRNL will provide many key functions for the PSMC. These functions include but are not limited to: annual maintenance and recertification to support packagings for DOE Office of Nuclear Energy (NE), Office of Environmental Management (EM), Office of Science (SC), National Nuclear Security Administration (NNSA) and others; administrative management and design authority functions for DOE SARP with no other programmatic owner; annual certification support to staged packagings as required for future program needs; testing and recertification work; and training for DOE/NNSA complex and international personnel in packaging technical support.

The PT&PS group would be responsible for administering the PSMC programmatic requirements and, as PCP Design Authority, will provide program oversight.

DOE-SR would hold the CoCs for packagings with no other programmatic owner. SRS will provide staging for DOE (e.g., 9977 see figure 3) and commercial packaging (e.g., 10-160, see figure 2, and NAC-LWT) for DOE and other missions.

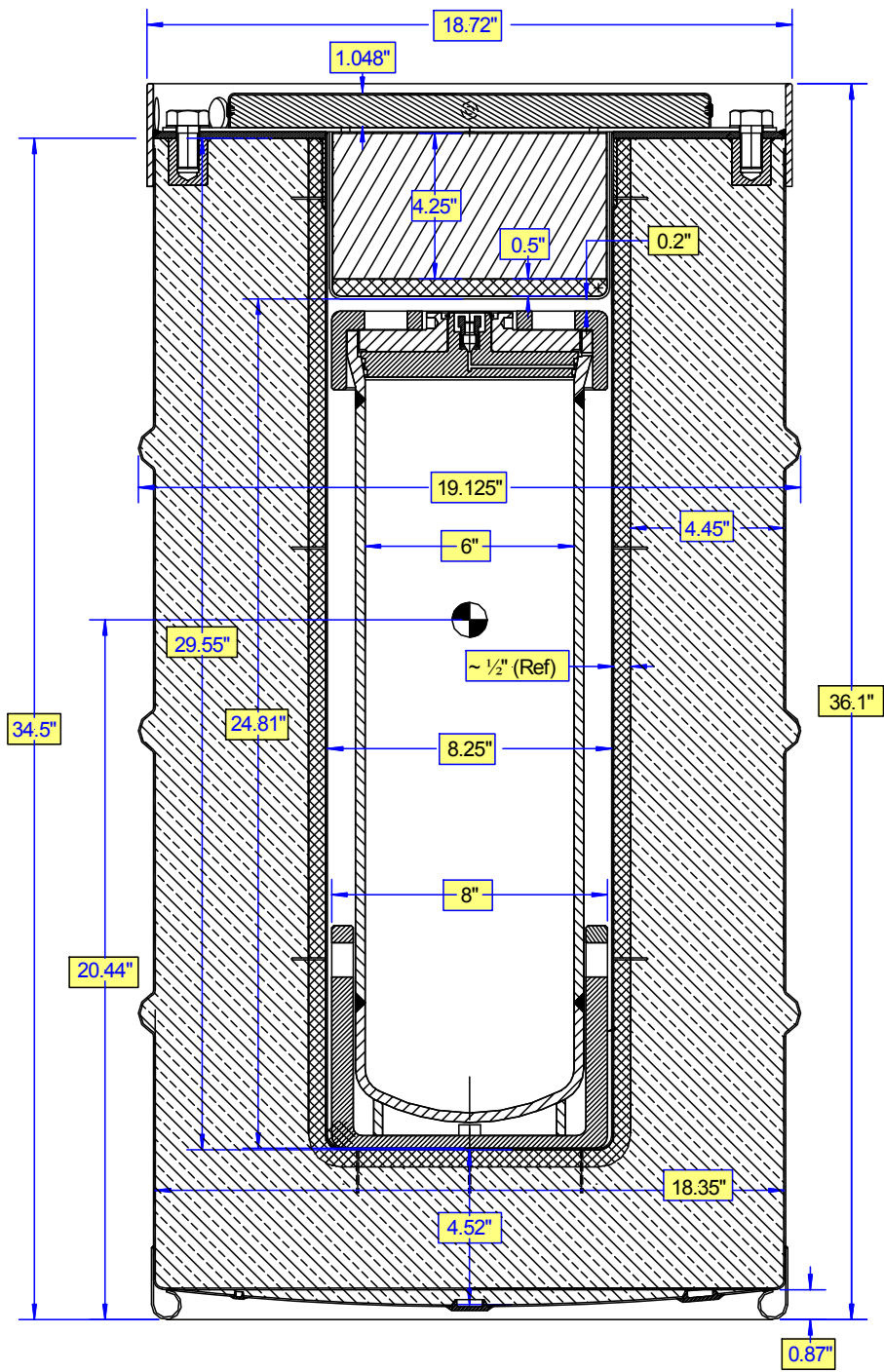


Fig 3. 9977 Packaging

NNSS is one of only two approved Regional LLW and MLLW Disposal Facilities in the DOE

complex and has received multiple shipments of waste for disposal from over twenty-five different sites. Due to the temporary closure of Hanford for receipt of offsite waste shipments, the NNSS is currently disposing a large portion of the total DOE complex waste and is the only available location that can currently accept higher-activity offsite mixed wastes and classified wastes. The NNSS has received wastes in a wide variety of packagings – including fissile containers, specialty casks, Type B packages, intermodal containers, and bulk shipments. NNSS Disposal Operations personnel serve as Registered Users for the special packaging currently being received. The arid climate at the NNSS is ideal for year-round operations and for storage of a wide variety of packaging materials. Waste shipment and disposal programmatic experience make NNSS a prime location to support the complex. Initial PSMC scope at NNSS would include, but not be limited to:

- Storage, inspection, and annual maintenance to support packagings for DOE Office of Nuclear Energy (NE), Office of Environmental Management (EM), Office of Science (SC), National Nuclear Security Administration (NNSA) and others,
- Provide staging for DOE and commercial packaging (e.g., 10-160B and NAC-LWT) for DOE and other missions,
- Consolidation of specialty packaging at a convenient centralized location to DOE sites in the western US.

CONCLUSIONS

The overall benefits associated with having the PSMC functions performed at SRS would include, but not be limited to the following:

- Quick turn-around due to cost-effective support by dedicated facilities with established capabilities for the inventory, staging, re-certification, maintenance, off-loading, and deployment of specialized packagings,
- Direct involvement of highly experienced and proficient packaging professionals and disposal operations staff,
- Centralized testing and recertification of DOE packages to assure consistent conduct of operations, ready availability of needed items, and regulatory compliance,
- Direct oversight by a qualified packaging Design Authority Engineer, and
- Ability to stage, maintain, and make available a wide variety of packagings for effective and efficient use throughout the DOE Complex.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 71 (10 CFR 71), Packaging and Transportation of Radioactive Materials

WM2013 Conference, February 24 – 28, 2013, Phoenix, Arizona USA

2. U.S. Department of Energy, Packaging and Transportation Safety, DOE O 460.1C, Washington, DC (April 2010).