

Classified Component Disposal at the Nevada National Security Site (NNSS) – 13454

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ABSTRACT

The Nevada National Security Site (NNSS) has added the capability needed for the safe, secure disposal of non-nuclear classified components that have been declared excess to national security requirements. The NNSS has worked with U.S. Department of Energy, National Nuclear Security Administration senior leadership to gain formal approval for permanent burial of classified matter at the NNSS in the Area 5 Radioactive Waste Management Complex owned by the U.S. Department of Energy. Additionally, by working with state regulators, the NNSS added the capability to dispose non-radioactive hazardous and non-hazardous classified components. The NNSS successfully piloted the new disposal pathway with the receipt of classified materials from the Kansas City Plant in March 2012.

INTRODUCTION

The Nevada National Security Site (NNSS) can be the designated one-stop shop for cradle-to-grave handling of non-nuclear classified components. The NNSS has the only approved disposal site that accepts off-site classified matter without sanitization. The existing NNSS Waste Acceptance Criteria (WAC) and permits have been modified to allow disposal of both radiologically and non-radiologically contaminated classified waste streams.

Three key initiatives identified in the fiscal year (FY) 2011 Feasibility Study were designated as being critical to the path forward at the NNSS. All three initiatives were completed by the end of the third quarter of FY 2012. The key initiatives are listed below:

1. Submit a request for disposal of High Risk Personal Property (HRPP). Seek concurrence from the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) to allow permanent burial of classified matter at the NNSS of weapons components without sanitization.

2. Negotiate with State of Nevada officials to allow disposal of non-radiologically contaminated classified components (hazardous and non-hazardous).
3. Establish a pilot project to demonstrate work procedures and methodology.

In addition to the key initiatives listed above, two secondary initiatives were identified in FY 2012 as a result of visiting various NNSA sites and evaluating their disposition needs. Both secondary initiatives were completed by the end of FY 2012.

1. Establish “macro equivalency” acceptance criteria for items that meet the definition of macroencapsulation as manufactured.
2. Negotiate the criteria with State of Nevada officials to allow shipment and receipt of classified components that have not been sanitized under the Military Munitions Rule.

As a result of the DOE’s change in mission and because of the need to downsize the nuclear stockpile, those facilities originally intended for nuclear weapon fabrication have been retooled for life-cycle extension and dismantling of weapons. The dismantlement process produces parts and subassemblies containing radioactive, hazardous, and non-hazardous non-nuclear components. Due to national security and non-proliferation regulations, the excess non-nuclear components from the dismantlement process are classified. In many cases metals regulated by the Resource Conservation and Recovery Act (RCRA) are present in the components. Completely disassembling components amounts to a relatively small volume of RCRA-regulated components but entails a labor-intensive process. Following the January 2011 Weapons Dismantlement and Disposal (WDD) Nuclear Weapons Component Disposition Summit, the WDD Federal Program Manager established a working group to address the disposition limitations associated with orders and regulations. This included components associated with the current dismantlement process and legacy components stored throughout the Nuclear Security Enterprise.

REGULATORY AUTHORITIES

Sanitization

The requirement to sanitize components prior to release and disposal at a commercial facility was one obstacle in the dismantlement and disposal process and was based on the property release regulations for classified components. In addition, national security requirements and export controls govern the amount of sanitization required to release classified components to the general public [1]. National Security Technologies, LLC (NSTec), and the NNSA Nevada Site Office proposed that the act of shipping classified components to the NNSA for permanent burial is not a release to the public but rather a transfer of property between DOE sites. This designation eliminated the need for sanitization prior to disposal, as components have controlled access, thereby significantly reducing the amount of handling required prior to disposal and ultimately reducing related process costs. In some cases, the cost can be reduced by 80%–90%.



Fig. 1. Parts before sanitization (left) and after sanitization (right)

The Office of Defense Nuclear Non-proliferation (NA-20) issued a letter of concurrence on July 14, 2011, to permanently bury HRPP, with the exception of pits, canned subassemblies, neutron generators, and detonators that are not yet demilitarized and/or sanitized, at DOE-owned and -controlled sites [2].

Non-Radioactive Waste Permit Modifications

The NNSS has been designated as a low-level radioactive disposal site for both non-hazardous and hazardous waste. Although commercial facilities have been required in the past for disposal of non-radioactively contaminated waste, the use of commercial facilities for disposal of classified items required full sanitization prior to disposal. In the effort to open the door for direct disposal of all types of classified waste streams (radioactively contaminated, hazardous, non-hazardous, and non-radioactive) for the complex, two permit modifications were requested:

- Existing solid waste permit for asbestiform and hydrocarbon burdened waste has been modified to allow disposal of non-hazardous non-radioactive classified waste.
- Existing RCRA permit for the mixed waste disposal unit was modified to allow disposal of non-radioactive hazardous waste.

Revision to NNSS Waste Acceptance Criteria (WAC)

On February 29, 2012, a modification to the NNSS WAC was approved and published [3]. Revisions to the WAC were required to develop the waste profile for shipment, packaging, and transport of non-radioactive classified waste. The changes included revisions to the Standardized Waste Profile Sheet to allow these materials to be shipped to Nevada for disposal and updates to the Low-Level Waste Information System to support tracking of materials shipped to Nevada for disposal. These changes specified who could ship items to Nevada and what type of classified waste streams would be accepted at the NNSS disposal site.

- Only DOE classified or U.S. Department of Defense classified wastes are accepted for disposal at the NNSS.
- Waste streams shall have a “clear and unambiguous nexus” to a DOE-funded project, DOE-performed operation, DOE-owned material/waste, or project whose waste

disposition is directed by statute. Documentation may be requested demonstrating the waste nexus to DOE or showing that the waste is being directed to DOE for disposal.

- Generators are responsible for ensuring the requirements of NNSA Administrative Policy NAP 70.4, “Information Security,” or DOE Order DOE O 471.6, “Information Security,” are satisfied for permanent burial of classified waste at the NNS [4,5]. Generators shall submit a signed NNSA or DOE Security Authorization for permanent burial without sanitization with their classified waste profile.

Macroencapsulated as Manufactured

The classified legacy weapon components are composed of thousands of parts, which in most cases include RCRA-regulated metals in the parts that make up the components. Typically, regulated metals in components include lead and silver from circuit boards and wiring, and cadmium- or chromium-plated parts. Regulated metals in completely disassembled components are found in relatively small amounts. However, because weapon components were designed and built to be very durable under extreme mechanical and environmental conditions, disassembly remains a labor-intensive process.

The majority of classified legacy weapon components have more than one hazardous constituent. More than 95% of the components are estimated to meet the Title 40 Code of Federal Regulations (CFR) 268.2(g) definition of hazardous debris [6]. The appropriate Land Disposal Restriction (LDR) treatment for the classified hazardous debris is macroencapsulation. Table 1 of 40 CFR 268.45 defines macroencapsulation as the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or the use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media [7]. Encapsulating material must completely surround debris and be resistant to degradation by debris, its contaminants, and material into which it may come into contact after placement (leachate, other waste, and microbes).

Many of the classified components are fully encased in stainless steel, resin potting material, or other polymer coating. These components meet the regulatory macroencapsulation requirement as manufactured and require no further treatment. Nevada Division of Environmental Protection regulators provided concurrence with this macroencapsulation position, and the guidance can be found on the NNS Radioactive Waste Acceptance Program web page at <http://www.nv.energy.gov/emprograms/rwap.aspx>.



Fig. 2. Example of items that are macroencapsulated as manufactured

Military Munitions Applicability and Implementation

The Atomic Energy Act of 1954 gave the Secretary of Energy the authority for management and disposition of classified matter [8]. Subsequently, pursuant to assigned functions under the NNSA Act of 1999, as well as specific delegation by the Secretary of Energy, the NNSA Administrator also holds responsibilities and authorities for management and disposition of classified matter. DOE, and later NNSA, has implemented this authority through promulgation of regulations and development of further specific implementing requirements for appropriate management, handling, and disposition of classified matter. These laws, regulations, policies, and directives comprehensively address, from creation to destruction, all aspects of management and disposition to ensure the protection and control of classified information critical to national security.

Classified weapons components are defined as HRPP and must be managed as such [9]. HRPP is defined as property that, because of its potential impact on “national security interests or proliferation concerns must be stored, controlled, and disposed of in other than the routine manner” (41 CFR 109-1.100-51) [10].

For classified weapons components “managed under DOE’s nuclear weapons program” that must be sanitized, the Military Munitions Rule provides an explicit exclusion from the RCRA regulations until the sanitization process is completed (40 CFR 266, Subpart M) [11]. RCRA regulation, as a matter of law, becomes applicable when such DOE-managed weapons components are sanitized. Until RCRA becomes effective, the component must be managed under DOE and NNSA legal authorities and its comprehensive set of implementing requirements.

KANSAS CITY PLANT (KCP) PILOT PROJECT

The pilot project was initiated at the Kansas City Plant (KCP) in late November 2011, and the plan was divided into three phases to demonstrate effective implementation of the numerous

requirements discussed above for disposal of classified components, whether radioactive or non-radioactive, hazardous or non-hazardous, requiring treatment or not. Phase I was planned to demonstrate disposal of non-radioactive, non-hazardous components; Phase II was for hazardous components that were macroencapsulated as manufactured; and Phase III is for components that require repackaging in macro containers. Although all phases of the Kansas City items generally follow the same steps as in Phase I, each phase is progressively more complicated. It was intended that the first phase lay the foundation for the second and the second lay the foundation for the third.

KCP Pilot Project Phase I

The first shipment of the Phase I waste stream took place the week of March 19, 2012. Phase 1 of the KCP pilot project included non-hazardous classified shapes, primarily machined, extruded, or cut metal, glass, or plastic items that are classified and cannot be disposed in a commercial facility without further processing. Examples of this type of item include metal fixtures, cover plates, and machined parts, which are typically composed of a single material type, such as stainless steel, or two or three material types that are all easily identifiable and non-hazardous.

The majority of both the Phase II and Phase III items have more than one hazardous component defined as debris and requiring macroencapsulation as the appropriate LDR treatment for the classified debris. Approximately 50% of this waste stream will need no further treatment. For the remainder of the Phase II and III items, the only option will be macroencapsulation under generator treatment provisions or preparation as permanent burial waste by a commercial facility.



Fig. 3. Example of the types of items in KCP Phase I pilot project

KCP Pilot Project Phase II

Phase II of the KCP pilot project included simple component hazardous and mixed shapes. These shapes were composed of one or multiple components that could be characterized from drawings or by process knowledge. Examples of this type of item included individual or unassembled components that can be characterized based on component drawings. Based on completion of the two secondary initiatives identified in FY 2012 for macroencapsulation equivalency and unsanitized components shipped as classified matter, Phase II at KCP was expanded to include items made up of hundreds of components. Components were not characterized individually; rather each shape was characterized based on process knowledge as a whole. Examples of this type of item included trainers, radar assemblies, and other similar items. The first shipment of the Phase II waste streams took place the week of October 8, 2012.



Fig. 4. Example the types of items in KCP Phase II pilot project

KCP Pilot Project Phase III

Phase III of the KCP pilot project is anticipated to start in FY 2013 and will include complex hazardous and mixed shapes requiring macroencapsulation treatment. These items are composed of hundreds of components. The items will be characterized based on process knowledge as a whole. Examples of this type of item include items that are not macroencapsulated by manufacture and need further treatment to meet LDRs for RCRA-regulated constituents. The only options for the generator will be macroencapsulation under generator treatment provisions, or preparation as permanent burial waste by a commercial facility.

CONCLUSIONS

As the pilot program and first shipments of hazardous and non-hazardous components have been completed, the NNSS team incorporated lessons learned into the operating procedures and generator guidance via the NNSS WAC and the Radioactive Waste Acceptance Program website at <http://www.nv.energy.gov/emprograms/rwap.aspx>. This process will allow other sites an avenue to review the same type of documentation in the event of preparing similar shipments.

The NNSS has initiated the ability to dispose of retired classified components in a cost-efficient manner, thereby reducing the security and maintenance burden of legacy components. While the sanitization and recycling of items is the ultimate disposal option, sometimes these options cannot be achieved. Certain decisions need to be made about the disposal of excess components; as long as funding, resources, and/or technologies continue to decline, other options need to be available. The next option is the most secure, safe, and regulatory-approved disposal of these items: burial of excess components at the DOE Area 5 Radioactive Waste Management Complex. Any questions should be directed to the Manager of the Radioactive Waste Acceptance Program (Gregg Geisinger, 702-295-5196, geisingr@nv.doe.gov) or any of the authors of this document.

REFERENCES

- 1 41 CFR 109, DOE Property Management Regulations High Risk Personal Property
- 2 July 14, 2011, NA10/NA20 Letter (HQ-#438995-v1-Memo__a_A_Harrington)
- 3 NNSS WAC Rev 9, Section 3.1.18, Classified Waste
- 4 NAP 70.4, Information Security (NNSA Policy)
- 5 DOE O 471.6, Information Security
- 6 40 CFR 268.2(g), Alternate Land Disposal Standards for Hazardous Waste Debris
- 7 40 CFR 268.45 Table 1, Alternative Treatment Standards For Hazardous Debris
- 8 Atomic Energy Act 1954 as amended, Chapter 9 Military Application
- 9 41 CFR 109-1.53, Management of High Risk Personal Property
- 10 41 CFR 109-1.100-51, Definition of High Risk Personal Property
- 11 40 CFR 266 Subpart M, Military Munitions Definitions

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