



Department of Energy  
Under Secretary for Nuclear Security  
Administrator, National Nuclear Security Administration  
Washington, DC 20585



June 12, 2022

The Honorable Joyce L. Connery  
Chair, Defense Nuclear Facilities Safety Board  
625 Indiana NW, Suite 700  
Washington, DC 20004

Dear Chair Connery:

The Department of Energy's National Nuclear Security Administration (DOE/NNSA) received your letter, dated January 6, 2022, regarding pit staging at the Pantex Plant. The letter established a 120-day reporting requirement to address the Defense Nuclear Facilities Safety Board's questions and concerns.

Our team that examined the Board's concerns validated that pit packaging at the Pantex Plant continues to meet all requirements and there is no safety concern associated with the pit staging configurations, whether they are staged in an AL-R8 Sealed Insert container or an AL-R8 container. Sampling and inspection activities are routinely conducted on these items to ensure their safety, integrity, and adequate protection. We will continue to monitor safety performance of these packages. To date, no concerns have been identified.

We do believe it is prudent, however, to repackage pits into AL-R8 containers with the Sealed Insert. Therefore, NNSA is developing a strategy to increase the rate of pit repackaging into AL-R8 containers with the Sealed Insert as described in the enclosed report. This strategy targets full implementation by the end of fiscal year 2026.

If you have any questions, please contact Ms. Teresa Robbins, Manager, NNSA Production Office at (865) 576-0841. Thank you for the careful and thoughtful work and clear reporting.

Sincerely,

Jill Hruby

Enclosure

**Defense Nuclear Facility Safety Board  
Pantex Plant Pit Inventory Review**

Report

May 2022

**Background: Letter from DNFSB Chair Joyce L. Connery to NNSA Administrator Jill Hruby, dated January 6, 2022.**

The referenced letter and accompanying report detail the results of the review conducted by the Defense Nuclear Facilities Safety Board (DNFSB) of the Pantex Plant (Pantex) pit inventory from February 2020 through April 2021. The DNFSB chair requested a response from National Nuclear Security Administration (NNSA) Administrator that addressed the following topics:

- The technical basis for the reduced pace of repackaging and the relaxed requirements to preserve pit quality and integrity for the storage environment
- The plan and schedule to package pits in AL-R8 Sealed Insert (SI) containers, particularly for higher hazard legacy pits
- Actions being taken to address any shortages in components of AL-R8 SI containers
- An analysis of process improvements that can enhance safety by ensuring pits are packaged into AL-R8 SI containers in a timely manner after removal from a weapon

**Topic: Technical basis for the reduced pace of repackaging and the relaxed requirements to preserve pit quality and integrity for the storage environment**

The first topic involves two sub-topics: 1) the reduced rate of packaging at Pantex, and 2) the change to the Design Agency requirement pertaining to the time allowance for staging in AL-R8 containers.

The packaging rates achieved, and the number of pits staged in AL-R8 containers without an SI varied each year from 2006 to 2021 based on the availability of personnel and facilities as well as issues encountered during specific years in that time frame. The lowest rates of packaging were experienced in 2013 and 2018-2021. The major factors that influenced packaging rates during this period are as follows:

- Resolution of facility issues in 2013 paused packaging operations. During this time, required updates, primarily pertaining to fire penetration seals, were made that limited the time packaging bays were operational. In addition, when the bays were operational, they were used to conduct higher priority operations.
- Resolution of the AL-R8 SI Rusted Container issues in 2018-2019 paused packaging into AL-R8 SI containers. Upon initial discovery of rusted containers in Zone 4 through surveillance activities, packaging operations were paused until a determination was made as to why the outer drum of the AL-R8 SI container was rusting. An extent-of-condition review was conducted to determine whether the outer container rust occurred with all pit types or only certain pit types. A long-term solution was developed for the rusted container concern.
- Re-prioritization of limited resources to support weapons production slowed packaging in 2020-2021. During this period, there were limited qualified personnel to support all ongoing operations. As a result, personnel normally assigned to support the packaging operations were diverted to support weapon production work, resulting in lower packaging rates. Effects from the COVID-19 pandemic were also at their highest during this time. Efforts were made, based on NNSA-directed priorities, to defer lower priority

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activities until infection risk was lower. Packaging activities were considered at that time to be lower priority.

- Competing demands for packaging facilities resulted in lower packaging rates during 2020-2021, and have continued during 2022. The bays equipped and authorized for SI packaging operations are also used for other packaging, un-packaging, and container surveillance activities with higher demand and priority. These activities, combined with the need for major start-up projects (e.g. MD-2 container and Savannah River Site material re-packaging) to use these same facilities for the readiness portions of their authorization, have limited the time available for packaging operations and subsequently reduced the packaging rates.

The Design Agencies' explanation for removing the requirement for Design Agency approval to stage pits in AL-R8 containers without a sealed insert for longer than 24 consecutive months is documented in IER 202202681LL and is summarized below. It should be noted that all pits at Pantex are staged in approved configurations, with adequate protection for worker and public health and safety, and no known quality or safety issues with the pits staged in the current configurations.

- The origin of the SI container was related to pits in AL-R8 containers sharing a headspace with packaging products whose off-gassing produced chlorides, acetates, and sulfates without moisture control. This environment has caused notable rusting of containers and is also considered to increase the potential for reactions that could compromise pit integrity. This same consideration, which led to the repackaging of pits stored in AL-R8s into AL-R8 SIs in the early 2000s, remains today, though mitigating factors include improvements to pit surface cleaning processes and pits stored in AL-R8s now being exclusively performed in temperature-controlled environments in Zone 12.
- The joint Los Alamos National Laboratory and Lawrence Livermore National Laboratory (LANL/LLNL) specification, RM257919 revision F, released in 2006, added for the first time, a maximum AL-R8 storage time. This was done for the purpose of clarifying the intent for long-term storage to be conducted in SIs and included a negotiated timeline for AL-R8 repackaging that was seen as achievable at the time. It is noted the maximum duration did not have a clear quantitative basis when it was first added to RM247919. The timeline associated with this requirement immediately and persistently proved to be a challenge, due primarily to programmatic factors that persist today (resources, capacity, competing priorities, changes to national pit disposition plans, etc.). In 2014, RM257919 revision G, removed this maximum AL-R8 duration requirement, and the document was restructured to clarify requirements related to long-term storage configuration in SI containers.
- SIs are the intended configuration for long-term storage due to their ability to provide a gas environment for which maintained pit pedigree can be best assured. LANL/LLNL are in the process of revising RM257919 to clarify this more explicitly, though a quantitative maximum duration of AL-R8 storage will not be added.

Pit packaging at Pantex continues to meet all requirements and neither Pantex nor LANL/LLNL are aware of an imminent concern of the current state of AL-R8 storage. Sampling and inspection activities are routinely conducted on these items to ensure their safety and integrity.

**Topic: The plan and schedule to package pits in AL-R8 Sealed Insert (SI) containers, particularly for higher hazard legacy pits**

While there is no current concern with pit staging, LANL/LLNL have not determined the likelihood of a pit in the AL-R8 storage configuration becoming compromised as a function of age, or provided a precise aging timeline over which compromise could be expected. LANL/LLNL also have not quantified the increased risk of pits remaining in AL-R8s rather than the AL-R8 SI, although both configurations meet requirements set by the laboratories. Consolidated Nuclear Security, LLC (CNS) is developing a multi-year strategy to significantly increase SI packaging activity and reduce the number of pits stored in AL-R8 containers without an SI. This strategy should be formalized into a plan by the end of July 2022. The plan, including hiring and qualifying additional personnel to maximize packaging efforts, will be coordinated with NA-12 to ensure it aligns with overall NNSA priorities and funding availability. This strategy notionally includes the following components, subject to funding prioritization:

- Prioritize packaging high energy legacy pits. The design agencies have provided a list of pit types they consider their highest priority for removal from AL-R8 containers without an SI. CNS is using this input to develop a prioritized packaging plan.
- Prioritize packaging pits using a risk management approach, taking into account factors such as duration of pits in non SI containers, risks associated with different pit types/containers/locations, and other programmatic risks.
- Increase the rate of AL-R8 SI packaging such that the growth in the number of pits staged in AL-R8 containers without an SI stabilizer starts to decline in FY 2024. This will require additional personnel during FY 2023 to support two dedicated SI packaging bays. All non-packaging operations will be moved to a separate single bay.
- Identify necessary resources to support completing the packaging of pits currently in inventory (no near-term use) by FY 2026. Near-term pits that are designated for use in weapons and those identified for surveillance activities will not be repackaged.
- Produce estimates needed beyond FY 2027 for maintaining a packaging rate that ensures pits from dismantlement, disassembly and inspection, and surveillance activities not targeted for near-term use are packaged in SI containers in a timely manner.

**Topic: Actions being taken to address any shortages in components of AL-R8 SI containers**

An analysis was completed that shows there is no shortage in components of AL-R8 SI containers in FY 2022. CNS is also taking the following actions to ensure there will be no shortages to support the strategy outlined above:

- A procurement plan is being developed based on the number of containers needed to support the packaging plan in future years. The plan accounts for the long lead times associated with these containers and container components. Variables such as reuse, attrition, and containers becoming available from scheduled un-packaging operations are also being considered.

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- The procurement plan will be reviewed and updated on an annual basis, taking into account the changes to dismantlement, disassembly and inspection, surveillance, and other applicable activities.

### **Topic: An analysis of process improvements that can enhance safety by ensuring pits are packaged into AL-R8 SI containers in a timely manner after removal from a weapon**

CNS has identified two areas where process improvements will help ensure pits are packaged into AL-R8 SI containers in a timely manner after removal from a weapon:

- Higher hazard legacy pits currently in AL-R8 containers without an SI will be packaged into an SI container upon completion of the surveillance activities. The specific list of associated pits will be coordinated with the design agencies.
- Pits with no near-term use will go from the weapons bay to the packaging bay to be packaged in an SI container in a timely manner (i.e. prioritized).

Pantex pit packaging operations are safe today and are conducted in accordance with applicable requirements. The CNS leadership team has taken a holistic approach in developing the packaging strategy and process improvements identified above, is committed to reducing the number of pits staged in AL-R8 containers without an SI, and is making process changes to reduce the time pits remain in AL-R8 containers without an SI once they are removed from a weapon. CNS will also charter a process improvement team in May 2022 to develop actions to further enhance Pantex's SI processing capability.