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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Washington, DC 20004-2901

October 17, 2025

The Honorable Chris Wright
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Wright:

As part of the Defense Nuclear Facilities Safety Board's (Board) independent nuclear safety oversight mission, the Board maintains a safety allegations program, in which members of the public, including Department of Energy (DOE) federal employees and contractors, can confidentially submit safety concerns regarding DOE defense nuclear facilities. In 2024, the Board received a safety allegation regarding alleged deficiencies in nuclear weapon safety component manufacturing, certification, and quality assurance processes at the Kansas City National Security Campus; the process by which nuclear weapon design agencies evaluate and disposition issues with nuclear weapon safety components; and an adverse safety culture at Sandia National Laboratories that included instances of perceived retaliation against employees for raising safety or quality concerns. Given the implications of the allegation for the safety of nuclear explosive operations at the Pantex Plant, the Board voted to initiate a formal safety investigation into these matters under its authority pursuant to the Atomic Energy Act of 1954, codified at 42 U.S.C. § 2286a(b)(2), and carried out under its regulations at 10 C.F.R. Part 1708.

While the Board's safety investigation did not reveal any immediate safety concerns affecting the ability of specific nuclear weapon safety components to perform their safety function during operations at the Pantex Plant, the Board identified several weaknesses in the areas of safety culture, measurement assurance, nuclear weapon safety component quality, and National Nuclear Security Administration (NNSA) oversight. The Board identified nineteen corresponding opportunities for improvement to safety in these areas that warrant NNSA consideration and has highlighted five of these for prioritization by NNSA in the enclosed report, as they have the greatest potential safety impact. Such safety improvements would help to bolster assurance that nuclear weapon safety components are fabricated, procured, and installed in a manner commensurate with their safety function.

The Board acknowledges and appreciates the cooperation of NNSA and its contractors in facilitating our staff's investigation of this serious safety matter. The Board looks forward to continuing to identify opportunities to improve safety in the complex, as NNSA increases its

activity and prepares for the next round of nuclear weapon life extension programs critical to our national security.

Pursuant to 42 U.S.C. § 2286b(d) the Board requests a DOE briefing and report within 180 days of receipt of this letter that describe DOE's path forward on the opportunities for improvement to safety identified in the enclosed report.

Sincerely,

Thomas A. Summers

Thomas A. Summers
Acting Chairman

Enclosures:
1. Executive Summary
2. Safety Investigation Report for PTX-2024-01

c: The Honorable Brandon Williams, Under Secretary for Nuclear Security; Administrator, National Nuclear Security Administration
Mr. Joe Olencz, Director, Office of the Departmental Representative to the Board

EXECUTIVE SUMMARY

The National Nuclear Security Administration (NNSA) is responsible for several Department of Energy (DOE) laboratories, the Nevada National Security Sites, and production and processing facilities involved in the design, production, and testing of nuclear weapon components. These facilities collectively compromise the nuclear security enterprise. Within the nuclear security enterprise, some facilities are statutorily classified as 'defense nuclear facilities' and thus subject to the jurisdiction of the Defense Nuclear Facilities Safety Board (Board).[1] Among them are several facilities at the Pantex Plant (Pantex) in its role of assembling and disassembling nuclear weapons. Certain other facilities, while not defense nuclear facilities themselves, are subject to Board jurisdiction to the extent that their activities are relied upon to assure public health and safety at defense nuclear facilities such as Pantex.

As part of its safety oversight activities of the nuclear security enterprise, the Board has a safety allegations program, in which anyone can submit safety allegations in a confidential manner. In April 2024, the Board received an allegation through its safety allegations program asserting the following:

1) an adverse safety culture at Sandia National Laboratories (SNL) that included instances of perceived retaliation against employees for raising safety or quality concerns;

2) inadequacies in the quality assurance practices for nuclear weapon components produced at the Kansas City National Security Campus (KCNSC) for use at Pantex;

3) inadequacies in SNL processes for evaluating potential deviations in nuclear weapon components; and

4) limited or ineffective oversight of nuclear weapon component production and acceptance practices by NNSA.

KCNSC is the 'production agency,' or site responsible for manufacturing 80 percent of non-nuclear components that go into the nuclear stockpile for NNSA. SNL is the 'design agency,' or site responsible for designing and establishing the performance, reliability, and safety requirements for most of the components manufactured by KCNSC.[2] A subset of these non-nuclear components is relied upon to ensure safety when workers assemble, disassemble, and handle a nuclear weapon at Pantex, a site with numerous defense nuclear facilities under the Board's jurisdiction. These nuclear weapon safety components are relied upon to perform a safety function, providing protection to workers at Pantex and the public, against postulated hazard scenarios with consequences ranging from inadvertent nuclear detonation to the aerosolized dispersal of plutonium to other adverse worker safety effects.

[1] 42 U.S.C. § 2286g.

[2] KCNSC is managed and operated by Honeywell Federal Manufacturing & Technologies, LLC, a subsidiary of Honeywell International, Inc. SNL is managed and operated by National Technology & Engineering Solutions of Sandia, LLC, also a subsidiary of Honeywell International, Inc.

While KCNSC is not a defense nuclear facility, the processes that ensure the quality of these nuclear weapon safety components are subject to Board jurisdiction for the limited purpose of providing safety oversight of nuclear explosive operations at Pantex. For both SNL and KCNSC, the Atomic Energy Act of 1954 gives the Board broad access to facilities, personnel, and information the Board considers necessary to carry out its responsibilities.[3] Moreover, while the Board's jurisdiction does not include the safety of atomic weapons, the Atomic Energy Act of 1954 gives the Board the right to information about atomic weapons to the extent necessary to carry out its functions.[4] Both KCNSC and SNL perform critical roles in ensuring the safety of Pantex defense nuclear facilities, and thus the Board requires information from both to carry out its safety oversight responsibilities of Pantex.

Pantex is typically not responsible for the performance and acceptance testing of nuclear weapon safety components provided by KCNSC. Many such components arrive at Pantex assembled and sealed, so additional inspections are generally not feasible. Therefore, Pantex relies upon the quality assurance and inspection processes at KCNSC to ensure these components meet their requirements when shipped. In some cases when nuclear weapon components do not meet design requirements, SNL—as the design agency—will perform additional analyses to determine what effect these deviations from design requirements will have on weapon quality or safety. If these analyses show the deviation will not have a negative impact, an 'engineering authorization' is approved, and the affected nuclear weapon component can still be used.

The safety allegation specifically raised concerns with these processes. First, the allegation raised concerns with KCNSC measuring and test equipment used to certify that nuclear weapon safety components meet design requirements. Nuclear weapon safety components must meet their design requirements to ensure they will be able to perform their safety functions at Pantex. The safety allegation stated that the concerns with the measuring and test equipment may have led to an increased chance of unintentionally using nuclear weapon safety components that did not meet design requirements. Additionally, the allegation indicated concerns with the SNL processes for development and approval of engineering authorizations.

Several of the specific allegations[5] echoed trends the Board was monitoring as part of its routine safety oversight of the nuclear security enterprise. Given this and the significance of the potential issues, the Board voted to initiate a formal safety investigation on May 23, 2024, and briefed the NNSA Administrator and appropriate senior staff on the potential concerns and the scope of the safety investigation. The Board limited the scope of the safety investigation to those processes that affect nuclear weapon safety components that are relied upon at Pantex.

The Board has concluded its safety investigation and did not identify any immediate safety concerns affecting the ability of specific nuclear weapon safety components to perform

[3] See 42 U.S.C. § 2286c(a).
[4] See 42 U.S.C. § 2286a(c).
[5] Over the course of its investigation, the Board confirmed that some of the allegations were similar to concerns identified by other independent reviews, including the Pantex Causal Factors Analysis Investigation Report in 2010 titled, *Use of W76-1 Unscreened/Failed Screen Arming, Fuzing and Firing Subassemblies on Pantex Nuclear Explosives*, and the Congressionally directed independent review in 2020 of the *B61-12 Life Extension Program and W88 Alteration 370 Technical Issue*.

their safety function during operations at Pantex. However, the Board has identified weaknesses and related opportunities for improvement in the areas of safety culture, measurement assurance, nuclear weapon safety component quality, and NNSA oversight. These weaknesses represent vulnerabilities in NNSA's overall framework for assuring that nuclear weapon safety components can perform their safety functions. Therefore, if left uncorrected, these weaknesses could increase the probability of accepting nuclear weapon safety components that do not meet design requirements. These weaknesses and opportunities for improvement are summarized below. The Board has provided NNSA with additional context and information in the body of the main investigation report on these weaknesses and opportunities for improvement, which has not been approved for public release.

1) Safety Culture—Part of the safety investigation focused on the ability of individuals to raise safety or quality concerns that could impact the functionality of nuclear weapon safety components. The Board's safety investigation team interviewed approximately forty current and former federal and contractor employees at KCNSC and SNL. While opinions voiced during interviews on safety culture were mixed, the Board identified the most significant indicators of an adverse safety culture at SNL within organizations related to engineering authorizations and measurement assurance.

Specifically, multiple individuals in these organizations at SNL stated that they were either retaliated against by contractor management for raising quality or safety concerns, or fear retaliation for raising safety or quality concerns. Multiple individuals stated the retaliation took the form of a loss of job functions, poor performance reviews, and lack of inclusion in key meetings. While this limited pool of interviewees does not necessarily represent the culture of their entire organization at SNL, the Board is concerned by these indicators and concluded that additional assessment may be necessary.

Due to the sensitive and often classified nature of the work involved within the nuclear security enterprise, the community of engineers, scientists, and other technical individuals with the access, knowledge, and experience necessary to identify quality or safety concerns with any weapon component is necessarily small. Decision makers within NNSA are reliant on this small group of individual employees to identify concerns, and for contractor management to appropriately communicate these concerns. If there is not a healthy safety culture, such concerns can go unreported or not be communicated to higher-level decision makers.

While SNL has several internal processes for individuals to raise safety concerns related to nuclear weapon components, such as the ethics complaint process, the Board found some reluctance to use these processes by multiple individuals. Additionally, regarding the ethics complaint process, the Board found an example of a complaint related to nuclear weapon safety components that may not have been adequately investigated and addressed. Finally, DOE has a program for contractor and federal employees to raise safety concerns, known as the Employee Concerns Program, so employees can raise safety concerns outside their line management. The Board found a general lack of awareness of this program by interviewees, and some reluctance to use the process among the minority that were knowledgeable.

The Board has identified the following opportunities for improvement, with the first warranting prioritization given its safety significance:

- Determine the full extent of adverse safety culture conditions at SNL.
- Assess the SNL ethics complaint process to ensure complaints related to nuclear weapon safety components were properly investigated and no outstanding safety concerns exist.
- Consider the potential benefit of documenting minority technical opinions on engineering authorizations.
- Ensure internal SNL processes for raising safety concerns with nuclear weapon components are understandable, implemented appropriately, and credible to employees.
- Ensure the DOE Employee Concerns Program processes are familiar and understandable to contractors, implemented appropriately, and credible to employees at both SNL and KCNSC.

2) Measurement Assurance—KCNSC relies on a measurement assurance program[6] to help ensure measuring and test equipment, including gages, provide accurate, reliable, and traceable measurements. These measurements are used to help certify that KCNSC manufactured or procured components meet their design requirements. Given the importance of measurement assurance, the Board evaluated NNSA and KCNSC measurement assurance requirements and their implementation at KCNSC.

The Board's safety investigation revealed challenges involving sufficient KCNSC gage engineering staffing, who help ensure gages meet requirements; an instance where a KCNSC gage engineer was indicted for alleged fraudulent procurement of gages; an engineering authorization that allowed the use of over 300 product acceptance gages that may not have met measurement uncertainty requirements and did not have adequate technical justification; and differences of opinion between KCNSC and SNL (including the Primary Standards Laboratory[7]) involving implementation and interpretation of measurement assurance requirements. While the Board did not identify any immediate safety concerns with specific manufactured nuclear weapon safety components, the Board found that there was an increased likelihood of NNSA and its contractor accepting product that did not meet design requirements in cases where certain KCNSC gages were used.

[6] Measurement assurance is a system for understanding, modeling, measuring, and managing the sources of uncertainty and variability in a measurement process to ensure that measurement results are valid.
[7] The Primary Standards Laboratory maintains measurement and calibration expertise for the NNSA complex. Part of their role is to consult on measurement problems, calibrate reference standards, and perform technical surveys of NNSA sites (including KCNSC) to evaluate compliance with NNSA requirements that impact measuring and test equipment at those sites.

KCNSC has made improvements to resolve some of these challenges, including improving measurement assurance processes, requirements, and guidance, as well as hiring additional gage engineers. However, several weaknesses regarding measurement assurance requirements and implementation remain.

The Board has identified the following opportunities for improvement, with the first warranting prioritization given its safety significance:

- Improve measurement assurance requirements and address significant differences of opinion that remain between relevant stakeholders.

- Compare and contrast measurement assurance practices within the nuclear security enterprise against other government agencies with high-risk missions.

- Ensure the development of measurement assurance requirements considers all stakeholder input to verify decisions are reached that do not unduly favor either the production or design agency, such that safety could be negatively impacted.

- Evaluate and resolve KCNSC measurement assurance issues previously identified by the Primary Standards Laboratory.

- Evaluate applicability of a 2021 external study[8], performed due to a Primary Standards Laboratory identified issue, to existing KCNSC measuring and test equipment.

3) Nuclear Weapon Safety Component Quality—The Board evaluated certain quality assurance practices at KCNSC and SNL, including: (1) corrective actions taken to preclude repetitive production issues; (2) processes for developing engineering authorizations; and (3) processes for communicating potential safety concerns with nuclear weapon safety components between production agencies, design agencies, and Pantex. The Board found challenges in the timeliness of these communications and with identifying effective corrective actions at KCNSC and its vendors to prevent future production issues. The Board also found examples of multiple deviations from design requirements on a single nuclear weapon safety component, that were often addressed through separate engineering authorizations. However, there was a lack of a formal, timely evaluation to determine if multiple deviations could collectively impact the safety function of the single component. From the Board's perspective, timely would be prior to use at Pantex, which is necessary to ensure the safety of work conducted there.

Finally, while all nuclear weapon safety components undergo testing to ensure they will perform their safety functions, the Board found examples of engineering authorizations that relied heavily on existing testing when accepting deviations from design requirements. The Board determined relying on existing acceptance testing alone may not always be sufficient to meet the strict requirements associated with nuclear weapon safety components and could erode safety margins.

[8] *Report on Gage Analysis of Sandia "Utility Header Assembly, 7-Pin"*

The Board has identified the following opportunities for improvement, with the first two warranting prioritization given their safety significance:

- Ensure that impacts from compounding deviations approved via multiple engineering authorizations are adequately assessed for nuclear weapon programs in a timely manner.

- Ensure that design agencies limit reliance on existing acceptance testing as the sole rationale for accepting deviations from design requirements.

- Ensure continued vigilance in developing effective corrective actions by KCNSC and its vendors to minimize future production issues.

- Evaluate the timeliness and adequacy of the processes for communication and disposition of deviations from design requirements for nuclear weapon safety components.

4) NNSA Oversight—The Board performed a limited evaluation of NNSA oversight related to the areas outlined in the previous sections of this executive summary. The Board interacted with NNSA personnel within the Sandia Field Office, the Kansas City Field Office (KCFO), and the NNSA weapons quality division (WQD). The Board found a lack of routine oversight by NNSA personnel of the Primary Standards Laboratory and the process for development and approval of engineering authorizations. Additionally, the Board found that while WQD gathers data from across the nuclear security enterprise, it does not always analyze this data effectively. For example, WQD did not identify and fully resolve differing interpretations of measurement assurance requirements in a timely manner. Most significantly, as noted previously in the *Measurement Assurance* section, the Board is concerned that KCFO did not address multiple documented issues related to KCNSC measurement assurance practices.

The Board has identified the following opportunities for improvement, with the first warranting prioritization given its safety significance:

- Evaluate KCFO's response to issues related to KCNSC measurement assurance practices to determine if there is a potential gap in the existing weapon quality assurance oversight model.

- Improve WQD data collection and analysis such that it can identify and resolve differing interpretations.

- Consider periodically evaluating the Primary Standards Laboratory, including staffing, implementation of requirements, and performance of technical surveys.

- Ensure that safety issues related to KCNSC measurement assurance practices are identified and resolved in a timely manner.

- Improve NNSA's oversight of engineering authorizations.