



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



October 16, 2026

Ms. Laura McGill
Laboratories Director
National Technology and Engineering Solutions of Sandia, LLC
Post Office Box 5800, MS-0101
Albuquerque, New Mexico 87185

NEA-2026-01

Dear Ms. McGill:

This letter refers to the U.S. Department of Energy's (DOE's) investigation into the facts and circumstances associated with a tritium experiment that resulted in unplanned dose to workers outside of posted radiological areas and unexpected neutron radiation levels from the Z Machine (located in Building 983) at the Sandia National Laboratories campus in Albuquerque, New Mexico, on June 5, 2024. The Office of Enforcement provided the results of the investigation to National Technology and Engineering Solutions of Sandia, LLC (NTESS) in an investigation summary dated August 19, 2025. An enforcement conference was convened on October 15, 2025, with you and members of your staff to discuss the findings in the summary and NTESS's response.

The National Nuclear Security Administration (NNSA) considers the unplanned dose to workers outside of posted radiological areas to be of high safety significance. The June 5, 2024, experimental tritium shot at the Z Machine caused a detector on the third floor of a nearby office building (Building 972) to detect neutrons. After the neutron detection, NTESS collected and analyzed the exposed thermoluminescent dosimeters, which revealed that the neutron radiation levels outside of the posted boundary exceeded the threshold levels required for Radiation Area posting, as defined by the levels established in 10 Code of Federal Regulations (C.F.R.) Part 835¹, *Occupational Radiation Protection*. The event revealed deficiencies in: (1) adherence to written procedures, (2) detecting changes in radiological conditions, and (3) causal analysis and corrective action.

¹ 10 C.F.R. § 835.2, *Definitions*, defines a Radiation Area as "any area, accessible to individuals, in which radiation levels could result in an individual receiving an equivalent dose to the whole body in excess of 0.005 rem (0.05 mSv) in 1 hour at 30 centimeters from the source or from any surface that the radiation penetrates," and a High Radiation Area as "any area, accessible to individuals, in which radiation levels could result in an individual receiving an equivalent dose to the whole body in excess of 0.1 rems (0.001 Sv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates." Subpart G, *Posting and Labeling*, requires that at each access point to these areas, signs be posted bearing the wording set forth in 10 C.F.R. § 835.603.

Based on an evaluation of the evidence in this matter, including information presented at the enforcement conference, NNSA concludes that NTESS violated requirements enforceable under 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*, including 10 C.F.R. Part 835, *Occupational Radiation Protection*. Accordingly, NNSA hereby issues the enclosed Preliminary Notice of Violation (PNOV), which cites three Severity Level II violations, with a total base civil penalty, before mitigation, of \$393,000.

As discussed in the attached PNOV, NNSA concluded that the causal analysis associated with this event failed to adequately identify the underlying issues that led to this event. During the enforcement conference and in a subsequent letter to the Office of Enforcement, NTESS defended its approach, stating that “we believe the causal analysis process yielded actions that have addressed the key issues and significantly improved the safety posture of neutron-producing shots on Z,” and that the “causal analysis identified that the generation of a Radiation Area outside the posted area was caused by a disconnect between the [methodology] used to establish the boundary location and the [methodology] used to assign personnel dose and interpret area monitoring.” However, NTESS’s response underscores the inadequacy of the causal analysis, as it attributes the problem to the analytical approach instead of recognizing the failure to detect changes to the neutron fields before they became a concern under the analytical approach required at that time.

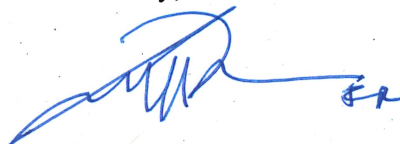
One significant issue that was overlooked in the causal analysis was the failure to evaluate the impact of changing operational conditions on the radiological hazards. After almost tripling the target yield in August 2023, NTESS did not reevaluate the impact this would have on the existing controls. NTESS incorrectly believed that the existing control on cumulative neutron yield was adequate to protect workers. However, NTESS did not identify, ahead of the June 2024 shot, that changing operating conditions could lead to radiation levels beyond those assessed for a single shot. The failure to recognize the implications of either the change to neutron yields or the increased dose readings from a precursor shot on April 26, 2024, was not addressed in the causal analysis.

In consideration of the lack of mitigating factors, NNSA calculated a proposed civil penalty (prior to adjustment for fee reduction) of \$393,000. However, in response to the violations associated with this event, NNSA withheld \$40,000 of the available contract award fee for NTESS’s performance failures in fiscal year 2024. Consequently, NNSA elects to exercise enforcement discretion and proposes a reduction of the civil penalty for the violations cited in this PNOV by \$40,000 in recognition of the fee previously withheld. In consideration of this factor, NNSA imposes a total proposed civil penalty of \$353,000.

Pursuant to 10 C.F.R. § 820.24, *Preliminary notice of violation*, subsection (b), you are obligated to file a written reply within 30 calendar days after the date of filing of the enclosed PNOV and to follow the instructions specified in the PNOV when preparing your response. If you fail to submit a reply within 30 calendar days, then, NNSA may pursue a Default Order in accordance with 10 C.F.R. § 820.33.

After reviewing your reply to the PNOV, including any proposed additional corrective actions entered in DOE's Noncompliance Tracking System, NNSA will determine whether any further activity is necessary to ensure compliance with DOE nuclear safety requirements. NNSA will continue to monitor the completion of corrective actions until this matter is fully resolved, consistent with 10 C.F.R. Part 820, Subpart B.

Sincerely,



Brandon M. Williams
Under Secretary for Nuclear Security
Administrator, NNSA

Enclosures: Preliminary Notice of Violation (NEA-2026-01)
Payment Processing Instructions

cc: Maria Braem, National Technology and Engineering Solutions of Sandia, LLC
Daryl Hauck, NA-SN

Preliminary Notice of Violation

National Technology and Engineering Solutions of Sandia, LLC
Sandia National Laboratories

NEA-2026-01

A U.S. Department of Energy (DOE) investigation into the facts and circumstances associated with a tritium experiment that resulted in unplanned worker dose and unexpected neutron radiation levels from the Z Machine (located in Building 983) at the Sandia National Laboratories (SNL) campus in Albuquerque, New Mexico, on June 5, 2024, revealed violations of DOE nuclear safety requirements by National Technology and Engineering Solutions of Sandia, LLC (NTESS).

The June 5, 2024, experimental tritium shot at the Z Machine caused a detector on the third floor of a nearby office building (Building 972) to detect neutrons. After the neutron detection, NTESS collected and analyzed the exposed thermoluminescent dosimeters, which revealed that the neutron radiation levels outside of the posted boundary exceeded the threshold levels at which Radiation Area (RA) posting is required under 10 Code of Federal Regulations (C.F.R.) Part 835², *Occupational Radiation Protection*.

Pursuant to section 234A of the Atomic Energy Act of 1954, as amended, and DOE regulations set forth in 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*, the National Nuclear Security Administration (NNSA) hereby issues this Preliminary Notice of Violation (PNOV) to NTESS. The violations included deficiencies in: (1) adherence to written procedures, (2) detecting changes in radiological conditions, and (3) causal analysis and corrective action. NNSA has grouped and categorized the violations as three Severity Level II violations.

Severity Levels are explained in Part 820, appendix A, *General Statement of Enforcement Policy*. Paragraph VI(b) states that "Severity Level II violations represent a significant lack of attention or carelessness toward responsibilities of DOE contractors for the protection of public or worker safety which could, if uncorrected, potentially lead to an adverse impact on public or worker safety at DOE facilities."

In consideration of the lack of mitigating factors, NNSA calculated a civil penalty (prior to adjustment for contract fee reduction) of \$393,000. However, in response to the violations

² 10 C.F.R. § 835.2, *Definitions*, defines a Radiation Area as "any area, accessible to individuals, in which radiation levels could result in an individual receiving an equivalent dose to the whole body in excess of 0.005 rem (0.05 mSv) in 1 hour at 30 centimeters from the source or from any surface that the radiation penetrates," and a High Radiation Area as "any area, accessible to individuals, in which radiation levels could result in an individual receiving an equivalent dose to the whole body in excess of 0.1 rems (0.001 Sv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates." Subpart G, *Posting and Labeling*, requires that at each access point to these areas, signs must be posted bearing the wording set forth in 10 C.F.R. § 835.603.

associated with this event, NNSA withheld \$40,000 in contract fees from NTESS in fiscal year 2024. Consequently, NNSA elects to exercise enforcement discretion and proposes a reduction of the civil penalty for the violations cited in this PNOV by \$40,000, in recognition of the fee previously withheld.

In consideration of this factor, NNSA proposes a total civil penalty of \$353,000.

As required by 10 C.F.R. § 820.24(a) and consistent with Part 820, appendix A, the violations are described below.

I. VIOLATIONS

A. Adherence to Written Procedures

Title 10 C.F.R. § 835.101, *Radiation protection programs*, states “(a) [a] DOE activity shall be conducted in compliance with a documented radiation protection program (RPP) as approved by the DOE,” and “(e) [t]he content of the RPP shall address, but shall not necessarily be limited to, each requirement in this part.”

Title 10 C.F.R. § 835.104, *Written procedures*, states that “[w]ritten procedures shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.”

NTESS established its RPP in the *Sandia National Laboratories Radiation Protection Program*, Revision 2, dated January 25, 2018. Article 229 of the RPP states that the “primary methods used [to limit radiation exposures in controlled areas] shall be engineered controls (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls shall be employed only as supplemental methods to control radiation exposure.”

NTESS currently implements the requirements of the RPP through MN471022, *ES&H Manual*, chapter 24, *Radiation Protection*. MN471022, section 1.3, *Conform with Requirements*, states, “No Member of the Workforce shall take or cause to be taken any action that would be inconsistent with the requirements contained in this Radiation Protection chapter (RPC) of MN471022, *ES&H Manual*, or with any plan, process, or procedure developed to implement the requirements of this chapter.”

MN471022, section 7.2, states that “[t]he responsible line organization shall evaluate...unmitigated (i.e., no effort or attempt to reduce) radiological hazards and radiation doses when changing a source of radiation (e.g., radioactive source, radiation-generating device) or process that may affect radiological conditions.” Section 7.4.1 states that if the unmitigated dose to a radiological worker will likely exceed “250 mrem in a year to a radiological worker” or “10 mrem during a single event to a Member of the Public, a non-radiological worker, a visitor, or an individual located outside a controlled area,” then the “responsible line organization shall...[d]ocument the hazards and controls.”

Prior to 2022, NTESS implemented the requirements of the RPP through MN471016, *Radiological Protection Procedures Manual*, section 7.4.4, which states that the analysis of the hazards and controls “shall be reviewed by an individual with expertise in radiation protection that is NOT associated with the affected operation...prior to construction of a new structure.”

Contrary to these requirements, NTESS failed to adequately adhere to written procedures to evaluate radiological hazards, as evidenced by the following:

1. NTESS did not adequately document the hazards and controls for Building 972 during its design or prior to commencing its construction. The NNSA Sandia Field Office transmitted a letter to NTESS on July 22, 2019, that identified that construction of Building 972 had begun without integrating radiation protection safety in the design. In their response, *Z-Facility Support Building 972 and Associated Corrective Action Plan Response from Sandia National Laboratories*, dated August 22, 2019 (hereinafter the “response and CAP”), NTESS confirmed that construction was ongoing and that two of the five possible dose mitigation strategies (i.e., relocating or not constructing the building) “[c]annot be performed since building is being built already.”
2. NTESS did not reevaluate the radiological hazards discussed in their response and CAP or the resultant plans, processes, and procedures needed to address those hazards when changing a source of radiation (i.e., the Z Machine). Specifically:
 - a. NTESS prepared their response and CAP based on historical use patterns for the Z Machine and assumed a maximum of three tritium shots per year with a maximum neutron yield an order of magnitude lower than that identified in the original *Safety Case for Chamber Confined Tritium Experiment on Z*, issued in July 2020. Between the original Safety Case and August 2023, NTESS revised the Safety Case three times to support increasing quantities of radiological material that were needed to support experiments with higher neutron yields, including some that exceeded the maximum neutron yield per shot postulated in the response and CAP. Specifically, in August 2023, the tritium experiments were changed to support neutron yields about three times higher than previous experiments and approximately six times the neutron yields postulated in the response and CAP. Furthermore, the rate of tritium shots increased from the assumed range of one to three per year to four conducted in 2024, and eight planned in 2025. These changes represented substantial modifications to the radiological conditions. Such changes exceeded the planning assumptions of the response and CAP, which states in attachment C that the analysis “is only applicable to the current state, including shot schedule and Z Machine yield” and that reevaluation would be required “if the radiological conditions change.”
 - b. NTESS did not evaluate changing conditions in accordance with the *Z ALARA Committee (ZAC) Charter*, dated July 27, 2020. The ZAC Charter, section 6, *Expected Outcomes*, identifies that “[a]n upper threshold on doses of 1.5 mrem per shot from Z Machine operations...is to be used as a trigger for notification to the ZAC” and that “if there is a concern addressed for the potential dose to an individual per shot in an occupiable space outside of the Z Exclusion Area related to these identified operations to be greater than 1.5 mrem, Z Management will notify Radiation Protection and Operations Management as soon as this risk is identified and

prior to the commencement of such shots of concern, and the ZAC will be called into session.” NTESS did not engage the ZAC when a reading of 1.529 mrem was recorded on a neutron detector in Building 972 after the April 26 tritium shot, even though this reading exceeded the defined 1.5 mrem trigger for the ZAC.

Furthermore, the possibility of exceeding the 1.5 mrem threshold for the April 20, April 30, and June 5 tritium shots was not identified prior to their commencement, even though there was a predictable correlation between the neutron yield and measured neutron dose as shown in NTESS’s *Factual Accuracy Review*, appendix B, *Plotting of the Albatross Data vs Z Experimental Yield*. This demonstrated a failure to utilize available predictive data and to address exceedances of established thresholds, and thus undermined the ZAC’s intended role in managing radiological risk.

- c. NTESS did not evaluate changing conditions in accordance with the *Exclusion Area for Neutron Shots at Z-Machine* memorandum, dated June 19, 2019. This memorandum used the measured dose (0.49 mrem) from a tritium shot conducted on April 17, 2019, as the basis for the outer boundary of an exclusion area (i.e., the posted RA for the Z Machine. The document goes on to state that NTESS “will provide measured data to ensure the access controls remain adequate: [less than] 1 mrem per shot....If future Z-Machine experiments are expected to significantly exceed the current outputs...or if measured data is made available that modifies dose estimates, it is recommended that the boundary be re-assessed.” However, NTESS did not reassess the boundary after increasing the neutron yields by a factor of three and subsequently measuring 1.529 mrem outside the posted RA.
- d. NTESS did not recognize that the changes to the Z Machine neutron yields had the potential to cause a dose of 10 mrem or more from a single shot to an individual outside a controlled area. In addition to the correlation between albatross data as discussed in section I.A.2.b above, NTESS’s analysis in the response and CAP, attachment 6 [*Monte-Carlo Neutral Particle (MCNP)*] *Estimate of Dose to Potential Occupants of Building 972*, includes an estimated dose per neutron at several locations. When these dose-per-neutron estimates are multiplied by the target neutron yield for the June 2024 shot, it results in an estimated 10.9 mrem per tritium shot on the third floor of Building 972. This value is consistent with the dose assignments for individuals outside of the posted RA (6-68 mrem over three tritium shots) and exceeds the action levels identified in both the *Exclusion Area for Neutron Shots at Z-Machine* memorandum and the ZAC Charter discussed above (sections I.A.2.c and - .b, respectively). However, the analysis provided in the response and CAP was not reevaluated prior to the tritium shot on June 5, 2024. The potential to exceed the action levels was evidenced by the assignment of doses of more than 10 mrem to personnel outside of controlled areas³ from the June 5, 2024, tritium shot.
- e. Similarly, NTESS did not recognize that the Z Machine neutron yields had the potential to cause a cumulative dose of 250 mrem in a year to a radiological worker. The maximum cumulative dose assigned to radiological workers in the control room for the

³ 10 C.F.R. § 835.2, *Definitions*, defines a controlled areas as “any area to which access is managed by or for DOE to protect individuals from exposure to radiation and/or radioactive material.”

April 26, April 30, and June 5 shots was 200 mrem, with additional tritium shots planned later in the year. This demonstrates that there was considerable potential for the next planned shot to exceed the 250 mrem dose threshold. However, the analysis provided in the response and CAP was not reevaluated prior to the tritium shot on June 5, 2024.

Collectively, these noncompliances constitute a Severity Level II violation.

Base Civil Penalty – \$131,000

Proposed Civil Penalty – \$117,700

B. Detecting Changes in Radiological Conditions

Title 10 C.F.R. § 835.101, *Radiation protection programs*, states “(a) [a] DOE activity shall be conducted in compliance with a documented radiation protection program (RPP) as approved by the DOE,” and “(e) [t]he content of the RPP shall address, but shall not necessarily be limited to, each requirement in this part.”

Title 10 C.F.R. § 835.401, *General Requirements*, states “(a) [m]onitoring of individuals and areas shall be performed to...(3) [d]etect changes in radiological conditions” and “(5) [v]erify the effectiveness of engineered and administrative controls in containing radioactive material and reducing radiation exposure;” 10 C.F.R. § 835.2, *Definitions*, defines monitoring as “the measurement of radiation levels...or individual doses and the use of the results of these measurements to evaluate radiological hazards or potential and actual doses resulting from exposures to ionizing radiation.”

Article 88 of NTESS’s RPP states, “At SNL, monitoring of individuals and areas shall be performed to demonstrate compliance with § 835.401(a)(1)-(6).”

MN471022, *ES&H Manual*, chapter 24, *Radiation Protection*, section 8.1, *Conduct Required Radiological Monitoring*, states that “[m]anagers shall ensure that individuals and areas under their control are monitored by the appropriate Radiation Protection (RP) line support team (LST) to meet the following regulatory requirements:

- Demonstrate compliance with DOE radiation protection requirements.
- Document radiological conditions.
- Detect changes in radiological conditions.
- Detect the gradual buildup of radioactive material.
- Verify the effectiveness of engineered and administrative controls in containing radioactive material and reducing radiation exposure.
- Identify and control potential sources of individual exposure to radiation and/or radioactive material.”

MN471022, *ES&H Manual*, chapter 24, *Radiation Protection*, section 8.10, *Perform Routine Surveillance*, states, “Appendix 8-1, *Requirements for Establishing Radiological Survey*

Frequency, is used as a basis for establishing routine survey frequencies along with process knowledge and historical data.” Appendix 8-1 requires that RAs be surveyed “weekly” at both “temporary boundaries to confirm adequacy of posting” and “in routinely occupied areas.”

Contrary to these requirements, NTESS did not adequately detect changes in radiological conditions and use those results to evaluate changes to radiological hazards and verify the effectiveness of engineered and administrative controls in reducing radiation exposure, as evidenced by the following:

1. NTESS did not adequately monitor tritium shots and document radiological conditions at the posted RA boundary, within the control room, or at other appropriate points within the facility, consistent with requirements for detecting changes in radiological conditions and verifying control effectiveness. Consequently, NTESS did not detect changes in conditions in these areas caused by tripling the neutron yield from tritium shots prior to the June 5 shot. This resulted in unposted radiological areas near the Z Machine exceeding 5 mrem per hour (i.e., a RA) and occupied areas within the Z Machine exceeding 100 mrem per hour (i.e., a High Radiation Area [HRA]). These areas did not meet posting requirements set forth in 10 C.F.R. Part 835, Subpart G, *Posting and Labeling*. Consequently, workers that were present in these areas received doses that exceeded the amount that was anticipated or planned (i.e., an unplanned dose).
2. NTESS did not adequately respond to indications that neutron radiation levels outside the posted RA had increased after tripling the neutron yield from tritium shots or that occupied areas within the Z Machine were approaching HRA levels. Specifically, NTESS did not evaluate the change in radiological conditions following these indications or the potential impact of these changing radiological conditions on future experiments. NTESS’s failure to meet Part 835 requirements resulted in unplanned exposure to workers outside of posted radiological areas.
3. NTESS did not adequately monitor the April 30 shot, or several other prior tritium shots, to detect changes in radiological conditions because of concerns that this information could be used to determine the experimental yield, which was classified; however, there are no security exceptions for 10 C.F.R. Part 835 monitoring requirements. Although thermoluminescent dosimeters, which were read quarterly, were present for the April 30 shot, this monitoring method was insufficient because it could not detect radiological-condition changes from a single shot that would trigger a ZAC review of postings and other hazard controls (see section I.A.2.b above).

Collectively, these noncompliances constitute a Severity Level II violation.

Base Civil Penalty – \$131,000

Proposed Civil Penalty – \$117,700

C. Causal Analysis and Corrective Action

Title 10 C.F.R. § 835.101, *Radiation protection programs*, states “(a) [a] DOE activity shall be conducted in compliance with a documented radiation protection program (RPP) as approved by the DOE,” and “(e) [t]he content of the RPP shall address, but shall not necessarily be limited to, each requirement in this part.”

Title 10 C.F.R. § 835.104, *Written procedures*, states, “[w]ritten procedures shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.”

Article 46 of the NTESS’s RPP states, “[a]t SNL, written procedures shall be developed and implemented as necessary to ensure compliance with 10 C.F.R. 835, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.”

MN471022, *ES&H Manual*, chapter 24, *Radiation Protection*, section 13.2.1, *Submit ESHield Reports*, states that “[m]anagers of owning organizations shall ensure, for radiological facilities and/or radiological work operations that they own, that all events associated with their radiological operations are reported to Radiation Protection (RP) and entered into ESHield. A causal analysis may be required per QA001.3, *Identify and Manage Issues*.”

QA001.3, *Identify and Manage Issues*, dated January 11, 2024, in the section titled, *Develop Corrective Action Plan*, states that the responsible party must “[d]evelop and document the corrective action plan (CAP) in the causal report...taking into consideration...[c]orrective actions to correct and prevent the causal factors.”

MN471016, *Radiological Protection Procedures Manual*, section 13.3, *Responsibilities*, states that line managers shall ensure that “[t]he Radiation Protection (RP) Program Department is notified of conditions not conforming to requirements of this manual....[A] causal analysis may be required for nonconformances from events, as appropriate, in accordance with CA001.2, *Identify and Manage Issues*.”

Title 10 C.F.R. § 835.203(b) states, “[d]eterminations of the effective dose shall be made using the radiation and tissue weighting factor values provided in § 835.2.” In applying these weighting factors, 10 C.F.R. § 825.2, Table “Radiation Weighting Factors,” footnote 2, (pertaining to neutrons) notes that “[w]hen spectral data are insufficient to identify the energy of the neutrons, a radiation weighting factor of 20 shall be used.” A weighting factor of 20 is the highest provided for neutrons in § 835.2.

Title 10 C.F.R. § 835.1001, *Design and control*, states “(a) [m]easures shall be taken to maintain radiation exposure in controlled areas [to limit radiation exposure] through engineered and administrative controls. The primary methods used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls shall be employed only as supplemental methods to control radiation exposure.”

NTESS established its RPP in the *Sandia National Laboratories Radiation Protection Program*, Revision 2, dated January 25, 2018. Article 229 of its RPP states that “primary methods used shall be engineered controls (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls shall be employed only as supplemental methods to control radiation exposure.”

MN471022, *ES&H Manual*, chapter 24, *Radiation Protection*, section 1.6.1, *Select Engineered Controls*, states that “[e]ngineered controls shall be used as the primary control methods for the performance of all radiological work.”

Contrary to these requirements, NTESS failed to adequately identify issues and prevent recurrence, as evidenced by the following:

1. NTESS did not adequately address the issues identified in the analysis provided in the response and CAP, attachment 8. Specifically, that attachment states that “[a]s improvements in the Z Machine target design are made, increased radiation output is possible. This would lead to an increase in the estimated [total effective dose] to nearby buildings. No monitoring program is discussed in the [response and CAP] that could alert workers and management to such a situation.” As discussed in section I.B above, NTESS did not have an adequate monitoring program in place prior to the June 5 tritium shot.
2. The NTESS causal analysis *Potential Radiation Exposure Beyond the Neutron Exclusion Boundary*, dated August 30, 2024, identified causal factors that did not contribute to the generation of a RA outside of posted areas and did not identify inconsistencies with the requirements of 10 C.F.R. Part 835. Specifically:
 - a. Four of NTESS’s six causal factors relate to difficulties in measuring neutron spectral data resulting from tritium shots. When spectral data is insufficient to determine the specific neutron energy for dose assignment, 10 C.F.R. Part 835 requires the use of the most conservative radiation weighting factor (i.e., 20). Although NTESS employed this factor when assigning the actual dose, it did not do so when initially establishing the RA. NTESS’s causal analysis states that “spectral data was sufficient to identify the energy of the neutrons with an upper and lower bound.” However, this data was insufficient to determine the specific neutron energy within that range. Therefore, per 10 C.F.R. Part 835, the most conservative radiation weighting factor was required for establishing the RA.
 - b. One causal factor identifies the 10 C.F.R. Part 835 radiation weighting factor as “overly conservative,” a characterization that is inconsistent with the requirement in 10 C.F.R. Part 835 to apply the most conservative radiation weighting factor when spectral data are insufficient to determine the specific neutron energy for dose assignment. The causal factor states that the RA “was determined utilizing a model that was perceived as most accurate based on available information, but the dose calculations were determined utilizing a more conservative model [i.e., one based on unknown neutron energy spectrum] that increased actual dose numbers by an approximate factor of 10 to allow for early detection and analysis of appreciable signals before actual doses would become a true health and safety risk.”
 - c. NTESS’s causal analysis discussed difficulties in neutron energy measurement and contrasted them with regulatory requirements in relation to the “true health and safety risk.” This analysis did not evaluate why NTESS’s modeling and subsequent controls, including the RA boundaries, did not comply with the applicable regulatory requirements when the neutron spectrum data is insufficient. This omission suggests

a potential underestimation of risk, as the noncompliances stemming from applying regulatory requirements based on incomplete data were not identified.

3. The NTESS causal analysis evaluated whether a corrective action is adequate based on a combined score consisting of the hierarchy of controls (ranging from 1 for personnel protective equipment to 5 for elimination of the hazard) and the “appropriateness” of the control (ranging from 0 for no apparent alignment to the cause to 5 for direct alignment). NTESS considered a corrective action adequate if it achieved a combined score of 6. This scoring mechanism allows the selection of less effective controls, such as personal protective equipment (score of 1), to be deemed adequate when combined with a direct alignment to cause (score of 5). This approach fails to prioritize physical design features for controlling radiation exposure, contrary to Part 835 requirements. As a result, none of the corrective actions identified in the causal analysis involved physical design improvements.

Collectively, these noncompliances constitute a Severity Level II violation.

Base Civil Penalty – \$131,000

Proposed Civil Penalty – \$117,600

II. REPLY

Pursuant to 10 C.F.R. § 820.24(b), NTESS is hereby obligated to file a written reply within 30 calendar days after the date of filing of this PNOV. The reply should be clearly marked as a “Reply to the Preliminary Notice of Violation” and must be signed by the person filing it.

If NTESS’s reply specifically states that NTESS agrees to comply with the proposed remedy and waives any right to contest this PNOV, then, pursuant to 10 C.F.R. § 820.24(d), this PNOV will constitute a Final Order upon the filing of the reply. In such case, the civil penalty of \$353,000 must be remitted in accordance with 10 C.F.R. § 820.32(c) within 30 calendar days after the Final Order is filed. Remittance of payment must be submitted via electronic funds transfer (EFT) or automated clearing house (ACH) transfer to DOE through the U.S. Treasury. The Office of Enforcement must be copied at enforcementdocketclerk@hq.doe.gov when the electronic payment is submitted to the U.S. Treasury. Instructions for remitters sending payments in U.S. dollars via EFT or ACH transfer are enclosed.

If NTESS disagrees with any aspect of this PNOV, then as applicable and in accordance with 10 C.F.R. § 820.24(c), the reply must: (1) state any facts, explanations, and arguments that support a denial of an alleged violation, and (2) discuss the relevant authorities that support the position asserted, including rulings, regulations, interpretations, and previous decisions issued by DOE. In addition, 10 C.F.R. § 820.24(c) requires that the reply include copies of all relevant documents.

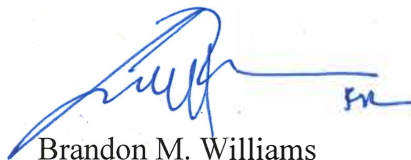
Please submit your reply to the Acting Director, Office of Enforcement, by email to enforcementdocketclerk@hq.doe.gov.

A copy of the reply should also be sent to my office and the Manager of the Sandia Field Office.

Pursuant to 10 C.F.R. § 820.33, *Default order*, subsection (a), if NTESS fails to submit a written reply within 30 calendar days after the date of filing of this PNOV, the NNSA Administrator may pursue a Default Order.

III. CORRECTIVE ACTIONS

Corrective actions that have been or will be taken to avoid further violations should be delineated with target and completion dates in DOE's Noncompliance Tracking System.



Brandon M. Williams
Under Secretary for Nuclear Security
Administrator, NNSA

Washington D.C.

This 16th day of October 2026