

Bruce Hamilton, Chairman  
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**DEFENSE NUCLEAR FACILITIES  
SAFETY BOARD**

Washington, DC 20004-2901



June 5, 2019

The Honorable James Richard Perry  
Secretary of Energy  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-1000

Dear Secretary Perry:

The Defense Nuclear Facilities Safety Board completed a review of the DOE-STD-1158-2010, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*. During the course of this review, the National Nuclear Security Administration (NNSA) Office of Safety approved Cancellation of DOE-STD-1158. The Board notes that at the time of cancellation, DOE-STD-1158-2010 was not consistent with the current revision of ANSI/ANS 8.19-2014, *Administrative Practices for Nuclear Criticality Safety*.

DOE-STD-1158 provided a consistent basis for DOE contractors to develop self-assessment criteria for their criticality safety programs. The Board is concerned that cancellation of the standard erodes that consistency and result in divergent implementation of ANSI/ANS-8.19 and other applicable ANSI/ANS-8 series standards. The Board advises that the DOE consider incorporating the information archived in DOE-STD-1158 into an active DOE directive or technical standard and updating DOE Standard 1158 to be consistent with the current ANSI/ANS-8.19 standard. The attachment describes the rationale for the Board's advice in this matter. Maintaining an active DOE directive or technical standard to DOE contractors is important to ensuring healthy criticality safety programs and safe operations. The DOE directive or technical standard should provide a consistent basis for DOE contractors to self-assess their criticality safety programs in compliance with the current revisions of ANSI/ANS-8.19 and applicable ANSI/ANS-8 series standards.

Yours truly,

A handwritten signature in black ink that reads "Bruce Hamilton". The signature is fluid and cursive, with a long horizontal stroke at the end.

Bruce Hamilton  
Chairman

Enclosure

c: The Honorable Lisa Gordon-Hagerty  
Mr. Daniel Sigg  
Mr. Joe Olencz

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Report

January 9, 2019

### DOE Standard 1158, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*

**Summary.** Members of the Defense Nuclear Facilities Safety Board's (Board) staff reviewed U.S. Department of Energy (DOE) Standard 1158-2010, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs* [1], to verify that the requirements and guidance provided by the document are current and adequate, and to determine whether any additional requirements or guidance may be necessary. The review team found that contractors frequently use this standard to develop the lines of inquiry used to assess their own criticality safety programs (CSP). The staff team identified two potential safety items as a result of this review.

DOE has not updated Standard 1158 to comply with current American National Standards Institute (ANSI)/American Nuclear Society (ANS)-8 consensus standards. The effectiveness of DOE Standard 1158 as a reference document is directly related to its connection to ANSI/ANS-8.19, *Administrative Practices for Nuclear Criticality Safety*, and related ANSI/ANS 8 series standards. Updating DOE Standard 1158 would ensure consistent assessment of DOE complex CSPs.

DOE personnel use DOE Standard 1158 as the basis for their CSP assessment plans, but they have expressed mixed opinions as to its relevance as a DOE standard and the value added in maintaining it. In June 2018, the National Nuclear Security Administration (NNSA) submitted a memorandum to DOE recommending that DOE cancel Standard 1158, citing the standard's failure to meet the requirements of DOE Order 252.1A, *Technical Standards Program*, criteria for a DOE technical standard [2]. Specifically, that DOE Standard 1158 does not "provide specific standardized approaches, methodologies, technical criteria, or other information...[or] provide a common shared approach or methodology for implementing a DOE requirement such that its implementation is consistent across DOE programs and operations. [3]" On November 20, 2018, DOE cancelled Standard 1158 [3]. The staff team concludes that DOE Standard 1158 should be updated and maintained as an active DOE directive or technical standard.

**Background.** DOE Standard 1158 provides an assessment tool to determine whether DOE contractors' CSPs meet the requirements of ANSI/ANS-8.19, *Administrative Practices for Nuclear Criticality Safety* [5], and related ANSI/ANS-8 series standards. In accordance with DOE Order 420.1C (and earlier revisions), *Facility Safety* [6], a site's CSP "must describe how the contractor will satisfy the requirements of the ANSI/ANS 8 series of nuclear criticality safety standards that are in effect as of the date of this Order, unless otherwise modified or approved by DOE. The criticality safety program document must include an explanation as to why any recommendation in applicable ANSI/ANS-8 standards is not implemented."

DOE Standard 1158 recommends that sites tailor the lines of inquiry to ensure applicability to site-specific programs. Following the [1999 DOE Criticality Safety Workshop](#), DOE wrote Standard 1158-2002 (original revision) to comply with ANSI/ANS 8.19-1984 [7]. DOE revised



Standard 1158 in 2010 (DOE Standard 1158-2010) to comply with ANSI/ANS-8.19-2005 [8]. DOE Standard 1158 was not updated to comply with the current revision of ANSI/ANS-8.19 which was issued in 2014 [5]. The majority of the standards remained unchanged in the 2014 revision; therefore, contractors continue to use DOE Standard 1158 to develop the lines of inquiry used to assess their own CSPs' compliance with ANSI/ANS-8.19-2014 and other ANSI/ANS 8 series standards. However, for areas where ANS added new requirements, recommendations, or made substantial changes to existing requirements, the contractors develop the corresponding lines of inquiry without DOE guidance.

**Discussion.** The intent of DOE Standard 1158, per the purpose and scope sections of the standard, is to provide guidance on how to assess proper compliance with ANSI/ANS 8.19-2005 and other applicable ANSI/ANS 8 series standards consistently across the complex [1].

Based on the review team's interactions with contractors and DOE personnel and reviews of contractor documentation, the review team concludes that sites across the complex consistently use DOE Standard 1158.

*DOE Cancelled DOE Standard 1158*—NNSA recommended that DOE cancel Standard 1158 because the standard does not provide any requirements and is used as a reference document [1]. On November 20, 2018, DOE cancelled Standard 1158 [3]. NNSA's memorandum also states that DOE Standard 1158 does not meet the criteria of a DOE standard per DOE Order 252.1A *Technical Standards Program*, Appendix A [9]. DOE justified cancellation by stating that DOE and contractor personnel already are using the applicable consensus standards referenced in DOE Standard 1158. However, the lines of inquiry contained in Standard 1158 are valuable because they enable consistent and accurate evaluation of CSPs across the complex. In addition, DOE stated that it will make information from this standard available to practitioners via the DOE Nuclear Criticality Safety Program (NCSP) website [3]. The staff team notes that as of December 2018, DOE had not added this information to the NCSP website. Furthermore, while the canceled DOE Standard 1158 may still be available for contractor use, it no longer contains sufficient lines of inquiry that support updated ANSI-8 requirements, as discussed below.

DOE and contractors have reported issues with contractor and federal criticality safety staff turnover in recent years [10] [11] [12]. Attrition due to retirement and the difficulty of retaining qualified mid-career criticality safety engineers due to high demand for their skillset within the complex have resulted in retention issues. DOE Standard 1158 provides a safe-harbor for criticality safety engineers to understand the purpose of the ANS requirements, and moving forward, can serve as a place to maintain this institutional knowledge. The ANSI/ANS 8.19 working group chair has communicated to individual staff members of the Board's staff that there is interest in developing peer reviewed papers discussing the history, lessons learned, and intent of the ANSI/ANS 8.19 requirements. As of December 2018, the organizations had not published any of these papers.

*DOE Standard 1158 is not Consistent with the Current Revision of ANSI/ANS-8.19*—DOE Standard 1158 requires updating to reflect the use of changed and updated ANSI/ANS standards. It currently references older versions of ANSI/ANS-8.19, as well as other ANSI/ANS 8 series standards. The majority of the standards remained unchanged; therefore contractors continue to use DOE Standard 1158 to develop the lines of inquiry used to assess their own CSPs' compliance with ANSI/ANS-8.19-2014 and other ANSI/ANS 8 series standards. However, for areas where

ANSI/ANS have added new requirements, recommendations, or have made substantial changes to existing requirements, the contractors must develop the corresponding lines of inquiry without DOE guidance, which runs the risk of inconsistent and/or inaccurate application across the complex.

**Conclusions.** Members of the Board's staff reviewed DOE Standard 1158-2010 to verify that the requirements and guidance provided by the document are current and adequate, and to determine whether any additional requirements or guidance may be necessary. The review team found that contractors frequently use this standard to develop the lines of inquiry used to assess their own CSPs. The staff concludes that DOE's cancellation of Standard 1158 will reduce the effectiveness of consistent and accurate contractor and external self-assessments of DOE complex CSPs as institutional knowledge is lost due to retirements and other forms of attrition. The staff's position is that DOE should incorporate the information currently archived in Standard 1158 into an active DOE directive or technical standard. The staff does not have a position on the type of DOE document. The staff's position is that the information currently archived in Standard 1158 in an active DOE directive or technical standard is important to ensuring healthy criticality safety programs and safe operations. The DOE directive or technical standard should provide a consistent basis for DOE contractors to self-assess their criticality safety programs in compliance with the current revisions of ANSI/ANS-8.19 and applicable ANSI/ANS-8 series standards.



## References

- [1] U.S. Department of Energy, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*, DOE STD-1158-2010, 2010.
- [2] National Nuclear Security Administration, *Proposed Cancellation of DOE Standard 1158*, 27 June 2018. [Online]. Available: <https://www.standards.doe.gov/cancellation-memo/1158-cm-2010-1>. [Accessed 12 December 2018].
- [3] U.S. Department of Energy, *DOE Office of Environmental Health & Safety DOE Standard 1158 Cancellation Memorandum*, 20 November 2018. [Online]. Available: <https://www.standards.doe.gov/cancellation-memo/1158-cm-2010-1>. [Accessed 12 December 2018].
- [4] U.S. Department of Energy, *Cancellation Notice for DOE Standard 1158-2010, Self-Assessment Standard for DOE Contractor Criticality Safety Programs*, 20 November 2018. [Online]. Available: <https://www.standards.doe.gov/standards-documents/1100/1158-astd-2010>. [Accessed 13 December 2012].
- [5] American Nuclear Society, *Administrative Practices for Nuclear Criticality Safety*, ANSI/ANS-8.19, 2014.
- [6] U.S. Department of Energy, *Facility Safety*, DOE Order 420.1C, 2018.
- [7] American National Standards Institute/American Nuclear Society, *Administrative Practices for Nuclear Criticality Safety Programs*, ANSI/ANS 8.19, 1984.
- [8] American National Standards Institute/American Nuclear Society, *Administrative Practices for Nuclear Criticality Safety*, ANSI/ANS 8.19, 2005.
- [9] U.S. Department of Energy, *Technical Standards Program*, DOE Order 252.1A, 2013.
- [10] U.S. Department of Energy, *2015 Annual Metrics Report to the Defense Nuclear Facilities Safety Board April 14, 2016 Nuclear Criticality Safety Programs*, April 19, 2016.
- [11] U.S. Department of Energy, *2017 Annual Metrics Report to the Defense Nuclear Facilities Safety Board*, January 24, 2018.
- [12] U.S. Department of Energy, *2016 Annual Metrics Report to the Defense Nuclear Facilities Safety Board*, January 24, 2017.