

July 6, 2021

To: Angela Chambers, Manager, US DOE Nuclear Criticality Safety Program (NCSP)

From: D. G. Erickson, Chair, US DOE NCSP Criticality Safety Support Group (CSSG)

**Subject: CSSG Tasking 2021-01 Response**

Tasking 2021-01 was initiated to support a CSSG review of the CSCT draft revision to DOE-STD-1134. DOE-STD-1134 was first issued in 1999 and had not been updated even though several related documents had been either developed or revised.

- Jerry McKamy, CSSG Emeritus, Chair,
- David Erickson,
- Jerry Hicks,
- Tom McLaughlin,
- Jim Morman, and
- Bob Wilson.

The attached response was developed by the CSSG Subgroup and was reviewed by the entire CSSG and some CSCT members. The final Tasking Response addresses the comments received.

The CSSG is available to answer any questions that may arise while working with the provided results.

cc: CSSG Members  
D. G. Bowen  
M. Henley

Attachment 1: Response to Tasking 2021-01

CSSG RESPONSE FOR TASKING 2021-01

“CSSG Review of draft revision to DOE-STD-1134”

June 15, 2021

Summary of Task Statement

The DOE standard for DOE review of contractor criticality safety evaluations (DOE-STD-1134-99) has been archived. However, DOE staff at many sites use the archived standard and have expressed a need for an updated version. The DOE CSCT agreed and established a working group to develop a proposed revision. In 2020 the CSCT issued a draft of the revised 1134-Standard. The CSSG was tasked, by the NCSP Program Manager, to:

- Review the CSCT draft of the revision to 1134
- Communicate with appropriate CSCT members to understand the need and intent of the revision and to provide the CSCT a chance to discuss draft CSSG comments
- Provide recommendations to the CSCT and NCSP Manager:
  - Purpose for resurrection of 1134
  - How the revised 1134 should be used
  - How it should or should not be captured in the DOE regulatory structure.

History of DOE-STD-1134-99

The DOE Office of Technical Assistance (then EH-34) developed site-specific review guidance for criticality safety evaluations tailored to the Y12 site to assist and improve federal reviews at Y12 in 1996. This guidance was helpful and well received by the local site office.

The DOE did not have federal staff with criticality safety experience at each site where there was a NCS program nor did it have a formal training and qualification program for nuclear criticality safety staff in 1996. One of the goals of the DOE Office of Technical Assistance at the time was to standardize the interpretation and application of the ANSI/ANS-8 Series Standards and to clearly communicate federal expectations to contractors in the use of the ANSI/ANS-8 Standards.

Therefore, beginning in 1997, EH-34 used the site-specific guidance for Y12 to develop a DOE-wide technical standard for federal reviews of criticality safety evaluations. DOE issued DOE-STD-1134-99 based on this work. As a point of history, nuclear criticality safety requirements were promulgated under DOE Order 420.1 at the time which made implementation of the Double Contingency Principle (DCP) a requirement (i.e. a ‘shall’ statement in the Order) and also modified the ANSI/ANS-8.1 intent of the DCP to include multiple controls on a single parameter. EH-34 developed DOE-STD-1134-99 to reflect the requirements of DOE Order 420.1.

## Rev. 0

In 1999 EH-34 formed, chartered, and chaired a collegial working group of all federal NCS staff called the Criticality Safety Coordinating Team (CSCT). The CSCT mission included sharing of lessons learned and best practices in NCS to ensure a consistent federal approach to NCS in accord with the ANSI/ANS-8 Standards. EH-34 contemporaneously issued DOE-STD-1135-99, "Guide for Nuclear Criticality Safety Engineer Training and Qualification" which was the first ever such guidance on the subject. This formed the foundation for DOE to develop a formal training and qualification program for federal NCS staff in the form of DOE-STD-1173-2003. By this time DOE had made substantial progress in hiring more federal staff that had prior NCS experience as practitioners. Finally, DOE issued DOE-STD-3007-2007 which promulgated federal expectations for the content, not just the format, of criticality safety evaluations.

In the mid-2010's, as a result of the improvement in federal NCS staff capability and coordination, alongside improved DOE Orders and Technical Standards, clearly communicating the technical content expectations for criticality safety evaluations, the DOE allowed DOE-STD-1134-1999 to become an inactive, archived standard. DOE-STD-1134-1999 had become outdated insofar as keeping up with the evolution of DOE Orders and Standards such as DOE-STD-3007-2007 and its revision in 2017, DOE-STD-3009-2014, DOE Order 420.1c, etc.

### CSSG Activities Supporting this Tasking

The CSSG formed a working group to perform this tasking. The working group members were:

- Jerry McKamy, CSSG Emeritus, Chair,
- David Erickson,
- Jerry Hicks,
- Tom McLaughlin,
- Jim Morman, and
- Bob Wilson.

The working group performed the following activities

- Reviewed the CSCT draft revision of 1134
- Held a virtual meeting to discuss comments
- Issued an email update to the broader CSSG and NCSP Management subsequent to the working group meeting
- Conducted a virtual meeting with CSCT members including the primary authors of the draft revision, and
- Prepared this report for CSSG and NCSP Management approval.

### Results from the CSSG Working Group Review and Meeting

The working group developed a voluminous set of comments on the draft revision. The vast majority of the paragraphs in the text of the draft received significant comments. Though the draft does contain some useful and helpful information, any attempt to simply address CSSG

comments would result in essentially a complete re-write of the draft revision starting from almost a blank sheet of paper.

The working group concluded:

- It was not clear what problem the CSCT is trying to solve;
- Events have overtaken much of the text of this document;
- The opening statement in the draft (referring to experienced DOE NCS staff being required to perform an adequate review) is accurate, but likely not implementable by many current federal field staff;
- The text of the proposed revision is out of date and not harmonized with DOE-STD-3007-2017;
- If DOE issues a revised 1134 as a technical standard then there will be two formal standards that pertain to developing a criticality safety evaluation (3007 and 1134) and the need for such is not apparent; and,
- The working group is unanimous in the opinion that this version of 1134 as currently drafted is not beneficial as a technical standard or as formal review guidance.

#### Results of the Meeting with the CSCT

The working group met virtually with five members of the CSCT including two primary authors of the draft revision to 1134. The CSCT identified improved knowledge transfer and a need for training/mentoring of inexperienced federal staff as the problems they were intending to address, at least in part, by this effort. The rather rapid and extensive experience drain the DOE saw in their NCS cadre over the past few years has limited the ability of the federal workforce to mentor less-experienced staff. It was also noted that the DOE training and qualification program for NCS staff has not been updated since 2009.

#### CSSG Recommendations

The CSCT was attempting to address a need they identified to improve knowledge transfer and provide some training/mentoring of inexperienced federal staff with this effort. Given that the DOE NCS Training and Qualification (T&Q) Program embodied in DOE-STD-1173 and associated supporting materials have not been updated since 2009 it would seem appropriate to do so. Therefore, going forward DOE management in charge of the NCS T&Q program should conduct a review of its current practices, update and improve the process in the areas of knowledge transfer and mentoring. Following the update, DOE Offices with NCS concerns should ensure themselves that they are consistently applying the intent of the improved T&Q program at all sites.

The CSSG Recommends:

- DOE should not issue a revised 1134 as a stand-alone technical standard because there is sufficient guidance for the content expectations of criticality safety evaluations in DOE-STD-3007-2017.

## Rev. 0

- DOE Management responsible for the NCS T&Q Program should perform an assessment of the DOE NCS technical qualification standard, DOE-STD-1173-2009, and any associated guides or training materials and update them as necessary. This review should include members of the CSSG and CSCT.
- DOE line management implementation of the revised DOE-STD-1173-2009 should be assessed and opportunities for improvement captured in the implementation infrastructure within the various DOE Offices.
- In order to ensure that this effort has the necessary visibility and management support to follow through to completion, senior NNSA, EM, and SC Management at DOE headquarters should be fully briefed on the above. Champions from Headquarters reporting to each of the Dash-1s or directly to the Deputy Secretary should be identified to ensure the improvements recommended above are carried through to completion.