

March 19, 2013

To: J.N. McKamy, Director, NA-00-10, Manager, US DOE NCSP

From: E. F. Trumble, Chair, US DOE NCSP Criticality Safety Support Group



Subject: CSSG Tasking 2013-03-01 Response

The CSSG has completed its action on Tasking 2013-03-01, *CSSG SME Document Review of DOE-STD-3009aYR*. As specified in the tasking, the review documentation is presented as recommendations or improvements for consideration by the NCSP Manager.

In addition to the "essential", "suggested" and "editorial" comments provided on Attachment 1, the CSSG also recommends that the NCSP Manager also include a comment in the consolidated NA-00-10 submittal to RevCom to the effect that DOE-HSS should consider removing the additional requirements that are currently specified in Chapter 6 of the DSA and simply require that Criticality Safety meet the same requirements in Chapter 6 that are required for Chapters 7-12 in this revision of DOE-STD-3009. This is in keeping with the philosophy that criticality safety is a safety management program like those called out in Chapters 7-12 and does not need additional amplifying discussion. Specifics of the NCSP for each Site are called out in the Criticality Safety Program Description Document which is DOE approved.

These comments were the collective effort of the entire CSSG and are the result of both individual comments and the collective consideration in both telecons and a face-to-face meeting held in Germantown, Maryland the week of March 12-13. Views presented in these comments are the consensus opinions of the CSSG.

Please feel free to contact us if you have any questions associated with these comments. The CSSG is both willing and interested in engaging with DOE-HSS or others who may have questions associated with these comments to ensure that the intent of the comments is fully captured.

Cc: CSSG Members

G. O. Udentia

M. Dunn

A.N. Ellis

A. Delapaz

| 1                                 | 2   | 3   | 4   |
|-----------------------------------|---|---|---|
| Essential / Suggested / Editorial | Line Number   | Comment (justification for change)  | Proposed change   |
| Editorial                         | 110, 267, 398, 483, 580, 601, 946, 1957, 1985, 2000, 2151 | A very common Misuse of the word "criticality" is to imply that it means "criticality accident". It does not. We should say "criticality accident" EVERY time that is what we truly mean. See Hugh Paxton's Glossary, LA-11627-MS, for the proper use of "criticality" as a stand-alone noun.   | Replace improper use of "criticality" with "criticality accident". Relatedly, never use Criticality Incident or Criticality Event when Criticality Accident is what is intended.  |
| Editorial                         | 167-169   | This definition makes no sense. Fissionable Materials cannot be A NUCLIDE. Just because it was incorrect in 10 CFR 830 does not justify carrying over an incorrect definition.  | Delete the definition. All CSE's will technically differentiate those materials capable of sustaining a fission chain reaction from those that are not capable (due to density, enrichment, moderation, concentration, poisons, volume, geometry, etc.)   |
| Editorial                         | 267   | Inadvertent criticality protection identified as a safety management program  | Replace "inadvertent criticality protection" with "criticality safety"  |
| Editorial                         | 398   | Nuclear criticality is cited analogously to radiological safety. Criticality safety would be a more analogous term and consistent with the previous comment (267)   | Replace "nuclear criticality" with "criticality safety"   |
| Essential                         | 413   | Criticality safety is a safety management program   | Delete the bullet point "Summarize criticality safety; and"   |
| Editorial                         | 469   | Same comment as above (413)   | Delete "criticality safety and" as criticality safety is a safety management program  |
| Editorial                         | 482   | Criticality accident is the preferred term  | Replace "accidental criticality" with "criticality accident"  |
| Editorial                         | 482/483   | I don't believe that "accidental criticality" needs to be called out specifically – it should be captured in either "release of the material" or "exposure of personnel to the hazard"  | Delete phrase "accidental criticality"  |
| Essential                         | 528/574   | Typically we do not do an "unmitigated scenario" for each initiating event. We would typically do an "unmitigated scenario" for each EBA (a single bounding criticality event as an EBA) to determine possible consequences.  | Use the following text (consistent with that from Appendix A.3) in line 574 replacing the current first sentence of this section<br><br>"Criticality represents a special case for hazard evaluation. The criticality safety program controls are derived from the hazard analysis process established in the American National Standards Institute/American Nuclear Society (ANSI/ANS)-8 series of national standards and DOE-STD-3007, which require a documented evaluation demonstrating that all fissionable material operations will be maintained subcritical under both normal and credible abnormal conditions. (see Appendix A, Section A.3)" |
| Essential                         | 529   | There is a disconnect between the footnote for line 529 and Sect. 3.2 (lines 610-612). The footnote says "The intent is to identify the maximum, physically possible consequence...", which can easily be misinterpreted to mean a never ending event. Sect. 3.2 states "...and the calculation of the approximate and reasonably conservative consequences of these events ", which takes us to where we need to be. | Modify the footnote for 529 to be consistent with philosophy in 610-612 of reasonably conservative.   |
| Editorial                         | 566, Table 1, col 3, row 4                                | "nor" should be "not".  |   |
| Editorial                         | 568-572   | Starting at: "If probabilistic ..." is not a sentence.  | Add "should/shall be used" or "is available for guidance"   |
| Editorial                         | 576   | ... ANS 8.1 .... Needs a dash   | ANS-8.1   |
| Editorial                         | 579   | Criticality accident is the preferred term  | Replace "criticality" with "criticality accident"   |
| Essential                         | 581   | There is not a logical tie between the first two bullets  | Remove the "and" at the end of the first bullet   |
| Editorial                         | 586   | Processes in which an active engineered control(s) are required ... Sloppy grammar  | AN active ...IS required  |
| Essential                         | 586-587   | NCS analysis is not the preferred term  | Replace bullet with "Processes requiring active engineered control(s) for criticality safety"   |

| 1                                 | 2                   | 3  | 4  |
|-----------------------------------|---------------------|--|--|
| Essential / Suggested / Editorial | Line Number         | Comment (justification for change)   | Proposed change  |
| Essential                         | 587-590             | This is felt to be too ambiguous to be useful and is likely to be misinterpreted.  | Delete this paragraph and move the use of a criticality accident alarm system to a separate sentence.  |
| Essential                         | 592                 | There did not appear to be a sufficient logical tie between scenarios included in the DSA and preventive and mitigative features   | replace "of the scenarios" with "of those scenarios" and replace "the preventive and mitigative" with "the associated preventive and mitigative"   |
| Suggested                         | 592                 | Misspelling  | Change "though" to "through"   |
| Essential                         | 595-598             | Requirements for Chapter 6 are provided in Section 4.  | Delete this paragraph  |
| Suggested                         | 599 - 600           | The last sentence of Section 3.1.3.2 finishes with "... unless it has been determined that criticality is not credible." Since "not credible" has not been defined this statement could lead to either confusion or confrontation.   | Suggest modifying the end of the sentence to "...unless it has been determined in the applicable criticality safety evaluations that criticality is not credible."   |
| Editorial                         | 946                 | Criticality events is not the preferred term   | Replace "criticality events" with "criticality accidents"  |
| Editorial                         | 948, 966, 976, 986, | "Signification" is too verbose   | Suggested: Change "Signification" to "Significant"   |
| Editorial                         | 995                 | ".."   | Delete one period.   |
| Editorial                         | 1012                | "...uses THE ANSI/ANS-8.1 ...."  | Delete THE   |
| Editorial                         | 1014                | "... of THIS standard ..."   | To avoid possible confusion about which "standard", replace THIS with "the DOE"  |
| Essential                         | 1012-1018           | Inconsistent with DOE-STD-3007 and confusing   | Replace paragraph with: "Section 3.1.3.2 of this Standard provides criteria for determining whether a particular scenario and associated control(s) should be explicitly documented in the DSA hazard evaluation. Criticality safety controls that are explicitly documented in the DSA hazard evaluation shall be evaluated for SS designation."  |
| Suggested                         | 1082                | The ANS Standard # is incomplete; however, instead of inserting ".1" after "-8", simply refer to the entire series of standards for NCS. Otherwise it would be necessary to cite every one of these standards in the references, which would be unnecessary detail for this document. See also the comments on lines 1974, 1975 and 1979 below which go along with this one. | Suggested: Change text to: "ANSI/ANS-8 Series of Standards for Nuclear Criticality Safety"   |
| Suggested                         | 1087                | Cancelled version of DOE O 420.1 is referenced   | Suggested: Change "B" to "C"   |
| Essential                         | 1961-1962           | Duplicative  | Replace "... included by reference and summarized in this chapter." with "... included by reference."  |
| Editorial                         | 1976                | <i>This section shall also list the applicable nuclear ... There was no requirement to list anything else.</i>   | Delete ALSO  |
| Essential                         | 1981-1984           | The basis for controls – including engineering design features and their design basis – are documented in criticality safety evaluations as described in the CSP description document and therefore should not appear in the DSA unless elevated for inclusion per DOE-STD-3007-2007.  | Replace "Additional information for this section shall include: (1) a general discussion of the criticality control strategy and criticality safety design strategy, its basis, and any design criteria used to ensure subcritical configurations under all normal, credible abnormal, and accident conditions (i.e., ensure that criticality limits are not exceeded)" with "Additional information for this section shall include: (1) a general discussion of the criticality control strategy and criticality safety design strategy" (2) "a general discussion of the parameters...." |
| Essential                         | 1986-1994           | Elements of the Criticality Safety Program are described in the CSP description document   | Make the wording for section 6.3 consistent with that required for 7.3. There is too much required information as currently written.   |
| Essential                         | 1995-2000           | Supporting elements and programs are no different for criticality  | Delete section 6.4   |

| 1                                 | 2           | 3  | 4   |
|-----------------------------------|-------------|--|---|
| Essential / Suggested / Editorial | Line Number | Comment (justification for change)   | Proposed change   |
|                                   |             | safety than for other safety management programs   |   |
| Editorial                         | 2001        | <i>required by the ANS/ANSI standards</i>  | Replace ANS/ANSI with ANSI/ANS  |
| Suggested                         | 2241 – 2244 | How does the statement, “ <i>DOE does not find any accident acceptable and requires appropriate measures be taken to avert [prevent, preclude, obviate, forestall?] and mitigate all accidents.</i> ”, square with the notion of “risk informed regulation” such as the US NRC and US DOT? The mere statement that DOE requires that all accidents be mitigated acknowledges that accidents may occur. | The objective should be risk control not hazard control or elimination. Remove the phrase “does not find any accident acceptable and”       |
| Editorial                         | 2250        | Grammar – preposition is missing   | Change text to “..., therefore, the selection <b>of</b> the 25 rem value provides a significant margin of safety for acute radiation risk.” |
|                                   |             |  |   |
|                                   |             |  |   |
|                                   |             |  |   |