

Preface:

The word "clarifies" comes from GD-327 and was appropriate since it was a supplement to the requirement document. Now this document does not clarify, it provides as it is the full program now.

Also "clarifies" also implies the limits are listed elsewhere and this document expounds upon the limits listed elsewhere. Please change this verb to "provides".

Important Note - page i:

These definitions HAVE A HUGE IMPACT on what used to be "requirements" and what used to be "guidance". GD-327 prefaced with the statement that it "provides information on how the requirements of RD-327 MAY be met." The SCOPE of that document reiterates this intent for guidance versus requirement.

If you go to section 2.3 Nuclear Criticality Safety Practices here now, it states "Operations with fissionable materials SHALL meet the requirements AND follow the recommendations of this document." This statement alone based on the 'shall' definition provided in this document now could easily be interpreted as all recommendations in this document are now also a requirement.

The words "shall", "should", and "may" have very specific meaning in the ANSI/ANS standards as well (and likely are the basis for these definitions herein) however, we can spend years debating EVERY SINGLE use of these verbs in a particular standard to ensure consistency and understanding of the impact in the criticality safety community as well as whether the appropriate level of regulation is applied (i.e. a shall makes something both an NRC and DOE requirement). Each time these verbs are used, the consensus committee for that standard agrees with the verb's usage with the understanding of it being a 'requirement' versus a 'recommendation'.

Simply merging GD and RD-327 together without reviewing the use of these verbs throughout will have HUGE LONG-TERM IMPACTS across all of the criticality safety community in Canada as is currently. There are more than 100 uses (I quit counting and highlighting them around section 11.4) of "shall" in GD-327 that are NOT in RD-327 at all. This alone implies that the new REGDOC is intending to implement more than 100 NEW LICENSEE REQUIREMENTS by taking the 'shall' statements of GD-327 and reprinting them exactly while also implementing this definition of 'shall'. While this may not affect anyone now, any new licensee or licence renewal group will have to deal with this in the future as well the CNSC and other regulators who are interpreting the requirements.

I realize that this REGDOC currently says 'where this document is part of the licensing basis...' so the impact of this is down the road but regulators will start using this definition here as well to review criticality safety programs to this level (i.e. all shall statements will become requirements).

As a result, the CNSC needs to assemble a group of criticality safety experts to review the whole REGDOC-2.3.4, with emphasis on GD-327 statements with 'shall', 'should' and 'may' and modify these verbs appropriately to the correct level necessary or at least ensure all uses are commiserate with their intent both for new licensees and for ensuring appropriate requirements are in place to continue ensuring the safety of the worker, facility, and public.

#### Section 1.1 – 'transportation'

Section 11 of this document is from ANS-8.17 which states "for off-site transportation, abnormal conditions that could credibly exist use .... 10CFR 71..." which was not cut and paste into this document, as appropriate, however, the ANSI standard further provides off-site requirements for the US transportation regulations. Additionally, 8.17 is applicable to LWR fuel handling ONLY, not CANDU fuel which is not transported off-site currently in Canada unless in individual bundles per basket location (PEGASES flasks). While there are current analyses being performed for CANDU fuel transport as modules (UFTP by NWMO), it is not complete AND has more requirements for safe transport than those required for LWR fuel which is transported as individual assemblies or rods (a fuel unit as stated in 8.17).

Throughout this document transportation is referenced in a generic sense with only a few places where "on-site" is specified (section 11.3.1 for example). This needs to be clarified throughout the document that this document is only applicable to on-site transportation of fissile material as none of the off-site requirements for criticality safety for category type packaging is included here. Off-site transportation is not in the scope of a licensee (facility) and is regulated by other requirement documents.

Additionally, Section 11 needs to be reviewed and revised appropriately for Canadian conditions and fuel types. A LWR fuel unit (as specified in ANSI/ANS-8.17) refers to a single LWR assembly and cannot, for example, be simply extrapolated to a CANDU module (multi-bundles configuration) without specific analysis being performed. This generic use of transportation requirements from the standard for LWR fuel is not bounding of CANDU fuel.

As a result, REGDOC-2.3.4 should specify that it is applicable to only 'on-site' transportation and specifically direct the reader to other guidance/requirements for 'off-site' transportation. Additionally, the requirements of Section 11 needs to be revised appropriately for Canadian fuel types to ensure the requirements bound the existing conditions to ensure the continued safety of the worker, facility, and public.

#### Section 1.4 – Standards:

ANSI/ANS-8.26, "Criticality Safety Engineer Training and Qualification Program" needs to be added and/or another appropriate training standard for the nuclear criticality safety staff. **Currently there are zero requirements or guidance in Canada for the training and/or qualification of nuclear criticality safety staff.** Section 13 of this document is directly from ANSI/ANS-8.20 which is NOT APPLICABLE to nuclear criticality safety staff (as quoted verbatim in Section 13.2 Scope here as well). As the co-chair of ANSI/ANS-8.20, I can also

state we are currently in a major re-write of this standard and it will more clearly demonstrate that this standard is less than adequate for ANY nuclear criticality safety staff and specifically written for those who handle fuel and work with those who handle fuel.

It is a requirement in most OECD countries (personally worked on US, UK, and France programs and at OECD in Paris) for there to be some type of training program for the Criticality Safety 'Engineer' or 'Physicist' or as referenced in this document 'nuclear criticality safety staff'. Basically, the individual who is performing the safety assessments requires to be trained and qualified to do their job. Additionally, without this training, the ability to make safety assessment conclusions is a guesstimate at best and there are no credentials to evaluate against. **The ability to even understand the requirements and guidance within this document is questionable without some baseline training for the nuclear criticality safety staff** - otherwise how does a regulator determine that the assessments, alarm coverage, validations, etc. are adequate when the staff implementing them has zero training requirements. The nuclear criticality safety staff and the nuclear criticality safety program is the first line of defense as they determine the requirements necessary for safety - how can that be done without some qualifications? Reactor Operators go through rigorous training in order to understand reactivity and the effects different parameters have on it.

Criticality Safety Engineers should also require this understanding with respect to the materials of concern within their facilities. The ability to interpret the experimental conclusions used to determine the safety of similar systems is required. The ability to model systems and interpret the results, make the parametric studies required to verify results, create appropriate facility controls that actually provide safety functions all require in-depth knowledge. This knowledge base can be acquired in several different methods, but is necessary to understand the functions of the Criticality Safety Engineer/nuclear criticality safety staff. How can a Criticality Safety specialist create training for fissionable material handlers and determine the requirements for them (per Section 13) when they have zero requirements of their own? **This is an oversight that needs to be addressed.** Otherwise, the requirements in this document are just words as they have no real meaning. Section 13.2 specifically excluding nuclear criticality safety staff leaves a gaping hole for those requirements.

Therefore, the requirements of ANSI/ANS-8.26, "Criticality Safety Engineer Training and Qualification Program" needs to be added and/or another appropriate training standard for the nuclear criticality safety staff. Certainly a graded approach can be applied but the CANADIAN nuclear criticality safety staff should be trained to do their jobs, especially since they are directly responsible for determining the safety case for the worker, the facility, and the public.

As an additional aid, suggest an Appendix with an outline of a basic nuclear criticality safety staff training program or qualification matrix to aid facilities with a graded approach for this.

Section 2.3:

This statement alone based on the 'shall' definition provided in the front of this document means all recommendations in this document are now also a requirement.

Again, the words "shall", "should", and "may" have very specific meaning in the ANSI/ANS standards as well (and likely are the basis for these definitions herein) however, we spend years debating EVERY SINGLE use of these verbs to ensure consistency and understanding of the impact in the criticality safety community as well as whether the appropriate level of regulation is applied (i.e. a shall makes something both an NRC and DOE requirement).

Therefore, this statement should be reworded as such "Operations with fissionable materials shall meet the requirements and **should** follow the recommendations of this document."

Section 11.3.4:

The ANSI standard for burnup of LWR provides requirements on taking credit of burnup for criticality safety. This document provides no requirements for CANADA's use of burnup other than an allowance of credit. Requirements must be included in this document if credit is taken for ANY burnup. Otherwise, this document does not provide the appropriate safety margin for the use of burnup in criticality safety evaluations. As a result, a limit that is not bounding could result thereby providing a non-conservative limit and potentially unsafe or unanalyzed configuration.

Therefore, a minimum baseline of requirements for the use of burnup credit for criticality safety appropriate for CANDU fuel should be provided prior to allowing the use of burnup credit in criticality safety calculations used for evaluations to ensure the continued safety of workers, facility, and public.

Section 12.3.3:

The words 'provide technical guidance' implies a level of competency but again, there are no training requirements, education requirements, etc. for this group in this document. They have no tools to succeed and the facilities are not guaranteed adequate reviews if staff is not qualified or trained.

Therefore, ANSI/ANS-8.26 should be referenced and used as an outline to establish these requirements for CANADA.

Section 12.5, 2<sup>nd</sup> paragraph:

The criticality safety staff needs training to do this appropriately.

As a result, implement a qualification program for nuclear criticality safety staff to include this requirement.

Section 13.2:

This leaves a huge gap as there are NO REQUIREMENTS in this document for training for nuclear criticality safety staff. Add the appropriate ASNI/ANS standard minimums at least to require facilities to implement a training or qualification program for the nuclear criticality safety staff. Otherwise, they are the ONLY group with no requirements whereas they should have the most since they are the first line of defense (determining PEC, ADMIN requirements, training for fissionable material handlers, evaluations of fissile configurations for safety, dose determinations, shielding requirements, etc.).

Ensure REGDOC-2.3.4 adds requirements for nuclear criticality safety staff training and qualification to ensure they have the appropriate understanding of the requirements listed in REGDOC-2.3.4 for the continued safety of workers, facility, and public.

Appendix G:

This program includes nothing for the use of burnup credit, nothing for the training of nuclear criticality safety staff (recall section 13 specifically states they are out of scope of that section), and uses the verbs 'shall', 'should', and 'may' in accordance to the previous RD and GD, not the new definitions per-say.

As a result, update this appendix appropriately to aid facilities with their programs based on all of the previous comments.