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Interim Staff Guidance - Shielding and Radiation Protection Review Effort and Licensing Conditions for 10 CFR Part 72 Applications

**Comment On:** NRC-2013-0051-0001
Shielding and Radiation Protection Review Effort and Licensing Conditions for Dry Storage Applications

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## Submitter Information

**Name:** WREN FOWLER
**Address:**
3930 EAST JONES BRIDGE ROAD
NORCROSS, GA, 30092
**Organization:** NAC Int.



## General Comment

See attached file(s)

## Attachments

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NAC INTERNATIONAL

**Atlanta Corporate Headquarters**
3930 East Jones Bridge Road, Suite 200
Norcross, GA 30092
Phone 770-447-1144
www.nacintl.com

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U.S. Nuclear Regulatory Commission
Mail Stop: TWB-05-B01M
Washington, DC 20555-0001

Attn: Cindy Bladey

Subject: Submission of NAC's Comments to the NRC's Request for Comments for Draft Interim Staff Guidance, "Shielding and Radiation Protection Review Effort and Licensing Conditions for Dry Storage Applications"

Docket ID: NRC-2013-0051

Reference: 1. 78 FR 0061, "Shielding and Radiation Protection Review Effort and Licensing Conditions for Dry Storage Applications," March 29, 2013

NAC International (NAC) hereby submits comments to Reference 1. Reference 1 requested public comments on Draft Spent Fuel Storage and Transportation Interim Staff Guidance No. 26A (SFST-ISG-26A), Rev. 0, "Shielding and Radiation Protection Review Effort and Licensing Conditions for 10 CFR Part 72 Applications" for the following subject:

10 CFR Part 72, Subpart L shielding and radiation protection reviews

The following attachment to this letter provides comments to the Reference 1 subject.

If you have any comments or questions, please contact me on my direct line at 678-328-1274.

Sincerely,

Anthony L. Patko
Director, Licensing
Engineering

Attachment 1

ED20130055

NAC INTERNATIONAL

NAC's Review comments on Draft ISG 26A

1. The "Issue" section should clarify that this ISG is not only related to high dose-rate transfer casks but also establishes criteria for spent fuel dry storage systems.

2. General – The ISG should recognize that for systems handled on-site and transferred to a storage pad within a nuclear facility there is no reasonable expectation of a dose change at the controlled area site boundary and little expectation of any appreciable dose to members of the public on-site.

3. General - As previously commented on the standard review plan revision that added the review priority level, there is no indication in the ISG of what a change in review level actually means to review time/level of detail. Assigning a priority level to review when the review is essentially "unlimited" does not make a review risk informed.

4. Table 2 TRANSFER CASK – Licensing Conditions and Safety Analyses,

    a. Level 1, Design Features, Item B (Page 6). Not clear what the term "limiting shielding effectiveness" implies. The ISG should state specifically that this is nominal shielding (or shielding equivalent to nominal defined materials/dimensions)
    b. Level 1, TS Radiation Protection Program (Page 6). The statement "have program to detect gross misloads" requires clarification as to the definition of "gross." Dose rate measurements will not be able to detect even a gross misload under all conditions (ex., a center loaded fuel assembly contributes negligible dose to radial dose rates and is difficult/impossible to discern axially and could therefore not be resolved via dose measurement). Based on several previous information exchanges with the NRC staff on the subject of the sensitivity of actual analyses, removal of misload evaluation via dose measurement from the ISG is recommended.
    c. Level 3, TS Radiation Protection Program (Page 6). The table includes a requirement that the licensee confirms use of a TC design that is compatible with 10 CFR Part 72 and Part 20 dose limits. In particular, for casks handled within a plant (building) there is no appreciable dose from even very high surface dose rates (>5 rem/hr) casks on public which is what the quoted 10 CFR 20 section limits. There are no Part 72 requirements on a particular transfer cask dose rates.

5. Appendix A Technical Basis and Guidance Detail –

   a. Section 3.2, Dose Rate Criterion for the Storage Overpack, Page 8. - The first paragraph states that "the dose rates on the overpack surface are readily and easily measured." Given concrete systems with their significant neutron shielding, the neutron component of the dose may not be readily measured to any degree of accuracy.
   b. Section 3.2, Dose Rate Criterion for the Storage Overpack, Page 8. - The third paragraph states "However, in cases where the overpack top surface is a significant contributor to doses, the reviewer should include the maximum top surface dose rate in determining ..." It is not clear what "significant contributor" implies. This may mean 1% to one reviewer and potentially 50% to another. Is it dose to public/worker or both? The regulatory requirement needs to be defined and if it is Part 72, then public and minimum 100-meter distance to ISFSI will not be significant for the length of a loading operation.
   c. Section 4.2.1.2 – Technical Specifications – Limiting Conditions and Design Features, Page 13, second full paragraph states "When the TS includes surface dose rate limits to assure the TC's shielding function is achieved, the TS must include a provision for the licensee to take measurements, compare them against the limits, and take corrective action(s) if those limits are exceeded. Taking dose rate measurements at the TC surface typically can be done shortly after the TC is removed from the pool, and remotely if necessary. This allows for early confirmation of predicted dose rates on the TC and provides confidence in the predicted dose rates at a distance since the limits are derived from the licensee's analyses for compliance with regulatory dose limits." The above is not always true as in a wet configuration that typically exists after removal from the pool, neutron doses are a small component of the overall dose but can be dominant in a dry system
   d. Section 4.2.1.2, Technical Specifications – Limiting Conditions for Operation and Design Features, Page 13, third full paragraph states "To be effective, the TS LCO should require the licensee to perform measurements with the TC in the same configuration (e.g., flooded vs. dry, fuel load) as in the analysis that provides the basis for the LCO limit. The TC configuration should be specified in the TS LCO. Consideration should be given to any advantage or preference for using a particular TC configuration in the TS LCO (e.g., TC configuration prior to canister closure). Additionally, the quantity and location of measurements should be sufficient to provide reasonable assurance that the purposes of the measurements are met. The TS bases should provide justification of the proposed measurement scheme, including the number and locations of measurements and why certain features are not measured, if applicable. The TS LCO dose rate limits should include limits for the TC top and side surfaces. Each measurement should be compared against the appropriate limit; averaging of measurements is not considered an acceptable practice because it can result in a problem remaining undetected since averaging can mask higher measured dose rates in one area with lower measured dose rates in another area of the TC." Contrary to as stated above, Table 1, Level 1 indicates that this LCO can be omitted if specifying

materials and thicknesses (See page 5 of ISG). This should be specified in Section 4.2.1.2 also. The first paragraph in Section 4.2.1.2 seems to indicate that dimensional specification alone is not sufficient. The second paragraph in the same section also invokes fabrication acceptance testing program not previously discussed as a required CoC/TS section. The third paragraph also indicates that dose measurement will provide indication of fabrication problems or loading problems. There is no technical reason stated why this is the case and one could its validity (except in some very limited application). For example, a significant missing load quantity would only be located during loading by taking a measurement at that particular spot. Another example would be that misloading would have to be extreme and at basket periphery to show up on dose measurements.If the purpose of the measurement are to protect the public (10 CFR 72 limit), then averaging dose values would seem to be acceptable as from a distance casks are closer to point sources (in particular for top surface).

e. Page 14 first full paragraph. This section invokes testing used for transport casks (out in public) for transfer casks. This should not be required for equipment handled on a 10 CFR 50 site. Acceptance testing for shielding performance of the transfer cask is a significant increase in scope and excessive for the transfer cask and should be removed from this ISG.
f. Page 14 third paragraph. 72.212 limits for TC operations are being invoked on a cask or load campaign specific basis (i.e., measurements to meet site specific calculated values rather than generic). This requirement appears to be unnecessary. Typically a 72.212 analysis would be performed on a bounding site payload.
g. Page 14 (bottom of page). It is not believed that US NRC licenses payload at "representative" (last line of page) contents. If so, further guidance should be given to applicants as to not needing to specific maximum source/content configurations.
h. Section 4.2.1.3 Radiation Protection Program, Page 15, second paragraph seems to imply that a misload will/can be detected by radiation measurements. This will not be the case unless extreme misload occurred, the misload is at the cask periphery and measurement is taken near the assembly in question.
i. Page 15, third paragraph. The requirement of directing Part 50/52 licensees how to manage their RP program seems beyond the scope of part 72.
j. Section 4.2.2.2, Technical Specification – Limiting Condition for Operation, on Page 17 states "Each measurement on an overpack feature is compared to the appropriate limit. Averaging of measurements is not typically considered an acceptable practice because it can result in a problem remaining undetected since averaging can mask higher measured dose rates in one area with lower measured dose rates in another area of the overpack. An application seeking to use averages of measured dose rates for dose rate limit compliance should justify the effectiveness of this method to detect problems and not mask a problem with either the shielding or the contents." As previously discussed, dose measurements are not typically going to reveal content problems. Unless a complete "grid" evaluation is performed it will also not reveal any shielding problems. Even significant variations on cask measurement (above/below limits) will not impact

the public dose (defined by 10 CFR 72 to be at least 100 meter away). Large variations on the top will definitely not impact regulatory limits on exposure. Therefore the argument given for not permitting averaging on a typical basis seems to be unsupported

6. General Comment - Past discussions with NRC management have explored risk based regulations and the potential for reduced design oversight relative to radiation shielding with the complimentary regulation focus of 10 CFR 20, 10 CFR 72.104 and 10 CFR 72.106. Past licensing reviews have directed reanalysis and SAR revisions for minor design and analysis issues that have represented mrem/hr differences in SAR documentation. These specific licensing review issues required significant engineering efforts to be duplicated and caused significant schedule delays in hardware licensing impacting industry dry storage loading efforts.