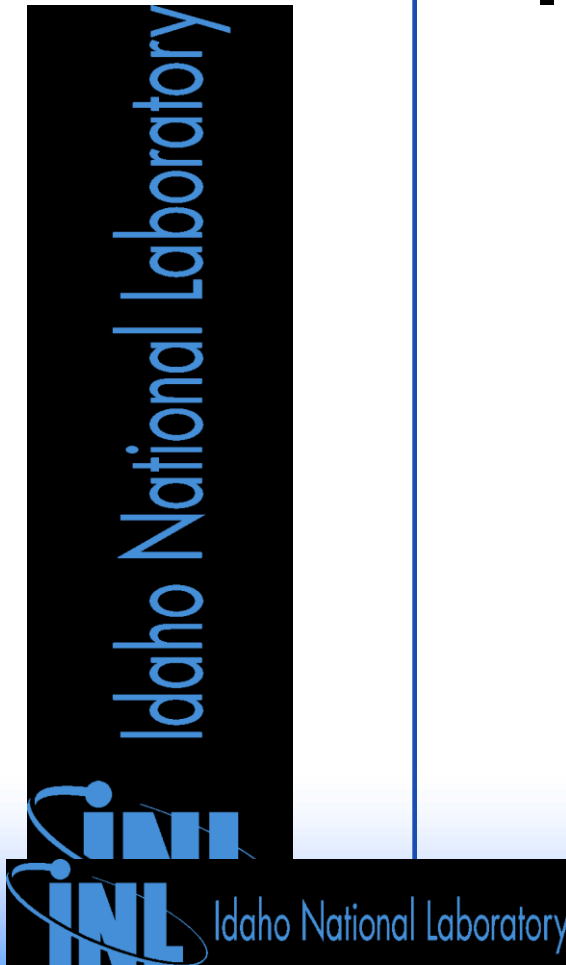


Continuing DOE-STD-1027 Issues at Idaho National Laboratory

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Criticality Issues

- **DOE-STD-1027, Attachment 1, Table A.1, footnote *** on page A-12.**

“To be used if segmentation or nature of process precludes potential for criticality. Otherwise, use the criticality lists for U₂₃₃, U₂₃₅, and Pu₂₃₉ of 500, 700, and 450 grams respectively.”

- **What does this mean in terms of calculating the sum of the ratios when maintaining radiological inventory control?**

Criticality Issue (cont'd)

- Footnote implies that the “criticality lists” or essentially the single parameter sub-critical limits should be used as a substitute TQV.
- If these limits are used as TQVs for sum of the ratios (SOR) calculations, even a fairly minimal amount of fissionable material would constitute a significant contribution to the SOR calculation.
- If facility contains 350gm U_{235}
 $350 / 700 \text{ gm single parameter limit} = 0.50 \text{ ratio}$
-vs-
 $350 \text{ gm} / 1.1E +08 = 3.18E-06 \text{ ratio}$

Idaho National Laboratory (INL) Approach

- **If facility contains less than the single parameter sub-critical limits per ANS-8.1 of 500gm U₂₃₃, 700gm U₂₃₅, or 450gm Pu₂₃₉**
 - Criticality is not considered credible
 - “High-level program control at the facility level” precludes the potential for criticality by controlling mass
 - Fissionable material is included in radiological material inventory
 - Standard HC 2 and 3 TQVs are used for sum of the ratios calculations (Table A.1, Attachment 1, DOE-STD-1027)

INL Approach (cont'd)

- **If facility contains or plans to contain greater than the single parameter sub-critical limits for fissionable material per ANS-8.1**
 - Criticality Safety organization will assess the potential for criticality.
 - If operational criticality safety controls are necessary, facility initial categorization is HC2
 - If nature of process argument can be made to reduce hazard categorization, Hazard Assessment Document (HAD) containing nature of process argument is sent to DOE for review and approval