United States Nuclear Regulatory Commission

NRC Comments on NEI Draft Evaluation Methodology Ground Rules, dated 12-12-02

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ATTACHMENT 4

Methodology Scoping Boundaries

- Issues that are considered to extend beyond the defined scope of the Evaluation Methodology should be flagged, and sources of guidance may also be referenced, for example:
  - Sump screen structural adequacy
  - Jet impingement/missile impaction on sump screen
  - Upstream containment flowpath blockage
  - Downstream ECCS/CSS blockage
  - Debris sources not addressed generically
  - Gaps in the knowledge base/untested strainer prototypes

Terminology

- Consistent use of clearly defined terminology will avoid confusion, for example:
  - "deposition" versus "accumulate" (pg. 2)
  - "zone of destruction", "zone of influence", "zone of damage" (pg. 3)
  - "sufficient damage" (pg. 3)
  - "destruction pressure" (pg. 3)
  - "number of types" of fibrous debris (pg. 5)

Pipe Break Locations (Section 1.1)

- Use of MEB 3-1, though germane to GDC 4, is not relevant to compliance with 10 CFR 50.46
- MEB 3-1 does not take into account sump clogging concerns
  - Analyzing worst-case MEB 3-1 break does not provide high confidence that overall worst-case break is bounded
  - Analyzed break locations should be determined according to criteria related to sump blockage potential (e.g., as per DG-1107)

Leak Before Break (Section 1.2)

- Staff has not approved Leak Before Break for compliance with 10 CFR 50.46
- Leak Before Break is a GDC 4-related concept that allowed removal of pipe whip restraints and jet impingement barriers, but did not affect thermal insulation
- Staff's regulatory analysis concerning Leak Before Break did not consider insulation destruction/sump clogging

Hemispherical Damage Zones

- The basis for using a hemispherical damage zone (Sect. 1.3.1) is not clear
  - Does a single-ended break refer to an MSLB with MSIV closure?
  - The staff did not approve hemispherical jet impingement zone boundaries for BWR MSLBs, in part due to closure time of MSIVs
  - Concerns with jet impingement reflection

Pipe Break Radial Offset

- In Section 1.3.2, credit for limited radial offset is allowed; however, specific methodology is necessary before licensees can implement radial offset credit in an acceptable way

Break Flow Washdown

- Although break flow washdown may not significantly contribute to generating debris from intact insulation, it should be acknowledged that it can significantly fragment large pieces of debris that it impacts (e.g., erosion of individual fibers or smaller fragments from fibrous blankets) - (Section 1.4.2)

Post –Accident Submergence

- More-specific guidance should be provided on what water level would be assumed in containment for evaluating the submergence of potential debris sources (i.e., minimum/maximum level, best-estimated level, etc.)

Quantifying Debris Size Distribution

- In Section 1.7, quantitative fractions or methods to quantify the debris size distribution should be specified for the size groupings that are established for each type of debris. It would be expected that this information be included in the Debris Generation section of the methodology.

Insulation Seam Orientation

(Section 1.7.2)

- Seam orientation of insulation jacketing affects debris generation for all types of debris, not only calcium silicate
- Uncertainties in jet impingement model (e.g., jet reflection is not considered) and the potentially limited number of break locations being analyzed raises questions concerning the validity of crediting seam orientation
- It is not clear that licensees have procedures for maintaining seam orientation on insulation

Microporous Insulation

- Section 1.7.2 should be categorized as microporous insulation and should treat or reference, not only calcium silicate, but also other types of debris with similarly physical characteristics, such as Min-K, Microtherm, asbestos, and Unibestos

Qualified Coatings

- Evaluation Methodology's treatment of qualified coatings in Section 1.7.4 is different than that approved in BWROG's URG. URG recommended that "Licensees should also consider whether qualified coatings have degraded over time (due to irradiation, misapplication, etc.) to the point that their qualification is in doubt."

Water-soluble tape, stickers,and labels

- In Section 1.7.5, does the discussion indicate that the adhesive of these materials is water-soluble, or that the materials themselves are water-soluble?

Miscellaneous/Floating Debris

- Section 1.7 should include a section for foam, rubber, and other miscellaneous insulation types
- Buoyancy of floatable debris must be demonstrated if credit is to be taken
- Floatable debris may block a portion of partially or shallowly submerged sump screens

Debris Characteristics

- Section 1.7 does not include sufficiently defining characteristics of debris types, for example:
  - Resident debris characteristics
  - Various other materials in Section 1.7.7
  - Characteristics of insulation which may affect debris generation, for example:
    - Latching/attachment method
    - Jacketing/encapsulation