

DRAFT

- a) The N-716 code case Section 2(5) does not include a LERF guideline analogous to the CDF guideline, and Table 3-1 in your submittal includes a column for CDF but not for LERF. Please explain why a LERF guideline is not included as a guideline in parallel with CDF.

Response

N-716 provides five criteria for determining the classification of welds. These criteria are specifically designed to address CDF considerations and LERF considerations [e.g., break exclusion region (BER)]. Additionally, Section 4 of the code case was also developed to specifically address CDF and LERF considerations. In particular, Section 4(d) (LOCA – outside containment) and Section 4(e) (BER) are important requirements of the Case, from a LERF perspective. As such, Sections 2 and 4 taken together are used to define the revised inspection program (i.e., the number and locations for inspection).

The CDF guideline for PRA internal flood segments was added to provide additional margin, as applicable, to the initial scope of HSS welds (i.e., a “belts and suspenders” approach). As discussed in the code case whitepaper, N-716 is based upon lessons learned from a large number of risk-informed applications (e.g., RI-ISI, RI-BER). With respect to defining the scope (e.g., HSS vs. LSS), these insights include both the impact on CDF and LERF (e.g., RI-BER insights). In the whitepaper, eight plants (4 BWRs and 4 PWRs) were compared to the N-716 criteria; N-716 was shown to provide for more inspections than traditional RI-ISI approaches even when the criterion of Section 2(5) is not used.

Additionally, as a final step, after Sections 2 and 4 have been completed, N-716 requires an assessment of the impact on plant risk, which includes both CDF and LERF. This change-in-risk assessment includes so-called “risk category 6 and 7” locations, which are not required to be included in the EPRI RI-ISI delta risk assessment. Risk acceptance criteria for these metrics are consistent with other RI-ISI applications and meet Regulatory Guide (RG) 1.174 criteria.

Irrespective of the above, GGNS reviewed LSS Class 2 piping to confirm that, in addition to having a CDF contribution of less than 1E-06, it also has a LERF contribution of less than 1E-07.

- b) Please provide a discussion justifying the guideline value for CDF selected in Section 2(5) in N-716 (i.e., 1E-6/year).

Response

N-716 provides five criteria for determining the classification of welds. The CDF guideline was added to provide additional margin, as applicable, to the initial scope of HSS welds (i.e., a “belts and suspenders” approach). As discussed in the code case whitepaper, N-716 is based upon lessons learned from a large number of risk-informed applications (e.g., RI-ISI, RI-BER). In the whitepaper, eight plants (4 BWRs, 4 PWRs) were compared to the N-716 criteria and N-716 was shown to provide for more inspections than traditional RI-ISI approaches even when the criterion of Section 2(a)(5) is not used.

DRAFT

The criterion of Section 2(a)(5) of N-716 provides an additional criterion that can only potentially increase the scope of HSS locations (i.e., will only increase the number of inspections). Although, the criteria of Section 2(a) were created based on the large number of risk-informed applications performed to date, Section 2(a)5 was added as a defense-in-depth measure to N-716 to provide a method of ensuring that any plant-specific locations that are important to safety are identified. Therefore, it is important to use a value that is low enough to capture any significant risk, but high enough so that valuable resources are not spent for minimal or no appreciable capture of risk. According to the guidelines in RG 1.174, plant changes (permitting the reallocation of resources) that increase risk less than $1E-6$ /year would normally be considered acceptable as long as the other principles are satisfied. This indicates resources directed toward risk represented by CDFs of $1E-6$ /year or less may be more effectively applied elsewhere.

Adopting RI-ISI programs permits a reduction in inspection by focusing inspections on the more important locations while, at the same time, maintaining or improving public health and safety. Use of a technically adequate, plant-specific flooding evaluation to identify relatively important locations provides confidence that the inspection will be focused on the more important locations. Selecting the guideline value of $1E-6$ /year is consistent with the premises that resources allocated toward risks less than $1E-6$ /year may be more effectively applied elsewhere.

From a practical perspective, the criterion used in Section 2(a)(5) has two potential impacts.

1. Class 2 Piping

Any piping that has inspections removed per this criterion is required to be assessed as to its impact on risk. This risk impact analysis is conducted on an individual system basis, which includes the cumulative effect of piping currently being inspected. The risk acceptance criteria on a system basis are defined as $1E-07$ (CDF) and $1E-08$ (LERF). If the risk acceptance criteria are not met, additional inspections need to be defined until these criteria are met [N-716 Section 5(d)]. Therefore, regardless of the number of segments (or inspections) that fall below this criterion, unacceptable risk changes will not occur.

Conceivably, the risk impact analysis could be conducted without the benefit of this criterion and shown to have acceptable changes in plant risk. However, apart from the acceptability of the risk impact analysis, if risk outliers exist in Class 2 piping [e.g., piping that exceeds Section 2(a)(5) criterion], N-716 would require that this piping be added to the scope of HSS piping and subjected to inspection.

DRAFT

2. Class 3 / NNS Piping

Currently, there are no Section XI NDE requirements for this piping. As such, use of this criterion, regardless of its value, can only result in a reduction in plant risk. These additional inspections will be imposed on the piping identified by the criterion of Section 2(a)(5) and cannot be used to reduce inspections in other HSS piping [N-716 Section 4(b)].

Finally, RI-ISI can be applied on a partial scope basis. That is, many plants have applied RI-ISI to Class 1 piping only. Thus, these plants have not witnessed the additional safety benefit of identifying and inspecting Class 2, 3 or NNS piping per the criterion of Section 2(a)(5).