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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Secretary
U.S. Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff
Washington, DC 20555-0001

Subject: Comments on NRC Proposed Rule 10 CFR 50, "American Society of Mechanical Engineers (ASME) Codes and New Revised ASME Code Cases" (75FR24324, dated May 4, 2010) (RIN 3150-AI35)

This letter is being submitted in response to the U.S. Nuclear Regulatory Commission (NRC) request for comments concerning the Proposed Rule 10 CFR 50, "American Society of Mechanical Engineers (ASME) Codes and New Revised ASME Code Cases," published in the Federal Register (FR) on May 4, 2010 (i.e., 75FR24324).

Under this *Proposed Rule* the NRC plans to amend its regulations to incorporate by reference the 2005 Addenda through 2008 Addenda of Section III, Division 1, and the 2005 Addenda through 2008 Addenda of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code (ASME B&PV Code); and the 2005 Addenda and 2006 Addenda of the ASME Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code). The NRC also proposes to incorporate by reference ASME Code Case N-722-1, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials Section XI, Division 1," and Code Case N-770, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR [Pressurized-Water Reactor] Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material with or without Application of Listed Mitigation Activities."

Exelon Generation Company, LLC (Exelon) appreciates the opportunity to comment on this *Proposed Rule* and offers comments in the attachment to this letter for consideration by the NRC.

If you have any questions or require additional information, please do not hesitate to contact Mr. Richard Gropp at 610-765-5557.

Respectfully,



David P. Helker
Manager - Licensing

Attachment – Comments on Proposed Rule

Template = SECY-067

DS10

ATTACHMENT

Comments Concerning
Proposed Rule 10 CFR 50, "American Society of Mechanical
Engineers (ASME) Codes and New Revised ASME Code Cases"

Comments

A. General Comment on Re-designation of Paragraphs in Section 10CFR50.55a(b)(2)

Excerpted Language from Page 24326

Due to the extent of the proposed revisions to 10CFR 50.55a(b)(2), the NRC is proposing to revise this portion of the regulations in its entirety, including the redesignation of paragraphs within the section.

In order to facilitate compliance with 10CFR50.55a in implementing Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code by a licensee, references to the appropriate regulation paragraphs are included in programmatic procedures. If this renumbering is carried forth in the final rule, numerous procedures and site specific Inservice Inspection program documents will need to be revised to ensure the new correct paragraphs of the regulation are referenced. While it is understood that leaving many now unused paragraph references in the regulation and marked as "not used" is also cumbersome, these changes will result in an undue hardship without any compensating increase in safety.

B. General Comment on Proposed Changes to Paragraphs 10CFR50.55a(b)(2) and 10CFR50.55a(b)(2)(xi)

Exelon believes that allowing multiple incompatible versions of Section XI, Appendix VIII, to be used by licensees may create a hardship on the industry related to consistent implementation of an Appendix VIII qualification program.

The proposed changes to Paragraph (b)(2) incorporates by reference the 2005 Addenda through 2008 Addenda of Section XI of the ASME B&PV Code, with conditions, into 10CFR50.55a. Exelon believes that when combined with the revision to paragraph (b)(2)(xi), the resulting changes could potentially create a situation that will have various licensees invoking distinctly different versions of Appendix VIII. Licensees using anything up to the 2006 Addenda of Section XI would have to implement the 2001 Edition, while licensees updating to the 2007 Edition, or the 2008 Addenda of Section XI would need to implement the version of Appendix VIII corresponding to the Code year to which they were updating. Historically, 10 CFR 50.55a has mandated a particular edition or addenda of Appendix VIII to be used by licensees, which has greatly simplified industry efforts at maintaining a qualification program that complies with the Code. The *Proposed Rule* does not seem to contain such a requirement.

The 2001 Edition of Appendix VIII is inconsistent, in certain respects, with the 2007 Edition and the 2008 Addenda. The titles and corresponding scopes of Supplements 5 and 7 have changed significantly, between the 2001 and 2007 Code years. Exelon believes that this may create difficulty with maintaining one qualification program or one set of inspection procedures that encompasses all these Code years. While the revisions that these supplements have undergone have no technical impact, Exelon believes that invoking them will require that the qualified procedures and the Performance Demonstration Initiative (PDI) qualification records be modified in order to accommodate the newer versions. These types of programmatic changes require significant time and resources.

For the reasons stated above, allowing incompatible versions of Section XI, Appendix VIII, to be used by licensees places an undue administrative burden on the industry and its Appendix VIII implementation program, without providing any improvement in safety.

In addition, if the 2008 Addenda of Section XI, Appendix VIII is the preferred singular version to be mandated, the industry will need time to update programs and procedures to accommodate this change.

Since the industry is currently working to the 2001 Edition of Appendix VIII, there would be no issues with 10CFR50.55a continuing to require licensees to use this version. However, significant work has transpired within the Section XI Nondestructive Examination (NDE) Code committees, between 2001 and 2008, to update Appendix VIII to eliminate the need for the additional provisions within 10CFR50.55a. There would be a significant amount of effort involved for the PDI program and the industry to revise programs and procedures to comply with the 2008 Addenda. Therefore, the date for mandatory implementation of the 2008 version of Appendix VIII should be delayed for a minimum of 18 months, after the publishing of the final rule, in order to allow time to make all the necessary program and procedure revisions and to communicate these changes to the industry.

C. Comment on proposed changes to 10 CFR 50.55a, paragraph (b)(2)(xi)(A)(2)

The provisions in Paragraph (b)(2)(xi)(A)(2) contain a requirement for qualification of dissimilar metal welds from the austenitic side of the weld. This provision may not always be possible to satisfy; therefore, Exelon recommends that it be revised to accommodate certain exceptions.

The third sentence of Paragraph (b)(2)(xi)(A)(2) currently states: "*Dissimilar metal weld qualifications must be demonstrated from the austenitic side of the weld and may be used to perform examinations from either side of the weld.*" The *Proposed Rule* reflects that this paragraph has not been changed.

Industry surveys have revealed that there are dissimilar metal weld configurations where a ferritic component has been attached to another ferritic component using an inconel weld (no austenitic base material involved). An example of this configuration is the Core Spray/Feedwater safe end-to-pipe welds of many Boiling Water Reactor plants.

Additionally, there are cases where only the ferritic side of a dissimilar metal welded component is accessible for scanning, due to component geometry. This is common in Babcock and Wilcox and Combustion Engineering designed Pressure Water Reactors, which have ferritic steel main loop piping. Often, there is either insufficient room on the austenitic safe end side of these welds to perform an examination or the safe end material itself is cast stainless steel, prohibiting a meaningful examination to be performed from that side.

Exelon recommends that the third sentence in Paragraph (b)(2)(xi)(A)(2) be replaced with the following two sentences: "Dissimilar metal weld qualifications must be demonstrated from the austenitic side of the weld, where practical, and may be used to perform examinations from either side of the weld. For dissimilar metal weld configurations that do not contain an austenitic base material, or for which the geometric or metallurgical conditions of the component preclude sufficient scan coverage to be obtained from the austenitic side of the weld, the qualification may be performed from the ferritic side of the weld only."

D. Section - 10 CFR 50.55a(b)(2)(iv) Examination of Concrete Containments (Redesignated)

10CFR50.55a(b)(2)(iv)(B), 10CFR50.55a(b)(2)(iv)(C), 10CFR50.55a(b)(2)(iv)(D)(1), and 10CFR50.55a(b)(2)(iv)(D)(2) are listed under 10CFR50.55a(b)(2)(iv); however, these paragraphs are not mandated by 10CFR50.55aa(b)(2)(iv). Therefore, Exelon suggests that paragraphs 10CFR50.55a(b)(2)(iv)(B), 10CFR50.55a(b)(2)(iv)(C), 10CFR50.55a(b)(2)(iv)(D)(1), and 10CFR50.55a(b)(2)(iv)(D)(2) be deleted.

E. Section - 10 CFR 50.55a(b)(2)(xiv)(C) Examination of Concrete Containments (Redesignated)

Exelon recommends that 10CFR50.55a(b)(2)(xiv)(C) be revised to read: "*When applying editions and addenda prior to the 2004 Edition through the 2005 Addenda of Section XI, licensees qualifying visual examination personnel for VT-3 visual examination under paragraph IWA-2317 of Section XI,*" The basis for this recommendation is that IWA-2317 of the 2004 Edition does not contain the requirements to demonstrate the proficiency of the training by administering an initial qualification examination and administering subsequent examinations on a 3-year interval.

F. Section - 10 CFR 50.55a(b)(2)(xv) Examination of Concrete Containments (Redesignated)

With regard to 10CFR50.55a(b)(2)(xv), Exelon is requesting further clarification regarding whether the substitution of ASME Section V ultrasonic examination method by an Appendix VIII ultrasonic examination method is allowed by the provisions of IWA-2240 of the 1997 Addenda as specified in this paragraph's condition.

G. Section - 10 CFR 50.55a(b)(2)(xxv) Evaluation of Unanticipated Operating Events (New)

1. Excerpted Language from Page 24339

10 CFR 50.55a(b)(2)(xxv) Evaluation of Unanticipated Operating Events (New)

The NRC proposes to add a new § 50.55a(b)(2)(xxv) to require the use of ASME B&PV Code, Section XI, Nonmandatory Appendix E, "Evaluation of Unanticipated Operating Events." Appendix E provides acceptance criteria and guidance for evaluating the effects of out-of-limit conditions on structural integrity of the reactor vessel beltline region. The NRC proposes to specify that Section E-1200 is not acceptable, and plans to establish two conditions on the use of Section E-1300. One proposed condition would require that a 1/4T flaw be used in the Linear Elastic Fracture Mechanics (LEFM) evaluation with a margin of 1.4 applying to K_{Im} in the two LEFM criteria. The other proposed condition would also use K_{Ic} instead of K_{Ir} in the Appendix E analysis.

Exelon requests that the NRC reconsider the change specifying "...that Section E-1200 is not acceptable." The intent of Section E-1200 is to provide licensees a conservative and yet simple screening method that can be used to immediately judge whether a reactor vessel can be returned to service or whether a more in-depth analysis is needed prior to returning the reactor vessel to service following an unanticipated event. The evaluation procedures in Appendix E, Paragraphs E-1200 and E-1300 provide adequate safety margins for evaluating reactor pressure vessel integrity following an unanticipated event that results in pressures and temperatures outside the limits established for normal operation. Additionally, Exelon considers Appendix E to be consistent with risk-informed acceptance criteria for normal operating and unanticipated events. Consequently, Exelon believes that modifying Appendix E as proposed is unnecessary and disallowing use of Section E-1200 will result in an undue hardship without any compensating increase in safety.

Exelon requests that the NRC reconsider the change that "...would require postulating a 1/4T flaw under Section E-1300." The intent of Section E-1300 is to use margins that are lower than what is currently specified in ASME, Section XI, Appendix G, "Fracture Toughness Criteria for Protection Against Failures," while at the same time the margin must be large enough to ensure that the transient did not produce any extension of a postulated range of crack sizes.

Exelon supports the proposed change to use K_{Ic} instead of K_{Ir} in the Appendix E analysis.

2. Excerpted Language from Page 24339

Appendix E of the ASME B&PV Code, Section XI, addresses the evaluation of the structural integrity of the reactor pressure vessel (RPV) after an out-of limit condition occurs using LEFM based on a postulated surface flaw. The underlying Appendix E methodology is based on the following two LEFM criteria:

1.6(K_{Im}) + K_{Ir} = K_{Ic} for the low temperature overpressure (LTOP) condition

1.6(K_{Im} + K_{It}) + K_{Ir} = K_{Ic} , for the pressurized thermal transient (PTT) condition

Where K_{Im} , K_{Ir} , and K_{It} are the applied primary, residual, and thermal stresses, respectively, and K_{Ic} is plane-strain fracture toughness. Both are based on a postulated flaw of 1-inch in depth. The details regarding these criteria are documented in the Electric Power Research Institute's (EPRI) report NP-5151, "Evaluation of Reactor Vessel Beltline Integrity Following Unanticipated Operating Events," dated April 1987. The justification for selecting the 1-inch deep flaw is given in the EPRI report as follows:

The crack size range has an upper limit of one inch. Experience shows that the fabrication practice and inspection requirements for nuclear pressure vessels generally preclude the undetected presence of larger flaws.

Exelon considers the above language to be editorial in nature and is not opposed to the proposed discussion.

3. Excerpted Language from Page 24339

The above qualitative justification for selecting the 1-inch depth for the postulated flaw is not sufficient. The ASME B&PV Code, Section XI, Appendix G, "Fracture Toughness Criteria for Protection Against Failure," analysis, which can be considered as the first "screening" criterion for safe operation of an RPV, is based on a postulated flaw of one-quarter of the RPV wall thickness (1/4T). The Section XI, Appendix E analysis is employed when the ASME B&PV Code, Appendix G requirements are exceeded due to an out-of-limit condition. Hence, it is considered as the second "screening" criterion, i.e., once satisfied, a refined analysis or a special RPV inspection is not needed. As the second screening tool, the Section XI, Appendix E analysis has to be conservative....

Exelon considers the statement: "The above qualitative justification for selecting the 1-inch depth for the postulated flaw is not sufficient," might be unjustified and requests further clarification. Exelon believes that the use of a postulated 1-inch flaw is sufficient for ensuring that crack extension will not occur.

The original selection of the 1-inch deep axial surface flaw was based on several factors, including the performance of preservice surface examinations that can detect surface or near-surface flaws less than a millimeter in length and preservice and inservice volumetric examinations that indicated no large flaws were present in the vessel base metal.

A review of recent service experience indicates almost all of the operating reactor vessels have completed their first ten-year volumetric inspection of the vessel with no indication of any significant flaws in the base metal and no indication of cladding flaws extending into the vessel base metal. These inspections were performed in accordance with ASME, Section XI, Appendix VIII, or to the supplemental requirement of NRC Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations," both of which were especially concerned with flaws near the interface between the stainless steel vessel cladding and ferritic base metal.

The original selection of the 1-inch deep axial surface flaw has proved to be conservative based on continued service experience and has been verified by the results from the comprehensive flaw evaluation performed by the NRC during their recent work in promulgating the revised Pressurized Thermal Shock (PTS) Rule.

The results from the flaw evaluation in the NRC PTS study are presented in Section 7.5 of NUREG-1806, *Technical Basis for Revision of the Pressurized Thermal Shock (PTS) Screening Limit in the PTS Rule (10 CFR 50.61)*, August 2007, and portions are briefly summarized below.

- The NRC indicated that "no surface breaking flaws were identified in all of the weld material examined, nor was a credible physical mechanism for surface flaw generation identified."
- The NRC indicated that "virtually all non-volumetric flaws found in welds were lack of side-wall fusion defects that exist on the fusion line between the deposited weld metal and the plate or forging being joined. Additionally, this observation implies that axial welds contain only axially oriented flaws whereas circumferential welds contain only circumferentially oriented flaws."
- The NRC indicated that the "entire inner-diameter of a nuclear RPV is clad with a thin layer of stainless steel to prevent corrosion of the underlying ferritic steel. Lack of inter-run fusion (LOF) can occur between adjacent weld beads, resulting in circumferentially oriented cracks."
- The NRC indicated that "while the data in [Simonen] shows a high probability (1 to 10 flaws per meter of deposited cladding weld bead) of obtaining very shallow LOF defects (1% of the clad layer thickness), only two deep LOF defects, having depths of ~50% and ~63% of the clad layer thickness, were found in all of the cladding inspected. Simonen found no evidence of LOF defects that completely compromised the clad layer."
- The NRC assumed that "these surface breaking defects exist only in single layer cladding. Multi-layer cladding was assumed to have no surface breaking flaws because the likelihood of two LOF defects aligning in two different weld layers is quite remote."
- The NRC also noted that the empirical data used as the primary evidence to establish the distribution of embedded weld flaws do not, and cannot, provide any information about the maximum size a flaw can be. For this reason, it was decided to truncate the non-repair flaw distribution at 1-in. (2.54-cm) and the repair flaw distribution at 2-in. (5.08-cm). In both cases, the selected truncation limit exceeds the maximum observed flaw size by a factor of 2. We performed a sensitivity study with FAVOR and ascertained that, within reasonable bounds on truncation limit dimension, the estimated through-wall cracking frequency is not influenced in any significant way by the truncation limit.

The results from the NRC's work demonstrate that flaws in welds are embedded flaws, and the only flaws that have potential to be surface flaws are circumferential flaws that originate in the cladding. Based on the results from the NRC comprehensive study and inservice inspection results performed to date, it seems reasonable to use a 1-inch deep axial surface flaw since: 1) it provides a credible conservative assumption for evaluating unanticipated events, especially in light of the NRC's conclusion that no surface breaking flaws were identified in all of the weld material examined, nor was a credible physical mechanism for surface flaw generation identified; 2) that a 2-inch flaw is twice as large as any flaw found in the NRC study and is much larger than any flaw detected in operating nuclear pressure vessels; and 3) the estimated through-wall cracking frequency is not influenced in any significant way by the truncation limit.

4. Excerpted language from Pages 24339 and 23340

...In addition, the following three concerns prompt the NRC to propose the use of a 1/4T flaw in the Appendix E, Section E-1300 analysis:

- In the probabilistic fracture mechanics (PFM) analyses supporting the proposed PTS rule, the truncated flaw depth for a repair weld flaw is 2 inches. For a deterministic analysis, the possibility of having a repair weld flaw line up with a clad flaw to become a surface flaw cannot be ruled out.*
- The Pressure Vessel Research User's Facility (PVRUF) and Shoreham RPV flaw data, used to develop generic flaw distributions for the proposed PTS rule, identified flaws that were consistently smaller than the proposed bounding flaw. However, the PVRUF and Shoreham data represent only a limited sampling of all RPV welds and may not directly provide an adequate bounding flaw size for a deterministic analysis like that of ASME B&PV Code, Section XI, Appendix E.*
- The use of a 1/4T flaw assumption also provides additional assurance that any service-induced growth of current fabrication flaws will be bounded for any RPVs having experienced severe transients over the course of their operating lifetimes.*

Exelon requests that the NRC reconsider the change to revise the postulated flaw size in Section E-1300 from a 1-inch deep flaw to a 1/4T flaw.

With respect to the NRC statement: *"In the probabilistic fracture mechanics (PFM) analyses supporting the proposed PTS rule, the truncated flaw depth for a repair weld flaw is 2 inches. For a deterministic analysis, the possibility of having a repair weld flaw line up with a clad flaw to become a surface flaw cannot be ruled out,"* Exelon considers it important to mention that the results from the flaw evaluation in the NRC alternate PTS Rule are presented in Section 7.5 of NUREG-1806 and state in part:

"It should also be noted that the empirical data used as the primary evidence to establish the distribution of embedded weld flaws do not, and cannot, provide any information about the maximum size a flaw can be. For this reason, it was decided to truncate the non-repair flaw distribution at 1-in. (2.54-cm) and the repair flaw distribution at 2-in. (5.08-cm). In both cases, the selected truncation

limit exceeds the maximum observed flaw size by a factor of 2. We performed a sensitivity study with FAVOR and ascertained that, within reasonable bounds on truncation limit dimension, the estimated through-wall cracking frequency is not influenced in any significant way by the truncation limit."

This statement indicates that the truncated value of 2-inches is, in fact, a factor of two larger (in the limiting case of a repair weld) than any flaw ever seen in the study or found in service after several thousand years of reactor operation. In addition, the real flaws are embedded flaws, while the postulated flaw is a surface flaw, which adds additional conservatism. Finally, the NRC demonstrated that: "*within reasonable bounds on truncation limit dimension, the estimated through-wall cracking frequency is not influenced in any significant way by the truncation limit."*

Additionally, in Section 3.3.3.4 of NUREG-1806, the NRC concludes:

"In FAVOR, flaws simulated to exist further than $\frac{3}{8} \cdot t_{wall}$ from the inner diameter surface are eliminated, a priori, from further analysis. This screening criterion is justified based on deterministic fracture mechanics analyses, which demonstrate that for the embrittlement and loading conditions characteristic of PTS, such flaws have zero probability of crack initiation. As illustrated in Figure 3.5, in practice, crack initiation almost always occurs from flaws that having their inner crack tip located within $0.125 \cdot t_{wall}$ of the inner diameter, further substantiating the appropriateness of eliminating cracks deeper than $\frac{3}{8} \cdot t_{wall}$ from further analysis."

The results presented in NUREG-1806, Section 3.3.3.4 correspond to transient pressure and temperature stresses with a margin of one. In this instance, the results show that a flaw larger than 1-inch (approximately $0.125 t_{wall}$) has almost no contribution to failure. Coupling this fact with the application of a safety margin of 1.6 on both the pressure and thermal K_I values used to develop the criteria in Paragraph E-1200 ensures that any transients that may contribute to Reactor Pressure Vessel (RPV) failure will be screened out by application of the Paragraph E-1200 criteria.

Furthermore, the NRC indicated in Section 7.5.3 of NUREG-1806 that:

"...Multi-layer cladding was assumed to have no surface breaking flaws because the likelihood of two LOF defects aligning in two different weld layers is quite remote."

If the likelihood of two Lack of Fusion (LOF) defects aligning in two different weld layers is quite remote, then the likelihood that a flaw in the cladding would line up with an embedded flaw in the weld also is quite remote. Moreover, the flaw in the cladding is circumferential while the Appendix E analysis uses the more conservative axial flaw orientation. Consequently, there is no meaningful flaw alignment effect.

With respect to the NRC statement: "*The Pressure Vessel Research User's Facility (PVRUF) and Shoreham RPV flaw data, used to develop generic flaw distributions for the proposed PTS rule, identified flaws that were consistently smaller than the proposed bounding flaw. However, the PVRUF and Shoreham data represent only a limited sampling of all RPV welds and may not directly provide an adequate bounding flaw size*

for a deterministic analysis like that of ASME B&PV Code, Section XI, Appendix E," Exelon considers it important to mention that the results from the flaw evaluation in the NRC alternate PTS Rule are presented in Section 7.5 of NUREG-1806 and state in part:

"Consequently, it is not possible to ensure on an empirical basis alone that the flaw distributions developed based on these data apply to all PWRs in general. However, the flaw distributions proposed in [Simonen] rely on the experimental evidence gained from inspections of the materials summarized in Table 7.1 do not rest solely on this empirical evidence. Along with these data Simonen et al. used both physical models and expert opinions when developing their recommended flaw distributions. Additionally, where detailed information was lacking Simonen et al. made conservative judgments (for example, all NDE indications were modeled as cracks and, therefore, potentially deleterious to RPV integrity). This combined use of empirical evidence, physical models, expert opinions, and conservative judgments allowed Simonen et al. to propose flaw distributions for use in FAVOR that are believed to be appropriate/conservative representations of the flaw population existing in PWRs in general."

Based on this NRC conclusion, Exelon believes that the 1-inch deep axial surface flaw used as the basis for defining the Appendix E evaluation criteria can be considered conservative for application to Pressurized Water Reactors (PWRs) generally.

With respect to the NRC statement: *"The use of a 1/4T flaw assumption also provides additional assurance that any service-induced growth of current fabrication flaws will be bounded for any RPVs having experienced severe transients over the course of their operating lifetimes,"* Exelon believes it important to mention that an evaluation of sub-critical crack growth is included in NUREG-1806, and the NRC concluded:

"...Growth of initial fabrication defects attributable to sub-critical cracking mechanisms does not need to be considered...."

The details of the NRC evaluation are presented in NUREG-1806, Section 3.3.3.2.

Consequently, based on the NRC work documented in NUREG-1806, Section 3.3.3.2 Exelon believes that there is no need to increase the evaluation flaw depth from 1-inch to 1/4T to accommodate subcritical flaw growth of fabrication defects.

5. Excerpted Language from Page 24340

Requiring that a 1/4T flaw be used in the LEFM evaluation with a margin of 1.4 applying to K_{Im} in the two LEFM criteria establishes a consistent approach regarding the postulated flaw size in the two deterministic LEFM analyses in ASME B&PV Code, Section XI, Appendices E and G. Applying the margin of 1.4 only to K_{Im} is consistent with the ASME B&PV Code, Section XI, Appendix G approach, making the decreased margin between the two appendices traceable. The proposed use of a smaller margin of 1.4 in the ASME B&PV Code, Section XI, Appendix E analysis is justified because all significant stress intensity factors resulting from an actual transient are considered. Further, using a 1/4T flaw is also consistent with prior NRC

approaches for evaluation of RPV structural integrity after out-of-limit events. The EPRI NP-5151 report mentioned that reference toughness K_{IR} has been used in the LEM evaluation in the prior NRC evaluation of RPV structural integrity after out-of-limit events. Consistent with the evolution of the ASME B&PV Code, Section XI, Appendix G analysis, the NRC now proposes to use K_{Ic} instead of K_{IR} in the ASME B&PV Code, Section XI, Appendix E analysis.

At this time, there have been several risk-informed assessments made for various RPV conditions. These include the alternate PTS Rule, alternate risk-informed ASME, Section XI, Appendix G, procedures to define limits for normal startup and shutdown of the RPV, and the criteria in ASME, Section XI, Appendix E. What has become clear from these studies and what Exelon considers important are the limits established for pressure, temperature, or material RT_{NDT} , not the specific deterministic variables, such as flaw size and margin that may be used to define these limits. For example, the pressure and temperature limits in ASME, Section XI, Appendix G, could easily be defined with a smaller reference flaw size and higher margins on load, or with a larger reference flaw size and decreased margin on RT_{NDT} , or any combination of these. Thus, changing from a 1-inch flaw to a 1/4T flaw for purposes of consistency is not an adequate technical justification for the change without an assessment and understanding of the underlying overall safety margin provided by the change.

In addition, Section 3.3.3.5 of NUREG-1806, states in part:

"When running a plant-specific analysis using FAVOR, we only calculated the CPTWC for TH transients that reach a minimum temperature at or below 400°F (204°C). This a priori elimination of transients is justified based on experience and deterministic calculations, both of which demonstrate that such transients lack adequate severity to have non-zero values of CPTWC, even for very large flaws and very large degrees of embrittlement. Additionally, the results of our plant-specific analyses (reported in Chapter 8) show that a minimum transient temperature of 352°F (178°C) must be reached before CPTWC will rise above zero, validating that our elimination of transients with minimum temperatures above 400°F (204°C) does not influence our results in any way."

The criteria in Appendix E, Section E-1200 for thermal transients states that the coolant temperature of any transient cannot fall below $RT_{NDT} + 55^{\circ}\text{F}$ at pressures up to design pressure, where RT_{NDT} is the highest adjusted reference temperature (for weld or base material) at the inside surface of the reactor vessel and includes the margin term defined in Regulatory Guide 1.99, Revision 2, "*Radiation Embrittlement of Reactor Vessel Materials.*" For older plants with high radiation sensitive materials, such as those considered in the industry Appendix E assessment and the NRC plant-specific PTS assessments, the limiting mean RT_{NDT} at the vessel inner surface is approximately 270°F and the RG 1.99 margin typically is approximately 60°F. Thus, minimum transient temperature corresponding to Appendix E criterion is approximately 385°F. The NRC results described in NUREG-1806, Section 3.3.3.5 provide further confirmation that the criteria and evaluation procedure in Appendix E, provide adequate safety margins since the NRC plant specific analyses for the limiting plants show that a minimum transient temperature of 352°F (178°C) must be reached before the Conditional Probability of

Through-Wall Cracking (CPTWC) will rise above zero even for very large flaws and very large degrees of embrittlement.

In summary, because all evidence indicates that use of a 1-inch deep axial surface flaw provides a credible conservative assumption for evaluating unanticipated events, and because the criteria in Appendix E, Section E-1200 provide adequate levels of safety there is no safety benefit to changing from a 1-inch flaw to a 1/4T flaw and disallowing the use of Section E-1200 for the purpose of having consistency with Section XI, Appendix G.

H. Section - 10 CFR 50.55a(g)(5)(iii) and 10 CFR 50.55a(g)(5)(iv) Inservice Inspection Requests for Relief

Exelon recommends that 10CFR50.55a(g)(5)(iii) be deleted since it appears to be in conflict with the timing requirement of 10CFR50.55a(g)(5)(iv).

The proposed revised wording of (g)(5)(iii) seems to imply that there is an acceleration of the submittal of limited coverage relief requests from within one year after the end of the interval to within one year of the end of the outage in which the examination was performed. This more frequent submittal requirement appears to increase the burden of requesting relief and could potentially limit the scheduling of examinations if the regulations are changed as proposed.

- This requirement restricts the Code allowable deferral of an examination within a period or an interval to achieve better coverage through the removal of interferences or introduction of new inspection technology.
- If this requirement is not a burden, Exelon believes it should be acceptable to project volumetric coverage based on previous examinations and request relief on all limited coverage examinations in advance at the beginning of the ten year interval and simply submit additional information at the end of each outage if superior coverage was achieved.

Exelon recommends that 10CFR50.55a(g)(5)(iv) be revised to read: “ ..., the basis for this determination must be submitted ~~for NRC review and approval~~ not to the NRC no later than 12 months after the expiration of the initial” The basis for this recommendation is that licensees are required to submit relief requests for impracticality within 12 months after the end of an ISI Interval for which relief is sought, and not required to obtain NRC approval for the impractical relief within the 12 months after the end of an ISI Interval for which relief is sought.

I. Section - 10 CFR 50.55a(g)(6)(ii)(F) Examination Requirements for Class 1 Piping and Nozzle Dissimilar-Metal Butt Welds (New)

1. Excerpted Language from Page 24342

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(2)) to require that welds mitigated by inlays, cladding, or stress improvement by welding, be categorized as

unmitigated welds pending plant-specific NRC review of the mitigation techniques and NRC authorization of an alternative ASME Code Case N-770 Inspection Item for the mitigated weld. ASME Code Case N-770 provides inspection methods and frequencies for welds mitigated by certain specified techniques. Inspections of mitigated welds are performed much less frequently than unmitigated welds. Requirements for most of the mitigation methods are contained in other ASME code cases under development. The NRC has typically approved the application of pressure boundary weld mitigation techniques on a case-by-case basis. This condition is necessary to ensure that appropriate mitigation techniques are applied to welds before they are categorized as mitigated under Code Case N-770.

All mitigation techniques, with the exception of Mechanical Stress Improvement Process (MSIP), discussed in Code Case N-770, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR (Pressurized-Water Reactor) Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 UNS W86182 Weld Filler Material with or without Application of Listed Activities," are the subject of separate Code Cases which will be subject to approval by the NRC. MSIP meets the requirements of Appendix I of Code Case N-770 and has been separately approved by the NRC. Exelon believes that if approved mitigation techniques are employed a separate review of the reclassification of the welds should not be required.

This proposed section, requiring that welds that have been mitigated by weld inlay or onlay of corrosion resistant cladding be categorized for ISI frequency as Inspection Item A-1, A-2, or B, is not consistent with other proposed requirements, or with later revisions of Code Case N-770. For example, § 50.55a(g)(6)(ii)(F)(6) requires that a weld that has been mitigated by inlay or corrosion resistant cladding, and then is found to be cracked, be reclassified and inspected using the frequencies of Inspection Item A-1, A-2, or B. This indicates that an uncracked weld that has been mitigated by inlay or corrosion resistant cladding would not be categorized as Inspection Items A-1, A-2 or B following an acceptable preservice examination. Another example is proposed Section § 50.55a (g)(6)(ii)(F)(7), which requires that a weld mitigated by inlay or corrosion resistant cladding be examined each interval if at hot leg temperatures, and as part of a 25 percent sample plan on a 20-year frequency if at cold leg temperatures, which is not consistent with Inspection Item A-1, A-2, or B.

2. Excerpted Language from Page 24343

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(3)) to require that the baseline examination of welds in Inspection Items A-1, A-2, and B (unmitigated welds) be completed at the next refueling outage after the effective date of the final rule. Paragraph -2200 of Code Case N-770 permits welds in Inspection Items A-1, A-2, and B (unmitigated welds) that have not received a baseline examination to be examined within the next two refueling outages from adoption of the Code Case. Welds in Inspection Items A-1, A-2, and B are the welds most likely to experience PWSCC and some of these welds may not have received a baseline examination, even under the industry initiative, MRP-139. This condition is necessary to ensure the integrity of these welds by requiring that all welds in Inspection Items A-1, A-2 and B be inspected at the first opportunity to perform the inspections.

For some plants, if this *Proposed Rule* promulgated as a final rule, the approval timing may be such that there is not adequate time to plan and prepare for the required baseline inspections, e.g., approval of the rule in June and the next refueling outage for a plant is in September. Therefore, Exelon suggests that the NRC consider providing an implementation window of perhaps two refueling outages to allow sufficient time so that the required planning and preparation can be accommodated.

3. Excerpted Language from Page 24343

The NRC proposes to add a condition to 50.55a(g)(6)(ii)(F)(4) to require essentially 100 percent coverage for axial flaws. Paragraph –2500(c) of Code Case N–770 permits examination of axial flaws with inspection coverage limitations provided essentially 100 percent coverage for circumferential flaws is achieved and the maximum coverage practical is achieved for axial flaws. This requirement on inspection limitations is inconsistent with comparable inspection requirements of the ASME B&PV Code, Section XI. Axial flaws can lead to through wall cracks and leakage of reactor coolant, which is a safety concern. This condition is necessary for the NRC to ensure that, through NRC review of an authorization of alternative inspection coverage, appropriate actions are being taken to address potential inspection limitations for axial flaws.

The above stipulation was placed in Code Case N–770 for those instances where essentially 100% coverage cannot be achieved due to interferences from other structures. In this case, if essentially 100% coverage for circumferential flaws (100% of the susceptible material volume) and the maximum coverage practical achieved for axial flaws, and limitations noted in the examination report, the coverage requirements were considered to be satisfied. This would assure that examinations necessary to prevent a “break-before-leak” were completed. The modifications required to obtain larger coverage for the axial flaws would result in increased dose to personnel which would not be justified for safety concerns.

It is not uncommon for the Dissimilar Metal (DM) welds in the PWR plants to have a taper transition from one side of the weld to the other side of the weld. This taper transition typically will not meet the flatness requirements needed to achieve essentially 100% coverage of the exam volume for a Performance Demonstration Initiative (PDI) qualified examination when examining for axially oriented flaws. The taper transition cannot be removed by simply removing excess weld material in the weld crown. It would typically require a change to the design of the components and welded connection to obtain a surface geometry that would allow essentially 100% coverage of the exam volume when examining for axially oriented flaws. Because an axially oriented Pressurized Water Stress Corrosion Crack (PWSCC) is limited to the PWSCC susceptible material, the axial flaw size would not be large enough to result in a safety concern. This has been documented in numerous Materials Reliability Program (MRP) reports and Pressurized Water Reactor Owner's Group (PWROG) evaluations. Because the axially oriented PWSCC flaw does not present a safety concern, it should not be necessary to achieve essentially 100% coverage of the exam volume when examining for axially oriented flaws.

Exelon is requesting further clarification that if this condition is placed on Code Case N-770, does it negate taking credit for previous "baseline inspections" of butt welds that met the requirements of MRP-139 and Code Case N-770?

4. Excerpted Language from Page 24343

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(5)) to reword Paragraph -3132.3(b) on determining flaw growth using wording consistent with that used in the ASME B&PV Code, Section XI. Paragraph -3132.3(b) contains the statement that a "flaw is not considered to have grown if the size difference (from a previous examination) is within the measurement accuracy of the nondestructive examination (NDE) technique employed." The "measurement accuracy of the NDE technique employed" is not defined in the code case or in the ASME B&PV Code. Use of this terminology may result in a departure from the past practice when applying ASME B&PV Code, Section XI. Under the requirements of Section XI, one concludes that flaw growth has not occurred when a "previously evaluated flaw has remained essentially unchanged." The proposed condition uses this wording. This condition is necessary to clarify the requirements for determining whether flaw growth has occurred and make the requirements consistent with ASME B&PV Code requirements endorsed by the NRC in 10 CFR 50.55a.

Code Case N-770-1, which has been approved by ASME, Paragraph -3132.3(b) has been modified to read as follows:

"...Previously evaluated flaws that were mitigated by the techniques identified in Table 1 need not be reevaluated nor have additional or successive examinations performed if new planar flaws have not been identified or the previously evaluated flaws have remained essentially unchanged."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

5. Excerpted Language from Page 24343

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(6)) on welds that are determined through a volumetric examination to have cracking that penetrates beyond the thickness of the inlay or cladding. The condition would require such welds to be reclassified as Inspection Item A-1, A-2, or B, as appropriate, until corrected by repair/ replacement activity in accordance with IWA-4000 or by corrective measures beyond the scope of Code Case N-770. Code Case N-770 would permit welds mitigated by inlay or cladding (i.e., onlay) in Inspection Items G, H, J, and K, to remain in those Inspection Items if cracking that penetrates through the thickness of the inlay or cladding occurs. The purpose of an inlay or cladding is to provide a corrosion resistant barrier between reactor coolant and the underlying Alloy 82/182 weld material that is susceptible to PWSCC. If cracking penetrates through the thickness of an inlay or cladding, the inspection frequencies of Inspection Items G, H, J, and K would no longer be appropriate even after satisfying the successive examination requirements of paragraph -2420. This condition is necessary because

welds with cracking that penetrates beyond the thickness of the protective barrier of the inlay or cladding would no longer be mitigated and would need to be inspected under one of the Inspection Items for unmitigated welds.

Code Case N-770-1, which has been approved by ASME, added the following to the end of Note 16(c):

"...If cracking penetrates beyond the thickness of the inlay or onlay, the weld shall be reclassified as Inspection Item A-1, A-2, or B, as appropriate, until corrected by repair/replacement activity in accordance with IWA-4000 or by corrective measures beyond the scope of this Case (e.g., stress improvement)."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

6. Excerpted Language from Page 24343

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(7)) on welds in Inspection Items G, H, J, and K, (welds mitigated by inlay or cladding) that the ISI surface examination requirements of Table 1 should apply whether the inservice volumetric examinations are performed from the weld outside diameter or the weld inside diameter. Code Case N-770 only requires a surface examination for welds in Inspection Items G, H, J, and K if a volumetric examination is performed from the weld inside diameter surface. A volumetric examination performed from the weld outside diameter surface would not be capable of detecting flaws in an inlay or cladding. This condition is necessary to ensure that weld inlays or cladding are still performing their intended function of providing a protective barrier between the reactor coolant and the underlying Alloy 82/182 weld that is susceptible to PWSCC.

Code Case N-770-1, which has been approved by ASME, modified the "Extent and Frequency of Examination" column in Table 1 to state:

"...Twenty-five percent of this population shall receive surface examination (17) performed from the weld inside surface and a volumetric examination (16) performed from either the inside or outside surface."

This same modification was applied to Inspection Item G, H, J, and K.

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

7. Excerpted Language from Page 24343

The NRC also proposes, as part of a new condition as § 50.55a(g)(6)(ii)(F)(7), to require that all hot-leg operating temperature welds in Inspection Items G, H, J, and K (welds mitigated by inlay or cladding) be inspected each interval and that a 25 percent sample of cold leg operating temperature welds in Inspection Items G, H, J, and K be inspected whenever the core barrel is removed (unless it has already been

inspected within the past 10 years) or 20 years, whichever is less. Code Case N-770 permits welds in Inspection Items G, H, J, and K to be placed in a 25 percent sample inspection program under certain conditions after the required initial inspection. The NRC has performed analyses of crack growth in welds mitigated by Alloy 52/152 inlay or cladding using experimentally derived crack growth data for this weld material. The results of those analyses show that welds in Inspection Items G, H, J, and K at hot leg temperature have to be examined once per interval and welds at cold leg temperature have to be inspected under a sample inspection program to detect potentially significant crack growth. This condition is being proposed to ensure that ASME Code allowable limits would not be exceeded and PWSCC would not lead to leaks or ruptures.

Code Case N-770 requires that a preservice inspection and at least one inservice inspection be performed before a weld mitigated by inlay or onlay can be put in the 25% population. This would provide early crack detection and the detection of any fabrication induced cracks. Thereafter, the leading indicator approach is taken in that the hottest, most susceptible, welds are inspected each interval. If these show indications of new cracking or growth of existing cracks, then the additional and successive examination paragraphs of the Code Case would apply to expand the examination. This is consistent with the philosophy applied to all the other mitigation techniques employed in the Code Case.

The analysis performed by Battelle assumed that a crack was present and then grew. However, no experimental data has been produced that shows that a PWSCC crack can be initiated in Alloy 690 material. The performance of steam generator tubes made from Alloy 690 would also support the absence of PWSCC initiated cracks in this material. Hence, with two inspections performed prior to placing the hot leg inlays and onlays in the 25% population, and the inspection of the most susceptible welds each interval, this provides defense in depth for future cracking. Even with the extremely conservative assumptions employed in the Battelle analysis, Exelon believes that a cold leg inspection is not justified unless flaws are discovered in the hot leg welds, which is the approach taken in this Code Case.

8. Excerpted Language from Page 24343

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(8)) to prohibit the first examination following weld inlay, cladding, or stress improvement for Inspection Items D, G, and H from being deferred to the end of the interval. Code Case N-770 provides requirements on the timing of the first examination following weld inlay, cladding, or stress improvement. Inspection Items D, G, and H pertain to mitigation of cracked welds and the timing of the initial examinations in the code case has been specified in the code case so that the welds are not in service for an extended time period prior to the initial examination. However, the code case does not explicitly preclude deferral of these examinations to the end of the interval. Therefore, this NRC condition is needed to ensure that the initial examinations of welds in Inspection Items D, G, and H take place on an appropriate schedule to verify the effectiveness of the mitigation process.

Code Case N-770-1, which has been approved by ASME, modified Notes 11(b)(1) and (2) as follows:

"..11(b) Examinations of welds originally classified Table IWB-2500-1, Category B-F welds, Item Numbers B5.10, and B5.20 prior to mitigation, may be deferred following weld inlay, onlay, overlay, or stress improvement, as follows:

- (1) Examination for Inspection Item C may be deferred to the end of the interval and performed coincident with the vessel nozzle examinations required by Category B-D.*
- (2) The first examinations following weld inlay, onlay, weld overlay, or stress improvement for Inspection Items E through K shall be performed as specified. For Inspection Item D, the first examinations following stress improvement may be performed any time within 10 years following mitigation. Subsequent examinations for Inspection Items D through K may be performed coincident with the vessel nozzle examinations required by Category B-D."*

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

9. Excerpted Language from Pages 24343 and 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(9)) on Measurement or Quantification Criterion I-1.1 of Appendix I to require the assumption in the weld residual stress (WRS) analysis of a construction weld repair from the inside diameter to a depth of 50 percent of the weld thickness extending 360° around the weld. Measurement or Quantification Criterion I-1.1 does not specify the circumferential extent of the repair that must be assumed. This condition is necessary to clarify the size of the repair to be assumed in the weld residual stress analysis which would ensure that appropriate criteria for the WRS analysis are used for mitigation by stress improvement.

Code Case N-770-1, which has been approved by ASME, modified paragraph I-1.1 to read as follows:

"...A pre-stress improvement residual stress condition resulting from a construction weld repair from the inside surface to a depth of 50% of the weld thickness and extending for 360 deg. shall be assumed."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

10. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(10)) on Measurement or Quantification Criterion I-2.1 of Appendix I to require that the last sentence be replaced. This criterion was inappropriately worded since this criterion pertains to the permanence of a mitigation process by stress improvement and plastic "shakedown" rather than "ratcheting" is the phenomenon that could lead to stress relaxation. This condition is necessary to clarify the type of analysis necessary to ensure that the mitigation process is permanent and that the inspection frequencies associated with the process continue to be correct.

Code Case N-770-1, which has been approved by ASME, modified paragraph I-2.1 to read as follows:

"...The analysis or demonstration test shall account for (a) load combinations that could relieve stress due to shakedown and (b) any material properties related to stress relaxation over time."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

11. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(11)) to require that in applying Measurement or Quantification Criterion I-7.1 of Appendix I, an analysis be performed using IWB-3600 evaluation methods and acceptance criteria to verify that the mitigation process will not cause any existing flaws to grow. Measurement or Quantification Criterion I-7.1 permits the growth of existing flaws in welds mitigated by stress improvement. This is an inappropriate provision since the process of mitigating by stress improvement is intended to prevent growth of existing flaws which could lead to leakage or rupture of the weld. This condition is necessary to ensure that stress improvement of welds with existing flaws is an effective mitigation technique consistent with the inspection frequency in the code case.

Code Case N-770-1, which has been approved by ASME, modified paragraph I-7.1 to read as follows:

"...An analysis shall be performed using IWB-3600 evaluation methods and acceptance criteria to verify that the mitigation process will not result in any existing flaws to become unacceptable over the life of the weld, or before the next scheduled examination."

This wording will assure that stress improvement of welds with existing flaws is an effective mitigation technique consistent with the inspection frequency in the Code Case. It is also consistent with the Code Case methodology.

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

12. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(12)) to require that the NRC be provided with a report if the volumetric examination of any mitigated weld detects new flaws or growth of existing flaws that exceed the acceptance standards of IWB-3514 and are found to be acceptable for continued service through an analytical evaluation or a repair or the alternative requirements of an ASME code case. The report would summarize the evaluation, along with inputs, methodologies, assumptions, and cause of the new flaw or flaw growth and would be provided to the NRC prior to the weld being placed in service. Welds that are mitigated have been modified by a technique, such as weld inlays, cladding, or stress improvement. Mitigation techniques are designed to prevent new flaws from occurring and prevent the growth of any existing flaws. If volumetric examination detects new flaws or growth of existing flaws in the required examination volume, the mitigation will not be performing as designed and the NRC will need to evaluate the licensee's actions to address the problem. Therefore, this condition is needed to verify the acceptability of the weld prior to being placed back in service.

Submittal of this report to the NRC is appropriate.

13. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(13)) to require that the last sentence of the Extent and Frequency of Examination for Inspection Items C and F be revised. Inspection Items C and F apply to butt welds mitigated by full structural weld overlays of Alloy 52/152 material. Note 10 of the Code Case requires that welds in Inspection Items C and F that are not included in the 25 percent sample be examined prior to the end of the mitigation evaluation period if the plant is to be operated beyond that time. This condition would ensure that welds in the 25 percent sample are also examined prior to the end of the mitigation evaluation period; that is, prior to the end of life of the overlay predicted by the mitigation evaluation. Inspection prior to the end of the mitigation evaluation period is necessary to ensure that appropriate information has been obtained to verify the condition of the weld overlay and update the analysis for the predicted life of the weld overlay.

Code Case N-770-1, which has been approved by ASME, added the following sentence to the Extent and Frequency of Examination for Inspection Items C and F:

"...For each overlay in the 25% sample that has a design life of less than 10 yr., at least one inservice inspection shall be performed prior to exceeding the life of the overlay."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

14. Excerpted Language from Page 24344

50.55a(g)(6)(ii)(F)(14)) on the 1/2-inch (13 mm) dimension shown in Figures 2(b) and 5(b) of Code Case N-770. The condition would require that a dimension "b" be used instead of c inch, where "b" is equivalent to the nominal thickness of the nozzle or pipe being overlaid, as appropriate. The code case contains information on component thicknesses to be used in application of the acceptance standards of ASME B&PV Code, Section XI, IWB-3514, to evaluate flaws detected during preservice inspection of weld overlays. The 1/2-inch (13 mm) dimension shown in Figures 2(b) and 5(b) is nonconservative. The appropriate dimension is a function of the nominal thickness of the nozzle or pipe being overlaid and not a single specified value for all pipes and nozzles. This condition is necessary to ensure that acceptance standards used for evaluation of any flaws detected during preservice inspection of weld overlays assure an appropriate level of safety.

Code Case N-770-1, which has been approved by ASME, removed the 1/2-inch (13 mm) dimension shown in Figures 2(b) and 5(b) of Code Case N-770 and replaced them with dimensions "X" and "Y". The notes beneath each figure define dimensions "X" and "Y" as follows:

"Dimension "x" or "y" is equivalent to the nominal thickness of the nozzle end preparation or the pipe, respectively, being overlaid."

Therefore, Exelon believes that NRC adoption of Code Case N-770-1 would eliminate the need for this condition.

15. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(15)) on the use of the acceptance standards of ASME B&PV Code, Section XI, IWB-3514, for evaluating indications in inlays or onlays. The proposed condition specifies that the thickness "t" in IWB-3514 is the thickness of the inlay or onlay. The code case requires that the preservice examination for inlays or onlays consist of a surface examination, which does not allow planar flaws, and a volumetric examination. The volumetric examination allows the use of the acceptance standards of IWB-3514 provided the surface examination acceptance standards are satisfied. That is, it would allow the acceptance of some subsurface indications, but IWB-3514 acceptance standards would only allow very small flaws. However, the code case does not specify the value "t" to be used in the application of IWB-3514. The appropriate value "t" when applying IWB-3514 to inlays or onlays is the thickness of the inlay or onlay, since the acceptance standards in this case only apply to accepting flaws within the inlay or onlay. This condition is necessary to preclude the misapplication of the acceptance standards of IWB-3514 and potential acceptance of flaws that could compromise the integrity and function of the inlay or onlay as a protective barrier.

Note 15(e) does not explicitly define the value of "t." However, the wording seems to imply that when evaluating flaws in the inlay/onlay, the thickness of the inlay/onlay is the "t" to be used and when evaluating flaws in the base material, the base material

thickness is "t." Exelon believes these definitions could be added to note 15(e) in a future revision to Code Case N-770, precluding the need to impose this condition.

16. Excerpted Language from Page 24344

The NRC proposes to add a condition (§ 50.55a(g)(6)(ii)(F)(16)) on welds mitigated by stress improvement by welding in Inspection Items D and E to not permit them to be placed into a population to be examined on a sample basis after the initial examination. Stress improvement by welding is also called an optimized weld overlay. Code Case N-770 permits welds mitigated by this technique to be placed in a 25 percent inspection sample after the initial examination. Sample inspections could result in three-quarters of the welds never being examined after the initial examination. Although full structural weld overlays have been used extensively in the nuclear industry for many years, the industry does not have experience with optimized weld overlays. Optimized weld overlays are designed to rely on the outer 25 percent of the original Alloy 82/182 material to satisfy the design margins and would not satisfy design margins if significant cracking were to occur. If significant cracking were to occur in the Alloy 82/182 material, the optimized weld overlay material would prevent the weld from leaking and could potentially rupture without prior evidence of leakage under design basis conditions. The proposed condition is necessary to ensure that all optimized weld overlays are periodically inspected for potential degradation.

Code Case N-770 requires that a preservice inspection and at least one inservice inspection be performed before a weld mitigated by an optimized overlay can be put in the 25% population. This would provide early crack detection and the detection of any fabrication induced cracks. Thereafter, the leading indicator approach is taken in that the hottest, most susceptible, welds are inspected each interval. If these show indications of new cracking or growth of existing cracks, then the additional and successive examination paragraphs of the Code Case would apply to expand the examination. Exelon believes that this is consistent with the philosophy applied to all the other mitigation techniques employed in the Code Case.