Mr. Oliver D. Kingsley, President October 22, 2001
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 - RELIEF REQUESTS NOS. CR-22 AND CR-23 (TAC NOS. MB2115 AND MB2116)

Dear Mr. Kingsley:

By letter dated May 23, 2001, Exelon Generation Company, LLC (EGC or the licensee) submitted two requests for relief from certain American Society of Mechanical Engineers (ASME) Code Section XI requirements for Dresden Nuclear Power Station, Units 2 and 3. Specifically, the licensee requested relief for training of personnel to perform ultrasonic testing (UT) (Relief Request CR-22) and relief for statistical parameters used for UT qualifications (Relief Request CR-23). In accordance with 10 CFR 50.55a(a)(3)(i) the licensee proposed alternatives to existing ASME Code Section XI requirements.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and determined that the proposed alternatives contained in Relief Request CR-22 and Relief Request CR-23 will provide an acceptable level of quality and safety. Therefore, the licensee's proposed alternatives are authorized in accordance with 10 CFR 50.55a(a)(3)(i) for the third 10-year inservice inspection interval for Dresden Nuclear Power Station, Units 2 and 3.

The enclosed safety evaluation contains the basis for this determination. This completes the staff's effort for TAC Nos. MB2115 and MB2116.

Sincerely,

/RA/

Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosure: Safety Evaluation

cc w/encl: See next page

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* Concurred by Safety Evaluation dated 8/20/01, no significant changes made
** See Previous Concurrence Sheet

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUESTS NOS. CR-22 AND CR-23

EXELON GENERATION COMPANY, LLC

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) will meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The inservice inspection Code of record for Dresden Nuclear Power Station (DNPS), Units 2 and 3, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code for both units. The third 10-year interval for Units 2 and 3 began March 1, 1992.

By letter dated May 23, 2001, Exelon Generation Company, LLC (the licensee), requested relief from certain ultrasonic testing (UT) requirements pertaining to UT performance qualification and examinations for the third 10-year ISI interval at DNPS. Specifically, the licensee's request for relief CR-22 proposed conducting annual UT training in accordance with 10 CFR 50.55a(b)(2)(xiv) and CR-23 proposed a change in the statistical parameters used to evaluate qualifications of UT personnel and procedures.

2.0 RELIEF CR-22, SUBSUBARTICLE VII-4240 ANNUAL TRAINING FOR UT PERSONNEL

2.1 Code Requirements for which Relief is Requested

The licensee is requesting relief from the 1995 Edition with 1996 Addenda, Appendix VII to Section XI of the Code, Subsubarticle VII-4240 for all UT personnel. Subsubarticle VII-4240 requires a minimum of 10 hours of annual UT training.

2.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed conducting annual UT training in accordance with 10 CFR 50.55a(b)(2)(xiv) in lieu of Subsubarticle VII-4240 of Section XI of ASME Code, 1995 Edition with 1996 Addenda, Appendix VII. The annual ultrasonic training would require that all personnel qualified for performing ultrasonic examinations in accordance with Section XI of the ASME Code, Appendix VIII, receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

2.3 Licensee's Bases for Requesting Relief (as stated)

On September 22, 1999, the NRC published a final rule in the *Federal Register* (64 FR 51370) to amend 10 CFR 50.55a(b)(2), to incorporate by reference the 1995 Edition and addenda through the 1996 Addenda, of Section XI of ASME Code. The change included the requirement to have a minimum of 10 hours of annual training contained in Subsubarticle VII-4240 of Section XI of ASME Code.

Additionally, the September 22, 1999, *Federal Register* notice amended 10 CFR 50.55a(b)(2)(xiv). The amended 10 CFR 50.55a(b)(2)(xiv) requires that all personnel qualified to perform ultrasonic examinations in accordance with Appendix VIII of the ASME Code shall receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be taken no earlier than 6 months prior to performing examinations at a licensee's facility. Paragraph 2.4.1.1.1 in the *Federal Register* notice contained the following statement which includes a discussion of the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) program.

> The NRC had determined that this requirement (10 hours of training on an annual basis) was inadequate for two reasons. The first reason was that the training does not require laboratory work and examination of flawed specimens. Signals can be difficult to interpret and, as detailed in the regulatory analysis for this rulemaking, experience and studies indicate that the examiner must practice on a frequent basis to maintain the capability for proper interpretation. The second reason is related to the length of training and its frequency. Studies have shown that an examiner's capability begins to diminish within approximately 6 months if skills are not maintained. Thus, NRC had determined that 10 hours of annual training is not sufficient practice to maintain skills, and that an examiner must practice on a more frequent basis to maintain proper skill level. The PDI program has adopted a requirement for 8 hours of

training, but it is required to be hands-on practice. In addition, the training must be taken no earlier than 6 months prior to performing examinations at a licensee's facility. PDI believes that 8 hours will be acceptable relative to an examiner's abilities in this highly specialized skill area because personnel can gain knowledge of new developments, material failure modes, and other pertinent technical topics through other means. Thus, the NRC has decided to adopt in the Final Rule the PDI position on this matter. These changes are reflected in 50.55a(b)(2)(xiv) of the final rule.

Implementation of the training requirements contained in Subsubarticle VII-4240 of Section XI of ASME Code, 1995 Edition with the 1996 Addenda, Appendix VII and 10 CFR 50.55a(b)(2)(xiv) will result in redundant training programs.

2.4 Evaluation

Subsubarticle VII-4240, Appendix VII of Section XI of the Code requires 10 hours of annual training to impart knowledge of new developments, material failure modes, and any pertinent technical topics as determined by the licensee. No hands-on training or practice is required to be included in the 10 hours of training. This training is required of all UT personnel qualified to perform examinations of ASME Code Class 1, 2, and 3 components. Independent of the ASME Code, 10 CFR 50.55a(b)(2)(xiv) imposes the requirement for Appendix VIII qualification that 8 hours of hands-on training with flawed specimens containing cracks be performed no earlier than 6 months prior to performing examinations at a licensee's facility. The licensee contends that maintaining two separate UT annual training programs for Appendix VIII and non-Appendix VIII qualifications create redundancies in training programs.

As part of the staff's rulemaking effort to revise 10 CFR 50.55a(b)(2), the issue of UT annual training requirements was reviewed. This review was included in the summary of comments to the rule that was published in the *Federal Register* on September 22, 1999, (64 FR 51370). In the review, the staff determined that the 10 hours of annual training requirement specified in the ASME Code was inadequate for the two reasons quoted in the licensee's basis for relief (Section 2.3 above). In resolving public comment to the rulemaking, the staff adopted a recommendation advanced by the nuclear power industry which proposed 8 hours of hands-on practice with specimens containing cracks. This practice would occur no earlier than 6 months prior to performing examinations at a licensee's facility. These recommendations were accepted by NRC and are reflected in 10 CFR 50.55a(b)(2)(xiv). The staff has determined that the proposed alternative to use 10 CFR 50.55a(b)(2)(xiv) in lieu of Subsubarticle VII-4240 will maintain the skill and proficiency of UT personnel at or above the level provided in the Code for annual UT training, thereby, providing an acceptable level of quality and safety.

2.5 Conclusion

Based on the discussion above, the staff concludes that the proposed alternative to use the requirements in 10 CFR 50.55a(b)(2)(xiv) in lieu of Subsubarticle VII-4240 for annual UT training will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative CR-22 is authorized for the third 10-year ISI interval for Dresden, Units 2 and 3.

3.0 RELIEF CR-23, APPENDIX VIII, SUPPLEMENT 4, DEPTH SIZING QUALIFICATION TOLERANCE

3.1 Code Requirements for which Relief is Requested

The licensee is requesting relief from the 1995 Edition with 1996 Addenda, Appendix VIII to Section XI of the ASME Code, Supplement 4, Subparagraph 3.2(c).

3.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative is to use the root mean square (RMS) calculations of Subparagraph 3.2(a) of Section XI of the ASME Code, Appendix VIII, Supplement 4, which utilize an RMS value of 0.15 [inch] depth and the RMS calculations of Subparagraph 3.2(b), which utilize an RMS value of 0.75 [inch] length in lieu of the statistical parameters of Subparagraph 3.2(c) of Section XI of the ASME Code, Appendix VIII, Supplement 4. The request is for the third 10-year ISI interval for Units 2 and 3.

3.3 Licensee's Bases for Requesting Relief (as stated)

> The statistical parameters to be used in flaw sizing specified in subparagraph 3.2(c) of Section XI of ASME Code, 1995 Edition with the 1996 Addenda, Appendix VIII, Supplement 4 rely upon the depth sizing acceptance criteria used in Subparagraph 3.2(a) and the length sizing acceptance criteria used in Subparagraph 3.2(b). For Supplement 4 UT performance demonstrations, the linear regression line of the data required by Subparagraph 3.2(c) is not applicable because the performance demonstrations are performed on test specimens with flaws located on the inner 15 percent through-wall. Additionally, the Subparagraph 3.2(c) specified value for evaluating the mean deviation of flaw depth is not restrictive enough for evaluating flaw depths within the inner 15 percent of wall thickness. We proposed to use the 10 CFR 50.55a(b)(2)(xv)(C)(1) RMS calculations of Subparagraph 3.2(a), which utilizes an RMS value of 0.15 inch depth and the RMS calculations of Subparagraph 3.2(b), which utilizes an RMS value of 0.75 inch length in lieu of the statistical parameters of 3.2(c).

3.4 Evaluation

Supplement 4, Subparagraph 3.2(c), requires that the UT performance demonstration results be plotted on a two-dimensional plot with the measured depth plotted along the ordinate axis and the true depth plotted along the abscissa axis. For qualification, the plot must satisfy the following statistical parameters: (1) slope of the linear regression line is not less than 0.7, (2) the mean deviation of flaw depth is less than 0.25 inches, and (3) correlation coefficient is not less than 0.70.

The licensee proposed eliminating the use of Supplement 4, Subparagraph 3.2(c) which imposes three statistical parameters for depth sizing. The first parameter, 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual versus true value plotted along a through-wall thickness. For Supplement 4 performance

demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the inner 15 percent through-wall. The differences between actual versus true value produce a tight grouping of results which resemble a shot gun pattern. The slope of a regression line from such data is extremely sensitive to small variations, thus making the parameter of Subparagraph 3.2(c)(1) a poor and inappropriate, acceptance criterion. The second parameter, 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, the licensee proposed to use the more appropriate criterion of 0.15 inch RMS of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies Subparagraph 3.2(a), as the acceptance criterion. The third parameter, 3.2(c)(3), pertains to a correlation coefficient. The value of the correlation coefficient in Subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from Subparagraph 3.2(c)(1).

PDI was aware of the inappropriateness of Subparagraph 3.2(c) early in the development of their program. They brought the issue before the appropriate ASME committee which formalized eliminating the use of Supplement 4, Subparagraph 3.2(c) in Code Case N-622. The NRC staff representatives participated in the discussions and consensus process of the code case. Based on the above, the NRC staff believes that the use of Subparagraph 3.2(c) requirements in this context is inappropriate and that the proposed alternative to use the RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1) in lieu of Subparagraph 3.2(c), will provide an acceptable level of quality and safety.

3.5 Conclusion

Based on the discussion above, the staff has concluded that the proposed alternative RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the depth sizing criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a) and the length sizing criterion of Appendix VIII, Supplement 4 Subparagraph 3.2(b) in lieu of Subparagraph 3.2(c) will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative CR-23 is authorized for the third 10-year ISI interval for DNPS, Units 2 and 3.

4.0 CONCLUSION

The staff has reviewed the licensee's submittal and determined that the proposed alternatives contained in Relief Request CR-22 and Relief Request CR-23 provide an acceptable level of quality and safety. Therefore, the licensee's proposed alternatives are authorized in accordance with 10 CFR 50.55a(a)(3)(i) for the licensee's third ISI interval for DNPS, Units 2 and 3.

Principal Contributor: D. Naujock, EMCB

Date: October 22, 2001