August 25, 2000

Mr. Oliver D. Kingsley, President
Nuclear Generation Group
Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: DRESDEN - EXEMPTION FROM THE REQUIREMENTS OF 10 CFR PART 50, SECTION 50.60(a) AND APPENDIX G (TAC NOS. MA8353 AND MA8354)

Dear Mr. Kingsley:

The Commission has approved the enclosed exemption from specific requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section 50.60(a) and Appendix G, for the Dresden Nuclear Power Station, Units 2 and 3 (Dresden). This action is in response to your letter of February 23, 2000, that submitted new pressure-temperature (P-T) limits for Dresden. The new P-T limits were developed using the methodologies in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Cases N-588, "Alternative to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessels, Section XI, Division 1," and N-640, "Alternative Reference Fracture Toughness for Development of P-T Limit Curves for ASME Section XI, Division 1," which modify the methods of the ASME Code, Section XI, Appendix G.

Your letter of February 23, 2000, also included a request to amend your license to change certain Technical Specifications. That request is being handled as a separate action.

A copy of the Exemption and the supporting Safety Evaluation is enclosed. The Exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA/

Lawrence W. Rossbach, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosures: 1. Exemption
2. Safety Evaluation

cc w/encls: See next page

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The Commission has approved the enclosed exemption from specific requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section 50.60(a) and Appendix G, for the Dresden Nuclear Power Station, Units 2 and 3 (Dresden). This action is in response to your letter of February 23, 2000, that submitted new pressure-temperature (P-T) limits for Dresden. The new P-T limits were developed using the methodologies in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Cases N-588, "Alternative to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessels, Section XI, Division 1," and N-640, "Alternative Reference Fracture Toughness for Development of P-T Limit Curves for ASME Section XI, Division 1," which modify the methods of the ASME Code, Section XI, Appendix G.

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7590-01-P

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
COMMONWEALTH EDISON COMPANY	)	Docket Nos. 50-237 and 50-249
	)	
(Dresden Nuclear Power Station, Units 2 and 3)	)	

EXEMPTION

I.

The Commonwealth Edison Company (ComEd, the licensee) is the holder of Facility Operating Licenses Nos. DPR-19 and DPR-25 which authorize operation of the Dresden Nuclear Power Station, Units 2 and 3 (Dresden). The licenses provide, among other things, that the facility is subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (the Commission) now or hereafter in effect.

The facility consists of boiling water reactors (Units 2 and 3) located on the licensee's Dresden site in Grundy County, Illinois. This exemption refers to both units.

II.

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix G, requires that pressure-temperature (P-T) limits be established for reactor pressure vessels (RPVs) during normal operating and hydrostatic or leak rate testing conditions. Specifically, 10 CFR Part 50, Appendix G states, "The appropriate requirements on both the pressure-temperature limits and the minimum permissible temperature must be met for all conditions." Appendix G of 10 CFR Part 50 specifies that the PT limits must meet the safety margin requirements specified in the

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Appendix G.

To address provisions of the proposed amendments to the technical specification (TS) P-T limits, in its submittal of February 23, 2000, the licensee requested that the staff exempt Dresden from application of specific requirements of 10 CFR Part 50, Section 50.60(a) and Appendix G, and substitute use of ASME Code Cases N-588 and N-640. Code Case N-588 permits the postulation of a circumferentially-oriented flaw (in lieu of an axially-oriented flaw) for the evaluation of the circumferential welds in RPV P-T limit curves. Since the pressure stresses on a circumferentially-oriented flaw are lower than the pressure stresses on an axially-oriented flaw by a factor of two, using Code Case N-588 for establishing the P-T limits would be less conservative than the methodology currently endorsed by 10 CFR Part 50, Appendix G and, therefore, an exemption to apply the Code Case would be required by 10 CFR 50.60(a). Code Case N-640 permits the use of an alternate reference fracture toughness (K_{1c} fracture toughness curve instead of K_{1a} fracture toughness curve) for reactor vessel materials in determining the P-T limits. Since the K_{1c} fracture toughness curve shown in ASME Code, Section XI, Appendix A, Figure A-2200-1 provides greater allowable fracture toughness than the corresponding K_{1a} fracture toughness curve of ASME Code, Section XI, Appendix G, Figure G-2210-1 (the K_{1a} fracture toughness curve), using Code Case N-640 for establishing the P-T limits would be less conservative than the methodology currently endorsed by 10 CFR Part 50, Appendix G and, therefore, an exemption to apply the Code Case would also be required by 10 CFR 50.60(a).

Code Case N-588

The licensee has proposed an exemption to allow the use of ASME Code Case N-588 in conjunction with ASME Code, Section XI, 10 CFR 50.60(a) and 10 CFR Part 50, Appendix G, to determine the P-T limits.

The proposed amendments to revise the P-T limits for Dresden rely, in part, on the requested exemption. These proposed P-T limits have been developed using the postulation of a circumferentially-oriented reference flaw as the limiting flaw in a RPV circumferential weld in lieu of an axially-oriented flaw required by the 1989 Edition of ASME Code, Section XI, Appendix G.

Postulating the Appendix G (axially-oriented flaw) reference flaw in a circumferential weld is physically unrealistic and overly conservative because the length of the flaw would extend well beyond the girth of the circumferential weld and into the adjoining base metal material. Industry experience with the repair of weld indications found during preservice inspection, and data taken from destructive examination of actual vessel welds, confirms that any remaining flaws are small, laminar in nature, and do not transverse the weld bead orientation. Therefore, any potential defects introduced during the fabrication process, and not detected during subsequent nondestructive examinations, would only be expected to be oriented in the direction of weld fabrication. A defect with a circumferential orientation is, therefore, postulated for circumferential welds.

An analysis provided to the ASME Code's Working Group on Operating Plant Criteria (WGOPC) (in which Code Case N-588 was developed) indicated that if an axial flaw is postulated on a circumferential weld, then based on the correction factors for membrane stress (M_m) given in the Code Case for the inside diameter circumferential (0.443) and axial (0.926) flaw orientations, it is equivalent to applying a safety factor of 4.18 on the pressure loading under normal operating conditions. Appendix G requires a safety factor of two on the contribution of the pressure load in the case of an axially-oriented flaw in an axial weld, shell plate, or forging. By postulating a circumferentially-oriented flaw on a circumferential weld and using the appropriate stress magnification factor, the margin of two (1.5 for pressure testing condition) is maintained for the contribution of the pressure load to the integrity calculation of the circumferential weld. Consequently, the staff determined that the postulation of an axially-oriented flaw on a circumferential RPV weld is a level of conservatism that is not required to establish P-T limits to protect the reactor coolant system (RCS) pressure boundary from failure during pressure testing and normal operations, including heatup, cooldown, and anticipated operational transients.

In summary, the ASME Code, Section XI, Appendix G, procedure was developed for axially-oriented flaws, which is physically unrealistic and overly conservative for postulating flaws of this orientation to exist in circumferential welds. Hence, the NRC staff concurs that relaxation of the ASME Code, Section XI, Appendix G, requirements by application of ASME Code Case N-588 is acceptable and would maintain, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety.

Code Case N-640 (formerly Code Case N-626)

The licensee has proposed an exemption to allow the use of ASME Code Case N-640 in conjunction with ASME Code, Section XI; 10 CFR 50.60(a); and 10 CFR Part 50, Appendix G, to determine P-T limits.

The proposed amendments to revise the P-T limits for Dresden rely in part on the requested exemption. These revised P-T limits have been developed using the K_{1c} fracture toughness curve, in lieu of the K_{1a} fracture toughness curve, as the lower bound for fracture toughness.

Use of the K_{1c} curve in determining the lower bound fracture toughness in the development of P-T operating limits curve is more technically correct than use of the K_{1a} curve since the rate of loading during a heatup or cooldown is slow and is more representative of a static condition than a dynamic condition. The K_{1c} curve appropriately implements the use of static initiation fracture toughness behavior to evaluate the controlled heatup and cooldown process of a reactor vessel. The staff has required use of the initial conservatism of the K_{1a} curve since 1974 when the curve was codified. This initial conservatism was necessary due to the limited knowledge of RPV materials. Since 1974, additional knowledge has been gained about RPV materials, which demonstrates that the lower bound on fracture toughness provided by the K_{1a} curve is well beyond the margin of safety required to protect the public health and safety from potential RPV failure. In addition, P-T curves based on the K_{1c} curve would enhance overall plant safety by opening the P-T operating window with the greatest safety benefit in the region of low temperature operations.

Since the RCS P-T operating window is defined by the P-T operating and test limit curves developed in accordance with the ASME Code, Section XI, Appendix G, continued operation of Dresden with these P-T curves without the relief provided by ASME Code Case N-640 would unnecessarily require that the RPV maintain a temperature exceeding 212 degrees Fahrenheit in a limited operating window during pressure tests. Consequently, steam vapor hazards would continue to be one of the safety concerns for personnel conducting inspections in primary containment. Implementation of the proposed P-T curves, as allowed by ASME Code Case N-640, does not significantly reduce the margin of safety and would eliminate steam vapor hazards by allowing inspections in primary containment to be conducted at lower coolant temperature. Thus, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the regulation will continue to be served.

In summary, the ASME Code, Section XI, Appendix G, procedure was conservatively developed based on the level of knowledge existing in 1974 concerning RPV materials and the estimated effects of operation. Since 1974, the level of knowledge about these topics has been greatly expanded. The NRC staff concurs that this increased knowledge permits relaxation of the ASME Code, Section XI, Appendix G, requirements by application of ASME Code Case N-640, while maintaining, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety.

III.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50, when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. The staff accepts the licensee's determination that the exemption would be required to approve the use of Code Cases N-588 and N-640. The staff examined the licensee's rationale to support the exemption requests and concurred that the use of the code cases would meet the underlying intent of these regulations. Based upon a consideration of the conservatism that is explicitly incorporated into the methodologies of 10 CFR Part 50, Appendix G; Appendix G of the ASME Code; and Regulatory Guide 1.99, Revision 2, the staff concludes that application of the code cases as described would provide an adequate margin of safety against brittle failure of the RPV and that application of the specific requirements of

10 CFR 50.60(a) and Appendix G in these circumstances is not necessary to achieve the underlying purpose of the rules. This is also consistent with the determination that the staff has reached for other licensees under similar conditions based on the same considerations (Quad Cities Nuclear Power Station, Units 1 and 2, exemption dated February 4, 2000). Therefore, the staff concludes that requesting an exemption under the special circumstances of 10 CFR 50.12(a)(2)(ii) is appropriate and that the methodology of Code Cases N-588 and N-640 may be used to revise the P-T limits for Dresden Nuclear Power Station, Units 2 and 3.

IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not endanger life or property or common defense and security, and is, otherwise, in the public interest, and that special circumstances are present. Therefore, the Commission hereby grants Commonwealth Edison Company an exemption from the requirements of 10 CFR Part 50, Section 50.60(a) and 10 CFR Part 50, Appendix G, for Dresden Nuclear Power Station, Units 2 and 3.

Pursuant to 10 CFR 51.32, an environmental assessment and finding of no significant impact has been prepared and published in the Federal Register (65 FR 51344). Accordingly, based upon the environmental assessment, the Commission has determined that the granting of this exemption will not result in any significant effect on the quality of the human environment.

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

John A. Zwolinski, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 25th day of August 2000

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AN EXEMPTION FROM THE REQUIREMENTS OF

10 CFR PART 50, SECTION 60(a) AND APPENDIX G

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

On February 23, 2000, the Commonwealth Edison Company (ComEd, the licensee) submitted a license amendment request to update the pressure-temperature (P-T) limit curves for the Dresden Nuclear Power Station, Units 2 and 3 (Reference 1). In this February 23, 2000, submittal, ComEd also requested NRC approval for exemptions to use two Code Cases, N-588 and N-640, as methods that would allow ComEd to deviate from complying with the requirements in 10 CFR 50.60(a) and Appendix G, for generating the P-T limit curves. Requests for such exemptions are allowed pursuant to 10 CFR 50.60(b), which allows licensees to use alternatives to the requirements of 10 CFR Part 50, Appendices G and H, if an exemption to use the alternatives is granted by the Commission pursuant to 10 CFR 50.12. According to 10 CFR 50.12, the Commission may, upon request, grant exemptions to the requirements of 10 CFR Part 50, if the exemptions are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. In considering the exemptions, the Commission will not consider granting exemptions unless special circumstances are present. These special circumstances include, but are not limited to, the following special cases:

- pursuant to 10 CFR 50.12(a)(2)(ii), the circumstance that application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule, and

- pursuant to 10 CFR 50.12(a)(2)(iii), the circumstance that compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated, and

- pursuant to 10 CFR 50.12(a)(2)(vi), the circumstance that there is present any other material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption.

2.0 BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) has established requirements in 10 CFR Part 50, Appendix G, to protect the integrity of the reactor coolant pressure boundary in nuclear power plants. The Appendix to Part 50 requires the P-T limits for an operating plant to be at least as conservative as those that would be generated if the methods of Appendix G to Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) (Appendix G to the Code) were applied. The methodology of Appendix G to the Code postulates the existence of a sharp surface flaw in the reactor pressure vessel (RPV) that is normal to the direction of the maximum applied stress. For materials in the beltline and upper and lower head regions of the RPV, the maximum flaw size is postulated to have a depth that is equal to one-fourth of the RPV beltline thickness and a length equal to 1.5 times the RPV beltline thickness. For the case of evaluating RPV nozzles, the surface flaw is postulated to propagate parallel to the axis of the nozzle's corner radius. The basic parameter in Appendix G to the Code for calculating P-T limit curves is the stress intensity factor, K_1, which is a function of the stress state and flaw configuration. The methodology requires that licensees determine the reference stress intensity (K_{1a}) factors, which vary as a function of temperature, from the reactor coolant system (RCS) operating temperatures, and from the adjusted reference temperatures (ARTs) for the limiting materials in the RPV. Thus, the critical locations in the RPV beltline and head regions are the 1/4-thickness (1/4T) and 3/4-thickness (3/4T) locations, which correspond to the points of the crack tips if the flaws are initiated and grown from the inside and outside surfaces of the vessel, respectively. Regulatory Guide (RG) 1.99, Revision 2, provides an acceptable method of calculating ARTs for ferritic RPV materials; the methods of RG 1.99, Revision 2, include methods for adjusting the ARTs of materials in the beltline region of the RPV, where the effects of neutron irradiation may induce an increased level of embrittlement in the materials.

The methodology of Appendix G requires that P-T curves must satisfy a safety factor of 2.0 on primary membrane and bending stresses during normal plant operations (including heatups, cooldowns, and transient operating conditions), and a safety factor of 1.5 on primary membrane and bending stresses when leak rate or hydrostatic pressure tests are performed on the RCS. Table 1 to 10 CFR Part 50, Appendix G provides the staff's criteria for meeting the P-T limit requirements of Appendix G to the Code and 10 CFR Part 50, Appendix G.

3.0 EVALUATION

3.1 Exemption to Use Code Case N-588

ComEd has requested, pursuant to 10 CFR 50.60(b), an exemption to use Code Case N-588 as the basis for evaluating the axial and circumferential welds in the Dresden RPVs. The current methods of Appendix G to the Code mandate consideration of an axial flaw in full penetration RPV welds and, thus, for circumferential welds, dictate that the flaw be oriented transverse to the axis of the weld. Postulation of an axial weld in a circumferential weld is unrealistic because the length of the flaw would extend well beyond the girth of the circumferential weld and into the adjoining base metal material. Industry experience with the repair of weld indications found during preservice inspection, and data taken from destructive examination of actual vessel welds, confirms that any remaining flaws are small, laminar in nature, and do not transverse the weld bead orientation. Therefore, any potential defects introduced during the fabrication process, and not detected during subsequent nondestructive examinations, would only be expected to be oriented in the direction of weld fabrication. For circumferential RPV welds, the methods of the Code Case, therefore, postulate the presence of flaw that is oriented in a direction parallel to the axis of the weld (i.e., in a circumferential orientation).

An analysis provided to the ASME Code's Working Group on Operating Plant Criteria (WGOPC) (in which Code Case N-588 was developed) indicated that if an axial flaw is postulated on a circumferential weld, then based on the correction factors for membrane stress (M_m) given in the Code Case for the inside diameter circumferential (0.443) and axial (0.926) flaw orientations, it is equivalent to applying a safety factor of 4.18 on the pressure loading under normal operating conditions.[1] Appendix G to the Code only requires that a safety factor of two be placed on the contribution of the pressure load in the case of an axially-oriented flaw in an axial weld, shell plate, or forging. By postulating a circumferentially-oriented flaw on a circumferential weld and using the appropriate correction factor, the margin of two (1.5 for pressure testing conditions) is maintained for the contribution of the pressure load to the integrity calculation of the circumferential weld. Consequently, the staff determined that the postulation of an axially-oriented flaw on a circumferential RPV weld is a level of conservatism that is not required to establish P-T limits to protect the RCS pressure boundary from failure during hydrostatic testing, heatup, and cooldown. For this reason, the methods of the Code Case provide for a reduction in the applied stress intensities for primary membrane and bending stresses for the circumferential flaw by a factor of approximately two ($\approx$ 0.926/0.443).[2] This is realistic since the postulated circumferential flaw in the vessel will propagate if a stress is applied in a direction normal to the axis of the flaw (i.e., by application of an axially oriented stress that results in Mode I crack propagation of the circumferential flaw). Such tensile stresses in the RPVs are typically about half the magnitudes of the corresponding membrane stresses.

The Code Case method for evaluating axially oriented flaws postulated in axial welds or base metal materials does not deviate from the methods for evaluating them in the 1995 Edition of Appendix G to the Code. Thus, application of Code Case N-588 will only matter if the Code Case is applied for the case where a circumferential weld is the most limiting material in the beltline region of the BWR designed RPV. Since application of the Code Case methods allow licensees to reduce the stress intensities attributed to the circumferential weld, the net effect of the Code Case would allow ComEd to use the next most limiting base metal or axial weld material in the RPV as the basis for evaluating the vessel and generating the P-T limit curves. In this case, the Code Case is really relevant to the evaluation of the Dresden, Unit 3, RPV,

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1 The margin of safety of 4.18 is arrived at by dividing 0.926 by 0.443 and then multiplying by the required safety factor of two.

2 The Code Case accomplishes this by reducing the M_m factors for circumferential welds that are used for calculations of the stress intensities attributed to primary membrane stresses (K_{1m}) and primary bending stresses (K_{1b}). As stated previously, for RPVs with wall thicknesses in the range of 4.0-12.0 inches, the M_m factor for circumferential welds is 0.443. This is the normal wall thickness range for GE designed boiling water reactors.

which is limited in the beltline region by the circumferential weld (Heat No. 299L44) between the lower and lower-intermediate vessel shells. The net effect of the Code Case results in shifting the basis for evaluating the beltline of the Dresden, Unit 3, RPV to the axial welds fabricated from Heat No. PQ1300. The Code Case does not affect the evaluation of the beltline region for the Dresden, Unit 2, RPV, which is limited by the axial welds fabricated from material heat No. PQ1092C-2. WGOPC has concluded that application of Code Case N-588 to plant P-T limits is still sufficient to ensure the structural integrity of RPVs during plant operations. The staff has concurred with WGOPC's determination and has previously granted exemptions to use Code Case N-588 for the Quad Cities Nuclear Power Station (i.e., in the NRC letter to ComEd dated February 4, 2000, Reference 2). By letter of February 4, 2000, the staff concluded that the procedure in Appendix G to the Code was developed for axially oriented flaws and that such a procedure was physically unrealistic and overly conservative for postulating flaws of this orientation. The staff also concluded that relaxation of the requirements of Appendix G to the Code by application of Code Case N-588 is acceptable and would maintain, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety for the Quad Cities RPVs and reactor coolant pressure. ComEd's proposal to use Code N-588 for generation of the Dresden P-T limit curves is predicated on the same technical basis as was used for generation of the Quad Cities P-T limits. The staff, therefore, concludes that Code Case N-588 is acceptable for application to the Dresden P-T limits.

3.2 Exemption to Use Code Case N-640

ComEd has requested, pursuant to 10 CFR 50.60(b), an exemption to use ASME Code Case N-640 (previously designated as Code Case N-626) as the basis for establishing the P-T limit curves. Code Case N-640 permits application of the lower bound static initiation fracture toughness value equation (K_{1c} equation) as the basis for establishing the curves in lieu of using the lower bound crack arrest fracture toughness value equation (i.e., the K_{1a} equation, which is based on conditions needed to arrest a dynamically propagating crack, and which is the method invoked by Appendix G to Section XI of the ASME Code). Use of the K_{1c} equation in determining the lower bound fracture toughness in the development of the P-T operating limits curve is more technically correct than the use of the K_{1a} equation since the rate of loading during a heatup or cooldown is slow and is more representative of a static condition than a dynamic condition. The K_{1c} equation appropriately implements the use of the static initiation fracture toughness behavior to evaluate the controlled heatup and cooldown process of a reactor vessel. The staff has required use of the initial conservatism of the K_{1a} equation since 1974 when the equation was codified. This initial conservatism was necessary due to the limited knowledge of RPV materials. Since 1974, additional knowledge has been gained about RPV materials, which demonstrates that the lower bound on fracture toughness provided by the K_{1c} equation is well beyond the margin of safety required to protect the public health and safety from potential RPV failure. In addition, P-T curves based on the K_{1c} equation will enhance overall plant safety by opening the P-T operating window with the greatest safety benefit in the region of low temperature operations.

Generating the RCS P-T limit curves developed in accordance with Appendix G to the Code, without the relief provided by ASME Code Case N-640, would unnecessarily require the RPV to be maintained at a temperature exceeding 212 degrees Fahrenheit during the pressure test.

Consequently, steam vapor hazards would continue to be one of the safety concerns for personnel conducting inspections in primary containment. Implementation of the proposed curves, as allowed by ASME Code Case N-640, does not significantly reduce the margin of safety and would eliminate steam vapor hazards by allowing inspections in primary containment to be conducted at a lower coolant temperature. Thus, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the regulation will continue to be served. However, since use of the K_{1c} equation results in the calculations of less conservative P-T limits than does use of the K_{1a} equation, licensees need staff approval to apply the Code Case methods to the P-T limit calculations.

WGOPC has concluded that application of Code Case N-640 to plant P-T limits is still sufficient to ensure the structural integrity of RPVs during plant operations. The staff has concurred with ASME's determination and has previously granted exemptions to use Code Case N-640 for the Quad Cities Nuclear Power Station (i.e., in the NRC letter to ComEd dated February 4, 2000, Reference 2). In the staff's letter of February 4, 2000, the staff concluded that application of Code Case N-640 would not significantly reduce the safety margins required by 10 CFR Part 50, Appendix G, and would eliminate steam vapor hazards by allowing inspections in the primary containment to be conducted at a lower coolant temperature. The staff also concluded that relaxation of the requirements of Appendix G to the Code by application of Code Case N-640 is acceptable and would maintain, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety for the Quad Cities RPVs and reactor coolant pressure boundary. ComEd's proposal to use Code N-640 for generation of the Dresden P-T limit curves is predicated on the same technical basis as was used for generation of the Quad Cities P-T limits. The staff, therefore, concludes that Code Case N-640 is acceptable for application to the Dresden P-T limits.

4.0 CONCLUSION

The staff has determined that ComEd has provided sufficient technical bases for using the methods of Code Cases N-588 and N-640 in the calculation of the P-T limits for Dresden, Units 2 and 3. The staff has also determined that application of Code Case N-588 and Code Case N-640 to the P-T limit calculations will continue to serve the purpose in 10 CFR Part 50, Appendix G, for protecting the structural integrity of the Dresden RPVs and reactor coolant pressure boundaries. In this case, since strict compliance with requirements of 10 CFR 50.60(a) and 10 CFR Part 50, Appendix G, is not necessary to serve the overall intent of the regulations, the staff concludes that application of the Code Cases N-588 and N-640 to the P-T limit calculations meets the special circumstance provisions in 10 CFR 50.12(a)(2)(ii), for granting an exemption to the regulations and that, pursuant to 10 CFR 50.12(a)(1), the granting of an exemption is authorized by law, will not present undue risk to the public health and safety, and is consistent with the common defense and security. The staff, therefore, grants an exemption to 10 CFR 50.60(a) and 10 CFR Part 50, Appendix G, to allow ComEd to use Code Cases N-588 and N-640 as the part of the bases for generating the P-T limit curves for Dresden, Units 2 and 3.

5.0 REFERENCES

1. Letter PSLTR-00-0057 from Preston Swafford, Site Vice President, Dresden Nuclear Power Station, to the U.S. Nuclear Regulatory Commission Document Control Desk, “Dresden Nuclear Power Station, Units 2 and 3 . . . . Request for an Amendment to Technical Specifications Section 3/4.6.K `Primary System Boundary’ and Section 3/4.12.C `Special Test Exceptions’ and Request for Exemption from 10 CFR 50.60, `Acceptance criteria for fracture prevention measures for lightwater nuclear power reactors for normal operation’,” dated February 23, 2000.

2. Letter from S.N. Bailey, U.S. Nuclear Regulatory Commission, to O.D. Kingsley, Commonwealth Edison Company, “Quad Cities - Exemption from the Requirements of 10 CFR Part 50, Section 50.60(a) and Appendix G,” dated February 4, 2000.

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