

August 22, 2000

Mr. Oliver D. Kingsley, President
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SUBJECT: QUAD CITIES - RELIEF REQUESTS FOR THIRD 10-YEAR INSERVICE
INSPECTION INTERVAL (TAC NOS. MA7842 AND MA7843)

Dear Mr. Kingsley:

By letter dated August 13, 1999, Commonwealth Edison Company (ComEd) submitted eight requests for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, for Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities). Five of the relief requests were identified as being needed for the refueling outage scheduled to start on January 20, 2000, and the staff authorized those relief requests by letters dated February 3 and 4, 2000. The other three relief requests, CR-28, PR-11 and PR-13, were identified by ComEd as not being needed to support the refueling outage, and are the subject of this review. By letter dated July 31, 2000, ComEd amended Relief Request PR-13 to propose additional qualification requirements for examination personnel.

The staff has reviewed and evaluated the information provided by ComEd concerning CR-28, PR-11 and PR-13. The alternatives proposed in these relief requests are authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year inspection interval at Quad Cities because they would provide an acceptable level of quality and safety. The staff's safety evaluation is enclosed.

Sincerely,

/RA/

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

Docket Nos. 50-254 and 50-265

Enclosure: Safety Evaluation

cc: See next page

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Quad Cities Nuclear Power Station
Units 1 and 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO REQUESTS FOR RELIEF FOR
THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
COMMONWEALTH EDISON COMPANY
AND
MIDAMERICAN ENERGY COMPANY
QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
DOCKET NOS. 50-254 AND 50-265

1.0 INTRODUCTION

The inservice inspection of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, 2, and 3 components shall be performed in accordance with Section XI of the Code and applicable 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 (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) shall 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 second 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) on the date 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities), during the third 10-year inservice inspection (ISI) interval is the 1989 Edition. The components (including supports) may meet the requirements set forth in subsequent editions

ENCLOSURE

and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

By letter dated August 13, 1999, Commonwealth Edison Company (ComEd, or the licensee) requested, in part, approval of relief requests CR-28, "Implementation of the ASME Section XI Code Case N-532;" PR-11, "Continuous Pressure Monitoring of the Control Rod Drive (CRD) System Accumulators;" and PR-13, "Implementation of the ASME Section XI Code Case N-546," for the third 10-year ISI interval for Quad Cities. By letter dated July 31, 2000, ComEd amended PR-13 to add qualification requirements for examination personnel. The staff has reviewed and evaluated the licensee's requests and their supporting information as alternatives to the Code requirements, pursuant to 10 CFR 50.55a(a)(3)(i), as described below.

2.0 EVALUATION OF RELIEF REQUESTS

- A. Relief Request CR-28: Implementation of the ASME Section XI Code Case N-532, Alternative Requirements to Repair and Replacements Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000

System/Component Applicable to Use of Code Case:

ASME Code, Section XI, Class 1, 2, and 3 Components

Code Requirement Affected by Use of Code Case:

IWA-6200 requires the preparation of Inservice Inspection (ISI) Summary Reports which contain completed Form NIS-1, "Owner's Report for Inservice Inspection," and Form NIS-2, "Owner's Report for Repair and Replacement." In accordance with IWA-6240, the ISI Summary Report is required to be submitted to the enforcement and regulatory authorities having jurisdiction at the plant within 90 days of the completion of the inservice inspections conducted each refueling outage. IWA-4900 reiterates the requirement to complete NIS-2 forms for repairs and replacements.

Basis for Relief:

Pursuant to 10 CFR 50.55a(a)(3)(i), an alternative is requested on the basis that it provides an acceptable level of quality and safety. Code Case N-532 provides an alternative to the current ASME Section XI repair and replacement documentation requirements, as well as regulatory

reporting requirements relating to inservice inspection. This alternative will reduce the resources required to prepare NIS-2 forms and prepare and submit the ISI Summary Report currently required by the Code after each refueling outage. This is a significant reduction in the administrative burden required by ASME Code, Section XI, IWA-6000.

By use of this code case, the licensee will prepare an "Owner's Activity Report" on Form OAR-1 upon completion of each refueling outage providing the following information:

- an abstract of all examinations and tests performed during the outage;
- a listing of item(s) with flaws or relevant conditions that required evaluation to determine acceptability for continued service; and
- an abstract of repairs, replacements, and corrective measures performed due to an item containing a flaw or relevant condition that exceeded acceptance criteria.

Each Form OAR-1 prepared during an inspection period would be available onsite for NRC's review and would be submitted to the NRC at the end of the inspection period. The licensee states that the corrective measures to be reported in the Form OAR-1 will include the Code required activities such as repairs and replacements instead of routine maintenance activities such as tightening threaded fittings to eliminate leakage, replacing valve packing due to unacceptable packing leakage, adjusting and realigning supports, etc.

The licensee considers the alternative documentation and reporting requirements of Code Case N-532 to be a reasonable alternative and an improvement to existing requirements. Because the use of this alternative only affects documentation and reporting requirements, the licensee considers this alternative to provide an acceptable level of quality and safety.

Licensee's Proposed Alternative Criteria:

Quad Cities will use Code Case N-532 with the clarification stated above regarding the provision in paragraph 2(c) of the code case for reporting corrective measures.

STAFF EVALUATION:

The staff reviewed the alternative documentation requirement of Code Case N-532. The staff concurs with ComEd that the corrective measures to be reported in Form OAR-1 will include the code-required activities such as repairs and replacements instead of routine maintenance activities such as tightening threaded fittings to eliminate leakage, replacing valve packing due to unacceptable packing leakage, adjusting and realigning supports, etc. The staff's review also determined that the use of the code case would still require preparation of the Repair/Replacement Certification Record, Form NIS-2A. The completed Form NIS-2A shall be certified by an Authorized Nuclear Inservice Inspector (ANII) as defined in ASME Code, Section XI, IWA-2130, and shall be maintained by the owner. Furthermore, the Owner's Activity Report Form, OAR-1, shall also be prepared and certified by an ANII upon completion of each refueling outage. The staff noted that each OAR-1 form shall contain an abstract of applicable examinations and tests, a list of items with flaws or relevant conditions that require evaluation to

determine acceptability for continued service, an abstract of repairs, replacements and corrective measures performed as a result of unacceptable flaws or relevant conditions. Hence, the information provided in the documentation pertaining to the use of Code Case N-532 can be used in the same manner to assess the safety implications of code activities performed during an outage. The review using the information as prescribed by the code case will, therefore, provide a similar level of safety as reviews that may have been conducted using the older reporting requirements. In addition, more detailed information may be requested by the staff if it is deemed necessary.

The staff has determined that the proposed alternative documentation requirement of Code Case N-532 would provide an acceptable level of quality and safety. Therefore, the use of Code Case N-532 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) at Quad Cities for the third 10-year inspection interval. If Code Case N-532 is published in a future revision of 10 CFR 50.55a and the licensee intends to continue implementing Code Case N-532, the licensee should follow all provisions of the code case with limitations (if any) listed in 10 CFR 50.55a.

B. Relief Request PR-11, Continuous Pressure Monitoring of the Control Rod Drive (CRD) System Accumulators

Component Identification:

Code Class:	2
References:	Table IWC-2500-1
Examination Category:	C-H
Item Number:	C7.10, C7.20, C7.30, C7.40, C7.70, and C7.80
Description:	Continuous Pressure Monitoring of the Control Rod Drive (CRD) System Accumulators
Component Numbers:	CRD Accumulators and Associate Piping

Code Requirement from which Relief is Requested:

Relief is requested from the visual VT-2 examination requirements specified in Table IWC-2500-1 for the nitrogen side of the CRD system accumulators on the basis that Quad Cities Technical Specification surveillance requirements exceed the Code requirement for a visual VT-2 examination.

Licensee's Basis for Relief:

In accordance with 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternatives provide an acceptable level of quality and safety.

As required by Quad Cities Technical Specifications, the CRD system accumulator pressure must be greater than or equal to 940 psig to be considered operable. The accumulator pressure is continuously monitored by system instrumentation. Since the accumulators are isolated from the source of make up nitrogen, the continuous monitoring of the CRD accumulators functions as a pressure decay type test. Should accumulator pressure fall below 1000 psig (+/- 15 psig), an alarm is received in the control room. The pressure drop for the

associated accumulator is then recorded in the control room log, and the accumulator is recharged by station procedure QCOP 0300-06, "CRD Accumulator Charging." If an accumulator requires charging more than twice in a 30-day period, then a leak check is performed to determine the cause of the pressure loss. When leakage is detected, corrective actions are taken to repair the leaking component as required by QCOP 0300-06.

Since monitoring the nitrogen side of the accumulators is continuous, any degradation of the accumulator would be detected by normal system instrumentation. An additional visual VT-2 examination performed once per inspection period would not provide an increase in safety, system reliability, or structural integrity. In addition, performance of a visual VT-2 would require applying a leak detection solution to 177 accumulators resulting in additional radiation exposure without any added benefit to safety. This inspection would not be consistent with As Low As Reasonably Achievable (ALARA) practices.

Licensee's Proposed Alternate Examinations:

As an alternate to the visual VT-2 examination requirements of Table IWC-2500-1, Quad Cities will perform continuous pressure decay monitoring in conjunction with Technical Specification surveillance requirements for the nitrogen side of the CRD accumulators including attached piping.

STAFF EVALUATION:

The 1989 ASME Code, Section XI, requires a system leakage test of all pressure retaining components of CRD system accumulators and the associated piping once every 40 months and a VT-2 visual examination is required to be conducted to detect evidence of leakage from pressure retaining components. The Code states that the contained fluid in the system shall serve as the pressurizing medium. As an alternative to the VT-2 visual examination requirements of the Code, the licensee proposes to take credit for Technical Specification Surveillance 4.3.G, which states that each control rod scram accumulator shall be determined operable at least once per 7 days by verifying that the indicated pressure is greater than or equal to 940 psig unless the control rod is fully inserted and disarmed, or scrambled. In addition to the surveillance requirement, the accumulator pressure is continuously monitored and annunciated in the control room if the pressure drop is 15 psig from 1000 psig. This pressure drop is documented in the control room log and the accumulator is recharged to a set pressure. In the event of an accumulator requiring charging more than twice in a 30-day period, a leak check is performed and corrective action is taken to repair any leaking component. The difference in leak detection technique in these two cases is that VT-2 visual examination requires application of a leak detection solution to each of the 177 accumulators and observation for bubbles versus leak detection by continuous monitoring of pressure decay with alarm in the control room followed by corrective action if required. The staff concludes that the latter technique is as reliable as the former in leak detection capability and, therefore, it provides an acceptable level of quality and safety.

The staff concludes that the licensee's proposed alternative of continuous pressure decay monitoring in conjunction with the Technical Specification Surveillance 4.3.G in lieu of the Code-required VT-2 visual examination during each inspection period would provide an

acceptable level of quality and safety. Therefore, the alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for Quad Cities for the third 10-year inspection interval.

C. Relief Request PR-13, Implementation of the ASME Section XI Code Case N-546, Alternative Requirements for Qualification of VT-2 Visual Examination Personnel

Code Requirement:

ASME Section XI, Subarticle IWA-2300 and Paragraph IWA-2312 require personnel performing non-destructive examinations not listed in SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing," to be qualified and certified to a comparable level of qualification as defined in SNT-TC-1A and the employer's written practice.

Licensee's Code Relief Request:

The licensee has requested approval to implement the alternatives to the Code requirements that are contained in Code Case N-546, *Alternative Requirement for Qualification of VT-2 Examination Personnel*, with the additional qualifications for examination personnel described below.

Licensee's Basis for Relief:

ASME Code, Section XI, currently requires personnel conducting VT-2 visual examinations to be qualified and certified to comparable levels of qualification as defined in SNT-TC-1A and the employer's written practice. However, unlike the nondestructive testing methods addressed within SNT-TC-1A for VT-1 and VT-3 examination methods, VT-2 examination does not require any special knowledge of technical principles underlying its performance. It is only the straightforward examination for leakage. No special skills or technical training are required in order to observe bubbles forming on a joint wetted with leak detection solution. As such, VT-2 personnel should not be subject to the same qualification and certification requirements that were established for nondestructive testing personnel. Code Case N-546 provides more applicable requirements for the qualification and certification of VT-2 inspection personnel. Code Case N-546 requires that the examination personnel will have at least 40 hours of plant walkdown experience, receive a minimum of 4 hours of training on Section XI requirements and plant specific procedures for VT-2 visual examinations, and will pass the vision test requirements of IWA-2321, 1995 Edition.

This alternative to the existing Code requirements reduces the administrative burden of maintaining an ASME Section XI qualification and certification program for VT-2 examination personnel and allows use of personnel most familiar with the walkdown of plant systems, such as licensed and non-licensed operators, local leak rate personnel, system engineers, and inspection and nondestructive examination personnel, to perform VT-2 visual inspections.

Licensee's Alternate Provisions:

Quad Cities will use the provisions of Code Case N-546 as alternatives to the requirements of Section XI, IWA-2300 for qualifying VT-2 visual inspectors. In addition, Quad Cities will qualify

examination personnel by test to demonstrate knowledge of Section XI and plant specific procedures for VT-2 visual examination, and will re-qualify examination personnel in accordance with the frequency specified in IWA-2314.

STAFF EVALUATION:

The ASME Code, Section XI, IWA-2300, requires that VT-2 visual examination personnel be qualified and certified to comparable levels of qualification as defined in SNT-TC-1A and the employer's written practice. The Code also requires that the examination personnel be qualified for near and far distance vision acuity. Quad Cities proposes to implement the alternatives provided in Code Case N-546. The licensee will document and maintain records to verify that persons selected are qualified by meeting the following requirements of Code Case N-546:

1. At least 40 hours plant walkdown experience, such as that gained by licensed and non-licensed operators, local leak rate personnel, system engineers, and inspection and nondestructive examination personnel.
2. At least 4 hours of training on Section XI requirements and plant specific procedures for VT-2 visual examination.
3. Vision test requirements of IWA-2321, 1995 Edition.

Further, Quad Cities will qualify examination personnel by test to demonstrate knowledge of Section XI and plant specific procedures for VT-2 visual examination, and will requalify examination personnel in accordance with the frequency specified in IWA-2314.

The qualification requirements in Code Case N-546, with the additional provisions described above, are comparable to those qualifications required for VT-2 visual examiner certification. Furthermore, all licensed and non-licensed operators, local leak rate personnel, system engineers, and inspection and nondestructive examination personnel typically have a sound working knowledge of plant components and piping layouts. Hence, the plant personnel with such background are acceptable candidates for performing VT-2 visual examinations.

The staff has determined that the use of Code Case N-546, with the additional provisions related to qualification of examination personnel, would provide an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year interval at Quad Cities. If Code Case N-546 is published in a future revision of 10 CFR 50.55a and the licensee intends to continue implementing Code Case N-546, the licensee should follow all provisions of the code case with limitations (if any) listed in 10 CFR 50.55a.

3.0 CONCLUSION

The staff has evaluated the licensee's submittal for Quad Cities, Units 1 and 2. The authorizing of alternatives or granting of relief is based upon fulfillment of any commitments made by the licensee in its basis for each relief request and the alternatives proposed. The implementation of the ISI program and relief requests is subject to inspection by the NRC.

The alternatives in Relief Requests CR-28, PR-11, and PR-13 are authorized for the third 10-year ISI interval pursuant to 10 CFR 50.55a(a)(3)(i), with the limitations stated above, on the basis that the proposed alternatives provide an acceptable level of quality and safety.

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Date: August 22, 2000