July 1, 2003

Mr. John L. Skolds, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNIT 2 - RELIEF REQUEST CR-25 FOR THIRD 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NO. MB6583)

Dear Mr. Skolds:

By letter dated October 25, 2002, as supplemented by letter dated April 30, 2003, Exelon Generation Company, LLC (the licensee) submitted a request for relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, for Dresden Nuclear Power Station, Unit 2. Relief Request No. CR-25, concerns an alternative to the schedule for completing examinations of control rod drive housing welds.

The Nuclear Regulatory Commission staff has evaluated the licensee's submittals, and finds the licensee's evaluation acceptable completed visual examinations and proposed alternative, provide reasonable assurance of structural integrity. The staff also finds that the proposed alternative may be authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. On this basis, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the next Unit 2 refueling outage in mid-October 2003, or any Unit 2 outage with a time frame that permits the licensee to examine the subject welds. Our 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 No. 50-237

Enclosure: Safety Evaluation

cc w/encl: See next page

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Dresden Nuclear Power Units 2 and 3

cc:

Site Vice President - Dresden Nuclear Power Station
Exelon Generation Company, LLC
6500 N. Dresden Road
Morris, IL 60450-9765

Dresden Nuclear Power Station Plant Manager
Exelon Generation Company, LLC
6500 N. Dresden Road
Morris, IL 60450-9765

Regulatory Assurance Manager - Dresden
Exelon Generation Company, LLC
6500 N. Dresden Road
Morris, IL 60450-9765

U.S. Nuclear Regulatory Commission
Dresden Resident Inspectors Office
6500 N. Dresden Road
Morris, IL 60450-9766

Chairman
Grundy County Board
Administration Building
1320 Union Street
Morris, IL 60450

Regional Administrator
U.S. NRC, Region III
801 Warrenville Road
Lisle, IL 60532-4351

Illinois Department of Nuclear Safety
Office of Nuclear Facility Safety
1035 Outer Park Drive
Springfield, IL 62704

Document Control Desk-Licensing
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Senior Vice President, Nuclear Services
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Senior Vice President
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President - Licensing and Regulatory Affairs
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Director - Licensing
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Senior Counsel, Nuclear
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Manager Licensing - Dresden and Quad Cities
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

RELIEF REQUEST NO. CR-25

EXELON GENERATION COMPANY, LLC

DRESDEN NUCLEAR POWER STATION, UNIT 2

DOCKET NO. 50-237

1.0 INTRODUCTION

By letter dated October 25, 2002, Exelon Generation Company, LLC (the licensee) submitted a request for relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, for Dresden Nuclear Power Station (DNPS), Unit 2. The licensee provided additional information in its letter dated April 30, 2003. Relief Request No. CR-25, concerns an alternative to the schedule for completing inservice inspection (ISI) examinations of control rod drive (CRD) housing welds.

2.0 REGULATORY REQUIREMENTS

The ISI of the American Society of Mechanical Engineers (ASME) Code Class 1, 2 and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Code) and applicable addenda as required in Section 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(6)(g)(i). The regulation at 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission, if the applicant 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) 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 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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for the DNPS, Unit 2, third 10-year ISI interval is the 1989 Edition of the ASME Code.

ENCLOSURE

3.0 TECHNICAL EVALUATION

Code Requirement

DNPS, Unit 2, is currently in the third 10-year ISI interval under the 1989 Edition of the ASME Code, Section XI. Section IWB-2412 requires examinations in each examination category be performed during each successive inspection interval. Table IWB-2500-1, Examination Category B-0, "Pressure Retaining Welds in Control Rod Housings," requires that the welds associated with 10 percent of peripheral CRD housings be examined. DNPS, Unit 2, has a total of 177 CRD housings, of which 32 are peripheral housings. Thus, the welds associated with 10 percent of 32, or four housings need to be examined in each interval.

Licensee's Code Relief Request (As stated):

The required tube-to-tube welds associated with the CRD housings have not been examined at DNPS, Unit 2. In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(ii), relief is requested on the basis that compliance with the requirement would cause a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Specifically, as detailed below, requiring a plant shutdown during the current inspection interval to examine the tube-to-tube welds would cause an economic hardship without a compensating increase in the level of quality and safety.

Identification of Components:

Code Class:	1
References:	IWB-2500 Table IWB-2500-1 Table IWB-2412 B-0
Examination Category:	B-O
Item Number:	B14.10
Description:	Examination of Tube-to-Tube Welds in CRD Housings
Component Numbers:	Peripheral Housing Welds

Licensee's Basis for Requesting Relief (As stated):

Each CRD housing tube contains two circumferential welds. One weld connects the CRD housing tube to the flange at the lower end of the housing (i.e., tube-to-flange). The second weld is an intermediate circumferential weld within the housing tube (i.e., tube-to-tube).

Examination of the tube-to-flange welds has been completed on four CRD housing tubes during the third 10-year inspection interval. In June 2002, DNPS determined that the tube-to-tube welds were not included in the ISI Program. The last scheduled opportunity to complete the third ISI interval examinations of these welds occurred during the last refueling outage, D2R17, completed on November 7, 2001. The next scheduled opportunity to perform the examinations of these welds is refueling outage, D2R18, which is scheduled to begin in mid-October 2003. This is after the conclusion of the third inspection interval on September 30, 2003.

DNPS has evaluated the impact of not examining the tube-to-tube welds. The following provides reasonable assurance that the structural integrity of the these [SIC] welds is not compromised.

- Previous DNPS and industry experience has shown no degradation on these welds and similar welds.

  Industry inspection history is provided in the Boiling-Water Reactor Vessel and lnternals Project (BWRVIP) document, BWRVIP-47 (Reference 1).
  No degradation of these welds is reported in this document. This document addresses potential failure locations in lower plenum components and recommends an inspection program to ensure long term structural integrity.
  No additional inspections beyond that of ASME Section XI are recommended.

  Previous DNPS Unit 3 examinations of the tube-to-tube welds and previous Unit 2 and 3 examinations of the tube-to-flange welds, which are similar welds in similar service conditions, have been completed successfully. DNPS is required to examine a total of sixteen CRD housing welds (four tube-to-tube welds and four tube-to-flange welds on each unit) during each inspection interval. Of these 16 welds, 12 have been examined to date. All 12 of the completed surface (liquid penetrant) examinations have met ASME Section XI acceptance criteria and have shown no degradation. Four tube-to-tube welds were examined as required for DNPS, Unit 3, during its current refueling outage, D3R17. Eight of the tube-to-flange welds (Units 2 and 3) have been examined.

- Previous experience with the leakage testing of the reactor coolant pressure boundary testing performed every outage and leakage monitoring during normal plant operation has not identified any leakage occurring through the subject welds.

  Visual (VT-2) examinations have been performed in conjunction with the system leakage test of the reactor coolant pressure boundary performed each refuel outage with the reactor at operating pressure. No evidence of leakage has been identified at these locations. In addition, cracking at these locations would result in leakage into the drywell floor drain sump, which provides a reliable means of determining leakage trends in the drywell. The leakage collected in the drywell floor drain sump is considered unidentified leakage. In accordance with DNPS technical specifications, an increase in unidentified leakage requires investigation and appropriate actions.

  Therefore, through-wall leakage would have been detected prior to plant startup following refueling outages. During normal operation, means of leakage detection exist such that necessary corrective measures can be taken.

- These welds experience minimum thermal cycling.

  During plant operation, operating conditions in the CRD housings are stable with continuous flow of cooling water through the control rod drives. Thermal cycling occurs only during startup and shutdown cycles of the reactor.

- There are no significant stresses experienced by these welds.

  The control rod housing tube is supported by the attachment to the reactor vessel. The housing tube is free to grow vertically since the housing or flange is not constrained in the vertical direction. The weld is outside of the reactor vessel penetration and radial growth is not prohibited.

  There are no other loads on the housing to create bending stresses on this weld. The weight of the CRD housing is insignificant. The only significant operating load on the CRD housing is the load induced due to reactor internal operating pressure. The control rod housing tube is supported by the attachment to the reactor vessel. There are no additional restraints and attachments on the drive housings that would restrict movement during normal operation thereby inducing stresses into the weld.

  The peak stresses caused by vibration of the CRD housings would occur at the connection to the reactor vessel and not at the tube-to-tube weld. The control rod housing tube is supported by the attachment to the reactor vessel. Any stresses induced would be transferred to the vessel attachment.

- lntergranular Stress Corrosion Cracking (IGSCC) susceptibility is low for these welds.

  The CRD housings are constructed with type 304 stainless steel, which can experience IGSCC. However, the tube-to-tube welds were shop welds with the housings supplied as a single unit to be attached to the reactor vessel. The cooling water supplied to the control rod drives is approximately 120 °F. Temperature of the housings is monitored by thermocouples approximately 11 feet from the tube-to-flange welds. Cooling flow through each individual drive can vary and recorded temperatures at the thermocouple typically are below 250 °F, but range from 100-300 °F. This temperature range is at the low end of the range for IGSCC susceptibility.

In conclusion, since there is reasonable assurance that the tube-to-tube welds have structural integrity, and that the requested relief is only for a period of approximately 60 days, the need to perform an unscheduled plant shutdown to inspect these welds would present an economic hardship without a compensating increase in the level of quality and safety.

Licensee's Proposed Alternative Examination (As stated):
DNPS will examine the Unit 2 tube-to-tube welds required by ASME Section XI at the next available opportunity. The next scheduled opportunity to perform the required examinations is the next Unit 2 refueling outage which is scheduled to begin in mid-October 2003, approximately 2 weeks following the end of the current inspection interval. DNPS will examine these welds during any outage of sufficient duration that occurs prior to the next Unit 2 refueling outage.

Staff Evaluation:
The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-0, "Pressure Retaining Welds in Control Rod Housings," requires that the welds associated with 10 percent of peripheral CRD housings be examined by a 100 percent surface examination each interval.

The licensee completed examinations on four CRD housing tube-to-flange welds during the third 10-year inspection interval and subsequently determined that it did not include four tube-to-tube welds for examination in their ISI program plan. The licensee has proposed as an alternative to examine the excluded tube-to-tube welds at the next Unit 2 refueling outage, scheduled to begin in mid-October 2003, which is approximately 2 weeks following the end of the third inspection interval. In addition, the licensee proposed as an alternative to examine these welds during any outage of sufficient duration when the reactor is expected to be in cold shutdown for at least four days, should that occur prior to the scheduled mid-October 2003, outage.

The licensee's and industry experience as stated in the Electric Power Research Institute's BWRVIP document, BWRVIP-47 dated December 30, 1997, and supplemented by letter dated March 3, 1999, has shown to date that there has been no occurrence of any degradation mechanism on these welds and similar welds. The staff in its Safety Evaluation dated April 7, 1999, found BWRVIP-47 guidelines acceptable for use by licensees. In addition, the leakage testing of the reactor coolant pressure boundary performed by the licensee every outage and leakage monitoring during normal plant operation has not identified any leakage occurring at the subject welds. Furthermore, these welds experience minimal thermal cycling, no significant stresses, and intergranular stress corrosion cracking susceptibility is low for these welds. The licensee in previous examinations of the tube-to-tube welds and similar welds in similar service conditions did not find any degradation mechanism.

The staff reviewed the licensee's evaluation regarding the impact of not examining the tube-to-tube welds until the next Unit 2 refueling outage and determined that the licensee's evaluation and the acceptable VT-2 visual examinations performed during system leakage tests and the proposed alternative provide reasonable assurance of structural integrity of the subject welds.

The staff has determined that to perform the subject Code examinations prior to the next scheduled Unit 2 refueling outage in mid-October 2003, would be a substantial hardship without a compensating increase in quality and safety, because it would be necessary for licensee to shut the plant down. Although the licensee described a potential shutdown as an economic hardship, the staff considered this to be an operational hardship instead. Shutting the plant down to inspect the subject welds would put an unnecessary thermal cycle on the plant.

4.0 CONCLUSION

For Relief Request No. CR-25, the staff concludes that the Code requirements are a substantial hardship without a compensating increase in quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year ISI interval and until refueling outage D2R18 scheduled for mid-October 2003, or any outage with a

time frame that permits the licensee to examine the subject welds and occurs prior to the next Unit 2 refueling outage. All other requirements of the ASME Code, Section III and XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: T. McLellan, EMCB

Date: July 1, 2003