May 8, 2006

Mr. Christopher M. Crane, President
and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNIT 3 - RELIEF REQUEST CR-28 FOR THIRD 10-YEAR INSERVICE INSPECTION (ISI) INTERVAL (TAC NO. MC7068)

Dear Mr. Crane:

By letter dated May 6, 2005, Exelon Generation Company, LLC (the licensee) submitted a request for relief, CR-28, regarding the volumetric examinations required by Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, paragraph (g)(6)(ii)(A)(2), and the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Article IWB-2500. Specifically, Exelon proposed alternative examinations and requested reduction of the examination volumes for specified reactor vessel (RV) longitudinal shell welds at Dresden Nuclear Power Station (DNPS), Unit 3. In a letter dated March 10, 2006, Exelon provided additional information to support its request.

The U. S. Nuclear Regulatory Commission (NRC) staff has evaluated the licensee's submittal and the supporting additional information, and concludes that the ASME Code, Section XI requirement for essentially 100 percent volumetric examination coverage of the RV longitudinal shell welds is impractical for the subject welds listed in request for relief CR-28. Furthermore, the NRC staff concludes that the licensee's proposed alternative examination provides an acceptable level of quality and safety for the specified RV longitudinal shell welds at DNPS, Unit 3, and granting relief is authorized by law. Therefore, the proposed alternative is authorized in accordance with 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(ii)(A)(5) for the licensee's third 10-year ISI interval for DNPS, Unit 3.

The NRC staff's evaluation and conclusions are provided in the enclosed safety evaluation. If you have any questions about this review, please contact Maitri Banerjee at (301) 415-2277.

Sincerely,
/RA MBanerjee for/
Daniel Collins, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-249

Enclosure:
Safety evaluation

cc w/encl: See next page

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Dresden Nuclear Power Station Unit 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, Region III
U.S. Nuclear Regulatory Commission
Suite 210
2443 Warrenville Road
Lisle, IL 60532-4351

Illinois Emergency Management
Agency
Division of Disaster Assistance &
Preparedness
110 East Adams Street
Springfield, IL 62701-1109

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

Senior Vice President of Operations
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 and Regulatory Affairs
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Assistant General Counsel
Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

Manager Licensing - Dresden,
Quad Cities and Clinton
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

EXELON GENERATION COMPANY, LLC

DRESDEN NUCLEAR POWER STATION, UNIT 3

DOCKET NO. 50-249

1.0 INTRODUCTION

By letter dated May 6, 2005 (Agencywide Document Access and Management System (ADAMS) Accession No. ML051260293), Exelon Generation Company, LLC (the licensee) submitted a request for relief, CR-28, regarding the volumetric examinations required by Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, paragraph (g)(6)(ii)(A)(2), and the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Article IWB-2500. Specifically, Exelon proposed alternative examinations and requested reduction in the coverage of the volumetric examination for specified reactor vessel (RV) longitudinal shell welds at Dresden Nuclear Power Station (DNPS), Unit 3. The licensee provided additional information to support its request in its letter dated March 10, 2006 (ADAMS Accession No. ML060690197). The licensee stated that the ASME Code-required examination coverage of “essentially 100 percent” for the welds was not feasible or practical within the limits of the current plant design. However, all components received applicable examination(s) to the extent practical given limited or lack of available access. The staff has evaluated the reduction in examination coverage pursuant to 10 CFR 50.55a(g)(6)(ii)(A)(5).

2.0 REGULATORY REQUIREMENTS

2.1 Applicable Requirements

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 inspection (ISI) 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 the ASME Code, Section XI, incorporated by

ENCLOSURE

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 applicable Code of record for the DNPS, Unit 3 ISI program is the 1989 Edition of the ASME Code, Section XI.

Section 50.55a(g) of 10 CFR requires that ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with the applicable edition of Section XI of the ASME Code and applicable addenda, except where specific relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, 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.

The licensee requested relief for the third 10-year ISI interval at DNPS, Unit 3, which began on March 1, 1992, and ended on October 31, 2003.

2.2 Augmented Inservice Inspection Requirements for RV Shell Welds

Section 50.55a(g)(6)(ii)(A)(2) of 10 CFR requires licensees to augment their RV examinations by implementing, as part of the ISI interval, the examination requirements for RV shell welds specified in the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," Item No. B1.10. Item No. B1.10 includes the ASME Code, Section XI volumetric examination requirements in Item No. B1.11 for RV circumferential shell welds and Item No. B1.12 for RV longitudinal shell welds. By letter dated March 23, 2005 (ADAMS Accession No. ML050620359), the NRC approved an alternative to the requirements of 10 CFR 50.55a(g)(6)(ii)(A)(2) and the ASME Code, Section XI, that allowed for permanent deferral of the volumetric examination requirements for Item No. B1.11, RV circumferential shell welds, for the extended period of the DNPS, Unit 3 operating license.

3.0 TECHNICAL EVALUATION (Provided by the licensee)

3.1 ASME Code, Section XI Requirement

The 1989 Edition of ASME Code, Section XI, Article IWB-2500 requires that components be examined and tested as specified in Table IWB-2500-1 of the ASME Code, Section XI. Table IWB-2500-1, Examination Category B-A, Item No. B1.12 requires a volumetric examination of the RV longitudinal shell welds once each 10-year ISI interval with essentially 100 percent volumetric coverage of the examination volume cross-section specified in Figure IWB-2500-2 of the ASME Code, Section XI for essentially 100 percent of the weld length.

3.2 Components for Which Relief is Requested

Code Class:	Class 1
Code Edition:	1989 Edition of the ASME Code, Section XI
Examination Category:	B-A
Item Number:	B1.12
Weld Identification Number:	Various RV Longitudinal Shell Welds, see attached Table CR-28

3.3 Limits of Weld Volumetric Examination

DNPS, Unit 3, obtained Construction Permit CPPR-22 on October 14, 1966. The RV was designed and fabricated before the examination requirements of the ASME Code, Section XI were formalized and published. Since this plant was not specifically designed to meet the requirements of the ASME Code, Section XI, full compliance is not feasible or practical within the limits of the current plant design.

The RV is examined from the internal surface to the extent practical. Further examination from the inside surface is not practical without disassembly of the vessel internal components. The vessel exterior surface is covered with permanent insulation. The lower vessel exterior surface is also covered with a structural steel biological shield wall. Supplemental manual examinations from the exterior surface are not practical due to the biological shield wall, insulation, and dose considerations.

3.4 Licensee's Proposed Alternative and Basis for Use

In accordance with 10 CFR 50.55a(a)(3)(i), and 10 CFR 50.55a(g)(6)(ii)(A)(5), the licensee proposes the following alternate provisions for the subject weld examinations to provide an acceptable level of quality and safety.

The examination requirements specified in 10 CFR 50.55a(g)(6)(ii)(A)(2) for the RV longitudinal shell welds shall be performed to the extent possible. When this examination is performed, welds are examined from the inside surfaces of the RV using an automated ultrasonic inspection system, which provides the best possible examination of the RV longitudinal shell welds. Additionally, a VT-2 examination is performed on the RV during the system leakage test per examination category B-P each refueling outage.

The RV longitudinal shell welds are ultrasonically examined utilizing a Performance Demonstration Initiative qualified automated ultrasonic inspection system meeting the requirements of the ASME Code, Section XI, Appendix VIII.

All components received examination(s) to the extent practical due to limited or lack of access. The examinations that were conducted confirmed satisfactory results, evidencing no unacceptable flaws present, even though "essentially 100 percent" coverage was not attained. Based on the above, and in consideration of the early design, the underlying objectives of the ASME Code, Section XI-required volumetric examinations have been met. The examinations were completed to the extent practical and evidenced no unacceptable flaws present. Additionally, a VT-2 examination performed during the system leakage test per examination category B-P each refueling outage provides additional assurance that the structural integrity of the RV is maintained.

4.0 STAFF EVALUATION

Section 50.55a(g)(6)(ii)(A)(2) of 10 CFR requires licensees to augment their RV examinations by implementing once, as part of the ISI interval in effect on September 8, 1992, the examination requirements for RV shell welds specified in the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel,"

Item No. B1.10. The rule also states that, for the purposes of this augmented examination, the ASME Code, Section XI requirement for “essentially 100 percent” coverage of the examination volume specified in Table IWB-2500-1 of the ASME Code, Section XI, means more than 90 percent of the specified examination volume for each weld.

The 1989 Edition of the ASME Code, Section XI, Article IWB-2500, requires that components be examined and tested as specified in Table IWB-2500-1 of the ASME Code, Section XI. Table IWB-2500-1 requires a volumetric examination of all RV longitudinal welds at DNPS, Unit 3, with essentially 100 percent volumetric coverage of the examination volume crosssection specified in Figure IWB-2500-2 of the ASME Code, Section XI, for essentially 100 percent of the weld length. Figure IWB-2500-2 of the ASME Code, Section XI, specifies that the total examination volume cross-section include the weld and the RV base metal material extending to a distance of one-half the applicable thickness of the RV wall from the extremities of the weld crown at the outside surface of the RV.

The licensee conducted volumetric examinations of all fourteen RV longitudinal shell welds specified in Table CR-28 to the extent practical by conducting ultrasonic scans of the accessible regions of the RV interior surface using procedures and personnel qualified in accordance with the ASME Code, Section XI, Appendix VIII, Supplements 4 and 6. By using these techniques, the licensee was able to obtain the overall examination volume coverage percentages specified in Table CR-28. Six of the fourteen longitudinal shell welds received examination volume coverages of greater than 90 percent, for which the examination is deemed to have met the “essentially 100 percent” examination coverage requirement, as specified in 10 CFR 50.55a(g)(6)(ii)(A)(2). Eight of the longitudinal shell welds received examination volume coverages of less than 90 percent. Therefore, as specified in Table CR-28, the licensee requested relief for these eight welds under 10 CFR 50.55a(g)(6)(ii)(A)(5). For each of these eight welds, the licensee provided, in Table CR-28, a description of the condition that limited the examination coverage. In all cases, the limitation in examination coverage was attributed to interferences associated with RV internal components which restricted access for scanning. Four of the eight longitudinal welds for which the licensee requested relief received examination volume coverages of greater than or equal to 80 percent. The remaining four longitudinal welds received examination volume coverages of 75 percent, 59 percent, 57 percent, and 21 percent. The examinations provided no evidence of the presence of unacceptable flaws in any of the longitudinal welds. In addition to the limited-scope volumetric examinations of the specified longitudinal welds, a VT-2 visual examination of the RV is performed during the system leakage test each refueling outage.

For each of the eight welds that received an examination volume coverage of less than 90 percent, the staff agreed that it would be impractical to satisfy the ASME Code, Section XI requirements for “essentially 100 percent” coverage due to the interferences listed in Table CR-28. In order to comply with the ASME Code, Section XI requirements, a design modification of the RV and internals would have to be performed. This would impose a significant burden on the licensee. The examinations were conducted to the extent practical and provide reasonable assurance of structural integrity since any significant pattern of degradation should have been detected during examination of the accessible weld volume. Furthermore, the ASME Code, Section XI-required VT-2 visual examinations of the RV during the system leakage test, which is conducted during each refueling outage, provide additional assurance regarding the overall structural integrity of the RV.

By letter dated March 23, 2005, the NRC approved an alternative RV weld examination pursuant to 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(ii)(A)(5) for DNPS, Units 2 and 3 that allows permanent deferral of the ASME Code, Section XI requirements to perform a volumetric examination of the RV circumferential welds for the extended operating license terms for DNPS, Units 2 and 3. In support of this request, which was submitted to the NRC on February 23, 2004, the licensee's proposed alternative stated that the examination requirements of the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item No. B1.12, for RV longitudinal welds, will be performed, to the extent practical, and shall include inspection of the RV circumferential welds only at their intersections with the longitudinal welds, or approximately 2 to 3 percent of the RV circumferential weld length. The staff concluded, in its March 23, 2005, Safety Evaluation (SE), that the licensee's request for permanent deferral of the RV circumferential weld volumetric examination requirements was justified based on sufficiently low conditional failure probabilities for these welds. In its evaluation, the staff noted that this relief does not apply to longitudinal welds, and therefore, the licensee would still need to perform the ASME Code, Section XI-required examinations of "essentially 100 percent" of all RV longitudinal welds.

In proposed Relief Request CR-28, the licensee did not indicate the extent to which the reduced examination volumes for the RV longitudinal welds included the points of intersection with the RV circumferential welds. In a request for additional information (RAI), the staff requested that the licensee provide supplemental information indicating whether the reduced examination volumes for the specified DNPS, Unit 3 RV longitudinal welds included all of the points of intersection with the circumferential welds. In addition, the staff requested that the licensee indicate whether 2 to 3 percent volumetric coverage of the circumferential welds in the vicinity of the points of intersection with the longitudinal welds was achieved.

In its March 10, 2006, RAI response, the licensee indicated that the reduced examination volumes for the RV longitudinal welds did not include all the points of intersection with the five RV circumferential welds. However, there are a total of 28 intersection points between longitudinal and circumferential welds in the DNPS, Unit 3 RV, and of these 28 intersections, a total of 21 were examined. For each individual circumferential weld, the licensee stated the percentage volumetric examination coverage that was achieved. Four of the five RV circumferential welds received volumetric examination coverages in excess of 2 to 3 percent. One weld, the RV shell-to-flange weld, received a volumetric examination coverage of 0.92 percent. This resulted in an average overall volumetric examination coverage of 3.82 percent for all RV circumferential welds at DNPS, Unit 3. The 2 to 3 percent circumferential weld examination coverage specified in the staff's March 23, 2005, SE was, therefore, exceeded overall for the circumferential welds. Therefore, the licensee demonstrated that the limitedscope longitudinal weld volumetric examinations had satisfied the alternative provisions of the NRC-approved relief request for permanent deferral of the circumferential weld volumetric examinations. Based on this assessment, the staff determined that the above information satisfied resolution of the RAI.

Based on the above considerations, the staff concludes that the ASME Code, Section XI requirement to perform the volumetric examination of the RV longitudinal shell welds, with essentially 100 percent volumetric coverage of the examination volume cross-section specified in Figure IWB-2500-2 of the ASME Code, Section XI, for essentially 100 percent of the weld length, is impractical for the welds specified in Table CR-28 at DNPS, Unit 3. The licensee's

alternative examination, which includes the reduced examination volumes along with the VT-2 visual examinations of the RV, provides an acceptable level of quality and safety.

5.0 CONCLUSION

The staff has reviewed the licensee's submittal, as supplemented by its RAI response, and concludes that compliance with the ASME Code, Section XI requirements for essentially 100 percent volumetric examination coverage of the RV longitudinal welds identified in Table CR-28 is impractical due to configuration and interferences associated with the RV internal components. The staff finds that the proposed alternative examination, which includes the reduced examination volumes along with the VT-2 visual examinations of the RV, provides reasonable assurance of the structural integrity of the welds identified in the relief request, and hence, an acceptable level of quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(3)(i) and 10 CFR 50.55a(g)(6)(ii)(A)(5) for the third 10-year ISI interval at DNPS, Unit 3 . All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested and approved, remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Attachment: Table CR-28 DNPS, Unit 3 RV Longitudinal Shell Welds

Principal Contributor: C. Sydnor

Date: May 8, 2006

Table CR-28 DNPS, Unit 3 RV Longitudinal Shell Welds

Weld Identification	Weld Description	Relief Requested (Based on 90% Coverage)	Condition Limiting Coverage	Coverage Percent
SC1A	Shell Course 1 Weld at 77 deg.	Yes	Jet Pump Diffuser	86
SC1B	Shell Course 1 Weld at 197 deg.	Yes	Jet Pump Diffuser, Core Shroud Repair Tie Rod	59
SC1C	Shell Course 1 Weld at 317 deg.	Yes	Jet Pump Diffuser	86
SC2A	Shell Course 2 Weld at 22 deg.	Yes	Jet Pump Riser Brace, Surveillance Specimen Support Bracket, Core Shroud Repair Tie Rod	57
SC2B	Shell Course 2 Weld at 142 deg.	No	Surface Condition at Circumferential Weld Intersection	98
SC2C	Shell Course 2 Weld at 262 deg.	No	Core Spray Piping	91
SC3A	Shell Course 3 Weld at 77 deg.	Yes	Core Spray Piping and Feedwater Sparger, Core Spray Repair Coupling	21
SC3B	Shell Course 3 Weld at 197 deg.	Yes	Core Spray and Feedwater Sparger, Core Shroud Repair Tie Rod	75
SC3C	Shell Course 3 Weld at 250 deg.	Yes	Core Spray Piping and Feedwater Sparger	80
SC3D	Shell Course 3 Weld at 317 deg.	Yes	Core Spray Piping and Feedwater Spargers	81
SC4A	Shell Course 4 Weld at 99 deg.	No	Nozzle N5A, Surface Condition at Reactor Flange Weld Intersection	97
SC4B	Shell Course 4 Weld at 219 deg.	No	Steam Dryer Support Bracket	91
SC4C	Shell Course 4 Weld at 261 deg.	No	None	100
SC4D	Shell Course 4 Weld at 339 deg.	No	None	100