

November 2, 2001

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

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 - RELIEF FOR
TESTING OF MAIN STEAM SAFETY AND RELIEF VALVE DISCHARGE
PIPING (TAC NOS. MB1653 AND MB1654)

Dear Mr. Kingsley:

By letters dated March 30, and August 2, 2001, Exelon Generation Company, LLC (EGC or the licensee) submitted relief request PR-16 for the Dresden Nuclear Power Station, Units 2 and 3. EGC requested relief from certain inservice inspection requirements of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Code, Section XI, concerning testing of main steam safety and relief valve discharge piping. EGC submitted PR-16 pursuant to 10 CFR 50.55a(g)(5)(iii) and 10 CFR 50.55a(3)(i).

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittals and determined that the proposed alternatives will provide reasonable assurance of leakage integrity. Although the staff could not evaluate PR-16 as qualifying under 10 CFR 50.55a(g)(5)(iii) or 10 CFR 50.55a(3)(i), the staff review of PR-16 pursuant to 10 CFR 50.55a(3)(ii) finds that the licensee's proposed alternatives are authorized in accordance with 10 CFR 50.55a(3)(ii) for the licensee's third 10-year inservice inspection interval for Dresden Nuclear Power Station, Units 2 and 3, on the basis that compliance with Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The enclosed safety evaluation contains the basis for this determination. This completes the staff's effort for TAC Nos. MB1653 and MB1654.

Sincerely,

/RA/

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

Docket Nos. 50-237 and 50-249

Enclosure: Safety Evaluation

cc w/encl : See next page

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PUBLIC OGC, O15B18
PD3-2 r/f ACRS, T2E26
A. Mendiola M. Ring, RIII
C. Rosenberg T. Bergman
L. Rossbach G. Hill (4)
P. Patnaik

*Concurred by Safety Evaluation dated 8/1/01, no significant changes made.

ADAMS Accession Number: ML012750082

**See previous concurrence

OFFICE	PM:LPD3-2	LA:LPD3-2	SC:EMCB	OGC	SC:LPD3-2
NAME	LRossbach	CRosenberg	TChan*	RHoefling**	AMendiola
DATE	10/3/01	10/26/01	8/01/01	10/25/01	11/02/01

OFFICIAL RECORD COPY

O. Kingsley
Exelon Generation Company, LLC

Dresden Nuclear Power Station
Units 2 and 3

cc:

Exelon Generation Company, LLC
Site Vice President - Dresden
6500 N. Dresden Road
Morris, Illinois 60450-9765

Mr. John Cotton
Senior Vice President, Operations Support
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

Exelon Generation Company, LLC
Station Manager - Dresden
6500 N. Dresden Road
Morris, Illinois 60450-9765

Mr. William Bohlke
Senior Vice President, Nuclear Services
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

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

Mr. Robert J. Hovey
Vice President
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

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

Mr. Christopher Crane
Senior Vice President
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

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

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

Mr. Jeffrey Benjamin
Vice President - Licensing and Regulatory
Affairs
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

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

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

Mr. John Skolds
Chief Operating Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

O. Kingsley
Exelon Generation Company, LLC

- 2 -

Dresden Nuclear Power Station
Units 2 and 3

Mr. K. A. Ainger
Director - Licensing
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

Mr. Robert Helfrich
Senior Counsel, Nuclear
Mid-West Regional Operating Group
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
ALTERNATIVE EXAMINATION REQUIREMENTS FOR REACTOR VESSEL
THIRD 10-YEAR INTERVAL REQUEST FOR RELIEF FROM TESTING OF
MAIN STEAM SAFETY AND RELIEF VALVE DISCHARGE PIPING
EXELON GENERATION COMPANY
DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3
DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

By letter dated March 30, 2001, Exelon Generation Company, LLC, (EGC or the licensee), requested relief from certain inservice inspection requirements of the 1989 Edition of the ASME Code, Section XI. The requirements for system pressure tests for Class 3 components as delineated in IWD-5200 state that a system functional test in accordance with IWD-5222 once during each inspection period and a system hydrostatic test in accordance with IWD-5223(f) (a pneumatic test at a pressure of 90 percent of the pipe submergence head of water discharging into the suppression pool) be conducted once during each inspection interval for the main steam relief valve discharge piping. The licensee requests relief from performing the Code-required VT-2 visual examination of the pressure retaining boundary of the main steam safety and relief valve discharge piping in accordance with Table IWD-2500-1, Examination Category D-B, Item D2.10, during performance of system functional tests, and performance of a pneumatic test in accordance with subparagraph IWD-5223(f) at the end of the third 10-year inservice inspection interval for Dresden Nuclear Power Station (DNPS), Units 2 and 3. By letter dated August 2, 2001, EGC submitted a revision to their March 30, 2001, relief request to include clarifying information.

2.0 BACKGROUND

Inservice inspection (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 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 that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if the licensee demonstrates that (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified

requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) 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 applicable ISI Code of Record for the third 10-year ISI interval for DNPS, Units 2 and 3, is the 1989 Edition of ASME Section XI.

3.0 DISCUSSION

3.1 Identification of Components

System: Main Steam

Components: Main Steam Safety and Relief Valve Discharge Piping

Code Class: 3

Examination Category: D-B

Item Number: D2.10

3.2 Code Requirements

The 1989 Edition of ASME Section XI, subparagraph IWD-5223(f) states that for safety or relief valve piping which discharges into the containment pressure suppression pool, a pneumatic test, at a pressure of 90 percent of the pipe submergence head of water, that demonstrates leakage integrity shall be performed in lieu of the system hydrostatic test which Table IWD-2500 requires once each inspection interval. Table IWD-2500 also requires a system functional test in accordance with IWD-5222 for all Class 3 piping conducted once each inspection period.

3.3 Code Requirements from which Relief is Requested

Relief is requested from performing the Code-required VT-2 examination during system functional test once each inspection period and from the requirement to perform a pneumatic test at 90 percent submergence head at the end of the inspection interval for the main steam safety and relief valve discharge piping.

3.4 Proposed Alternative (as stated)

A VT-3 visual examination of the Relief Valve Discharge lines will be performed once each inspection period. This examination will be performed to detect evidence of wear, corrosion, erosion, structural distress, or physical damage on the surface of the piping and components that comprise the Main Steam Relief Valve Discharge System. Indications of discharge line leakage, such as increasing drywell pressure will be monitored during functional testing of the Main Steam Relief Valves.

3.5 Licensee's Basis for Relief (as stated)

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (g)(5)(iii), relief is requested on the basis that conformance with the Code requirements is impractical.

The discharge lines on the one Target Rock and four Electromatic Relief Valves (ERV) for DNPS, Units 2 and 3, discharge into the Suppression Chamber. The discharge lines terminate in a T-Quencher that is normally submerged. Each of the discharge lines also contains two vacuum breakers, one 8 inch diameter vacuum breaker and one 1 inch diameter vacuum breaker.

The physical design of the system prevents performance of a complete and meaningful pneumatic test in accordance with IWD-5223(f) for the following reasons:

- (a) The ERV pilot assembly (Figure PR-16-1 of the relief request) cannot be pressurized from the discharge side due to a labyrinth type seal on the stem of the pilot valve disc. This seal will not prevent the leakage of air from the discharge line, and therefore, would prevent the performance of a flow make-up or pressure decay pneumatic test of the entire relief valve discharge line.
- (b) The design of the Target Rock valve internals (Figure PR-16.2 of the relief request) includes several seating surfaces that may provide a path for leakage when pressurized from the discharge line. Because no through wall leakage in piping is acceptable, the acceptance criteria for such a piping integrity test must be zero leakage (within the accuracy of the instruments used). The smallest seat leakage would cause a failure of the test. Since the purpose of the test is to determine the integrity of the relief valve discharge line and not the quality of the pilot valve seating surface, leakage in the Target Rock valve pilot seats would give misleading test results.
- (c) No test taps are currently available on the line to allow for the proper pressurization of the relief valve discharge line during testing and for the depressurization of the line upon completion of testing.
- (d) The vacuum breakers are not designed to provide a leak tight seal at such low pressures, and therefore, provide another leakage path that would prevent the performance of a meaningful test.

In addition to the design restrictions which prevent complete testing, the test itself gives very little assurance of integrity when one considers the test conditions. For DNPS, Units 2 and 3, 90 percent of the T-Quencher submergence head corresponds to a pressure of approximately 4 psig. The design pressure of the relief valve discharge lines is 550 psig. Therefore, a test at 4 psig does not significantly challenge the piping.

Functional testing of the Main Steam Relief Valves is performed by manually opening the relief valves in accordance with DNPS Technical Specifications. During this testing, the relief valve discharge line is challenged by a pressure much closer to the design pressure. The radiation levels in the drywell at the power levels associated with relief valve functional testing are prohibitive and prevent drywell entry by plant personnel. Therefore, a VT-2 examination cannot be performed during the pressurization of the line during relief valve functional testing. Although the line cannot be visually examined during functional testing, significant leaks in the line would be detected by an increase in drywell pressure during the test. In addition, a visual examination of the discharge line performed once each period would verify the integrity of the discharge line.

Based on the above, DNPS requests relief from the ASME Section XI requirements for performing a VT-2 visual examination of the Main Steam Relief Valve discharge piping once each period at nominal operating pressure, and from the requirement to perform a pneumatic test at 90 percent submergence head on the same lines.

4.0 EVALUATION

EGC requested relief under 10 CFR 50.55a(g)(5)(iii) on the basis that conformance with the Code requirements is impractical, and 10 CFR 50.55a(3)(i) on the basis that their proposed alternative would provide an acceptable level of quality and safety. Based on the information provided, the NRC staff could not determine that the Code requirement is impractical. However, the information provided including the proposed alternative, can be considered as involving hardship or unusual difficulty when complying with the code requirement. Therefore, the staff finds that the request should be evaluated as a hardship or unusual difficulty for which alternatives may be authorized under 10 CFR 50.55a(a)(3)(ii), and, as a result, the request should not be evaluated as an alternative providing an acceptable level of quality and safety pursuant to 10 CFR 50.55a(3)(i).

The licensee's requested relief from the Code examination requirements for the main steam relief valve discharge piping has two segments. The first segment of the relief pertains to performance of VT-2 visual examinations during system functional test. The Code (Table IWD-2500-1, Examination Category D-B, Item D2.10) requires that a VT-2 visual examination be performed on the pressure retaining boundary of the main steam relief valve discharge piping during a system functional test conducted once in each inspection period (40-month interval). The discharge piping is located in the drywell portion of the primary containment which discharges into the suppression pool through a T-Quencher submerged in the pool. The system functional test of the relief valve discharge piping is performed by manually opening the relief valve and subsequently maintaining a hold time of 10 minutes after attaining the system operating pressure. The personnel performing the VT-2 visual examination are, therefore, exposed to a high radiation dose and an adverse ambient temperature inside the drywell. The licensee's proposed alternative in lieu of the Code-required VT-2 visual examination would require that the drywell pressure be monitored during the system functional test of the main

steam relief valve discharge piping to note any increase in pressure as an indication of significant leakage from the discharge line. The staff accepts this alternative since drywell pressure is a reliable parameter to monitor and can be correlated to the amount of leakage inside the drywell.

The second segment of the relief pertains to performance of a system pneumatic test of the main steam relief valve discharge piping at the end of the inspection interval. The ASME Code, Section XI, subparagraph IWD-5223(f) requires that a pneumatic test at 90 percent of pipe submergence head of water that demonstrate leakage integrity be performed in lieu of system hydrostatic test for the relief valve discharge piping. Accordingly, the ASME Code test pressure corresponding to 90 percent of the pipe submergence head of water is 4 psig. The licensee has raised certain feasibility concerns and the validity of such a test at DNPS, Units 2 and 3, in their basis for relief. First, there is no test connection on the line to pressurize the relief valve discharge line for the test, and therefore, would require field installation of a test tap. Second, there are several leakage paths for air, such as the special seal on the stem of the pilot valve disc, the seating surfaces of the safety/relief valve, and possibly the vacuum breakers, which could lead to an inconclusive test. The purpose of the Code requirement for such a test is to detect and locate any pressure boundary leakage. However, any alternative method of locating pressure boundary leakage will result in hardship without a compensating increase in the level of quality and safety. The staff further believes that performance of the subject pneumatic test at a pressure of 4 psig required by the Code, will not challenge a system that is designed for 550 psig.

The licensee's proposed alternative requires assessment of structural integrity of the main steam relief valve discharge system based on a program of performing a VT-3 visual examination once every inspection period to detect degradation such as corrosion, wear, erosion, physical damage and structural distress of the piping and components of the system. The staff has determined that the system functional test along with the VT-3 visual examination performed during each inspection period would provide a reasonable assurance of leakage integrity. Therefore, the licensee's proposed alternative is acceptable.

5.0 CONCLUSION

In evaluating the licensee's request for relief from the requirements of the ASME Code, Section XI, 1989 Edition, Table IWD-2500-1 and IWD-5223(f), the staff considered (1) the acceptability of proposed alternative testing, and (2) whether the hardship of compliance is without a compensating increase in the level of quality and safety. The staff concludes that the licensee's proposed alternative examination is acceptable since it provides reasonable assurance of leakage integrity of the main steam relief valve discharge piping. Performance of a Code-required VT-2 visual examination of the main steam relief valve discharge piping once each inspection period during system functional test, and a pneumatic test at the end of the inspection interval would result in a hardship or unusual difficulty to the licensee without a compensating increase in the level of quality and safety. Therefore, the alternative examination proposed in the licensee's request for relief, is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year inservice inspection interval of DNPS, Units 2 and 3.

Principal Contributor: P. Patnaik, EMCB

Date: November 2, 2001