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U. S. Nuclear Regulatory Commission
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Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Subject: Additional Risk Information Supporting the License Amendment Request to Permit Uprated Power Operation at Dresden Nuclear Power Station

References: (1) Letter from R. M. Krich (Commonwealth Edison Company) to U. S. NRC, "Request for License Amendment for Power Uprate Operation," dated December 27, 2000

(2) Letter from K. A. Ainger (Exelon Generation Company, LLC) to U. S. NRC, "Additional Risk Information Supporting the License Amendment Request to Permit Uprated Power Operation at Dresden Nuclear Power Station and Quad Cities Nuclear Power Station," dated August 14, 2001

In Reference 1, Commonwealth Edison Company, now Exelon Generation Company (EGC), LLC, submitted a request for changes to the operating licenses and Technical Specifications (TS) for Dresden Nuclear Power Station (DNPS), Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, to allow operation with an extended power uprate (EPU). In a July 18, 2001, telephone conference call between representatives of EGC and Mr. L. W. Rossbach and other members of the NRC, the NRC requested additional information regarding these proposed changes. In Reference 2, EGC provided a portion of the requested information. The attachment to this letter provides the remainder of the information for DNPS, with one exception as noted in the attachment. In an August 31, 2001, teleconference between representatives of EGC and Mr. J. Hopkins and other members of the NRC, it was agreed that EGC would provide the information not supplied in this attachment for DNPS by September 14, 2001.

Should you have any questions concerning this letter, please contact Mr. A. R. Haeger at (630) 657-2807.

Respectfully,

K. A. Ainger

K. A. Ainger
Director – Licensing
Mid-West Regional Operating Group

A001

Attachments:

Affidavit
Attachment: Additional Risk Information Supporting the License Amendment Request to Permit Uprated Power Operation

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Dresden Nuclear Power Station
Office of Nuclear Facility Safety - Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF	)	
EXELON GENERATION COMPANY, LLC	)	**Docket Numbers**
DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3	)	**50-237 AND 50-249**

SUBJECT: Additional Risk Information Supporting the License Amendment Request to Permit Uprated Power Operation at Dresden Nuclear Power Station

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

K. A. Ainger

K. A. Ainger
Director – Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 5th day of September, 2001.

Notary Public

" OFFICIAL SEAL "
Timothy A. Byam
Notary Public, State of Illinois
My Commission Expires 11/24/2001

Attachment
Additional Risk Information Supporting the License Amendment Request to Permit Uprated Power Operation
Dresden Nuclear Power Station, Units 2 and 3

Question

10 (DRESDEN ONLY) The licensee has stated in the Dresden IPEEE that the concept of providing a seismically-qualified/verified makeup path to each plant units isolation condenser was being developed. Although the use of the isolation condenser with a verified makeup water supply source provides a means of decay heat removal for the intact reactor case, torus cooling may still be needed for the small LOCA case. The licensee indicated that a study would be performed to ensure that a small LOCA, with no torus cooling but with the isolation condenser in operation, would not result in an unacceptable torus temperature. The design changes to support these items were to be completed in conjunction with the approved schedule for resolution of USI A-46 outliers, which is still many years in the future.

10.1 Did the IPEEE seismic margins analysis reflect the current plant configuration and operation or did it include the consideration of proposed future modifications and changes to the plant (i.e., take credit for the resolution of some USI A-46 outliers such as having a seismically-qualified means of makeup to the isolation condenser that does not currently exist)?

10.2 What means of providing makeup to the isolation condenser were credited? Are these means seismically qualified? If not seismically qualified, please describe the current estimated seismic margin for these means of makeup and explain how this margin has been determined?

10.3 Do the means to align and provide the makeup to the isolation condenser involve any operator actions. If so, what is the probability that the operators will not be able to perform these actions in sufficient time given the conditions of the event (i.e., a large - beyond design basis - earthquake that has failed multiple systems and collapsed structures that are not seismically qualified)? Are the required operator actions in areas, and the access paths to these areas, only in structures that are seismically qualified and in which all surrounding/nearby systems are seismically qualified? Please describe the operator actions considered and the related environmental/operational conditions for the operators to perform these actions.

10.4 Has the study for the small LOCA case been completed? If so, please summarize the results of the study and identify the design changes, if any, that may be required to satisfy the conditions and the schedule for these changes. How would the extended power uprate affect the results of this study? If the study has not been completed, what is the basis for the seismic margins analysis acceptability for the small LOCA case, including the power uprate conditions?

Response for Dresden Nuclear Power Station (DNPS)

10.1 The IPEEE seismic margins analysis (References 1 and 2) does include the consideration of proposed future modifications and changes to the plant. With the exception of the seismic makeup path to the isolation condenser (IC) discussed in the response to Question 10.2 below, resolutions for all of the equipment characterized as outliers in Reference 2, Section 3.4.4.5, "Equipment That Did Not Screen," will be completed prior to startup following the Unit 2 refueling outage scheduled for October 2001 and prior to startup following the Unit 3 refueling outage scheduled for September 2002.

10.2 As discussed in References 1 and 2, DNPS plans to develop a make-up path to the isolation condensers (ICs) for both DNPS units that meets the 0.3 g seismic capacity

assumptions in the seismic margins analysis. This makeup path was credited in the seismic margins analysis. A conceptual design has been developed which would permit operators to use the Unit 2 emergency diesel generator cooling water system as a seismically qualified supply of water from the ultimate heat sink. The equipment in the IC pump house, including the structure, system, and components, would also have a seismic capacity of 0.3 g, following minor modifications to equipment anchorage. These design changes are scheduled for completion prior to startup following the DNPS Unit 2 refueling outage scheduled in November 2003.

Currently, there are several methods of providing makeup to the IC. One method uses the condensate transfer pumps from the Unit 2/3 "A" or "B" condensate storage tanks (CSTs). The median seismic capacity of this path has been evaluated to be 0.20 g as noted in Reference 2. A second method uses the diesel-driven IC make-up pumps from the "1B" CST. The median seismic capacity of this path is estimated as 0.15 g, based on a comparison with the Unit 2/3 "A" and "B" CSTs. The condensate transfer pumps are powered by essential buses that are powered from the emergency diesel generators. Both make-up paths are described in DNPS operating procedures and both methods can be accomplished from the main control room. There are other methods of makeup available that are estimated to have a low seismic capacity.

10.3 The current conceptual design for the planned seismically qualified makeup path would require installation of portable hoses. The final design is not yet complete, and no probability estimates for failure of the necessary operator actions are available. Based on the conceptual design, however, preliminary information on operator actions is given below.

Under the conceptual design, operator actions for providing makeup to the IC include the following.

- Retrieve hoses from storage in the Unit 2 turbine building trackway area near the Unit 2 emergency diesel generator room.
- Connect hoses from the diesel generator cooling water discharge line to the suction of the IC makeup pump.
- Valve in the makeup to supply to the ICs.
- Monitor IC shell-side level and manually throttle nearby makeup valves to control shell-side level.
- Monitor fuel supply of IC makeup pump and transfer fuel as required.

These operator actions would take place in the Unit 2 turbine building trackway, the IC pump house, the area outside the turbine building that is located between them, and the reactor building IC floor. The turbine building, reactor building, and IC pump house are seismically qualified. The outside area houses water storage tanks that are not seismically qualified and can be considered as having failed. By the time the IC makeup is required it is assumed that the water from the damaged tanks will have drained from the area and all that remains will be rubble from the ruptured tanks. The length of hose provided will allow the operators to route the hose as necessary to the IC pump house for connection to the makeup pump suction piping.

The time available to perform these actions is expected to be in the range of hours for the following reasons. The dam has a relatively low head of approximately 22 feet, and debris at the

point of dam failure would likely impede drain down. The river extends approximately 15 miles to the next dam upstream. Thus, the drain down of the river will not occur quickly. During this time, the seismically qualified makeup sources will be available. The decay heat would drop significantly during the time that the river upstream of the dam drains down.

Because of the time judged available for completion of the operator actions, the actions required to align the makeup path in the conceptual design are judged to have a high probability of success. As discussed in the response to Question 10.2, the makeup paths currently available can be aligned from the control room and are proceduralized. Thus, these actions are considered to have a high probability of success.

10.4 The study for the small LOCA has not been completed. The seismic margins analysis submitted in References 1 and 2 considered that an acceptable resolution for the small LOCA case, including any required design changes, will be completed prior to startup following the DNPS Unit 2 refueling outage scheduled in November 2003. The study will reflect the EPU conditions.

Question
11. What is the current plants estimated seismic CDF and what is the estimated impact of the extended power uprate on this seismic CDF? Please explain the bases for deriving this estimate.

Response
In a teleconference between representatives of Exelon Generation Company (EGC), LLC and Mr. J. Hopkins and other members of the NRC, the NRC requested that EGC provide the EPU impact on the seismic dam failure scenario and the use of the isolation condenser for the safe shutdown path given the current plant capabilities for make-up to the IC. This scenario is of interest because it corresponds to the only seismic margins outlier that will not have been corrected at the time of EPU implementation at DNPS. In accordance with this request, and since DNPS, like many other sites, does not currently maintain a seismic probabilistic risk assessment (PRA), the response to this question includes a quantitative estimate of the change in core damage frequency (CDF) due to the EPU on this specific scenario. This quantitative analysis is characterized below.

The full seismic hazard curve is quantified (i.e., seismic events beyond the Dresden Review Level Earthquake (RLE) of 0.3g are included in this assessment). Seismic frequencies are taken from NUREG-1488, "Revised Livermore Seismic Hazard Estimates for Sixty-Nine Nuclear Power Plant Sites East of the Rocky Mountains," dated April 1994.

This analysis addresses the postulated seismic-induced failure of the Dresden lock and dam, successful scram and use of the isolation condenser, with associated shell make-up options, as the safe shutdown path. Other shutdown paths and equipment (e.g., high pressure coolant injection, automatic depressurization system, and low pressure coolant injection) are not included in this analysis.

Loss of offsite power and successful emergency diesel generator (EDG) operation is assumed.

Attachment
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Dresden Nuclear Power Station, Units 2 and 3

Assuming successful diesel operation simplifies the problem and has a negligible impact on the calculated results. The EDGs support only the alternative IC makeup system (i.e., the condensate transfer system) in this assessment.

The DNPS EPU risk assessment provides the basis for identifying those aspects of the DNPS PRA model affected by the EPU. The aspects of the DNPS PRA impacted by the EPU and affecting this scenario assessment are the human error probabilities for initiating IC shell make-up.

Two IC shell makeup options are included in this assessment. These are the same as discussed in the response to Question 10, and include the makeup path from the "1B" CST using the dedicated diesel-driven IC makeup pumps, and the makeup path from the 2/3 "A" and "B" CSTs using the condensate transfer pumps.

Both alignments are proceduralized in DNPS operating procedures. Initiation of either alignment involves opening a single motor-operated valve and starting one pump. These actions are performed from the main control room and can be completed within a few minutes. IC shell side level indication is also available in the main control room.

This analysis uses standard seismic risk assessment techniques (e.g., seismic hazard curve, division of hazard curve into discrete ranges for modeling and quantification, and seismic-induced component and structural failures).

The results of this assessment show that the EPU impact on this scenario is not significant. The change in CDF for this scenario due to the EPU is estimated at 1E-8/yr. An estimate of the CDF for this scenario will be provided by September 14, 2001.

References

1. Letter from J. M. Heffley (Commonwealth Edison Company), "Final Report - Individual Plant Examination of External Events, Generic Letter 88-20, Supplement 4," dated December 30, 1997

2. Letter from P. Swafford (Commonwealth Edison Company) to U. S. NRC, "Request for Additional Information Regarding Individual Plant Examination of External Events," dated March 30, 2000