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RS-01-200

September 19, 2001

U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

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

Quad Cities Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Additional Information Supporting the License Amendment Request to Permit Uprated Power Operation, Dresden Nuclear Power Station and Quad Cities Nuclear Power Station

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

In the referenced letter, 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, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2, to allow operation at uprated power levels. In telephone conferences on September 6 and 7, 2001, between representatives of EGC and Mr. S. N. Bailey, Mr. J Hopkins, and other members of the NRC, the NRC requested additional information regarding these proposed changes. The attachment to this letter provides the requested information.

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

Respectfully,

Terrence W. Simpkin
T. W. Simpkin
Manager – Licensing
Mid-West Regional Operating Group

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Attachments:

Affidavit
Additional Information Supporting the License Amendment Request to Permit Uprated Power Operation, Dresden Nuclear Power Station, Units 2 and 3, Quad Cities Nuclear Power Station, Units 1 and 2

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
NRC Senior Resident Inspector – Quad Cities 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**
QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2	)	**50-254 AND 50-265**

SUBJECT: Additional Information Supporting the License Amendment Request to Permit Uprated Power Operation, Dresden Nuclear Power Station and Quad Cities 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.

Terrence W. Simpkin
T. W. Simpkin
Manager – Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and

for the State above named, this 19th day of

September, 2001.

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

Timothy Byam
Notary Public

Attachment
Additional Information Supporting the License Amendment Request to Permit Uprated Power Operation,
Dresden Nuclear Power Station, Units 2 and 3
Quad Cities Nuclear Power Station, Units 1 and 2

<u>Question</u>

1. *Describe the reviews performed to ensure that the evaluations for Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," are unaffected by the extended power uprate (EPU).*

<u>Response</u>

The Dresden Nuclear Power Station (DNPS) and Quad Cities Nuclear Power Station (QCNPS) evaluations for GL 95-07 identified all valves susceptible to pressure locking and thermal binding. The GL 95-07 response addressed each valve either by eliminating the potential for pressure locking by drilling a hole in the valve or by committing to drill a hole at a future time when appropriate maintenance was being performed on the valve. For each valve to be drilled in the future, an analysis was performed to demonstrate that adequate margin existed to demonstrate MOV capability under the pressure lock conditions.

The EPU review looked at each valve to be drilled in the future and confirmed that the values of the parameters that govern pressure locking for these valves are unchanged by EPU. in addition, a separate review of MOVs based on changes in parameters due to EPU confirmed that no new valves needed to be added to the population of valves susceptible to pressure locking or thermal binding.

<u>Question</u>

2. *Discuss the effect of the EPU on the standby coolant supply system.*

<u>Response</u>

The standby coolant supply system consists of a crosstie from the non-safety related service water system to the condenser hotwell that provides a manually initiated supply of river water to the condensate system for containment flooding. It is not credited in any design basis accident, and has no power-related requirements. Therefore it is unaffected by EPU.

<u>Question</u>

3. *Provide the impact on the loss of offsite power event frequency and the core damage frequency of the load shedding scheme described in Section 6.1.2, "On-Site Power," of the Power Uprate Safety Analysis Report (PUSAR) (Reference 1).*

<u>Response</u>

During normal operation the station loads are distributed between the Unit Auxiliary Transformer (UAT) and the Reserve Auxiliary Transformer (RAT). Normally, the loads for two non-essential 4kV buses are aligned to the UAT and the loads for the other two non-essential 4kV buses are aligned to the RAT. If either the UAT or RAT become unavailable during normal operation without a reactor scram, the increased loads for the EPU configuration may result in an overload condition for the remaining transformer's bus duct connection to the 4kV buses.

The scenario of concern is a loss of the UAT or RAT due to transformer failure, failure of protective relaying (e.g., false fast transfer signal), or spurious opening of multiple circuit breakers [see note (1)], causing a fast transfer of all running loads to the other transformer. Under these conditions, certain bus duct segments are overloaded, requiring operator action within one hour to reduce load to within the bus duct rating. This action will be procedurally directed. The one hour time frame for load reduction was determined based on an Exelon Generation Company (EGC), LLC evaluation of a General Electric Company study on short term overload conditions for the bus ducts. The simplifying assumption is made that failure to take this action would lead to a loss of offsite power (LOOP). In reality, overload of the bus duct results in heating above the allowable temperature limits if ambient temperature is at the design value. No deterministic evaluation has been conducted to determine if overheating will result in complete failure of the bus duct, thereby causing a LOOP.

The quantitative impact of the new failure mode is conservatively calculated as follows.

CDF = (Fast transfer frequency) * (Operator fails to reduce loads on UAT or RAT) * (Single unit LOOP induced) * [(Operator fails to cross tie AC buses to opposite unit) * (Failure of all diesel generators) + (other failure combinations)]

= (4.2E-2/yr) * (1E-2) * (1.0) * [(1.1E-2) * (1E-3) + 3E-6]

= 6E-9/yr

The screening analysis was performed as follows.

- The frequencies of any events that could result in a fast transfer without a reactor scram were summed. The rate of a transformer failure (1.2E-6/hr) and spurious opening of a circuit breaker (6E-7/hr) were obtained from the EPRI ALWR generic failure data base. Spurious protective relay failure leading to a false fast transfer is approximately the same as the transformer failure rate (i.e., 1.2E-6/hr). These failure rates are consistent with the failure rates used in the QCNPS and DNPS probabilistic risk assessment (PRA) models. The fast transfer frequency calculation includes failure of either transformer or a spurious protective relay signal to either transformer. Simultaneous spurious opening of both circuit breakers on either transformer is probabilistically negligible. Assuming a conversion factor of 8760 hours/yr results in an estimated fast transfer frequency of 4.2E-2/yr, [i.e., 2 * (1.2E-6/hr + 1.2E-6/hr) * 8760 hours/yr].

(1) Spurious opening of an individual circuit breaker to an individual 4kV bus would cause a fast transfer of the individual 4kV bus loads to the alternate transformer. However, based on the estimated EPU loads, the transfer of loads for a single 4kV bus (i.e., loads from three 4kV buses on a single transformer) would not place the transformer bus ducts in an overload condition.

- The human error probability (HEP) for an operator failing to reduce the loads on the remaining auxiliary transformer is estimated to be 1E-2. As stated in Section 6.1.2 of the PUSAR (Reference 1), this action will be proceduralized. Indication and alarms for transformer failure and fast transfer of loads currently exist in the control room. The procedure for reducing loads on the remaining auxiliary transformer is expected to be a simple action from the control room (e.g., reduce power, trip feedwater/condensate train). The operators will have approximately one hour to perform this action.

- The conditional probability that failure to reduce loads on the remaining auxiliary transformer induces a single unit LOOP is conservatively assumed to be 1.0 for this screening analysis.

- The conditional probability of subsequent failures leading to core damage is dominated by the failure to supply AC power. This is characterized by the failure of all diesel generators capable of supplying the unit (conservatively ~1E-3) and failure to supply AC power from the opposite unit (~1.1E-2). Other failure combinations represent approximately 30% of this conditional probability or 3E-6. Therefore, the conditional probability of failure of all AC power given a single unit LOOP is approximately 1.4E-5 (see note (2)).

The additional CDF contribution of 6E-9/yr from this failure mode is negligible compared to the base CDF of 4.6E-6/yr for QCNPS and 2.6E-6/yr for DNPS. In additional, the CDF contribution of 6E-9/yr from this failure mode is minor compared to the increase in internal events CDF due to EPU of 2.4E-7/yr for QCNPS and 2.1E-7/yr for DNPS.

<u>References:</u>

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

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(2) Based on the QCNPS internal events PRA, the conditional core damage probability (CCDP) for single unit LOOP events is calculated to be 6.7E-6. Based on the DNPS internal events PRA, the CCDP for single unit LOOP events is calculated to be 3.1E-6. A conservative value of 1.4E-5 is used in this analysis to provide a simplified and straightforward approach towards correlating the availability of AC power given a single unit LOOP. This approach is consistent with that discussed in Reference 2.