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June 5, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

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 Fluence Information Supporting the License Amendment Request to Permit Up-rated Power

- Reference: (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 J. F. Klapproth (General Electric Company) to U. S. NRC, "Submittal of GE Proprietary Document NEDC-32983P, 'General Electric Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations,'" dated September 1, 2000

In Reference 1, Commonwealth Edison (ComEd) 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 discussion between EGC and Mr. L. W. Rossbach and other members of the NRC on May 3, 2001, the NRC requested additional information regarding the Reactor Pressure Vessel (RPV) neutron fluence projections associated with these proposed changes.

In Reference 2, General Electric (GE) Company submitted a licensing topical report (LTR) to the NRC describing a proposed methodology for calculating RPV fast neutron fluence. This GE LTR is currently undergoing NRC review. The projected end of life RPV fluence for DNPS Units 2 and 3, and QCNPS Units 1 and 2 for the EPU proposed changes was based on the GE LTR methodology.

Because the GE LTR methodology has not yet been approved by the NRC, the NRC requested information regarding the EPU fluence projections. Attachments A and B provide this information for DNPS and QCNPS, respectively.

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

Respectfully,



R. M. Krich
Director – Licensing
Mid-West Regional Operating Group

Attachments:

Affidavit

Attachment A: Additional Fluence Information Supporting the License Amendment
Request to Permit Up-rated Power Operation at Dresden Nuclear Power
Station, Units 2 and 3

Attachment B: Additional Fluence Information Supporting the License Amendment
Request to Permit Up-rated Power Operation at 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 Fluence Information Supporting the License Amendment Request to Permit Upgraded Power Operation

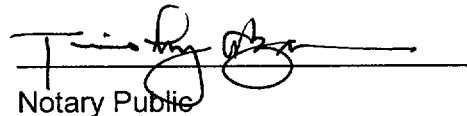
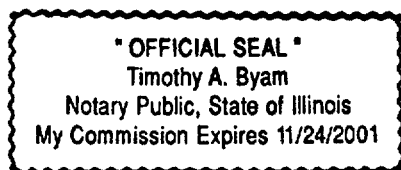
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I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.



R. M. Krich
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
June, 2001.


Notary Public

Attachment A

Additional Fluence Information Supporting the License Amendment Request to Permit Upgraded Power Operation at Dresden Nuclear Power Station, Units 2 and 3

Background

The extended power uprate (EPU) license amendment request (Reference 1) stated that the projected reactor pressure vessel (RPV) neutron fluence for Dresden Nuclear Power Station (DNPS), Units 2 and 3 at 32 effective full power years (EFPY) was 4.4×10^{17} neutrons/cm². This value is less than the current 32 EFPY projection of 5.1×10^{17} neutrons/cm². The EPU fluence value was calculated based on a General Electric (GE) Company licensing topical report (LTR) methodology for calculating RPV fast neutron fluence that was submitted to the NRC in Reference 2. This GE LTR is currently being reviewed by the NRC.

Because the GE LTR methodology has not been approved by the NRC, the NRC requested information regarding the projected EPU fluence values for DNPS, Units 2 and 3.

Response

The EPU fluence projection methodology was used to determine that the current Pressure-Temperature (P-T) limits in the Technical Specifications (TS) were conservative for EPU conditions. The following additional information demonstrates that the current P-T limits in the TS are conservative for at least one cycle of operation at EPU conditions.

The end of the first cycle of EPU operation is projected to be late November 2003 for Unit 2 and late October 2004 for Unit 3. The maximum RPV operating times attained at the end of the proposed period will be 21.6 EFPY for Unit 2 and 20.9 EFPY for Unit 3. These operating times represent a maximum of 67.5% of the current 32 EFPY limit for the current P-T limits. Even with an approximately 17% increase in reactor power for one cycle due to the EPU, this provides significant margin to ensure that the current 32 EFPY fluence projection of 5.1×10^{17} n/cm² will not be exceeded.

Additionally, two features of DNPS design result in minimizing the neutron fluence at the RPV wall. While these features do not change the assumptions made in the current fluence calculations, they explain why the DNPS projected fluence is relatively low compared to other Boiling Water reactors (BWRs) and ensure that the assumptions in the current fluence projections are preserved.

First, the DNPS RPVs are unique in that they have an unusually large diameter (i.e., 251 inches inside diameter (ID)) with a low thermal power core (i.e., 2527 megawatts thermal (MWt)). Many BWRs with low thermal power cores have significantly smaller diameter RPVs (i.e., 218 inches ID). These smaller ID RPVs have a narrower annulus and less clearance between the fuel and shroud, and therefore less water shielding to the RPV wall. Additionally, most BWR RPVs with 251 inch IDs have considerably higher thermal powers and a resulting higher neutron flux density. As a result, the fluence at the DNPS RPV wall is relatively low compared to most BWRs.

Second, DNPS cores are designed to obtain low neutron leakage. To achieve this, fresh fuel assemblies are placed into central core locations. After an operating cycle, fissionable U-235 is consumed and the fuel assemblies are relocated to a position radially further out from the center. Eventually, they are placed in peripheral locations, which provides shielding to the RPV. The DNPS core designs have been low neutron leakage since the initial core load. For the EPU condition, this low neutron leakage loading pattern will continue. Because of the increase in reactor power due to EPU, the neutron flux at the RPV wall will increase in approximate proportion to the extent of the power uprate, but this increase in neutron flux

Attachment A
**Additional Fluence Information Supporting the License Amendment Request to Permit
Up-rated Power Operation at Dresden Nuclear Power Station, Units 2 and 3**

over the one cycle approval period will have only a small effect on the accumulated RPV fluence.

In summary, the use of the current TS 32 EFPY P-T limits for one cycle of operation under EPU conditions is conservative because the limited term of operation provides significant margin to ensure that the basis for the current P-T limits will not be exceeded.

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 J. F. Klapproth (General Electric Company) to U. S. NRC, "Submittal of GE Proprietary Document NEDC-32983P, 'General Electric Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations,'" dated September 1, 2000

Attachment B

Additional Fluence Information Supporting the License Amendment Request to Permit Upgraded Power Operation at Quad Cities Nuclear Power Station, Units 1 and 2

Background

The extended power uprate (EPU) license amendment request (Reference 1) stated that the projected reactor pressure vessel (RPV) neutron fluence for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2 at 32 effective full power years (EFPY) was 4.5×10^{17} neutrons/cm². This value is less than the current 32 EFPY projection of 5.1×10^{17} neutrons/cm². The EPU fluence value was calculated based on a General Electric (GE) Company licensing topical report (LTR) methodology for calculating reactor pressure vessel (RPV) fast neutron fluence that was submitted to the NRC in Reference 2. This GE LTR is currently being reviewed by the NRC.

Because the GE LTR methodology has not been approved by the NRC, the NRC requested information regarding any further justification for the projected EPU fluence values.

Response

The EPU fluence projection was used to determine that the current Pressure-Temperature (P-T) limits in the Technical Specifications (TS) were conservative for EPU conditions. The following additional information demonstrates that the current P-T limits in the TS are conservative for at least one cycle of operation at EPU conditions.

The end of the first cycle of EPU operation is projected to be late November 2004 for Unit 1 and early March 2004 for Unit 2. The maximum RPV operating times attained at the end of the proposed period will be 22.4 EFPY for Unit 1 and 21.2 EFPY for Unit 2. These operating times represent a maximum of 70% of the current 32 EFPY limit for the P-T limits. Even with an approximately 18% increase in reactor power for one cycle due to the EPU, this provides significant margin to ensure that the current 32 EFPY fluence projection of 5.1×10^{17} n/cm² will not be exceeded.

Additionally, two features of QCNPS design result in minimizing the neutron fluence at the RPV wall. While these features do not change the assumptions made in the current fluence calculations, they explain why the QCNPS projected fluence is relatively low compared to other Boiling Water Reactors (BWRs) and ensure that the assumptions in the fluence projections are preserved.

First, the QCNPS RPVs, like the Dresden Nuclear Power Station (DNPS) RPVs, are unique in that they have an unusually large diameter (i.e., 251 inches inside diameter (ID)) with a low thermal power core (i.e., 2527 megawatts thermal (MWt)). Many BWRs with low thermal power cores have significantly smaller diameter RPVs (i.e., 218 inches ID). These smaller ID RPVs have a narrower annulus and less clearance between the fuel and shroud, and therefore less water shielding to the RPV wall. Additionally, most BWR RPVs with 251 inch IDs have considerably higher thermal powers and a resulting higher flux density. As a result, the fluence at the QCNPS RPV wall is relatively low compared to most BWRs.

Second, QCNPS cores are designed to obtain low neutron leakage. To achieve this, fresh fuel assemblies are placed into central core locations. After an operating cycle, fissionable U-235 is consumed and the fuel assemblies are relocated to a position radially further out from the center. Eventually, they are placed in peripheral locations, which provides shielding to the RPV. The QCNPS core designs have been low neutron leakage since the initial core load. For the EPU condition, this low neutron leakage loading pattern will continue. Because of the increase in reactor power due to EPU, the neutron flux at the RPV wall will increase in

Attachment B

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

approximate proportion to the extent of the power uprate, but this increase in neutron flux over the one cycle approval period will have only a small effect on the accumulated RPV fluence.

In summary, the use of the current TS 32 EFPY P-T limits for one cycle of operation under EPU conditions is conservative because the limited term of operation provides significant margin to ensure that the basis for the current P-T limits will not be exceeded.

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 J. F. Klapproth (General Electric Company) to U. S. NRC, "Submittal of GE Proprietary Document NEDC-32983P, 'General Electric Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations,'" dated September 1, 2000