July 21, 2003

Mr. John L. Skolds
President and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3, AND QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION

Dear Mr. Skolds:

By letter dated January 3, 2003, Exelon Generation Company, LLC (EGC) submitted, for the Nuclear Regulatory Commission's (NRC's) review, an application pursuant to 10 CFR Part 54, to renew the operating license for the Dresden Nuclear Power Station (DNPS), Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. We are reviewing the information contained in the license renewal application (LRA) and have identified, in the enclosure, areas where additional information is needed to complete its review. Specifically, the enclosed request for additional information (RAIs) is from Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Controls Systems," Section 3.6, "Aging Management of Electrical and Instrumentation and Controls," Section 4.4, "Environmental Qualification of Electrical Equipment (EQ)," Appendix A, "Updated Final Safety Analysis Report (UFSAR) Supplement," and Appendix B, "Aging Management Programs."

We have provided these RAIs to Messrs. R. Stachniak and F. Polaski of your staff on June 6, 2003. We are willing to meet with EGC prior to the submittal of the responses to provide clarifications of the staff's RAIs.

Sincerely,

/***RA***/

Tae Kim, Senior Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-237, 50-249, 50-254,
and 50-265

Enclosure: As stated

cc w/enclosures: See next page

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and 50-265

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DRESDEN AND QUAD CITIES
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

RAI 2.5-1

Bus ducts used for safety-related systems and those associated with the 4,160V power feeds between the reserve auxiliary transformers have been identified as being within the scope of license renewal. However, bus ducts are not included in Table 2.5-1 which identifies "Component Groups Requiring Aging Management - Electrical Commodities." Either include bus ducts in Table 2.5-1 or provide justification for excluding bus ducts.

RAI 3.6-1

LRA Table 3.6-1 indicates that aging effects of fuse blocks will be managed by AMP (B.1.33) for electrical cables and connections not subject to 10 CFR 50.49 EQ requirements. On March 4, 2003, the staff issued Interim Staff Guidance (ISG)-5 concerning identification and treatment of electrical fuse holders for license renewal. The ISG specified that the aging management review for fuse blocks (metallic clamps) need to include the following aging stressors: fatigue, mechanical stress, vibration, chemical contamination and corrosion. While the staff agrees that the proposed AMP (B.1.33) will manage aging of insulation material for fuse holders, the AMP may not be effective in addressing the above mentioned aging stressors associated with fuse blocks (metallic clamps). Provide a description of an aging management program, in accordance with the requirements of 10 CFR 54.21(a)(3), used to detect aging effects associated with aging stressors as discussed in the ISG, or provide a justification why such a program is not needed.

RAI 3.6-2

Are there any electrical penetrations that are not covered under EQ program for Dresden and Quad Cities?

RAI 3.6-3

In Paragraph 3.6.1.2.2, LRA indicates that five medium-voltage power cables at Dresden are exposed to significant moisture and significant voltage. Please identify these cables. Is the cable connecting the SBO diesel generator included in this group? Provide a discussion regarding the use of the SBO diesel generator. Is it possible to use the SBO diesel generator to generate power during peak demands? Also, provide information regarding the replacement cables. (Please note that staff has accepted submarine cables and lead sheathed cables for not requiring GALL XI.E3 program.) Please explain why this issue doesn't apply to Quad Cities. Additionally, provide a description of an aging management program (with ten elements) to remove water from the cable manholes or provide a justification why such a program is not needed.

Enclosure

RAI 3.6-4

LRA Table 3.6-2 indicates that polyester glass insulator associated with electrical bus ducts will be periodically inspected per AMP B.2.2. It is not clear whether all the components (i.e., bus bar, enclosure, insulators, etc.) are covered under this AMP. Industry operating experience, as documented in Information Notices (IN 2000-14, IN 1998-36, and IN 1989-64) and Licensee Event Reports (LERs: 26698002, 41095010, and 27596017), indicate several problems (i.e., loosening of splice plate bolts, degradation of Noryl insulation, insulation failure along with the presence of moisture or debris provided undesired phase to phase or phase to ground electrical tracking paths which resulted in catastrophic failure of the bus) associated with bus ducts. Additionally, most connections to non-segregated bus ducts are made by bolted connections. The non-segregated bus ducts may be exposed to appreciable ohmic or ambient heating during operation and may experience loosening related to the repeated cycling of connected loads or of the ambient temperature environment (Refer to SAND 96-0344, page 4-38). The staff understands that the proposed AMP B.2.2 program will manage the aging degradation of insulation material. Provide a discussion on how the other problems identified by the above INs and LERs and SAND 96-0344 will be managed by the AMP B.2.2.

RAI 3.6-5

In LRA Table 3.6-2, the staff did not find aging management review results for isolated phase bus. Provide a description of an aging management program, in accordance with the requirements of 10 CFR 54.21(a)(3), used to detect/manage aging effects as discussed in RAI 3.6-4 or provide justification why such a program is not needed.

RAI 3.6-6

In LRA Table 3.6-2, aging effect/mechanism for porcelain insulator is indicated as "none." The LRA states that "the plant outdoor environment is not subject to heavy industrial air pollution or saline environment. Plant indoor and outdoor environments are not conducive to promoting aging degradation of porcelain components." Please expand the discussion in Table 3.6-2 to better explain why surface contamination of porcelain insulator is not a concern. In addition, provide a discussion on why potential aging effects/mechanism, such as cracking and loss of material due to wear, are not of concern for Dresden and Quad Cities. Porcelain is essentially a hardened, opaque glass. As with any glass, porcelain will crack or break when subjected to enough force. Cracks have also known to occur with insulators when the cement that binds the part together expands enough to crack the porcelain. This phenomenon is known as cement growth. Mechanical wear is an aging effects for strain and suspension insulators in that they are subject to movement. Movement of the insulators can be caused by wind blowing the supported transmission conductor, causing it to swing from side to side. If this swing is frequent enough, it could cause wear in the metal contact points of the insulator string and between an insulator and supporting hardware.

RAI 3.6-7

In LRA Table 3.6-2, the staff did not find aging management review results for switchyard bus. Change in material properties leading to increased resistance and heating due to oxidation, and

cracking due to vibration are known to be potential aging effects/mechanism for high voltage electrical switchyard bus. Provide a description of an aging management program, in accordance with the requirements of 10 CFR 54.21(a)(3), used to detect/manage above mentioned aging effects or provide a justification why such a program is not needed.

RAI 3.6-8

In LRA Table 3.6-2, Ref. No. 3.6.2.1, aging effect/mechanism for high voltage transmission conductors is identified as loss of material/corrosion. However, no aging management program for high voltage transmission conductors and connections is provided. The LRA states that "the plant outdoor environment is not subject to heavy industry air pollution or saline environment. Aluminum is reactive but develops an aluminum oxide film that protects it from further corrosion." Loss of conductor strength and vibration is a known potential aging effects/mechanism for transmission line conductors. The most prevalent mechanism contributing to loss of conductor strength of an aluminum conductor steel reinforced (ACSR) transmission conductor is corrosion which includes corrosion of steel core and aluminum strand pitting. For ACSR conductors, degradation begins as a loss of zinc from the galvanized steel core wires. Corrosion rate depends largely on air quality which includes suspended particles chemistry, SO_2 concentration in air, precipitation, fog chemistry, and meteorological conditions. Transmission conductor vibration (caused by wind loading) or sway could cause loss of material (wear) and fatigue. Provide a description of an aging management program, in accordance with the requirements of 10 CFR 54.21(a)(3), used to detect/manage the aging effects described above or provide a justification why such a program is not needed

RAI 3.6-9

The aging management activity described in LRA Table 3.6-1, Ref. No. 3.6.1.3 does not utilize the calibration approach for non-EQ electrical cables used in circuits with sensitive, low level signals. Instead, these cables are simply combined with all other non-EQ cables under the visual inspection activity. The staff believes, however, that visual inspection alone would not necessarily detect reduced insulation resistance (IR) levels in cable insulation before the intended function is lost. Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced IR. Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in the instrument loop.

The staff is not convinced that aging of these cables will initially occur on the outer jacket resulting in sufficient damage that visual inspection will be effective in detecting the degradation before IR losses lead to a loss of its intended function, particularly if the cables are also subject to moisture. Therefore, please provide a technical justification that will demonstrate that visual inspection will be effective in detecting damage before current leakage can affect instrument loop accuracy or propose an alternate aging management activity.

RAI 4.4-1

The description of GSI-168, Environmental Qualification of Electrical Equipment, in the LRA is obsolete and should be modified to reflect "NRC Regulatory Issue Summary 2003-09, "Environmental Qualification of Low-Voltage Instrumentation and Control Cables."

RAI A.2.2-1

UFSAR Supplement Section A.2.2 did not address the frequency of inspection and when the first inspection will be completed. This section may require modification if the applicant modifies the program B.2.2, “Periodic Inspection of Non-EQ Non-Segregated Electrical Bus Ducts,” as a result of the staff’s RAIs.

Other parts of Appendix A (i.e., A.1.33), UFSAR Supplement, may also require revision as result of the staff’s RAI.

RAI B.1.33-1

In Appendix B, Section B.1.33, it is stated that the scope of this program includes inspection of power, control and instrumentation cables and connections located in adverse localized areas including the cables used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance. It is not clear to the staff how the scope of this program (B.1.33) is consistent with GALL XI.E1, since GALL XI.E1 does not include cables used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance. Based on the program description provided in B.1.33, it is not clear to the staff whether fuse holders are included in this program.

RAI B.1.33-2

GALL XI.E1 program requires visual inspection of cables and connections jacket anomalies, such as embrittlement, discoloration, cracking, or surface contamination. The description of B.1.33 and A.1.33 included inspection for "signs of accelerated age related degradation." Describe what would qualify as signs of accelerated age related degradation and explain how the requirements of GALL XI.E1 are met.

RAI B.1.33-3

Provide the technical basis for the samples selected (or to be selected), consistent with GALL Program XI.E1 attribute number 3 on Parameters Monitored/Inspected. Indicate whether the sample will include different type of cable insulations used in the plant. Provide details about the samples of connections and fuse holders.

RAI B.1.33-4

AMP B.1.33 indicated that selected cables and connections from accessible areas are inspected and represent, with reasonable assurance, the cables and connections in adverse environments. However, GALL XI.E1 states that selected cables and connections from

accessible areas are inspected and represent, with reasonable assurance, **all** cables and connections in adverse environments. Please clarify this difference.

RAI B.1.33-5

Under Operating experience of B.1.33, the staff did not find any discussion regarding industry operating experience including INs, LER, etc.

RAI B.2.2-1

In LRA Section B.2.2, Scope of Activity includes inspection of normally energized non-segregated bus ducts within the scope of license renewal. Are there any non-segregated bus ducts within the scope of license renewal that are not normally energized? In Section 2.5.1.2, the applicant states that bus ducts within the scope of license renewal are the bus ducts used for safety related system and those associated with the 4160 V power feed between the reserve auxiliary transformer and switchgear. If the answer is yes, then discuss why those bus ducts are not in the scope of B.2.2.

RAI B.2.2-2

Page B-77, Detection of Aging Effects for B.2.2 did not address when the first inspection will be completed.

RAI B.2.2-3

Parameters Monitored/Inspected should be revised to address the problems identified in IN 2000-14 and others listed in RAI 3.6-4.