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Nuclear

10 CFR 54

RS-03-178

October 3, 2003

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR–19 and DPR-25
NRC Docket No. 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 for the Review of the License Renewal Applications for Quad Cities Nuclear Power Station, Units 1 and 2 and Dresden Nuclear Power Station, Units 2 and 3

References: (1) Letter from J. A. Benjamin (Exelon Generation Company, LLC) to U. S. NRC, "Application for Renewed Operating Licenses," dated January 3, 2003

(2) Letter from Tae Kim (USNRC) to John Skolds (Exelon Generation Company, LLC), "Request for Additional Information for the Review of the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Unit 1 and 2, License Renewal Application," dated July 21, 2003

Exelon Generation Company, LLC (EGC) is submitting the additional information requested in Reference 2. This additional information provides further discussion of Section 2.1, "Scoping and Screening Methodology" to support the NRC review of Reference 1.

Should you have any questions, please contact Al Fulvio at 610-765-5936.

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A098

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

October 3, 2003
Executed on

Patrick R. Simpson
Manager – Licensing

Attachment: Response to Request for Additional Information

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

Attachment

Response to Request for Additional Information

DRESDEN AND QUAD CITIES
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

RAI 2.1-1

10 CFR 54(a)(1)(iii) requires, in part, that the applicant consider within the scope of license renewal those systems, structures, and components that ensure the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in §50.34(a)(1), §50.67(b)(2), or §100.11. Although the wording in the license renewal application (LRA), Section 2.1.2.1, "Title 10 CFR 54.4(a)(1) - Safety-related," is consistent with this requirement, the scoping criteria definition documented in Section 4.1.4 of procedure GE-NE-LRTI-2000, "Scoping and Screening of Systems, Structures, and Components for License Renewal," differs from the wording in 10 CFR 54(a)(1)(iii). Specifically, the GE-NE-LRTI-2000 safety-related scoping definition does not refer to offsite exposures comparable to those referred to in §50.34(a)(1) and §50.67(b)(2). Since the scoping implementation procedure does not directly refer to the offsite exposures limitations contained in §50.34(a)(1) and §50.67(b)(2), describe how these exposure limitations, as applicable, were factored into the license renewal scoping and screening process.

Response:

The applicable regulation for Dresden and Quad Cities Nuclear Power Stations is 10 CFR 100.11. The safety related classifications for SSCs are based on design basis documents that evaluated the criteria of 10 CFR 100.11. 10 CFR 50.34 applies to applications for a construction permit. Exelon has not applied for an application for a construction permit for Dresden or Quad Cities Stations. As such, this regulation does not apply. 10 CFR 67(b)(2) applies to revisions to current accident source term in design basis radiological consequence analyses. Exelon submitted a request for amendments to the Dresden and Quad Cities Facility Operating Licenses to support application of an alternate source term methodology. The NRC has not yet approved the submittal. To support the submittal, Exelon performed radiological consequences analyses of the four DBAs that result in offsite exposure and listed the proposed changes to the current licensing basis. None of the proposed current licensing basis changes would result in changes to system or equipment intended functions that affect the LRA. Those SSCs at each site credited for radionuclide plate out and hold up were included within the scope of license renewal and no changes will be required to the scoping results.

RAI 2.1-2

By letters dated December 3, 2001, and March 15, 2002, the Nuclear Regulatory Commission (NRC) issued a staff position to the Nuclear Energy Institute (NEI) which described areas to be considered and options it expects licensees to use to determine what systems, structures, or components (SSCs) meet the 10 CFR 54.4(a)(2) criterion (i.e., All nonsafety-related SSCs

whose failure could prevent satisfactory accomplishment of any safety-related functions identified in paragraphs (a)(1)(i),(ii),(iii) of this section.)

The December 3rd letter provided specific examples of operating experience which identified pipe failure events (summarized in Information Notice (IN) 2001-09, "Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor") and the approaches that the NRC considers acceptable to determine which piping systems should be included in scope based on the 54.4(a)(2) criterion.

The March 15th letter further described the staff's expectations for the evaluation of non-piping SSCs to determine which additional nonsafety-related SSCs are within scope. The position states that applicants should not consider hypothetical failures, but rather should base their evaluation on the plant's current licensing basis (CLB), engineering judgment and analyses, and relevant operating experience. The letter further describes operating experience as all documented plant-specific and industry-wide experience which can be used to determine the plausibility of a failure. Operating experience documentation sources would include NRC generic communications and event reports, plant-specific condition reports, industry reports such as SOERs, and engineering evaluations.

Based on a review of the license renewal application (LRA), the applicant's scoping and screening implementation procedures, and discussions with the applicant, the staff determined that additional information is required with respect to certain aspects of the applicant's evaluation of the 10 CFR 54.4(a)(2) criteria. Please address the following issues:

(a) LRA Section 2.1.2.2, "Title 10 CFR 54.4(a)(2) - Non-safety related affecting safety-related," stated that plant walkdowns were performed to identify those areas containing safety-related SSCs. The applicant further stated in LRA Section 2.1.2.2 that, in those instances where a plant walkdown could not be performed, plant drawings were used to identify those areas containing safety-related SSCs and identify component interactions. For areas where walkdowns could not be performed to identify nonsafety-related SSCs that could affect safety-related SSCs, describe the methodology and documentation sources used to perform scoping pursuant to 10 CFR 54.4(a)(2). In your response, list the areas where walkdowns were not performed and the basis for not performing the walkdowns.

(b) Instruction LRTI-16, "Identification of Non Safety Related Structures and Components Which Spatially or Structurally Interact With Safety Related Systems," describes the process used to identify nonsafety-related systems and components which meet the scoping criteria specified in 10 CFR 54.4(a)(2) due to spatial or structural interaction with safety-related systems. Section 4.3 of LRTI-16 states that nonsafety-related systems are evaluated using the criteria provided in LRTI-16, Table 2, "Spatial Interaction Screening Criteria." Describe the basis and/or justification for the use of the following spatial interaction screening criteria contained in LRTI-16, Table 2:

- Cables in conduit or trays are not affected by water sprays as long as the spray does not target a cable termination area. Nor is it credible that water would be channeled to a termination area (LRTI-16, Table 2, Item 4).

- Pipe whip and jet impingement only apply to high energy systems containing fluids with a

temperatures $ 200 F and a pressure $ 275 psig (LRTI-16, Table 2, Item 5). The staff noted that this definition of high energy systems appeared to be inconsistent with the current licensing basis definition of a high energy system (for example, see Dresden UFSAR, Section 3.6.1.1.1.1).

- Fluid sprays can only affect active components (LRTI-16, Table 2, Item 6).

- Early detection of leaks (sumps and floor drain systems) is taken credit in the scope of the rule to prevent long term degradation of passive equipment and flooding beyond the lowest elevation of the building (LRTI-16, Table 2, Item 8).

- Spray from high energy systems can affect equipment up to 25 feet (LRTI-16, Table 2, Item 10).

- Spray from medium/low energy systems can affect equipment up to 20 feet (LRTI-16, Table 2, Item 11).

(c) Section 2.1.2.2 of the LRA states that pipe whip, jet impingement, general flooding, or spray of a gas were not considered credible interactions for gas systems to adversely affect safety-related SSCs. LRTI-16, Table 2, Item 3, states, "while falling equipment from gas systems can spatially impact safety-related components located below them, the only credible manner in which equipment can fall is through failure of the attached supports." Consistent with the staff position described in the March 15 letter, please describe your scoping methodology implemented for the evaluation of the 10 CFR 54.4(a)(2) criteria as it relates to the non-fluid-filled SSCs of interest. As part of your response please indicate the non-fluid-filled SSCs evaluated and describe the site and industry operating experience relied on to determine the potential for failures of such non-fluid-filled SSCs which could impact safety-related SSCs within scope.

(d) As described in the March 15 letter, if an applicant uses a mitigative option when performing the scoping of nonsafety-related SSCs under 10 CFR 54.4(a)(2), the applicant should demonstrate that plant mitigative features are adequate to protect safety-related SSCs from nonsafety-related SSC failures, regardless of failure location. If an applicant cannot demonstrate that the mitigative features are adequate to protect safety-related SSCs from the consequences of nonsafety-related SSC failures, then the entire nonsafety-related SSC is required to be brought into scope of license renewal.

In reviewing the LRA, the NRC staff was unable to determine if the 10 CFR 54.4(a)(2) scoping methodology considered failures at all piping locations where age-related degradation is possible. Please clarify how the scoping methodology of nonsafety-related piping was performed relative to the guidance contained in the staff's March 15 letter.

(e) In discussions with the Exelon license renewal project team, the NRC staff noted some cases where nonsafety-related plant equipment was credited with providing anchorage for nonsafety-related piping that was attached to safety-related piping. In these cases, the nonsafety-related piping was placed within the scope of license renewal, but the plant equipment (such as a heat exchanger) was not considered to be within scope. For cases where an entire pipe run including both safety and nonsafety-related piping was analyzed as part of the current licensing basis to establish that it could withstand design basis event loads, NUREG-1800, Section 2.1.3.1.2 indicates that the scoping methodology includes: (1) the nonsafety-related

piping up to its anchors and (2) the associated piping anchors as being within the scope of license renewal under 10 CFR 54.4(a)(2). Because the plant equipment credited with providing support to nonsafety-related piping within the scope of license renewal appears to be equivalent to an associated piping anchor as described in NUREG-1800, provide justification for not including this plant equipment within the scope of license renewal.

In addressing each of the above issues, if your review indicates that use of the scoping methodology screened out potential nonsafety-related SSCs that could spatially interact with safety-related SSCs, describe any additional scoping evaluations performed to address the 10 CFR 54.4(a)(2) criteria. As part of your response, list any additional SSCs included within scope as a result of your efforts, and list those SCs for which aging management reviews were conducted, and for each SC describe the aging management programs, as applicable, to be credited for managing the identified aging effects.

Response:

(a) Scoping of Non-Safety Related Equipment in Non Accessible Areas

In those instances where a plant walkdown could not be performed, controlled plant piping layout drawings for the various elevations of the plant were used to identify those areas containing safety related SSCs and identify component interactions. Controlled electrical / instrumentation physical layout drawings were also used to aid in the identification of safety related components in the areas. The review of controlled plant drawings was only performed for high radiation areas where personnel entry at power operation would have resulted in an unnecessary accumulation of dose. Areas where a plant drawing review was performed included the following:

- Drywell
- Steam Tunnels & MSIV Rooms
- High Pressure Heater Bays
- Low Pressure Heater Bays
- Condenser (Hotwell Area)
- Reactor Water Cleanup Rooms
- Isolation Condenser Valve Rooms (Dresden Only)
- ECCS Corner Rooms (Quad Cities Only)
- Shutdown Cooling Heat Exchanger and Pump Rooms (Dresden Only)
- TIP Rooms
- Condensate Demineralizer/Filter Rooms
- Torus Basement (Quad Cities only)

The methodology followed to identify non-safety related equipment in inaccessible areas that could affect safety related equipment is the same as that followed in accessible areas and is described in the response to questions "b" through "e" below.

(b) Scoping Methodology of Non-safety Relating Equipment Spatially Affecting Safety Related Equipment

When considering whether any non-safety related system could spatially interact with any safety related components, the non-safety related systems were placed into the following two categories:

- High Energy Systems
- Medium/Low Energy Systems

High-Energy Systems
Section 3.6.1.1.1.1 of the Quad Cities UFSAR defines high-energy systems as those systems carrying high-energy fluid where the temperature and pressure conditions of fluid exceed 200°F and 275 psig respectively. Section 3.6.1.1.1.1 of the Dresden UFSAR defines high-energy systems as those systems carrying high-energy fluid where the temperature or pressure conditions of fluid exceed 200°F and 275 psig respectively. The list of high-energy systems is found in section 3.6.1.1.2 of the UFSAR for each site. With the exception of site unique systems, the same systems were evaluated for high-energy impact at both sites.

All high-energy piping located inside the primary containment is safety related and was included within the scope of License Renewal under scoping criteria 54.4(a)(1). These systems include:

- Core Spray
- Control Rod Drive
- Feedwater
- High Pressure Coolant Injection
- Isolation Condenser (Dresden only)
- Reactor Core Isolation Cooling (Quad Cities only)
- Low pressure coolant injection (Dresden only)
- Reactor recirculation
- Reactor Water Cleanup
- Shutdown Cooling (Dresden only)
- Residual Heat Removal (Quad Cities only)
- Main Steam

All high-energy systems located outside of the primary containment are listed in 3.6.1.1.2 of the UFSAR for each site. The list includes:

- Main Steam (MS)
- Feedwater (FW)
- High Pressure Coolant Injection (HPCI)
- Reactor Water Cleanup (RWCU)
- Reactor Core Isolation Cooling (RCIC) (Quad Cities only)
- Isolation Condenser (Dresden only)
- Extraction steam to heaters A, B, C or D.
- Heater drain from heater C or D
- Condensate booster
- Moisture separator drain

- Control rod drive hydraulic system

When determining the scope of non-safety related high-energy systems outside of the primary containment, a distance criterion of 25 feet was implemented. If a high-energy system component was located within 25 feet of a safety related component, the non-safety related component was included within the scope of License Renewal. Additionally, if a non-safety related high-energy system component was located directly above a safety related component, regardless of distance, the non-safety related component was included within the scope of License Renewal. In reviewing recent industry guidance concerning 54.4(a)(2) scoping criteria, Exelon has decided not to use the 25 foot separation criteria when scoping high energy systems for license renewal. As such, the scoping boundary has been revised for most of the high energy systems at each site. The expanded boundaries described below are now consistent with the scope of high energy line breaks analyzed in the current licensing basis and described in Appendix 3A of the UFSAR for both sites.

- Main Steam
  The boundary of main steam system will be expanded at both sites to include all piping and components outside of the primary containment up to and including the main turbine stop valves. A break in one of the main steam lines is assumed to whip the line in such a manner as to break both feedwater lines, break through the steam tunnel blowout panels, strike the floor, or whip against the primary containment. This is consistent with the high energy line break locations described in Appendix 3A, Section 4.6.1 of both site UFSARs.

- Feedwater
  The boundary of feedwater system will be expanded to include all piping and components outside of the primary containment up to the suction isolation valves of the feedwater pumps. A broken feedwater line is assumed to whip in such a manner as to whip against the pipe tunnel walls, whip against the floor above the suppression chamber, or whip into the wall of the diesel generator room. This is consistent with the high energy line break locations described in Appendix 3A, Section 4.6.2 of both site UFSARs.

- High Pressure Coolant Injection (HPCI)
  All high pressure piping in the HPCI system was included within the scope of license renewal during the original Exelon scoping effort. As such, not boundary expansions were necessary.

- Reactor Water Clean up
  The boundary of the reactor water clean up system will be expanded to include all high energy system piping and components outside the primary containment. This includes all piping components with the exception of the system heat exchangers and demineralizers. A break in one of the reactor water clean up system pipe lines is assumed to whip the line in such a manner as to strike the primary containment or reactor building slabs at several elevations. The heat exchangers and demineralizers have been excluded from the scope because they can not contribute to a pipe whip

against the primary containment walls or reactor building slabs. This is consistent with the high energy line break locations described in Appendix 3A, Section 4.6.4 of both site UFSARs.

- Reactor Core Isolation Cooling (RCIC) (Quad Cities only)
  All high pressure piping in the RCIC system was included within the scope of license renewal during the original Exelon scoping effort. As such, not boundary expansions were necessary.

- Isolation Condenser (Dresden only)
  All high pressure piping in the isolation condenser system was included within the scope of license renewal during the original Exelon scoping effort. As such, not boundary expansions were necessary.

- Extraction steam to heaters A, B, C or D.
  The high energy line break analysis did not include the extraction steam lines due to physical separation or absence of impact on equipment important to safety. See UFSAR section 3.6.1.1.2. As such, no boundary expansions for extraction steam lines were considered for spatial interaction.

- Heater drain from heater C or D
  The high energy line break analysis did not include the heater drain lines due to physical separation or absence of impact on equipment important to safety. See UFSAR section 3.6.1.1.2. As such, no boundary expansions for heater drain lines were considered for spatial interaction.

- Condensate booster
  The high energy line break analysis did not include the condensate booster lines due to physical separation or absence of impact on equipment important to safety. See UFSAR section 3.6.1.1.2. As such, no boundary expansions for condensate booster lines were considered for spatial interaction.

- Moisture separator drain
  The high energy line break analysis did not include the moisture separator drain lines due to physical separation or absent of impact on equipment important to safety. See UFSAR section 3.6.1.1.2. As such, no boundary expansions for moisture separator drain lines were considered for spatial interaction.

- Control rod drive hydraulic system
  Portions of the high energy lines associated with the control rod drive hydraulic system were excluded from the scope of license renewal when considering spatial interaction based upon a separation of 25 feet or greater. The boundaries of the control rod drive hydraulic system have been expanded to include all high energy piping within the scope of license renewal at both sites.

With the expansion of the boundaries described above, all high-energy piping outside of the drywell located in areas of the plant that contain safety related

SSCs (regardless of the 25-foot separation criteria) are now included within the scope of License Renewal.

Moderate/Low Energy Systems
Moderate / low energy systems were defined in the LRA as all non high-energy systems installed in the plant. Only non-safety related moderate / low energy systems that were located in the same general area of the plant as any safety related component were evaluated for spatial interaction with safety-related systems. A general area was defined as entire floor elevation of a structure. In evaluating moderate / low energy systems for spatial interaction, jet whip and jet impingement were not considered credible spatial interactions as these systems do not contain sufficient energy to cause such an interaction. Flooding was only considered for those systems located in the lowest elevations of the plant where water could accumulate. See the discussion on general flooding below.

The only other spatial interactions attributed to moderate / low energy systems were water spray and falling of piping components onto safety related components. With the exception of gas filled systems, all non-safety related piping systems located over safety related components (active or passive) regardless of the distance involved were included within the scope of License Renewal for the potential of spatial interaction. See discussion on gas filled systems below.

Spatial interaction due to fluid spray were considered for those potions of moderate / low energy systems that could affect active safety related components. It was assumed that water spray from moderate / low energy systems could not adversely affect passive components such as pipes or manual valves. The basis for this assumption is predicated on the operating experience that the degradation from moderate / low energy systems occurs gradually over time and will be detected and corrected before the aging mechanisms such as corrosion can have an adverse effect. System leakage would be detected by plant personnel during activities such as operator rounds, routine radiation protection surveys, or system engineer walkdowns. Additionally, leakage in remote areas of the plant that are not normally accessible during plant operation would be detected through normal plant operating activities.

Fluid spray from non-safety related moderate / low energy systems onto safety related active components was considered a credible interaction. However, a separation criterion of 20 feet was considered. Those portions of non-safety related moderate / low energy systems separated by less than 20 feet of an active safety related component were included in the scope of License Renewal for spatial interaction. As stated above, those portions of pipe that were located directly over a safety related component (active or passive) were included within the scope of License Renewal regardless of the distance separating the two systems.

Technical justification of the 20-foot separation criteria was based upon several factors. Section 3.6.2.2.2 of the Quad Cities UFSAR credits a 25-foot separation criteria used in the design of high-energy piping systems in the primary

containment. Special care was taken in component arrangements within the primary containment to see that equipment associated with engineered safety systems such as the core spray, low pressure coolant injection and containment spray were separated by a distance of 25 feet and segregated in such a manner that the failure of one could not cause the failure of the other. Section 3.6.3.2.1 of the Dresden UFSAR refers to tests conducted as part of an NRC sponsored Reactor Primary Coolant Rupture Study that demonstrated that it is the size of a crack that determines the speed with which the crack and leakage will propagate. Degradation from moderate / low energy systems occurs gradually over time and any early leakage will be detected by plant personnel through rounds, inspections, and monitoring of sumps. This is supported by plant operating experience. Furthermore, fluid sprays dissipate over distance. As such, the 20-foot separation criteria provides further protection of safety-related components from the adverse effects of a fluid. For these reasons, a 20-foot separation criteria between non-safety related moderate / low energy systems and safety-related components was considered conservative and appropriate.

Early Detection of Leaks
Early detection of leaks was credited when scoping non-safety related systems for license renewal. Early detection of leaks will prevent long term degradation of passive equipment and flooding beyond the lowest elevation of the building. Only equipment in the lowest levels of the plant are susceptible to flooding and system leakage would be detected by plant personnel during activities such as operator rounds, routine radiation protection surveys, or system engineer walkdowns.

Cable Trays
Non-safety related moderate energy systems were not included within the scope of License Renewal for spatial interaction with cables contained in conduit or cable trays. It was assumed that cables in conduit or trays are not affected by water sprays as long as the spray does not target a cable termination area. The technical justification for this assumption is that cables are protected by the cable insulation and jacketing. Cable pan covers and conduit also provide additional protection of cable from water spray. Nor is it credible that water sprayed onto an insulated cable will be channeled to a termination area. Cable trays often traverse long distances across the plant moving in various horizontal and vertical directions that would allow water to drain. This assumption is further supported by the fact that many cable tray systems throughout each plant have fire protection sprinkler systems installed directly over cable trays to that will actuate in the event of a fire.

(c) Scoping Methodology for Non-Safety Related Gas Systems

The non-safety related components on gas systems attached to safety related components were included within the scope of License Renewal following the methodology described in the response to "d" below. However, non-safety related gas systems were not evaluated for spatial interaction with safety related equipment in the same manner as other non-safety related systems. Pipe whip, jet impingement, general flooding, or spray of a gas were not considered credible interactions for non-safety related gas systems to adversely affect safety-related

SSCs. Gas systems contain no fluids that could spray or leak onto safety related systems causing shorts or other malfunctions. Also, gas systems do not contain sufficient energy that could cause pipe whip or jet impingement.

Falling of pipe components onto safety related equipment was also not considered a credible spatial interaction unless the attached piping supports were to fail. For this reason, the pipe supports for gas systems were included within the scope of License Renewal, but the gas system piping and valves were not included in the scope of license renewal. Other gas system piping components were excluded from the scope of License Renewal because no operating experience (other than high-energy FAC failures) exists documenting where pipe had fallen if the associated pipe supports were intact. Therefore, there is no viable aging effect that would cause the gas system to fall on safety-related equipment. This operating experience review was documented during the Aging Management Review process and included a review of NRC Information Notices, IE Bulletins, Generic Letters, and plant specific Condition Reports, Work Order History, and Self Assessments. Plant specific review included all of the non-safety related gas systems listed below. While numerous instances of system leaks requiring repair were identified, no instances of piping or component degradation resulting in falling of components were identified.

Those non-safety related gas systems to which this methodology was applied are listed below.

- Instrument Air
- Sparging Air
- Service Air
- Non-Safety Related Ventilation Systems
- Starting Air
- Pumpback Air
- Drywell Pneumatic
- Nitrogen Make up
- Hydrogen
- Oxygen
- Air sampling systems

(d) Mitigative Options When Scoping Non-Safety Related Systems Affecting Safety

Exelon did not credit any plant mitigative features to protect safety related SSCs from failures of non-safety related SSCs. Those portions of non-safety related SSCs that could spatially or structurally interact with a safety related SSC in such a manner that would prevent the accomplishment of a safety related SSC intended function were included within the scope of License Renewal.

(e) Scoping Methodology for Non-Safety Related Pipe Attached to Safety

The interim staff guidance (ISG) issued by the NRC on March 15, 2002 concerning scoping of non-safety related structures, systems, and components in accordance with the requirements of 10 CFR 54.4(a)(2) states:

"For a non-safety related SSC that is connected to a safety-related SSC, the non-safety related SSC should be included within the scope of license renewal up to the first seismic anchor past the safety/non-safety interface."

The design of non-safety related pipe supports at Dresden and Quad Cities does not require the use of seismic anchors to support the piping. While the current licensing basis for Dresden and Quad Cities is silent concerning the use of seismic anchors in non-safety related piping design, an examination of many piping isometric drawings supports this conclusion. To implement the intent of the ISG, Exelon conservatively included those portions of non-safety related pipe up to the point where the pipe was restrained in three orthogonal directions. Furthermore, all pipe supports installed in the plant were included in the scope of License Renewal. The scoping boundary was determined through a review of isometric pipe drawings. In those instances where isometric drawings of non-safety related pipe did not exist (typically small bore pipe less than 2 ½ inches in diameter), Exelon either included the entire line up to the end of the pipe run (e.g., no more pipe existed) or ended the boundary where the line attached to a larger piping header or a major component (i.e., pump or heat exchanger). The larger piping header or major component was treated as an anchor. However, the major component was excluded from the scope of License Renewal because Exelon included all pipe supports installed in the plant within the scope of License Renewal.

This scoping methodology ensured that a substantial number of piping and components representing the entire non-safety related system were included within the scope of license renewal. This population of components receiving aging management along with the total population of pipe supports installed within the plant provides reasonable assurance that the integrity of the attached safety related pipe would be maintained during a seismic event.

Finally, there is no industry operating experience that demonstrates welded steel pipe segments will fall due to a strong motion earthquake. Industry seismic experience shows that failure of pipe segments is extremely rare and only occurs when there is a failure or unzipping of multiple supports. Thus, Exelon conservatively included all of the piping supports at both sites within the scope of License Renewal.

For all of the reasons stated above, Exelon believes that the methodology implemented is more conservative than that described in the ISG. Exelon is confident that those portions of non-safety related piping and components that have been included within the scope of License Renewal in conjunction with all plant piping supports will ensure that the intended functions of the attached safety related piping will be maintained.

RAI 2.1-3

During the scoping and screening methodology audit, the staff discussed the applicant's position concerning the potential long-term program implementation of license renewal requirements and commitments into the operational phase of the plant during the period of extended operation. As a result of these discussions, the NRC staff concluded that the applicant needs to formally document the process it intends to implement at Dresden and Quad Cities to satisfy the requirements of 10 CFR 54.37(b). The discussion should include, as appropriate, a description of the current configuration and design control processes including references to implementation guidance for those processes which are currently being reviewed for potential impact, and identification of any new process(s) or procedure(s) planned to address the integration of the LRA methodology and guidance into the operational phase of the plant.

Response:

The configuration and design control processes at Exelon consist of a series of procedures that include a process description, implementing procedures, and detailed reference procedures. These procedures include Configuration Control and Licensing procedures that are used to make changes to the plant, including physical changes, changes to engineering and design documents, and changes to the licensing basis.

10 CFR 54.37(b) states

> **§54.37(b)**
> *After the renewed license is issued, the FSAR update required by 10 CFR 50.71(e) must include any systems, structures, and components newly identified that would have been subject to an aging management review or evaluation of time-limited aging analyses in accordance with 54.21. This FSAR update must describe how the effects of aging will be managed such that the intended function(s) in 54.4(b) will be effectively maintained during the period of extended operation.*

After the renewed licenses are granted for Dresden and Quad Cities, changes may occur to the plants' design and licensing basis. To comply with §54.37(b), Exelon will evaluate these changes to determine if any SSCs that were installed in the plant at the time the new licenses are issued would have been subject to an aging management review during the preparation of the IPA if the change to the design or licensing basis had occurred prior to the issue of the renewed licenses. Exelon will also be required to evaluate these changes to determine if any existing analysis would have been a TLAA.

New SSCs installed in the plant after the issue of the renewed licenses will not be subject to the requirements of §54.37(b), as §54.37(b) applies only to SSCs existing in the plant at the time the new licenses were issued. A significant observation to establishing the basis to this position is that the 1995 version of Part 54 changed 10 CFR 54.37(b) to indicate that the SSCs covered by this part are those that were in the plant prior to the issuance of the new license and were not in scope when the LRA was prepared, but due to changes in the CLB would have been in scope if the scoping criteria of 10CFR54.4(a) were applied later. This position in part is based on and supported by words in the Statement of Consideration (60 FR 22484; 5/8/95).

"The Commission believes that it is important to note that the SSCs discussed in 10CFR54.37(b) are those newly identified SSCs that would have been subject to an AMR in the

license renewal process."

"SSCs newly identified" are referenced to the past and as existing equipment. The only SSCs "that would have been subject to an AMR in the license renewal process" are the existing SSCs at the time of the license renewal process, not SSCs installed after issue of the new license as indicated in the wording in the 1991 Rule. These SSCs would be structures and components that have the potential to be in place for more than 40 years and are not subject to aging management or an AMP.

Configuration control procedures will be revised to include an assessment of changes to the plant with respect to the scoping criteria in 10 CFR 54.4(a). Changes will be reviewed to determine if any of the following conditions exist. If any of these conditions exist, then the person performing the change will be required to implement the requirements of 54.37(b) for these SSCs. The conditions that will be reviewed are:

As a result of the change, will an existing non-safety related SSC become a safety-related SSC?

As a result of the change, will the failure of an existing non-safety related SSC prevent satisfactory accomplishment of any safety-related functions?

As a result of the change, will existing SSCs be added to the scope of the SSCs that are credited in demonstrating compliance with 10CFR50.48 (Fire Protection)?

As a result of the change, will existing SSCs be added to the Environmental Qualification Program, in accordance with 10 CFR 50.49?

As a result of the change, will existing SSCs be added to the scope of the SSCs that are credited in demonstrating compliance with 10CFR50.61 (Pressurized Thermal Shock)? (PWRs only)

As a result of the change, will existing SSCs be added to the scope of the SSCs that are credited in demonstrating compliance with 10CFR50.62 (Anticipated Transient Without Scram)?

As a result of the change, will existing SSCs be added to the scope of the SSCs that are credited in demonstrating compliance wit/h 10CFR50.63 (Station Blackout)?

If the answer to any of these questions is yes, then the SSCs in question will be subject to 54.37(b). Procedural steps will be added to require that these components will be reviewed to determine how aging will be managed or if an evaluation of TLAAs is needed. The results will be included in the next FSAR update, describing how the effects of aging will be managed such that the intended functions of these SSCs will be effectively maintained during the period of extended operation.

RAI 2.1-4

The NRC staff reviewed the applicant's aging management programs described in Appendix A, "Updated Safety Analysis Report (USAR) Supplement," and Appendix B, "Aging Management Activities," of the Dresden and Quad Cities license renewal application. The purpose of this review was to assure that the aging management activities were consistent with the staff's guidance described in NUREG-1800, Section A.2, "Quality Assurance for Aging Management Programs (Branch Technical Position IQMB-1)," regarding quality assurance attributes of aging management programs.

Based on the staff's evaluation, the descriptions and applicability of the plant-specific aging management programs and their associated quality attributes provided in Appendix A.2 and Appendix B.2 of the LRA are consistent with the staff's position regarding quality assurance for aging management. However, the applicant has not sufficiently described the use of the quality assurance program and its associated attributes (corrective action, confirmation process, and administrative controls) in the discussions provided for aging management programs described in Appendix A.1 and Appendix B.1. The staff requests that the applicant supplement the descriptions in the Appendix A, "Updated Safety Analysis Report (USAR) Supplement," and Appendix B, "Aging Management Activities" to include a description of the quality assurance program attributes, including references to pertinent implementing guidance as necessary, which are credited for the programs described in Appendix A.1 and Appendix B.1 of the LRA. This description in Appendix B.1 should be consistent with the level of detail provided for the plant-specific aging management program descriptions in Appendix B.2. The description in Appendix A.1 should provide sufficient information for the staff to determine if the quality attributes for the Appendix A.1 aging management programs are consistent with the review acceptance criteria contained in NUREG-1800, Section A.2, "Quality Assurance for Aging Management Programs (Branch Technical Position IQMB-1)."

Response:

The LRA Sections A.2.1 and B.2.1, Corrective Action Program, apply to all of the aging management programs and activities that are credited for license renewal and to all plant systems, structures and components within the scope of license renewal.

RAI 2.1-5

In Regulatory Guide 1.188, "Standard Format and Content for Application to Renew Nuclear Power Plant Operating Licenses," issued July 2001, the NRC endorsed NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule," Revision 3 (March 2001), as providing an acceptable method for complying with the license renewal rule. In Section 2.1.1 of the LRA, the applicant states that scoping and screening have been performed consistent with the guidelines in NEI 95-10.

Based on a review of the applicant's scoping and screening procedures, and discussions with the Exelon license renewal project manager, the staff determined that the applicant implemented NEI 95-10, Revision 2, for the development of the LRA. For example, procedure PP-DRE&QDC Rev 02-AP, "Active/Passive Classification and Intended Function Determination of Structures and Components," Section 3, stated that the classification of components was performed in conformance and consistent with the guidelines provided in NEI 95-10, Revision 2. Because

Exelon utilized a version of NEI 95-10 that has not been endorsed by the NRC staff for LRA development, Exelon is requested to identify the differences that exist between Revisions 2 and 3 of NEI 95-10 and the potential impact on the license renewal application.

Response:

A comparison was made between NEI 95-10 Revision 2 and Revision 3. The major substantive changes involved the new LRA format, some changes to Appendix B, "Typical Structure, Component and Commodity Groupings and Active/Passive Determinations for the Integrated Plant Assessment", and added guidance on the treatment of consumables. Other changes were editorial in nature or provided examples for clarity. There were no changes in Revision 3 of NEI 95-10 Appendix B tables for Active/Passive determinations for components that impacted the conclusions or methodology implemented for the Dresden/Quad Cities component screening. The Exelon evaluation process for evaluating consumables is was consistent with the screening guidance provided in Table 2.1-3 of NUREG-1800 and in NRC Memo to NEI, Christopher I. Grimes to Douglas J. Walters, License Renewal Issue No. 98-12, "Consumables," March 10, 2000. See the response to RAI 2.3.2.9-4 for more detail on the evaluation of consumables.

RAI 2.1-6

NUREG-1800, Section 2.1.3.1.3, "Regulated Events," states that all SSCs that are relied upon in the plant's CLB (as defined in 10 CFR 54.3), plant-specific experience, industry-wide experience (as appropriate), and safety analyses or plant evaluations to perform a function that demonstrates compliance with NRC regulations identified under 10 CFR 54.4(a)(3), are required to be included within the scope of the rule. As part of the LRA review, the NRC staff evaluates the scope and depth of the applicant's document review to provide assurance that the scoping methodology considered all SSC intended functions.

Section 2.1.3.5 of the LRA identifies Technical Position Papers as a documentation source for license renewal scoping under 10 CFR 54.4(a)(3). Additionally, the staff noted that position papers were developed to support certain aspects of the scoping and screening methodology, such as treatment of insulation, classification of SSCs as active or passive, and scoping of electrical equipment. In reviewing the LRA and scoping and screening implementation procedures, the NRC staff was unable to determine the extent that the CLB was reviewed during position paper development. With regard to the technical position papers, provide the following information:

(a) Describe the methodology used to develop technical position papers. In your response, state which CLB source documents were used to develop the position papers.

(b) In discussions with the Exelon license renewal project managers during the scoping and screening methodology audit, it was identified that an electronic document database was used to identify CLB documents pertinent to position paper development. Describe the controls and processes, including proceduralized controls, used to ensure that the electronic current licensing basis document database was complete and accurate.

(c) In reviewing the technical position papers for regulated events, the NRC staff noted that the position papers identify SSC intended functions. Additionally, procedure "Desktop Guide - Scoping & Screening of Systems, Structures and Components," Section 3, Step 6, states that, "If the related Position Paper(s) say that a function of the System/Structure is credited to satisfy one of the questions 5 through 8, IDENTIFY the credited function(s) as an Intended Function(s)." However, during the scoping and screening methodology audit, the Exelon license renewal project team indicated that technical position papers were not intended to identify all credited SSC functions for the mitigation of regulated events. Please clarify how the intended functions identified in the technical position papers were used to support the scoping and screening methodology. If the technical position papers were not used to identify all SSC intended functions related to the mitigation of regulated events, describe how system, structure, and component level intended functions for SSCs credited in mitigating regulated events were identified.

Response:

(a) Position papers are of two general groups: papers to address regulated events, and papers to address technical approaches to generic topics. The methodology used to generate the position papers of these two types was different.

1. Regulated Events: There are four position papers in this group; Station Blackout (SBO), Fire Protection (FP), Anticipated Transient Without Scram (ATWS), and Environmental Qualification (EQ). All were generated using the same process.

A. Electronic documents were searched using appropriate key words to identify systems/structures required to support the regulated event addressed by the position paper.

B. Paper copy documents (for example, FP Reports, EQ binders) were reviewed to identify systems/structures required to support the regulated event.

C. Source CLB and other documents used to develop the position papers.

Position Paper	Document	Document Type
FP	UFSAR	CLB
FP	10 CFR 50.48, "Fire Protection"	CLB
FP	Fire Protection Report and Safe Shutdown Equipment List	CLB
FP	Fire Protection Documentation Package	CLB
FP	Appendix A to BTP APCSB 9.5 - 1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," dated August 23, 1976	CLB
FP	System Description Manuals	Non-CLB

Position Paper	Document	Document Type
FP	Procedures	Non-CLB
ATWS	UFSAR	CLB
ATWS	10 CFR 50.62, "ATWS"	CLB
ATWS	NRC SER	CLB
ATWS	General Electric Licensing Topical Report, "Anticipated Transients Without Scram; Responses to NRC ATWS Rule 10 CFR 50.62," NEDE-31096-P-A, February 1987	CLB
ATWS	Drawings	Non-CLB
ATWS	Calculations	Non-CLB
SBO	UFSAR	CLB
SBO	10 CFR 50.63, SBO	CLB
SBO	NRC SERs	CLB
SBO	Correspondence with NRC	CLB
SBO	Procedures	Non-CLB
SBO	NRC ISG SBO Position Attachment to NEI Letter Matthews to Nelson/Lochbaum, dated March 22, 2002	Non-CLB
EQ	10 CFR 50.49, "EQ"	CLB
EQ	EQ Binders	CLB

D. The position papers were developed by engineers who had previous experience with BWR systems and operations. The preparer reviewed applicable documents in the categories listed under 1.C, above, to identify systems required in each regulated event. For the FP, SBO and ATWS events, the position papers were structured to provide tables that list the required systems, the system functions and related CLB references. For EQ, the position papers were structured to provide tables that list systems containing EQ components and the EQ binders related to each system. After preparation, each position paper was checked for accuracy and completeness by another engineer who had not been directly involved in the preparation of the paper. After preparation and checking the position papers were approved by license renewal project management and issued for project use. Position paper revision was accomplished using a similar preparation-review-approval process.

2. Generic Topics: There are three position papers in this group; Active/Passive, Insulation, and Spaces Approach. All were generated using the same process.

   A. For the three position papers listed above, two industry-level source documents were used. They are:
      - NEI 95-10, Revision 2, Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule
      - NUREG 1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants

B. For the three position papers listed above, five plant-specific source documents were used. They are:
   - UFSARs
   - R-4411 Quad Cities Installation Specification
   - K-4080 Dresden Installation Specification
   - EQ Binders
   - Passport Equipment Database (EWCS)

C. The source documents were used to develop the following position papers:

   (1) Active/Passive Classification and Intended Function Determination of Structures and Components –
   NEI 95-10 and the Passport Equipment Database were used to develop a list of component types and identify the component type as active or passive. Where a component could potentially be either active (A) or passive (P), based on specific design details or applications, the component was assigned to the category "A/P". The screening process that was supported by the Active/Passive Position Paper required that components in category A/P be evaluated based on their design details and/or application to reach a final determination of the component's active/passive classification..

   (2) Scoping and Screening Position Paper for Electrical Components based on Electrical Spaces Approach for Aging Management Review –
   Guidance contained in NUREG-1800, Section 2.5 (Scoping and Screening Results: Electrical and Instrumentation and Control Systems), was used to develop a plant spaces process for screening electrical components.

   (3) Treatment of Pipe/Equipment Insulation During Scoping and Screening Systems For License Renewal –
   The position paper standardizes a process for evaluating insulation as a commodity group, rather than as a commodity component assigned to a specific plant system. Installation specifications R-4411 and K-4080 were used to evaluate the insulation contained in this insulation commodity group.

D. The Generic Topic position papers were developed by engineers who had previous experience with BWR systems and operations, using the source documents described above. After preparation, each position paper was checked for accuracy and completeness by another engineer who had not been directly involved in the preparation of the paper. After preparation and checking the position papers were approved by license renewal project management and issued for project use. Position paper revision was accomplished using a similar preparation-review-approval process.

(b) In the early 1990s, ComEd (now Exelon Nuclear) authorized a project to re-baseline the UFSAR for Dresden and Quad Cities Stations. This project was performed by an outside

engineering firm. A follow-on project involved converting all of the licensing documentation into electronic format. The deliverable for that project was a database. When the project was complete, ComEd administrative guidelines outlined requirements to have licensing correspondence sent to one individual charged with maintaining the database on a real-time basis. That process was still in place when the electronic CLB was provided to the Dresden/Quad Cities License Renewal project. In addition, a licensing document service was used to supplement the search for correspondence related to the position papers.

The License Renewal project maintained an electronic document repository that was controlled and administered as an Exelon intranet site by one member of the License Renewal team. All members of the License Renewal project team had access to read electronic documents stored on the intranet site. However, only one team member had access to add or delete documents stored on that site. As updated versions of documents stored on the project's intranet site became available, the project's intranet site administrator added the document to the site and, if appropriate, deleted earlier revisions of the document from the site.

(c) The intended functions listed in the SBO, FP and ATWS position papers provide a brief description of the system-level function(s) that are explicitly credited in the regulated event. For example, in the ATWS event, the main steam system is explicitly credited with providing safety relief valves and spring safety valves to prevent over pressurization of the reactor vessel and this function is specifically identified in the ATWS position paper. However, main steam system piping that is part of the reactor coolant pressure boundary is implicitly assumed to maintain pressure boundary integrity during the ATWS event and this implicit function is not specifically listed in the ATWS position paper. For most systems, the system-level intended function(s) explicitly credited in regulated events are also credited in design basis events, and the structures, systems and components (SSCs) that ensure the intended function are also in scope of license renewal under criteria 10CFR54.4(a)(1). However, for a few systems, the function credited in the regulated event is not explicitly credited in other design basis events and the SSCs required to provide the function are in scope of license renewal only under criteria 10CFR54.4(a)(3). An example of this second situation is the Dresden control rod drive hydraulic (CRDH) system that is explicitly credited with providing make-up water to the reactor vessel during the FP event. The intended functions identified in the technical position papers support the scoping and screening methodology by ensuring that system functions explicitly credited in the regulated events are properly identified. This subsequently allows the SSCs that are required to ensure the success of the regulatory event functions to be identified so that they can be properly included in the scoping and screening process.

RAI 2.1-7

10 CFR 54.4(a)(1), states, in part, that SSCs within the scope of license renewal include safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49(b)(1)). 10 CFR 50.49, states that design basis events are defined as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed. In regard to identification of design basis events, Section 2.1.3, "Review Procedures," of NUREG-1800 states:

The set of design basis events as defined in the rule is not limited to Chapter 15 (or equivalent) of the UFSAR. Examples of design basis events that may not be described in this chapter include external events, such as floods, storms, earthquakes, tornadoes, or hurricanes, and internal events, such as a high-energy-line break. Information regarding design basis events as defined in 10 CFR 50.49(b)(1) may be found in any chapter of the facility UFSAR, the Commission's regulations, NRC orders, exemptions, or license conditions within the CLB. These sources should also be reviewed to identify systems, structures and components that are relied upon to remain functional during and following design basis events (as defined in 10 CFR 50.49(b)(1)) to ensure the functions described in 10 CFR 54.4(a)(1).

During the scoping and screening methodology audit, the NRC staff questioned how non-accident design basis events, particularly design basis events that may not be described in the UFSAR, were considered during scoping. The NRC audit team noted that limiting the review of design bases events to design basis accidents described in the UFSAR could result in omission of safety-related functions described in the current licensing basis. For example, during a flooding event, the Dresden Updated Final Safety Analysis Report (UFSAR), Section 3.4.1.1, "External Flood Protection Measures," states that "if the water level reaches 513 feet at the plant site, cooling of the reactors will be transferred to the isolation condensers, which will thereafter maintain the primary system in a safe shutdown condition until the flood waters have receded and startup procedures can be initiated." Dresden USAR Section 2.4.3, states that the probable maximum flood elevation at the Dresden site is 528 feet. The team noted that the isolation condenser system level intended functions did not include a safety-related function for providing capability to shutdown the reactor and maintain it in a safe shutdown condition during a flooding event. For the isolation condenser, please explain the basis for the determination that the safety-related intended functions of the isolation condenser system did not include shutting down the reactor and maintaining it in a safe shutdown condition. Additionally, describe the methodology used to ensure that all design bases events (including conditions of normal operation, anticipated operational occurrences, design basis accidents, external events, and natural phenomena) were addressed during license renewal scoping. In your response, indicate the documentation sources reviewed to ensure that all design basis events were identified.

If, in addressing the above issues, your review indicates that additional scoping evaluations are required, describe these additional scoping evaluations performed to address the 10 CFR 54.4(a)(1) criteria. As applicable, list any additional SSCs included within scope as a result of your efforts, and list those SCs for which aging management reviews were conducted, and for each SC describe the aging management programs, as applicable, to be credited for managing the identified aging effects.

Response:

Safety related systems and structures at Dresden and Quad Cities were originally divided into two categories (Class I and Class II) that are defined in section 3.2 of the UFSAR for both sites. At a later date, both sites reclassified their mechanical and electrical systems and components utilizing a definition of "safety related" as described in Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events". Section 3.2.7 of the UFSAR for both sites describes this reclassification effort. This safety classification effort did not incorporate the

definition of design basis as defined in 10 CFR 50.49(b)(1). As such, the definition of "safety related" as licensed for Dresden and Quad Cities is not the same as that defined in 10 CFR 54.4(a)(1). However, to ensure that the intent of 10 CFR 54.4(a) was met, a review for systems, structures, and components credited for safe shutdown during non-accident events was performed in the preparation of the response to this RAI. This review determined that those systems and structures credited for safe shutdown in the non-accident events were already included within the scope of license renewal. However, there were additional components added to the scope of license renewal as a result of this review. These components are associated with High Energy Line Break non-accident events. Components were added to the scope of license renewal for the main steam, feedwater, reactor water cleanup, and control rod drive hydraulic systems. Each of the components added to the scope of license renewal will be screened and assigned to the appropriate aging management programs.
The non-accident events that were identified during this review were tornados, external flooding, internal flooding, high energy line breaks, damn failures, and earthquakes. As stated above all of the systems and structures credited for safe shutdown in non-accident events were already included within the scope of license renewal. The additional components included within the scope of license renewal as a result of non-accident events were not classified as "safety related" as defined in the licensing basis for each site. To remain consistent with the existing licensing basis for each site, these systems, structures, and components were included within the scope of license renewal under the criteria of 10 CFR 54.4(2). In this manner, the intent of 10 CFR 54.4(1) was met and systems, structures, and components meeting this definition were included within the scope of the rule and evaluated for aging management.

During the scoping process, various documentation sources were used during the scoping and screening process. These documentation sources are listed below and described in more detail in section 2.1.3 of the application.

- Updated Final Safety Analysis
- Maintenance Rule Data Base
- Current Licensing Basis and Design Basis Documents
- System and Structure Operating Description Documents
- Technical Position Papers
- Controlled Plant Component Database
- Systems and Structures List
- License Renewal Database

Using the information sources listed above, Exelon identified all functions that a system or structure was designed to perform. All of the system functions were then compared against the criteria of 10 CFR 54.4(a)(1), (a)(2) and (a)(3). Each of the system functions satisfying the scoping criteria in 10 CFR 54.4(a) was identified as a system intended function.
Functions performed by safety related parts of the evaluated system were identified as satisfying criterion (a)(1) and were classified as intended functions. Functions performed by non-safety related system or parts of systems that are required to ensure success of a safety related function were identified as satisfying criterion (a)(2) and classified as intended functions. This included functions described for non-accident events as discussed above. Functions that were credited in one of the regulated events were identified as satisfying criterion (a)(3) and classified as intended functions. A function may have been classified as an intended function under more than one of the three criteria in 10 CFR 54.4. Any system that contained one or more intended functions [i.e., satisfying criterion (a)(1), (a)(2), or (a)(3)] was classified as a system or structure

within the scope of license renewal.

When searching for all of the functions related to the isolation condenser system, Exelon utilized the information sources listed above. Intended functions were identified that satisfied all three of the scoping criteria specified in 10 CFR 54.4 [i.e. (a)(1), (a)(2), and (a)(3)]. These included an intended function to provide reactor core cooling in the event that the reactor becomes isolated from the turbine and main condenser by closure of the main steam isolation valves. This single intended function was credited for safe shutdown during a fire, safe shutdown during a station blackout condition, and safe shutdown during an anticipated transient without scram condition. These are design basis events as defined in 10 CFR 50.49(b)(1) that are not described in Chapter 15 of the UFSAR. Regardless, the Exelon scoping methodology identified this as an intended function.

However, the CLB search for intended functions for the isolation condenser inadvertently missed the statement in section 3.4.1.1 of the UFSAR crediting the cooling of the reactors during an external flood and maintain the primary system in a safe shutdown condition until the flood waters have receded and start up procedures can be initiated. Despite this oversight, the intended function of providing core cooling when the reactor is isolated from the main condenser was identified. The isolation condenser operates the same way and fulfills this function during a flood event, or during any of the other events as listed in the previous paragraph. The scoping results of the isolation condenser do not change when the flooding event is considered.

RAI 2.1-8

10 CFR 54.21(a)(3) requires, in part, that the integrated plant assessment contained in the license renewal application demonstrate that the effects of aging will be adequately managed so that the intended function(s) of systems, structures and components within the scope of 10 CFR 54 will be maintained consistent with the current licensing basis for the period of extended operation. 10 CFR 54.3(a) states that the current licensing basis is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis that are docketed and in effect. 10 CFR 54.3(a) further states that the CLB includes certain NRC regulations; orders; license conditions; exemptions; technical specifications; design basis information documented in the most recent final safety evaluation report; and licensee commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

LRA Section 2.1.3, "Documentation Sources Used for Scoping and Screening," provides a description of the CLB and related documents used during the scoping and screening process. Procedure GE-NE-LRTI-2000, "Scoping and Screening of Systems, Structures, and Components for License Renewal," describes the process used to identify those SSCs that fall within the scope of 10 CFR 54. GE-NE-LRTI-2000, Section 4.0, "Instructions," states that CLB documents must be utilized when determining whether a system, structure, or component falls within the scope 10 CFR 54, but does not describe the method used to review certain current licensing basis and design basis documents such as safety evaluation reports, license event reports, and responses to NRC bulletins, generic letters, and enforcement actions in a manner that ensured that all system and structure functions were identified for the purposes of license

renewal scoping. Please describe the method(s) used to review the documents identified in Section 2.1.3 of the LRA for the purposes of identifying all applicable SSC functions.

Response:

The documentation sources listed in LRA Section 2.1.3 were used during the scoping and screening process to identify the functions that a system or structure is required to accomplish. The list of functions for each system or structure was documented on the License Renewal Scoping and Screening Scoping Form. As described in LRA Sections 2.1.4.1, 2.1.4.2, and 2.1.4.3, a description was prepared for each system and structure that included the purpose and identified all functions that the system or structure was designed to perform. This description was prepared using the information from the documentation sources listed in LRA Section 2.1.3. The method used both manual and electronic searches to identify parts of the documents that might contain descriptions of system or structure functions. Then the relevant document sections were reviewed by reading them.

In performing the reviews described in the preceding paragraph, the most useful sources for identifying functions of SSCs were found to be the UFSARs, the Maintenance Rule Databases, the System/Structure Design Basis Documents, and the System/Structure Operational Description Documents. These documents were the first level of documents reviewed. The UFSARs provide narrative descriptions of various system and structure functions. The Maintenance Rule Databases provide lists of functions for systems/structures included in the Maintenance Rule. The Design Basis Documents and Operational Description Documents (operating procedures and lesson plans) typically include lists of functions for the system or structure and provide narrative descriptions of the functions.

Based on references contained in the initially reviewed documents, additional CLB documents such as safety evaluation reports, license event reports, responses to NRC bulletins, generic letters and enforcement actions were identified for review. The additional CLB documents typically were reviewed to provide additional information on how an SSC function is described. In addition to references found in source documents, electronic searches based upon key words or document numbers were also conducted. These methods provided reasonable assurance that all system and structure intended functions were identified.

RAI 2.1-9

Section 2.1.6 of the LRA states, in part:

> When a supporting system or structure was identified for an intended function that satisfies only criterion 10 CFR 54(a)(3), the scoping process did not require that the supporting function be classified as an intended function unless a requirement in a current licensing basis documented explicitly identifies a requirement for the supporting function.

10 CFR 54.4(a)(3) requires that all systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with specific regulated events be within the scope of license renewal. Please describe the intent and basis

for the 10 CFR 54.4(a)(3) support function scoping guidance contained in Section 2.1.6 of the LRA. In your response, specifically describe the extent of reviews conducted to identify support functions to SSCs within the scope of license renewal due to the 10 CFR 54.4(a)(3) criteria.

Response:

The intention of the 10 CFR 54.4(a)(3) support function scoping discussion in LRA Section 2.1.6 was to reflect the position in NUREG-1800, Section 2.1.3.1.2, that –

> *Consideration of hypothetical failures that could result from system interdependencies, that are not part of the current licensing bases and that have not been previously experienced is not required.*

The discussion in LRA Section 2.1.6 should have been written as follows:

> *When a supporting system or structure was identified for an intended function that satisfies only criterion 10 CFR 54.4(a)(3), the scoping process did not require that the supporting function be classified as an intended function unless 1) failure of the supporting system or structure is expected to cause failure of the intended function satisfying criterion 10 CFR 54.4(a)(3), or 2) a requirement in a current licensing basis documented explicitly identifies a requirement for the supporting function.*

The scoping process for systems and structures satisfying 10 CFR 54(a)(1) through (3) required that any supporting system function be identified as a License Renewal "intended function" if its failure would prevent the supported system from performing any of its intended functions. This requirement is stated in Steps 4.1.7 and 4.1.8 of GE-NE-LRTI-2000, "Technical Instruction for Commonwealth Edison Dresden/Quad Cities License Renewal Project, Scoping and Screening of Systems, Structures and Components for License Renewal." These steps read as follows:

4.1.7. For those systems or structures that fall within the scope of 10 CFR 54.4(a) (1) through (3), identify the support systems necessary to complete the "Intended Functions" identified in step 4.1.6 above. List supporting systems on Exhibit A, LRS&S Scoping Form, Identification of Supporting Systems.

4.1.8. For each supporting system, determine whether failure of that supporting system would prevent the system being evaluated from performing any of its "Intended Functions". Indicate the results of this determination on Exhibit A, LRS&S Scoping Form. If failure of a supporting system will prevent the system under evaluation from accomplishing any "Intended Function(s)", then the supporting system falls within the scope of the Rule. Document the "Intended Function(s)" that would not be accomplished if the supporting system were to fail on Exhibit A, LRS&S Form Scoping. Then, confirm that the supporting system is identified as within the scope of 10 CFR 54.4(a) (1) through (3).

The review to identify support functions of SSCs within the scope of license renewal consisted of reviewing the UFSARs, System Design Basis Documents, System Operating Description Documents (operator lesson plans and procedures), and, where necessary, engineering

drawings related to the system to identify interfaces with other systems and any required support provided by the interfacing system. Based on this review, critical supporting functions such as those provided by power supplies or required cooling water subsystems were identified. The supporting functions were classified as License Renewal intended functions if their failure was expected to cause failure of a supported intended function. A distinction was made between supporting functions whose failure "would" cause failure of a supported function and one whose failure "might" cause failure of a supported function. For example, an electrical cable that provided power to a required pump would be classified as within the scope of License Renewal because failure of the cable would be expected to cause failure of the pump. A cooling water pump that provided required cooling water to an in-scope engine would be classified as within the scope of License Renewal because failure of the pump would be expected to cause overheating and failure of the engine. However, a normal air supply to an accumulator that supports required operation of an air operated valve would not necessarily be classified as within the scope of License Renewal if an in-scope check valve was credited with maintaining the accumulator charged with air to support valve operation upon failure of the primary air supply.

RAI 2.1-10

Section 2.1.4.1 of the LRA stated that a component was determined to be in-scope if it was safety-related meeting the criteria of 10 CFR 54.4(a)(1), if it was determined that the component was needed to fulfill a system intended function, if the component met the criteria of 10 CFR 54.4(a)(2), or if the component was needed to support the intended function of the system needed to meet the regulation for regulated events.

LRA Section 2.3.3.1, "Refueling Equipment," identified two system-level intended functions for the refueling equipment system: (1) maintain structural integrity to prevent collapse of the platform onto the spent fuel storage racks or the reactor core, and (2) provide interlocks to preclude inadvertent criticality. LRA Table 2.3.3-1, "Component Groups Requiring Aging Management Review – Refueling Equipment System," identified the spent fuel gates as a requiring aging management to maintain a "pressure boundary" component level intended function. Based on a review of LRA Section 2.3.3.1, the NRC staff was unable to determine how the pressure boundary component level function for the spent fuel pool gates supported either of the refueling equipment system-level intended functions in a manner consistent with the component scoping methodology described in Section 2.1.4.1 of the LRA. Describe how the scoping methodology was implemented to identify the need for spent fuel gate pressure boundary integrity to support the specified refueling equipment system intended functions. If the spent fuel pool gate component level function was mis-classified in LRA Table 2.3.3-1, please address the potential extent of condition for this issue on the scoping results for other systems and structures.

Response:

The component intended function for the spent fuel pool gates was properly classified as pressure boundary and properly evaluated for aging management. The gates were included in the Refueling Equipment system because original equipment supplier included them in the list of refuel equipment provided to the station. After further review, Exelon has concluded that it would have been more appropriate to place the fuel pool gates, with pressure boundary intended

function, into the Reactor Building system, along with the fuel pool structure. This is an isolated example. As such, an extent of condition review is not necessary.

RAI 2.1-11

NUREG-1800, Section 2.1.3.1.2, "Nonsafety-Related," states:

> To satisfy the scoping criterion under 10 CFR 54.4(a)(2), the applicant must identify those nonsafety-related SSCs (including certain second-, third-, or fourth-level support systems) whose failures are considered in the CLB and could prevent the satisfactory accomplishment of the safety-related function identified under 10 CFR 54.4(a)(1). In order to identify such systems, the applicant should consider those failures identified in (1) the documentation that makes up its CLB, (2) plant-specific operating experience, and (3) industry-wide operating experience that is specifically applicable to its facility.

The LRA Section entitled "Hypothetical Failures and Cascading," located within LRA Section 2.1.6, indicates that only hypothetical failures described in the current licensing basis were considered during SSC scoping. The NRC staff noted that consideration of only hypothetical failures described in the CLB may result in the failure to consider failures identified in plant-specific and industry-wide operating experience. Please describe the intent of this statement in the LRA and discuss how the scoping process considered failures identified in the CLB and plant-specific and industry-wide operating experience that is applicable to the Dresden and Quad Cities facilities consistent with the guidance contained in NUREG-1800.

Response:

The response to this question will be broken into two separate areas of the scoping process with respect to how failures were considered in the evaluation of a SSC for criteria 54.4(a)(2). These areas are: 1) failures identified in the CLB, and 2) failures identified in plant-specific and industry-wide operating experience.

1) Failures identified in the CLB
Scoping of SSCs was performed in accordance with Technical Instruction GE-NE-LRTI-2000, "Scoping and Screening of Systems, Structures and Components for License Renewal." Step 4.1.2 requires the person performing the scoping review for each system or structure to identify information found in CLB documents and to list this information on the system or structure scoping form. The preparer then uses all the information gathered, including the CLB documents, to identify the system or structure functions. These functions are then used to answer the scoping questions which are the same as 10 CFR 54.4(a)(1) through (3). This process provides reasonable assurance that any CLB requirements dealing with scoping criteria 10 CFR 54.4(a)(2) are identified in the scoping process.

2) Failures identified in plant-specific and industry-wide operating experience
Plant-specific and industry-wide operating experience was not specifically reviewed during the scoping process in preparation of the Dresden / Quad Cities License Renewal

Application. This review was not needed as part of preparation of the application because routine Exelon practices for review of operating experience includes an assessment to determine if non-safety related equipment failures prevented a safety-related function from occurring. Any failure of non-safety related SSCs would have been identified through the operating experience review and would have identified appropriate corrective action. These actions would have included actions to prevent recurrence of the event or issue.

The review of both plant and industry operating experience is controlled within Exelon by Procedure LS-AA-115, Operating Experience Procedure. This procedure provides a formal process to review operating experience documents from both inside Exelon and from outside sources. Internal sources include, but are not limited to, Condition Reports (CRs) and Nuclear Event Reports (NERs). CRs are used to record and address any items coming from the Corrective Action Program. CRs include, but are not limited to, any unexpected corrective maintenance, repeat maintenance, and Maintenance Rule Functional Failures. NERs are generated when events occur that are of potential interest to other Exelon facilities.

External sources include, but are not limited to, INPO documents (Significant Operating Experience Reports, Significant Event Reports, Significant Event Notifications, and Operations and Maintenance Reminders), NRC documents (Generic Letters, Bulletins, and Information Notices), information from NSSSs suppliers, 10 CFR 21 reports, vendors' technical bulletins, and ANI / NEIL Bulletins.

Each operating experience item receives a 27-step review, with one of the steps answering the question "Did the event/issue described result in non-safety/BOP equipment causing a significant plant transient or prevent a safety-related function from occurring?" The Exelon Operating Experience Procedure requires appropriate corrective action to be taken. This results in any actual plant or industry operating experience where non-safety related SSCs had an impact on safety-related functions being identified by normal plant operating procedures, and appropriate actions being taken. Because of this existing procedural requirement, the license renewal scoping process did not need to explicitly include the review of plant or industry operating experience as part of the scoping process for 10 CFR 54.4(a)(2).

RAI 2.1-12

10 CFR 54.21(a)(1) requires that structures and components subject to an aging management review shall encompass those structures and components that: (1) perform an intended function without moving parts or a change configuration or properties; and (2) that are not subject to replacement based on a qualified life or specified time period. NUREG-1800, Table 2.1-3, "Specific Staff Guidance on Screening," provides guidance for determining if consumable items should be subject to an aging management review. For consumables that are periodically replaced, Table 2.1-3 states that the applicant should identify the standards that are relied on for replacement as part of the methodology description. For consumable such as packing, gaskets, component seals, and o-rings, Table 2.1-3 states that these components may be excluded from an aging management review using a clear basis.

Scoping and screening procedure GE-NE-LRTI-2000, Section 4.3.8 and Table 7, "Short Lived Components Not Requiring Aging Management," provide guidance for screening certain

components, including consumables. In reviewing GE-NE-LRTI-2000, Table 7, the NRC staff was unable to determine the basis for considering some of the components listed in Table 7 to be not subject to an aging management review. For each of the component types listed in Table 7, provide a justification for the determination that the component is not subject to an aging management review. If your review of this issue identified a component type that cannot be generically excluded from an aging management review on a plant-specific basis, please describe any further screening evaluations that were performed. As applicable, list any additional structures and components (SC) for which aging management reviews were conducted, and for each SC describe the aging management programs, as applicable, to be credited for managing the identified aging effects.

Response:

For each of the component types listed in Table 7 of GE-NE-LRTI-2000, the following table provides a justification for the determination that the component is not subject to an aging management review.

Component Listed in Table 7 of GE-NE-LRTI-2000	Reason Component Is Not Subject to an Aging Management Review
Oil, Grease, and Component Filters (oil or air)	These are short-lived consumables that are periodically replaced. As such, they are not subject to an aging management review.
Fire Extinguishers, Fire Hoses, and Air Packs	These are short-lived components that are replaced on condition. Fire extinguishers, fire hoses and air packs are periodically inspected and tested per the requirements of site-specific instructions that implement applicable National Fire Protection Association (NFPA) guidelines as documented in the Fire Hazards Analysis for each station.
Gas Bottles (cylinders)	These are short-lived components that are replaced on condition of low gas pressure.
Packing, Gaskets, O-Rings	These subcomponents are not credited with maintaining the integrity of the pressure boundary function of valve, pump and similar component housings. Dresden specification K-4080 and Quad Cities specification R-4411 implement the codes and standards applicable to piping and valves at the respective stations, including ANSI B31.1 and, where specified, ASME Section III. These specifications identify the pressure boundary components of valves as the body of the valve, bonnet, body-bonnet connection, valve disc and related pressure retaining components. Packing, gaskets, and O-rings are not credited with maintaining integrity of the pressure boundary function.
Radiation Detectors	These are active, short-lived components that are replaced on condition of low detector sensitivity.
Control Rod Blades	These are short-lived component that are replaced as part of the Dresden and Quad Cities control blade management program.
Fuel Assembly	These are short-lived components that are replaced as part of the Dresden and Quad Cities fuel management program.

The following paragraph discusses a component type originally listed in Table 7 of GE-NE-LRTI-2000 that cannot be generically excluded from an aging management review :

Flexible hoses should not have been listed in Table 7, GE-NE-LRTI-2000. Flexible hoses may be either short-lived or long-lived, depending on whether they are periodically replaced as part of preventative maintenance. This need for a change in Table 7 was recognized by Exelon during the transition from the scoping and screening phase to the aging management review phase of the integrated plant evaluation. At that time, any in-scope flexible hoses that had been categorized as "short-lived" were re-screened as "long-lived" and were carried forward for aging management review. During aging management review, flexible hoses screened as "long-lived" could be re-categorized as "short-lived" and excluded from further evaluation provided that a basis for re-categorizing them as "short-lived" was identified and documented in the component comment field of the license renewal database. The following table identifies locations in the LRA where long-lived flexible hoses subject to an AMR are listed:

LRA Chapter 2 Table	Component Group	Applicable Aging Management Program
2.3.2-1	Flexible Hose	3.2.2.33, 3.2.2.34
2.3.2-3	Flexible Hose	3.2.2.35, 3.2.2.36
2.3.2-4	Flexible Hose	3.2.2.35
2.3.3-6	Flexible Hose	3.3.2.65, 3.3.2.66
2.3.3-11	Flexible Hose	3.3.2.64, 3.3.2.66
2.3.3-25	Flexible Hose	3.3.2.64, 3.3.2.67
2.3.4-1	Flexible Hose	3.4.2.18, 3.4.2.19

The following provides a response to the request to list any additional structures and components (SC) for which aging management reviews were conducted, and for each SC describe the aging management programs, as applicable, to be credited for managing the identified aging effects.

Except for the flexible hoses described and listed in the preceding paragraphs, no additional structures or components originally listed in Table 7 of GE-NE-LRTI-2000 have been determined to require an aging management review. The need to include the flexible hoses had been previously recognized by Exelon at the beginning of the Dresden/Quad Cities aging management reviews, so they were correctly included both in an aging management review and in the LRA.

RAI 2.1-13

NUREG-1800, Section 2.5.3.1, "Components Within the Scope of License Renewal," states that an applicant may use the plant spaces approach in scoping electrical and instrumentation and control (I&C) components. In the plant spaces approach, an applicant may indicate that all electrical and I&C components located within a particular area are either within or not within the scope of license renewal. NUREG-1800, Table 2.5-1, "Examples of 'Plant Spaces' Approach for Electrical and I&C Scoping and Corresponding Review Procedures," provides guidance for the

review of scoping performed in accordance with the plant spaces approach. If the applicant limits the scope of electrical and I&C components considered within the scope of license renewal by excluding components in certain plant spaces, Table 2.5-1 indicates that this approach should not result in failing to place electrical and I&C components that perform intended functions within the scope of license renewal.

Based on a review of the LRA and scoping implementation procedure PP-DRE-QDC Rev. 01 SPACES, "Scoping and Screening Position Paper for Electrical Components," the NRC staff was unable to determine if the applicant excluded electrical components from the scope of license renewal based on their location in a particular plant space. Additionally, Section 3.0.3 of PP-DRE-QDC Rev.01 SPACES allows exclusion of electrical components "which are clearly in systems which are not in the License Renewal scope, or which are determined by other means to be outside license renewal scope" from the scope of license renewal. During the scoping and screening methodology audit, the applicant's license renewal project team indicated that electrical components located within certain plant spaces were excluded from license renewal scope, in addition to some electrical components that did not perform an intended function. In order to support the staff review of the implementation of the electrical spaces approach, the following information is required:

(a) Describe the methodology used to exclude electrical equipment located within certain plant spaces from the scope of license renewal. In your response, provide a listing of any plant spaces where electrical and I&C components were generically considered outside the scope of license renewal.

(b) Describe the methodology used to determine that an electrical or I&C component did not support a license renewal intended function. In your response, address the how the procedural guidance contained in the electrical spaces position paper that allows electrical components which are "determined by other means to be outside the license renewal scope" to be excluded from the scope of license renewal was implemented.

Response:

(a) Initially, all electrical cables and components were considered in the scope of license renewal. A review was performed of plant spaces that would not contain any electrical components in the scope of license renewal. The Radwaste Building did not contain any electrical components within the scope of license renewal, so all of its components were excluded from aging management review. This is the only space where the electrical components were generically excluded based on location.

(b) All electrical systems were evaluated to determine if the system intended functions met the requirements of 10 CFR 54.4(a)(1) through (a)(3). Electrical components, except for cables, that were clearly in systems not in the scope of 10 CFR 54.4(a)(1) through (a)(3) (e.g. Security system) were flagged as not in the scope of License Renewal. The remaining electrical components and all of the cables were flagged as being in the scope of License Renewal and assigned component intended functions.

During the aging management review process, a small population of cables and

components was evaluated to determine the specific intended functions that the cables and components performed. Using the electrical drawings, it was determined that these cables and components were not safety-related, that failure of these cables or components would not prevent satisfactory accomplishment of any of the indented functions identified in 10 CFR 54.4(a)(1)(i), (ii) or (iii) and that these cables and components performed no functions that demonstrates compliance with fire protection, environmental qualification, anticipated transients without scram or station blackout and therefore these cables and components were removed from the scope of License Renewal.