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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-001

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 Dresden Nuclear Power Station, Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2

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

Exelon Generation Company, LLC (EGC) is submitting the additional information requested in email requests sent by Tae Kim (NRC) to EGC on October 23, 2003, and November 10, 12, 14, 19, and 25, 2003. This additional information provides a response to questions regarding Sections 2.1, 2.3, 3.1, 3.3, 4.3, 4.6, and 4.7, and the Aging Management Programs sections of the reference letter.

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

A097
A098

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

Respectfully,

12/17/03
Executed on

Patrick R. Simpson
Manager – Licensing

Attachment : Response to Request for Additional Information – LRA Sections 2.1, 2.3, 3.1, 3.3, 4.3, 4.6, and 4.7, and Aging Management Programs

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station
NRC Senior Resident Inspector – Dresden Nuclear Power Station
Illinois Emergency Management Agency

Attachment

Response to Request for Additional Information

LRA Sections 2.1, 2.3, 3.1, 3.3, 4.3, 4.6, and 4.7, and Aging Management Programs

RAI 2.1-2b Supplemental Information Request (High Energy System Definition and Scoping)

The applicant stated that the definition of a high energy system used during scoping and screening evaluations was consistent with the specific licensing basis at each site. Consequently, Quad Cities defined a high energy system defined as a system where the temperature and pressure conditions of fluid exceed 200°F and 275 psig, respectively, while Dresden defined a system as a high energy system where the temperature or pressure conditions of fluid exceed 200°F and 275 psig, respectively. The applicant indicated that all systems meeting the plant-specific licensing basis definition of a high energy system at each site were evaluated for spatial interactions.

In their RAI response, the applicant did not justify the use of the 25 foot separation criteria, but instead revised the scoping methodology to consider potential spatial interactions between high energy systems and safety-related SSCs separated by more than 25 feet. Consequently, the applicant reviewed the following high energy systems to account for potential spatial interactions:

- Main Steam
- Feedwater
- High Pressure Coolant Injection (HPCI)
- Reactor Water Clean up
- 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 lines
- Moisture separator drain
- Control rod drive hydraulic system

The applicant stated that the license renewal boundaries were expanded for the following systems:

- Main Steam
- Feedwater
- Reactor Water Clean up
- Control rod drive hydraulic system

The applicant stated that the expanded boundaries described above 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.

Please identify the plant components or structures that were added into the scope of license renewal associated with these expanded boundaries. Provide the results of aging management review for each component or structure that was added into the scope. The staff notes that this information should have been included in your response to RAI 2.1-2b.

Response:

Main Steam System – Added Components and Aging Management Results:

For the Main Steam System the boundary expansion related to high energy line break (HELB) evaluations will result in the following changes which are described with reference to LR boundary diagrams:

- Dresden LR boundary diagram LR-DRE-M-12-2: The 30" equalizing header, the 24" steam lines from the equalizing header up to and including the main stop valves, the 18" bypass lines, the bypass valves, and the bypass lines from the bypass valves to the condenser are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation.
- Dresden LR boundary diagram LR-DRE-M-345-2: The 30" equalizing header, the 24" steam lines from the equalizing header up to and including the main stop valves, the 18" bypass lines, the bypass valves, and the bypass lines from the bypass valves to the condenser are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation.
- Quad Cities boundary diagram LR-QDC-M-13-2: The 30" equalizing header, the 24" steam lines from the equalizing header up to and including the main stop valves, the 18" bypass lines, the bypass valves, and the bypass lines from the bypass valves to the condenser are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation.
- Quad Cities boundary diagram LR-QDC-M-60-2: The 30" equalizing header, the 24" steam lines from the equalizing header up to and including the main stop valves, the 18" bypass lines, the bypass valves, and the bypass lines from the bypass valves to the condenser are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation.

All of the components included in the expanded in-scope boundary were also identified in Exelon's response to RAI-2.3.4.1-2 as being within the scope of license renewal.

The component groups applicable for the Main Steam System components that are brought into scope by this boundary expansion are 1) Piping and Fittings, 2) Restricting Orifices and 3) Valves. All of these components have a Component Intended Function of "Pressure Boundary." Aging Management Results applicable for these components are as follows:

Component Group	Component Intended Function	Aging Management Ref
Piping and Fittings	Pressure Boundary	3.4.1.3, 3.4.1.4, 3.4.1.5
Restricting Orifices	Pressure Boundary	3.4.1.3, 3.4.1.5
Valves	Pressure Boundary	3.4.1.3, 3.4.1.4, 3.4.1.5

Because these component groups and applicable Aging Management References are already encompassed by the listings currently in LRA Table 2.3.4-1 (Component Groups Requiring Aging Management Review – Main Steam), no additional changes to the LRA

are required to support the expansion of the Main Steam System boundaries that are in scope for license renewal.

Feedwater System – Added Components and Aging Management Results:

For the Feedwater System the boundary expansion related to high energy line break (HELB) evaluations will result in the following changes which are described with reference to LR boundary diagrams:

- Dresden LR boundary diagram LR-DRE-M-14: The three 18" feedwater lines between the pumps and the 24" feedwater header, the 24" feedwater header, the two 18" feedwater regulating station lines, the 6" feedwater regulating station bypass line, and the 6" feedwater recirculation lines to the condenser (up to and including the air operated recirculation valves) are all within the scope of the rule. In addition, the feedwater pump suction piping up to and including the pump suction isolation valve are included within the scope of the rule. Interfacing instrumentation lines and vent and drain lines are not included since these are not identified as part of the HELB evaluation. The feedwater pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Dresden LR boundary diagram LR-DRE-M-347: The three 18" feedwater lines between the pumps and the 24" feedwater header, the 24" feedwater header, the two 18" feedwater regulating station lines, the 6" feedwater regulating station bypass line, and the 6" feedwater recirculation lines to the condenser (up to and including the air operated recirculation valves) are all within the scope of the rule. In addition, the feedwater pump suction piping up to and including the pump suction isolation valve are included within the scope of the rule. Interfacing instrumentation lines and vent and drain lines are not included since these are not identified as part of the HELB evaluation. The feedwater pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Quad Cities LR boundary diagram LR-QDC-M-15-1: The three 18" feedwater lines between the pumps and the 24" feedwater header, the 24" feedwater header, the two 18" feedwater regulating station lines, the 6" feedwater regulating station bypass line, and the 6" feedwater recirculation lines to the condenser (up to and including the air operated recirculation valves) are all within the scope of the rule. In addition, the feedwater pump suction piping up to and including the pump suction isolation valve are included within the scope of the rule. Interfacing instrumentation lines and vent and drain lines are not included since these are not identified as part of the HELB evaluation. The feedwater pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Quad Cities LR boundary diagram LR-QDC-M-62-1: The three 18" feedwater lines between the pumps and the 24" feedwater header, the 24" feedwater header, the two 18" feedwater regulating station lines, the 6" feedwater regulating station bypass line, and the 6" feedwater recirculation lines to the condenser (up to and including the air

operated recirculation valves) are all within the scope of the rule. In addition, the feedwater pump suction piping up to and including the pump suction isolation valve are included within the scope of the rule. Interfacing instrumentation lines and vent and drain lines are not included since these are not identified as part of the HELB evaluation. The feedwater pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

The component groups applicable for the Feedwater System components that are brought into scope by this boundary expansion are 1) Piping and Fittings and 2) Valves. All of these components have a Component Intended Function of "Pressure Boundary." Aging Management Results applicable for these components are as follows:

Component Group	Component Intended Function	Aging Management Ref
Piping and Fittings	Pressure Boundary	3.4.1.2, 3.4.1.3, 3.4.1.4
Valves	Pressure Boundary	3.4.1.2, 3.4.1.3, 3.4.1.4

Because additional Valves have been added in-scope the Valve line in LRA Table 2.3.4-2 will be revised to read as follows :

Table 2.3.4-2 Component Groups Requiring Aging Management Review - Feedwater System

Component Group	Component Intended Function	Aging Management Ref
Valves	Pressure Boundary	3.1.1.1, 3.1.1.11, 3.1.1.15, 3.4.1.2, 3.4.1.3, 3.4.1.4, 3.4.2.5, 3.4.2.6, 3.4.2.11, 3.4.2.12, 3.4.2.13

Reactor Water Cleanup System – Added Components and Aging Management Results:

For the Reactor Water Cleanup (RWCU) System the boundary expansion related to high energy line break (HELB) evaluations will result in the following changes, which are described with reference to LR boundary diagrams

- Dresden LR boundary diagram LR-DRE-M-30: The 6" and 8" suction piping with associated valves and fittings, the 4" and 8" discharge piping with associated valves and fittings, and the 8" recirculation line to the main condenser with associated valves and fittings are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation. In addition the RWCU heat exchangers, the pumps, the cleanup filters and the cleanup demineralizers are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Dresden LR boundary diagram LR-DRE-M-361: The 6" and 8" suction piping with associated valves and fittings, the 4" and 8" discharge piping with associated valves and fittings, and the 8" recirculation line to the main condenser with associated valves and fittings are all within the scope of the rule. Smaller branch lines and instrumentation lines are not included since these were not identified as part of the HELB evaluation. In addition the RWCU heat exchangers, the pumps, the cleanup

filters and the cleanup demineralizers are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Quad Cities LR boundary diagram LR-QDC-M-47-1: The 3" and 4" suction piping with associated valves and fittings, the 3" and 4" discharge piping with associated valves and fittings, and the 8" recirculation line to the main condenser with associated valves and fittings are all within the scope of the rule. Smaller branch lines, instrumentation lines, the holding pumps, pre-coat pump and pre-coat subsystem are not included since these were not identified as part of the HELB evaluation. In addition the RWCU heat exchangers, the pumps, and the cleanup filter demineralizers are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Quad Cities LR boundary diagram LR-QDC-M-88-1: The 3" and 4" suction piping with associated valves and fittings, the 3" and 4" discharge piping with associated valves and fittings, and the 8" recirculation line to the main condenser with associated valves and fittings all within the scope of the rule. Smaller branch lines, instrumentation lines, the holding pumps, pre-coat pump and pre-coat subsystem are not included since these were not identified as part of the HELB evaluation. In addition the RWCU heat exchangers, the pumps, and the cleanup filter demineralizers are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

The component groups applicable for the Reactor Water Cleanup System components that are brought into scope by this boundary expansion are 1) Piping and Fittings and 2) Valves. All of these components have a Component Intended Function of "Pressure Boundary." Aging Management Results applicable for these components are as follows:

Component Group	Component Intended Function	Aging Management Ref
Piping and Fittings	Pressure Boundary	3.3.1.24, 3.3.2.40
Valves	Pressure Boundary	3.3.1.24, 3.3.2.40

Because additional Valves have been added in-scope the Valve line in LRA Table 2.3.3-4 will be revised to read as follows:

Table 2.3.3-4 Component Groups Requiring Aging Management Review - Reactor Water Cleanup System

Component Group	Component Intended Function	Aging Management Ref
Valves	Pressure Boundary	3.1.1.1, 3.1.1.9, 3.1.1.15, 3.3.1.5, 3.3.1.24, 3.3.2.40, 3.3.2.42, 3.3.2.270

Control Rod Drive Hydraulic (CRDH) System – Added Components and Aging Management Results:

For the Control Rod Drive Hydraulic System the boundary expansion related to high energy line break (HELB) evaluations will result in the following changes which are described with reference to LR boundary diagrams:

- Dresden LR boundary diagrams LR-DRE-M-34-1 and LR-DRE-M-34-2: All piping, pipe fittings and valves associated with the cooling water pressure control station, the stabilizing valves, the main CRDH header up to and including blank flanges, the entire exhaust water header, and the entire drive water header are all within the scope of the rule.

- Dresden LR boundary diagrams LR-DRE-M-365-1 and LR-DRE-M-365-2: All piping, pipe fittings and valves associated with the cooling water pressure control station, the stabilizing valves, the main CRDH header up to and including blank flanges, the entire exhaust water header, and the entire drive water header are all within the scope of the rule.

- Quad Cities LR boundary diagrams LR-QDC-M-41-2 and LR-QDC-M-41-4: All piping, pipe fittings and valves in the primary flowpaths from the CRDH pumps, and piping, fitting and valves associated with the exhaust water are all within the scope of the rule. The CRDH pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

- Quad Cities LR boundary diagrams LR-QDC-M-83-2 and LR-QDC-M-83-4: All piping, pipe fittings and valves in the primary flowpaths from the CRDH pumps, and piping, fitting and valves associated with the exhaust water are all within the scope of the rule. The CRDH pumps are not included because these are physically large components that are not subject to the pipe-whip concerns of HELB, and they have been identified by plant walkdown as located in areas where spray or leakage would not cause spatial interaction with nearby safety-related equipment.

The component groups applicable for the Control Rod Drive Hydraulic System components that are brought into scope by this boundary expansion are 1) Piping and Fittings, and 2) Valves. All of these components have a Component Intended Function of "Pressure Boundary." Aging Management Results applicable for these components are as follows:

Component Group	Component Intended Function	Aging Management Ref
Piping and Fittings	Pressure Boundary	3.3.1.5, 3.3.1.8, 3.3.1.25, 3.3.2.40
Valves	Pressure Boundary	3.3.1.5, 3.3.1.8, 3.3.1.25, 3.3.2.40

Because these component groups and applicable Aging Management References are already encompassed by the listings currently in LRA Table 2.3.3-3 (Component Groups Requiring Aging Management Review – Control Rod Drive Hydraulic System), no additional changes to the LRA are required to support the expansion of the Control Rod Drive Hydraulic System boundaries that are in scope for license renewal.

RAI 2.1-11 Supplemental Information Request

In their October 3, 2003, response to RAI 2.1-11, the applicant provided additional information regarding their treatment of hypothetical failures during scoping. The applicant stated that instruction GE-NE-LRTI-2000 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 applicant stated that 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. With respect to credible failures identified in plant-specific and industry-wide operating experience, the applicant stated that plant-specific and industry-wide operating experience was not specifically reviewed during the scoping process in preparation of the Dresden and Quad Cities License Renewal Application. The applicant based this position on the existence of routine Exelon practices for review of operating experience which include an assessment to determine if non-safety related equipment failures prevented a safety-related function from occurring. The applicant stated these practices would identify appropriate corrective actions to prevent recurrence of any failure of non-safety related SSCs identified through the routine operating experience reviews. Although the staff agrees that the applicant's scoping methodology would reasonably identify failures considered in the CLB, the staff lacked sufficient information to conclude that the applicant adequately considered operating experience in identifying credible failures. In particular, the staff determined that corrective actions arising from routine operating experience reviews would not necessarily be effective in preventing recurrence of failures identified in site-specific or industry operating experience. Further, the corrective actions arising from these reviews may not address the aging management aspects of the previously experienced failures. Therefore, pending additional justification from the applicant regarding the use of operating experience during scoping and screening, this issue is identified as Open Item 2.1-3.

Response

As described in LRA Section 2.1.2.2 (Title 10 CFR 54.4(a)(2) – Non-safety related affecting safety-related), the scoping of non-safety related systems, structures and components (SSCs) against criterion 10 CFR 54.4(a)(2) was implemented in two phases.

- In the first non-safety related SSC scoping phase, non-safety related SSC functions were identified by review of current licensing basis (CLB) documents and the maintenance rule database, and by a functional evaluation of the design features of non-safety related SSCs that provide support to operation of safety-related SSCs. During this implementation phase, site and industry operating experience were indirectly included as part of the CLB documentation and in the Maintenance Rule information that was reviewed. However, there was no explicit review of site and industry operating experience documents as part of the identification and classification of SSC functions satisfying criterion 10 CFR 54.4(a)(2).

- The second non-safety related SSC scoping phase was performed to incorporate the scoping guidance provided in the March 15, 2002, letter from Christopher I. Grimes to Alan Nelson on "License Renewal Issue: Guidance on the Identification and

Treatment of Structures, Systems, and Components Which Meet 10 CFR 54.4(a)(2)." The second non-safety related SSC scoping phase was performed relatively late in the over-all integrated plant evaluation process. At the time when the second scoping phase was initiated, the explicit operating site and industry experience reviews conducted as part of the Aging Management Review process were at or near completion, and information from those reviews was available and was used to develop the guidance for the second non-safety related SSC scoping phase. Operating experience sources considered included Institute of Nuclear Power Operations operating experience items, NRC documents (information notices, generic letters, violations, and bulletins), 10CFR Part 21 reports, vendor bulletins, and site operating experience reports (condition reports).

The following are examples of operating experience reviews that were used in development of the scoping guidance for the second phase of non-safety related SSCs:

- The site maintenance history was reviewed for the plant heating system to determine whether heating steam components could spatially interact with safety related SSCs throughout the Reactor Building and Turbine Building. The site maintenance history at Dresden station contained a large number of heating steam leaks including one instance in which a plant heating steam component was found leaking onto a safety related component. For this reason, the entire heating steam system inside the Turbine and Reactor Buildings was included within the scope of license renewal for both sites.

- A review of industry operating experience was performed on non safety related gas filled systems to determine whether there were any failures. The review did not identify any examples in which such systems resulted in falling pipe, jet impingement, or pipe whip. Specifically, the results of this review found no instances in which non safety related gas filled piping had fallen onto safety related SSCs located below. It was determined that pipe runs would only fail if the associated pipe supports were to fail concurrently with the pipe. From this review, a technical justification was developed to include all pipe supports within the scope of license renewal while excluding non safety related gas filled pipe from the scope of license renewal.

In conclusion, operating experience items such as NRC documents (information notices, generic letters, violations, and bulletins), 10 CFR 21 reports, vendor bulletins, and site operating experience reports (condition reports) were considered during the second non-safety related scoping phase.

RAI 2.3.3.3-8 Supplemental Information Request

In response to RAI 2.3.3.3-8, the applicant stated that at Dresden, the CRD pumps are credited in the Safe Shutdown Report for providing reactor make up water during hot shutdown. Therefore, portions of the CRD hydraulic system, including the pumps, filters, flow control station, drive water pressure control station, and suction and discharge piping as required to supply water to the cooling-water and charging-water headers for the hydraulic control units, are within the scope of license renewal. During the scoping process, the applicant took credit for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in the scope of license renewal. However, the applicant did not identify the procedure

for this operator action. The applicant stated that in the case of a CRD hydraulic system failure downstream of Valve 2(3)-0301-72, closing this valve would re-establish the system integrity necessary to restore pressure to the charging-water and cooling-water headers. This eliminated the need for placing the downstream components in the scope of license renewal. Given the availability of procedures for the operator action to close Valve 2(3)-0301-72, the staff agree with the applicant that components downstream of the Valve 2(3)-0301-72 are not in the scope of license renewal. The staff finds that the applicants response to RAI 2.3.3.3-8 has to include procedures for the operator action to close Valve 2(3)-0301-72 to be in accordance with the criteria set forth in 10 CFR 54.4(a) and acceptable. Therefore, the staff considers this RAI to be open.

Response

The explanation provided in response to RAI 2.3.3.3-8 correctly reflects the original basis for ending the in-scope boundary for Control Rod Drive Hydraulic (CRDH) pipe line 2(3)-0308-1½ "-A at valve 2(3)-0301-72. However, as a result of responses to RAI 2.1-02 and to Supplemental RAI 2.1-02b, Exelon has expanded the in-scope portion of the Dresden CRDH System as shown on LR boundary diagram LR-DRE-M-34-1 to include all downstream pipe lines that would be isolated by closing 2(3)-0301-72. The expanded boundary includes all of the piping, fittings, valves and piping components downstream of valve 2(3)-0301-72, up to and including points of termination at blank flanges, at normally closed vent or drain valves, at instrumentation, or at points of interface with portions of the piping system already designated as in-scope for license renewal. Because of this expanded boundary, valve 2(3)-0301-72 is no longer credited as a license renewal boundary valve, and closing this valve is not required to ensure that the LR boundary is appropriately isolated from non-LR piping or piping system components.

The piping, fittings, valves and piping components that are brought into scope by the expanded license renewal boundary are constructed of the same materials, are in the same environments and perform the same intended functions as components already listed in LRA Table 2.3.3-3 (Component Groups Requiring Aging Management Review - Control Rod Drive Hydraulic System). Therefore no change to LRA Table 2.3.3-3 is required to encompass the expanded in-scope boundary. The Aging Management References provided in LRA Table 2.3.3-3 are applicable for the CRDH System components that are brought into scope by this expansion of the CRDH System license renewal boundary.

RAI 2.3.3.3-9 Supplemental Information Request

In response to RAI 2.3.3.3-9, the applicant stated that at Dresden, the CRD pumps are credited in the Safe Shutdown Report for providing reactor make up water during hot shutdown. Therefore, portions of the CRD hydraulic system, including the pumps, filters, flow control station, drive water pressure control station, and suction and discharge piping as required to supply water to the cooling-water and charging-water headers for the hydraulic control units, are within the scope of license renewal. During the scoping process, the applicant took credit for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in the scope of license renewal. However, the applicant did not identify the procedure for this operator action. The applicant stated that in the case of a CRD hydraulic system failure downstream of Valves 3-0301-53 and -60, closing these valves would re-establish the system integrity necessary to restore pressure to the charging-water and cooling-

water headers, eliminating the need for placing the downstream components in the scope of license renewal. Given the availability of procedures for the operator action to close Valves 3-0301-53 and -60, the staff agree with the applicant that components downstream of the Valves 3-0301-53 and -60 are not in the scope of license renewal.

The applicant also stated that the corresponding sections on LR-DRE-M-34-1, from valve 2-0301-53 to and including Valve 2-0301-54, and from Valve 2-0301-60 to and including valve 2-0301-61, were also not included in the scope of license renewal and should not have been highlighted on the diagram. Boundary diagram LR-DRE-M-34-1 should have excluded the valves and piping sections described above from the scope of license renewal. Given the availability of procedures for the operator action to close Valves 3-0301-53 and -60, the staff agrees with the applicant on exclusion of above valves and piping sections from the scope of license renewal. The portions of the piping downstream of Valves 2(3)-0301-54 and -61 are highlighted RED because of non-safety related piping attached to safety related piping as continued on LR-DRE-M-26-1 and LR-DRE-M-357-1. The staff finds that the applicants response to RAI 2.3.3.3-9 has to include procedures for the operator action to close Valves 3-0301-53 and -60 to be in accordance with the criteria set forth in 10 CFR 54.4(a) and acceptable. Therefore, the staff considers this RAI to be open.

Response

As a result of responses to RAI 2.1-02 and to Supplemental RAI 2.1-02b, Exelon has expanded the in-scope portion of the Dresden Control Rod Drive Hydraulic (CRDH) System.

Exelon has concluded that it is appropriate to include the portions of CRDH between and including valve 2(3)-0301-53 and valve 2(3)-0301-54 as shown on LR boundary diagrams LR-DRE-M-34-1 and LR-DRE-M-365-1. This boundary expansion brings into license renewal scope active instrument dPT 2(3)-302-61 and its associated vent and equalizing valves. Because of this expanded boundary, valve 2(3)-0301-53 is no longer credited as a license renewal boundary valve, and closing this valve is not required to ensure that the LR boundary is appropriately isolated from non-LR piping or piping system components.

Similarly, Exelon has concluded that it is appropriate to include the portions of CRDH between and including valve 2(3)-0301-60 and valve 2(3)-0301-61 as shown on LR boundary diagrams LR-DRE-M-34-1 and LR-DRE-M-365-1. This boundary expansion brings into license renewal scope active instrument dPT 2(3)-302-88 and its associated vent and equalizing valves. Because of this expanded boundary, valve 2(3)-0301-60 is no longer credited as a license renewal boundary valve, and closing this valve is not required to ensure that the LR boundary is appropriately isolated from non-LR piping or piping system components.

The piping/tubing and valves (passive components) that are brought into scope by the expanded license renewal boundary are constructed of the same materials, are in the same environments and perform the same intended functions as components already listed in LRA Table 2.3.3-3 (Component Groups Requiring Aging Management Review - Control Rod Drive Hydraulic System). Therefore no change to LRA Table 2.3.3-3 is required to encompass the expanded in-scope boundary. The Aging Management References provided in LRA Table 2.3.3-3 are applicable for the CRDH System

components that are brought into scope by this expansion of the CRDH System license renewal boundary.

RAI 2.3.3.3-10 Supplemental Information Request

In response to RAI 2.3.3.3-10, the applicant stated that at Dresden, the CRD pumps are credited in the Safe Shutdown Report for providing reactor make up water during hot shutdown. Therefore, portions of the CRD hydraulic system, including the pumps, filters, flow control station, drive water pressure control station, and suction and discharge piping as required to supply water to the cooling-water and charging-water headers for the hydraulic control units, are within the scope of license renewal. During the scoping process, the applicant took credit for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in the scope of license renewal. However, the applicant did not identify the procedure for this operator action. The applicant stated that in the case of a CRD hydraulic system failure downstream of Valves 2-0301-67A and -67B, closing these valves (whichever is open) would re-establish the system integrity necessary to restore pressure to the charging-water and cooling-water headers. This eliminated the need for placing the downstream components within the scope of license renewal. The corresponding sections on LR-DRE-M-365-1, downstream of Valves 3-0301-67A and -67B were also not included in the scope of license renewal for the same reason. Given the availability of procedures for the operator action to close Valves 2(3)-0301-67A and -67B, the staff agree with the applicant that components downstream of the Valves 2(3)-0301-67A and -67B are not in the scope of license renewal. The staff finds that the applicants response to RAI 2.3.3.3-10 has to include procedures for the operator action to close Valves 2(3)-0301-67A and -67B to be in accordance with the criteria set forth in 10 CFR 54.4(a) and acceptable. Therefore, the staff considers this RAI to be open.
Response

The explanation provided in response to RAI 2.3.3.3-10 correctly reflects the original basis for ending the in-scope boundary for Control Rod Drive Hydraulic (CRDH) pipe line 2(3)-0316-1"-A at valves 2(3)-0301-67A and 2(3)-0301-67B. However, as a result of responses to RAI 2.1-02 and to Supplemental RAI 2.1-02b, Exelon has expanded the in-scope portion of the Dresden CRDH System to include all downstream pipe lines that would be isolated by closing valves 2(3)-0301-67A and 2(3)-0301-67B as shown on LR boundary diagrams LR-DRE-M-34-1 and LR-DRE-M-365-1. The expanded boundary includes all of the piping, fittings, valves and piping components downstream of valves 2(3)-0301-67A and 2(3)-0301-67B, up to and including points of termination at blank flanges, at normally closed vent or drain valves, at instrumentation, or at points of interface with portions of the piping system already designated as in-scope for license renewal. Because of this expanded boundary, valves 2(3)-0301-67A and 2(3)-0301-67B are no longer credited as license renewal boundary valves, and closing these valves is not required to ensure that the LR boundary is appropriately isolated from non-LR piping or piping system components.

The piping, fittings, valves and piping components that are brought into scope by the expanded license renewal boundary are constructed of the same materials, are in the same environments and perform the same intended functions as components already listed in LRA Table 2.3.3-3 (Component Groups Requiring Aging Management Review - Control Rod Drive Hydraulic System). Therefore no change to LRA Table 2.3.3-3 is required to encompass the expanded in-scope boundary. The Aging Management

References provided in LRA Table 2.3.3-3 are applicable for the CRDH System components that are brought into scope by this expansion of the CRDH System license renewal boundary.

RAI 3.1-1 Supplemental Information Request

The applicant's response to RAI 3.1-1 stated that there were fine, branched cracks in the cladding, which is consistent with IGSCC and possibly hot cracking. The cracks had a maximum depth of 6mm in the base material. Dresden and Quad Cities will continue to monitor the RPV head cladding using VT-3 described in ASME Section XI, IWB-2500-1, Item B13.10. This method is acceptable for detecting evidence of cracking, but can not determine the growth of the existing cracks. Therefore, provide a program (method) for sizing the flaws identified in the vessel head enclosure cladded with stainless steel during the period of license renewal. This program must satisfy the 10 elements of Branch Technical Position RLSB-1, and include, at a minimum, the frequency, acceptance criteria and qualifications of the inspection method.

Response

The inspection specified in ASME Section XI, IWB-2500-1, Item B13.10 also requires evaluation of inspection results in accordance with IWB-3520.2. Per IWB-3520.2 relevant indications, including cracking, require correction to meet the requirements of IWB-3142 prior to continued service. As the relevant condition is required to be resolved prior to continued service, an additional program for flaw sizing is not required.

The initial indication was evaluated in accordance with IWB-3142, which allows "Acceptance by Analytical Evaluation", provided subsequent examinations of IWB-2420(b) and (c) are performed. IWB-2420(b) requires the area containing the relevant indication be reexamined during the next three inspection periods. IWB-2420(c) indicates that if the reexaminations required by IWB-2420(b) reveal that the relevant indication remains essentially unchanged for the three successive examination, the component examination schedule may revert to the original schedule for successive examinations. The three successive examinations confirmed that the relevant indication remained essentially unchanged. The last of the three successive examinations was completed in 2000. Therefore the originally scheduled VT-3 examination was re-scheduled for successive examinations.

All ASME Code required examinations have been completed and returning to the originally scheduled VT-3 examination is appropriate per ASME Section XI. However, Exelon will perform one additional ultrasonic examination of the Quad Cities Unit 2 reactor vessel head to verify the relevant indication has remained essentially unchanged. This additional examination will be completed in 2018 (plus or minus 2 years). This is approximately half of the remaining life of the component and provides sufficient planning and scheduling flexibility.

RAI 3.3-1 (EMEB) Supplemental Information Request (Related to former RAI 3.3-1A)

The AMR reviewer for auxiliary systems identified that the applicant takes credit for AMP B.2.6 Heat Exchanger Program for managing the DG Building HVAC (AMR Ref 3.3.2.14) , but that the AMP does not appear to include the DG building air handlers

within the program scope. Also, in RAI response 3.3-1 the applicant credited AMP B.2.6 with managing aging of DG building air handling unit corrosion.

Response

The term "DGB HVAC" identified in Aging Management Reference 3.3.2.14 of LRA Table 3.3-2 was used generically to describe air handlers for the emergency diesel generator buildings or the station blackout diesel generator buildings. The air handlers identified in Aging Management Reference 3.3.2.14 (and 3.3.2.13) of LRA Table 3.3-2 are the Quad Cities Units 1 and 2 station blackout diesel generator battery room heat exchangers, and not any of the emergency diesel generator building air handlers. These heat exchangers are identified in the "Scope of Activity" portion of LRA Section B.2.6, Heat Exchanger Test and Inspection Activities, as "Quad Cities Units 1 and 2 battery/station blackout room HVAC heat exchangers."

The subject statements of the response to RAI 3.3-1 were contained in item c. of the response and read as follows:

"...The Dresden and Quad Cities materials of construction for the diesel generator building air handling unit did not match NUREG 1801... LRA Appendix B, B.2.6, "Heat Exchanger Test and Inspection Activities," manages loss of materials" aging effect for both the control room and diesel generator building units ..."

This statement should have read as follows:

"...The air handlers identified in Aging Management Reference 3.3.2.14 of LRA Table 3.3-2 are the Quad Cities Units 1 and 2 station blackout diesel generator battery room heat exchangers. The materials of construction for these heat exchangers did not match NUREG 1801... LRA Appendix B, B.2.6, "Heat Exchanger Test and Inspection Activities," manages loss of materials" aging effect for both the control room units and the Quad Cities Units 1 and 2 station blackout diesel generator battery room heat exchangers ..."

RAI 3.3-1 (Section 3.3) Supplemental Information Request

In its response to this section of the staff's RAI 3.3-1 the applicant stated that LRA Appendix B, B.2.6, "Heat Exchanger Test and Inspection Activities," manages the "loss of materials" aging effect for both the control room and diesel generator building air handling units by performing periodic inspections. The applicant further stated that corrosion would be detected during these periodic inspections, regardless of the mechanism involved. However, the staff notes that different types of corrosion (pitting, crevice, galvanic etc.) may be prevalent in different susceptible locations. To be effective and adequate periodic inspections may need to be conducted at appropriate susceptible locations. The applicant is requested to clarify that periodic inspections for both the control room and diesel generator building air handling units are conducted on locations that include those susceptible to galvanic corrosions.

Response

Appendix B, B.2.6, "Heat Exchanger Test and Inspection Activities," manages the "loss of materials" aging effect for both the Dresden and Quad Cities control room air handling

units (AHU), and the Quad Cities Units 1 and 2 Station Blackout Building Battery Room AHUs and air condensing units (ACU) by performing periodic visual inspections. Locations within the AHUs and ACUs that are potentially susceptible to galvanic corrosion are the copper cooling coil interfaces with the aluminum cooling fins, the locations where the copper tubing penetrates the galvanized steel housing, and the control room AHU galvanized steel tube support interfaces with the copper cooling coils. These locations, in addition to all accessible AHU and ACU interior and exterior surfaces, are inspected as part of the periodic visual inspections.

RAI 3.3.2.4.3 Supplemental Information Request - (Control Rod Drive Hydraulic System)

The staff reviewed the applicant's response to the issues raised in RAI 3.3.2.4.3. On the basis of its review, the staff finds that it needs further clarification from the applicant. EPRI report 1003056 (Nov 2001), states that a key factor in the evaluation of atmospheric corrosion is whether atmospheric pollutants can be concentrated to levels that would promote corrosion of the component surfaces. The EPRI report suggests that potential concentration processes include wet/dry condensation, contaminated insulation, accidental contamination, or leakage. The applicant indicates that periodic wetting is rare for these components. The applicant is requested to provide the basis for this assessment and to clarify with justification that whether the other potential concentration processes (i.e., contaminated insulation, or leakage) are also unlikely over the extent of the period of extended operation.

Response

The basis for the assessment that periodic wetting (either continuously wetted or alternately wetting and drying) of the external surfaces of copper and copper alloys is rare for an indoor (air, moisture and humidity <212°F) ambient environment is the following:

(a) The internal fluids for systems containing copper and copper alloy piping and components are predominately either saturated air or dry gas. This internal fluids for copper and copper alloy piping and components in the Control Rod Drive Hydraulic System are only saturated air or dry gas. Therefore leakage at a joint in one of these systems would not result in wetting of the affected component.

(b) Copper and copper alloy piping and components are typically not insulated because the fluids are predominately either saturated air or dry gas. For those cases where the fluid is other than saturated or dry air, the fluid in contact with the copper and copper alloy piping and components is not of a temperature that would cause condensation on the component. Therefore wetting from contaminated insulation or condensation is not a consideration.

(c) Leakage from other systems onto Control Rod Drive Hydraulic System copper and copper alloy piping and components would be detected by normal operator rounds. Leaks would not be allowed to persist, and wetting from leaks would not be long lasting or repetitive.

(d) The statements above are supported by the Quad Cities and Dresden station operation experience. As stated in the original response to RAI 3.3.2.4-03, other than one instance of copper/brass corrosion found at Quad Cities station, there

has no operating experience related to corrosion of copper, brass or bronze components in an indoor, ambient environment at either Quad Cities or Dresden stations. This one example at Quad Cities station was due to leakage from sodium hypochlorite system piping joints in the area of an instrument rack . The use of the sodium hypochlorite system has since been terminated, and the system has been removed.

RAI 3.3.2.4.8 Supplemental Information Request – (HVAC - Reactor Building)

In its response dated October 3, 2003, the applicant stated that for Aging Management References 3.3.2.52, 3.3.2.242, and 3.3.2.262, the susceptible materials, copper alloys, are not exposed to water for prolonged periods and, therefore, selective leaching is not considered an aging mechanism for Dresden and Quad Cities applications. The applicant is requested to clarify with justification on what is considered a prolonged period to support the conclusion that selective leaching is not considered an applicable aging mechanism.

Response

The copper alloy components used in Reactor Building HVAC system and referenced in Aging Management References 3.3.2.52, 3.3.2.242 and 3.3.2.262 contain air (instrument and process air) as their process fluid. The applicable components are (1) tubing for instrumentation, (2) restricting orifice (filter/strainer) for differential pressure instrument, and (3) tubing, manual/check valves and solenoid valves for air-operated dampers and valves. These components are located in the reactor building general areas, where the relative humidity level is a maximum of 90%. Neither the internal process nor the external environment could cause wetting of these components. The statement, "not exposed to water for prolonged periods," refers to the fact that the only potential source of wetting would be exposure from leaks from other systems. Since the HVAC controls are located in the reactor building general areas, these leaks would be detected by operators during their rounds and corrected. Operator rounds in the Reactor Building are performed at least once per day, so the duration of wetting would at most be a few days, assuming the leakage starts as small and would be detected in a few days. Therefore the copper alloy components in the Reactor Building HVAC are not subject to an aggressive wetted environment conducive to promoting a loss of material due to selective leaching. The external environment aging management review results for these components are provided in LRA Reference Number 3.3.2.23 and 34.

RAI 3.3.2.4.24 Plant Heating System

Aging management of tank bottom. The applicant plans to periodically inspect a representative sample of accessible locations. It is not clear that this will be a leading indicator for the tank bottom. However, the staff notes that this system is only in scope for spatial interactions and a leak in the tank bottom may not pose a concern. Therefore, the applicant should either describe how the inspections will bound the loss of material in the tank bottom, or explain that a leak in this area is not a concern.

Response

The components classified as tanks in the Plant Heating System are 1) condensate return units, and 2) (Quad Cities, only) the reactor pressure vessel heatup heat exchangers, which can support non-nuclear reactor pressure vessel heatup through the Reactor Water Cleanup System. The condensate return units are non-pressurized tanks with vents open to the atmosphere. The reactor pressure vessel heatup heat exchangers (Quad Cities, only) were used during initial plant startup, but they are no longer in service.

The plant heating steam system was included within the scope of license renewal at both sites because of the numerous instances in which heating steam components were found located above safety related equipment. In these instances, the possibility exists in which failed plant heating steam components could spray water onto safety related equipment located below. While not all heating steam components have the ability to spatially interact with safety related equipment, a decision was made to include all of the plant system components within the scope of license renewal. The tanks questioned in the RAI supplemental information request are amount those plant heating steam components that can not spatially interact with safety related equipment.

At Quad Cities, the condensate return units located in the Crib Houses are not located in proximity to any safety related equipment. At Dresden, the condensate return units located in the Turbine Buildings are not located in proximity to any safety related components. Leakage from these tanks could not result in spatial interactions that could cause failure of safety-related equipment.
At Quad Cities, the condensate return units in the turbine building are located in proximity, but not directly above, SR piping and manual valves from the B-Loop Control Room HVAC system. The condensate return units located in the Reactor Buildings are in the same general plant area as safety related instrumentation racks and other safety related equipment. However, no safety related equipment is located directly below those tanks. The tanks normally operate at atmospheric pressure, so there is no potential for high-energy spray that might interact with safety related components that are within line-of-sight, but not directly below, the tanks.

For the reasons summarized above, potential leakage from the Plant Heating System tanks does not jeopardize the functionality of any safety-related structures or components, and does not present a concern for loss of any safety related intended functions during the period of extended operation.

RAI 3.3-8 Supplemental Information Request

The staff reviewed the information provided by the applicant's response to RAI 3.3-8. The applicant stated that the restricting orifices are not typically in a low flow or stagnant flow areas. The applicant is requested to clarify whether any restricting orifices are in a low flow or stagnant flow areas and to discuss why a one-time inspection program is not needed to verify the effectiveness of the Water Chemistry Program for these restricting orifices.

Response

Exelon has reviewed the Aging Management Reference 3.3.2.186 for the restricting orifice in the Demineralized water environment. Further review of the aging management reference and the license renewal component data base concluded that the component (restricting orifice) is a ¼" brass and bronze orifice plate that is located on an instrumentation line. This component was inadvertently added to the scope of the license renewal because it was contained within the boundary of other components included within the scope of license renewal because of spatial interaction. Since this orifice is located internal to the instrument line, it cannot spatially interact with any safety related components located in the same proximity of the orifice. Aging Management Reference 3.3.2.186 will be removed from the LRA Section 3.3.2, Table 3.3-2. Similarly, line item with Component Group "Restricting Orifices (spatial interaction)(Quad Cities only)" in Table 2.3.3-19 will be removed.

Exelon review of the Clean Demineralized Water and Makeup Demineralized Water systems did not identify any restricting orifices that are in a low flow or stagnant flow area based on the system function. Aging Management References 3.3.2.72 and 3.3.2.188 address the restricting orifices in the Clean Demineralized Water and Makeup Water systems and will be managed with one-time inspection to verify the effectiveness of water chemistry program.

RAI 4.3.4 Supplemental Information Request

In Section 4.3.4 of the LRA, the applicant committed to perform and complete plant specific calculations for the locations identified in NUREG/CR 6260, prior to the period of extended operation. The applicant also committed to use the environmental factors from NUREG/CR 6583 and NUREG/CR 5704. The supplement sections A.3.2.4 of the UFSAR for the two plants do not contain these commitments. The staff requests that the applicant add these commitments to the UFSAR supplement sections.

Response

UFSAR supplement section A.3.2.4 will be revised to read as follows:

A.3.2.4Effects of Reactor Coolant Environment on Fatigue Life of Components and Piping (Generic Safety Issue 190)

Generic Safety Issue (GSI) 190 was identified by the NRC because of concerns about potential effects of reactor water environments on component fatigue life during the period of extended operation.

Prior to the period of extended operation, Exelon will perform plant-specific calculations for the applicable locations identified in NUREG/CR 6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components," for older-vintage BWR plants, to assess the potential effects of reactor coolant on component fatigue life in accordance with 10 CFR 54.21(c)(1)(ii). The calculations of current and projected cumulative usage factors (CUFs) under this program will include appropriate environmental fatigue effect (F_{en}) factors from NUREG/CR 6583 and NUREG/CR 5704. Appropriate corrective action will be taken if the resulting projected end-of-life CUF values exceed 1.0.

Exelon reserves the right to modify this position in the future based on the results of industry activities currently underway, or based on other results of improvements in methodology, subject to NRC approval prior to changes in this position.

RAI 4.6.2 Supplemental Information Request

Regarding section 4.6.2 of the LRA, state what corrective action will be taken if the SRV lifts exceed the number required to ensure that the CUF remains less than 1.0 for the SRVDL-Vent Line Penetration Components and Welds.

Response

The fatigue management program continuously monitors plant operational events, calculates usage factors for all monitored locations, and compares the accumulated data to allowable values; the program will thereby identify the need for any corrective actions. The Exelon corporate implementing procedure requires that a condition report be generated when the number of cycles approaches or exceeds the design allowable number. This procedure along with site implementing procedures will be revised to ensure that that a condition report is generated prior to exceeding any design allowable cycle limit. The corrective action process will allow appropriate corrective or mitigating actions to be taken before the number of SRV lifts exceed the number required to ensure that the CUF remains less than 1.0 for the SRVDL-Vent Line Penetration Components and Welds. Corrective action could include reanalysis of the CUF with more refined techniques or plant modification as appropriate.

RAI 4.7.2.1 Supplemental Information Request

Provide an UFSAR supplement for section 4.7.2.1 of the LRA, "Corrosion Allowance for Power Operated Relief Valves."

Response

A new Quad Cities UFSAR Supplement Section **A.3.5.2.3, Corrosion Allowance for Power Operated Relief Valves**, will read as follows:

Power Operated Relief Valves (PORVs) installed in the Quad Cities Unit 2 reactor coolant pressure boundary for overpressure relief were designed with a corrosion allowance for 40 years of operation. The specification for the valves is cited in UFSAR Section 5.2.2. The valves were installed under a plant modification in 1995. Since the valves were installed more than 20 years into the original license period, the design corrosion values remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

RAI 4.7.2.3 (a) Supplemental Information Request

The response to RAI 4.7.2.3 (a) in the Exelon letter of Oct 3, 2003 needs the following additional details:

- What paragraph in ASME Section III, Subsection NC 1977 with Summer addenda was used in the calculation?

- The maximum interaction ratios of what was calculated?

(They might consider providing the calculation, which will make things easier.)

Response

The following additional detail is provided to the staff related to the calculation.

1) The allowable stress limits used in the calculation are in accordance with paragraph NC-3647-1(d) of ASME Section III, Subsection NC, 1977 with Summer addenda.
2) The maximum interaction ratio of the existing non-standard 20" flanges was calculated. The maximum stress interaction ratios calculated were:

$$\frac{S_R}{1.5S_{tf.all}} = 1.001 \quad \text{and} \quad \frac{S_T}{1.5S_{tf.all}} = 0.13$$

S_R is the radial stress at the bolt circle and S_T is the tangential flange stress at the inside diameter. $S_{tf.all}$ is the torus flange material allowable stress which equals 17.5 ksi. The over stress of 0.1% for S_R was found acceptable because the worst case corrosion allowance of 4 mils per year was conservatively assumed to occur on the entire perimeter of all 20 bolt holes simultaneously. Using a more representative average corrosion rate of 1 to 3 mils per year would have resulted in a flange interaction ratio less than 1.00. Also, the loads used were very conservative.

As stated in the original response to RAI 4.7.2.3, the subject calculation was performed in response to an NRC concern identified during a review of the modification associated with replacement of the ECCS suction strainers (NRC Inspection Report 50-237/01-09; 50-249/01-09).

RAI A.3.5.2.2 Supplemental Information Request

The staff has reviewed the Section A.3.5.2.2 in the supplement to the Dresden and Quad Cities UFSARs. The section does not reflect the applicant's commitment to take appropriate measures in the event that galvanic corrosion is determined to potentially affect the structural integrity of the strainer flanges and suppression chamber attachments. The applicant is requested to include a commitment to take the appropriate measures in the supplement to the UFSARs.

Response

The following statement will be added to UFSAR Supplement section A.3.5.2.2:

In the event that the measured galvanic corrosion rate will not ensure acceptable thickness to the end of the 60-year licensed operating period, appropriate corrective action will be identified and implemented to maintain the structural integrity of the strainer flanges.

RAI B.1.13(a) Supplemental Information Request

The staff identified that loss of material due to galvanic corrosion is location-dependent. Adequate aging management may need to target susceptible locations for inspection and testing. By letter dated August 4, 2003, the staff asked the applicant to clarify whether the inspection and testing described in the Open-Cycle Cooling Water System program (B.1.13) are targeted or opportunistic with respect to managing loss of material due to galvanic corrosion (RAI B.1.13). In its response dated October 3, 2003, the applicant stated that the Open-Cycle Cooling Water System program manages galvanic corrosion through periodic inspections of the heat exchangers. The staff notes that the cast iron filter strainer bodies, discussed in RAIs 3.3.2.4.16 and 3.3.2.4.21(b), in the Dresden CCSW and service water systems are subject to galvanic corrosion. Clarify the aging management of galvanic corrosion on the strainer bodies. The response to RAI B.1.13(a) indicates it is not covered under the Open-Cycle Cooling Water System AMP, but it is not clear whether it is covered by the Selective Leaching of Materials AMP.

Response

The last sentence of the original response to RAI B.1.13(g) read as follows:

> "The aging effects of galvanic corrosion are managed through periodic heat exchanger inspections."

The above statement should have read as follows:

> "The aging effects of galvanic corrosion are managed through periodic inspections of in-scope components as appropriate."

Galvanic corrosion is an applicable aging effect for the strainer bodies (Aging Management Reference 3.3.2.208) identified in RAIs 3.3.2.4.16 and 3.3.2.4.21(b). The aging management of galvanic corrosion for these components is covered under the Open-Cycle Cooling Water System AMP, and either consists or will consist of periodic visual inspections of the strainer bodies.

Scheduled surveillances exist for periodic visual inspections of all of the subject strainers except the strainer in the CCSW supply line to the Main Control Room HVAC refrigeration condensing unit. A new surveillance for periodic inspection of this remaining strainer will be implemented prior to the end of the current license. The new inspection will be performed at a frequency not to exceed once every 8 years. The new periodic inspection will be added to the Open-Cycle Cooling Water System AMP for License Renewal. Section A.1.13 of the LRA Appendix A (Dresden only) is revised as follows to reflect the new periodic inspection:

A.1.13 Open-Cycle Cooling Water System

The open-cycle cooling water system aging management program includes (a) surveillance and control of biofouling, (b) tests to verify heat transfer, (c) a routine

inspection and maintenance program, including system flushing and chemical treatment, (d) periodic inspections for leakage, loss of material, and blockage, (e) engineering evaluations and heat sink performance assessments, and (f) assessments of the overall heat sink program. These evaluations and assessments produced specific component and programmatic corrective actions. The program provides assurance that the open-cycle cooling water system is in compliance with General Design Criteria, and with quality assurance requirements, to ensure that the open-cycle cooling water system can be managed for an extended period of operation. This program is in response to and uses the test and inspection guidelines of NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." Prior to the period of extended operation, the scope of the program will be increased to include inspection of an additional strainer, additional heat exchangers and sub-components, external surfaces of various submerged pumps and piping, cooling water pump linings, and components in the pump vaults that have a high humidity or moisture environment.

RAI B.1.34 Supplemental Information Request

In the response to RAI B.1.34, the applicant provided tables of design transients. Table 1 shows the following:

For QC: 286 plant cooldowns and 298 plant heat ups.
For Dresden: 293 plant cooldowns and 298 plant heatups.

Explain why the number of cooldowns is not the same as the number of heatups.

Response:

The number of allowable plant heatup and cooldown cycles is presented in Table 3.9-1 of the Dresden and Quad Cities UFSARs. In the late 1980s, all of the Units at Dresden and Quad Cities were approaching the limiting number of reactor scrams used in the original reactor vessel stress and fatigue analysis. As such, Exelon hired General Electric (GE) to re-evaluate the number of allowable cycles for each of the design transients contained in Table 3.9-1 of the UFSAR. As discussed in Quad Cities UFSAR Section 3.9.1.1, the revised fatigue evaluation was approved by the NRC in 1991. The revised cycle counts were based on actual accumulated cycles for each plant through May 1988 projected out to 40 years of operation, with some additional conservatisms included. The difference between the allowable plant cooldown and heatup cycles is accounted for by an increase in the allowable SRV blowdowns. For Quad Cities, the allowable SRV blowdowns events increased from 1 to 12. For Dresden, the increase was from the original allowable of 1 SRV blowdown to 5 SRV blowdown events. Therefore, the cycle counts referenced in the question reflect the latest design basis analyses for the RPV, as documented in the plant UFSARs.

RAI B.2.3 Supplemental Information Request (AMP B.2.3, Periodic Inspection of Ventilation Elastomers)

The applicant states that the scope of the program includes the periodic replacement of elastomers. The staff only finds that the applicant's approach acceptable only if there is assurance that the components will still perform their intended function at the time of replacement. This should be self-evident. However, the applicant needs to provide

information or commitments to cover this. In the past we have accepted in-service inspections to specified criteria (such as standards) that support continued operation or post-mortem inspections/evaluations to verify that the equipment was operable and the frequency is acceptable.

Response

Exelon stated in its original response to RAI B.2.3 (b) that there are no plans or schedules to perform replacements of ventilation system elastomers at this time and that the intention of the second paragraph in LRA, Appendix B.2.3, Scope of Activity, was to provide the opportunity to credit replacement of elastomers in lieu of performing the inspection.

Upon further evaluation, Exelon has determined that it does not need to include the flexibility of being able to replace elastomers in lieu of performing the inspection. Therefore, Exelon will remove the statement pertaining to periodic replacement of ventilation system elastomers from aging management program B.2.3 Periodic Inspection of Ventilation System Elastomers.

LRA section B.2.3, Periodic Inspection of Ventilation System Elastomers, Evaluation and Technical Basis (1), Scope of Activity, will be revised by deleting the second paragraph. After revision, the Scope of Activity for Aging Management Program B.2.3 will read as follows.

Evaluation and Technical Basis

(1) Scope of Activity: The program inspects elastomers utilized in ventilation systems within the scope of license renewal, including flexible boots, access door seals, filter seals, and RTV used as a duct sealant. These elastomers prevent external leakage and bypass of HEPA and carbon filters. These inspections apply to the standby gas treatment system and ventilation systems within the scope of license renewal; that is, to the main control room ventilation, station blackout diesel generator building ventilation, Dresden reactor building ventilation, and Quad Cities emergency diesel generator building ventilation systems.