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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 August 4, 2003

Exelon Generation Company, LLC (EGC) is submitting the additional information requested in Reference 2. This additional information provides further discussion of Section 2.3, "Scoping and Screening Results: Mechanical," Section 3.3, "Aging Management of Auxiliary Systems" (fire protection portion), and Appendix B, "Aging Management Programs" 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
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 2.3.1.1-1

Please verify whether Dresden and/or Quad Cities is equipped with a thermal shield, whose intended function is to provide shielding for the safety-related systems, structures, and components (SSCs), such as the reactor vessel and the internals, from gamma- and neutron-, and thereby, it may be relied upon to minimize irradiation induced embrittlement of the vessel and/or the internals. If the component exists at Quad Cities and/or Dresden, please justify its exclusion from aging management review (AMR); otherwise, submit an AMR for the subject component.

Response:

The reactor vessels at Dresden and Quad Cities do not contain any thermal shield to protect safety-related SSCs such as the reactor vessel and the vessel internals from radiation. No boiling water reactors manufactured by General Electric contain such a design feature.

RAI 2.3.1.1-2

Please clarify whether vessel head spray nozzle is included in the license renewal application (LRA) Table 2.3.1-1 as part of the component group, "Nozzles." If not, please provide justification for exclusion of vessel head spray nozzles from AMR.

Response:

The vessel head spray nozzles for Dresden are included in LRA Table 2.3.1-1 as part of the component group, "Top Head Enclosure (Top Head Nozzles)." The applicable aging management references are 3.1.2.4 and 3.1.2.59.

RAI 2.3.1.1-3

Please indicate whether the following components are considered part of the reactor pressure vessel nozzles, safe ends, attachments and instrument penetrations requiring an AMR. If so, please provide an AMR for the subject components and include them in LRA Table 2.3.1-1:

- Thermal sleeves for core spray and recirculation inlet nozzles;
- Standby liquid control and core differential pressure line;
- Low-pressure coolant injection coupling;

Please indicate whether the nozzles connecting the reactor recirculation system to the connecting piping should be identified as reactor recirculation system components requiring AMR.

Response:

- The thermal sleeves for core spray are considered to be part of the core spray lines and spargers. They are addressed in LRA Section 2.3.1.2.1, Table 2.3.1-2, Component Group – Core Spray Lines and Spargers. The recirculation inlet nozzles thermal sleeves are considered an integral part of the recirculation nozzles. They are addressed in LRA 2.3.1.1, Table 2.3.1-2, Component Group – Nozzle Safe Ends.

- LRA Section 2.3.2.8 Standby Liquid Control, Table 2.3.2-8, Component Group – Piping and Fittings addresses the standby liquid control line (not including the vessel nozzle). LRA Section 2.3.1.1 Reactor Vessel, Table 2.3.1-1, Component Group – Nozzle Safe Ends, address the standby liquid control nozzle.

  LRA Section 2.3.1.3.3 Nuclear Boiler Instrumentation, Table 2.3.1-7, Component Group – Piping and Fittings (small bore) addresses the core differential pressure line. These system evaluation breaks are depicted on Boundary Diagrams LR-DRE-M-26-1 (E/6), LR-DRE-M-357-1 (B/5), LR-QDC-M-35-1 (G/4), and LR-QDC-M-77-1 (G/4).

  Those portions of the standby liquid control and core differential pressure piping located inside the reactor vessel were determined to be not in the scope of the Rule. They do not perform a safety related function and their failure would not prevent a safety related SSC from performing a safety related function. This evaluation is supported by BWRVIP-27, BWR Standby Liquid Control System / Core Plate ΔP Inspection and Flaw Evaluation Guidelines. BWRVIP-27 has been evaluated and accepted by the NRC staff. Paragraph 2.2.1 of BWRVIP-27 provides a safety assessment stating that the standby liquid control and core differential pressure internals are not essential and therefore concluded in paragraph 3.1.1 of BWRVIP-27 that no inspections are recommended.

- As stated in LRA Table 3.1-1, Ref. No. 3.1.1.17 low-pressure coolant injection (LPCI) couplings are not used at Dresden or Quad Cities. The low-pressure coolant injection (LPCI) coupling identified in BWRVIP-06, Safety Assessment of BWR Reactor Internals, applies to BWR/4, BWR/5 and BWR/6 reactors (Ref. Section 2.7, BWRVIP-06). The Dresden and Quad Cities reactors are a BWR/3 design. Neither site has a LPCI coupling as described in BWRVIP-06.

- LRA Section 2.3.1.1 Reactor Vessel, Table 2.3.1-1, Component Group – Nozzle Safe Ends, includes the nozzles connecting the reactor recirculation system to the connecting piping. They are considered to be part of the reactor vessel and should not be identified as reactor recirculation system components.

RAI 2.3.1.2-1

According to drawing LR-QDC-FSAR-3.9, the steam separator and standpipe assembly are both in scope at Quad Cities. Please explain why per LR-DRE-FSAR-3.9, the steam separator

assembly, including the steam separator, steam separator standpipe and steam plenum head, are not in scope at Dresden.

Response:

LR-QDC-FSAR-3.9 incorrectly shows the steam separator and standpipe assembly as in scope at Quad Cities. The steam separator and standpipe assemblies are not safety related, nor would their failure cause another safety related SSC from performing its safety related function, as discussed in BWRVIP-06, BWR Vessel and Internals Project, Section 3.2.2. Therefore, the steam separator and standpipe assemblies at both Dresden and Quad Cities are not in the scope of the rule and not subject to aging management review. The steam plenum head depicted on LR-DRE-FSAR-3.9 is the area between the core shroud head and the bottom of the steam separator standpipe. It is not a component.

RAI 2.3.1.2-2

According to drawing LR-DRE-FSAR-3.9, steam dryer lifting lugs are in scope at Dresden. Does Quad Cities have steam dryer lifting lugs? If so, please explain why the steam dryer lifting lugs are in scope at Dresden but not in scope at Quad Cities.

Response:

The steam dryer lifting lugs are not identified on LR-DRE-FSAR-3.9. However, these lugs are out of scope at both Dresden and Quad Cities. This is consistent with boundary diagram LR-QDC-FSAR-3.9 which does show the steam dryer lifting lugs as out of scope.

RAI 2.3.1.2-3

Please explain why feedwater spargers are not in scope.

Response:

The feedwater spargers are not in scope because their failure would not prevent the injection of coolant makeup and they are not required to safely shut down the reactor. They were therefore classified as non-safety related. Also, the sparging function is not credited in delivery of Emergency Core Cooling System (EECS) flow to the vessel and no failure that could result in consequential failure of safety-related components has been identified.

RAI 2.3.1.2-4

In accordance with 10CFR54.4(a) criteria, sump screens and vortex suppressors/breakers are in scope of license renewal requiring AMR. Are sump screens and vortex suppressors/breakers in scope at Dresden and Quad Cities? If so, please submit the AMR results to the staff. If not, please explain the reason for their exclusion.

Response:

Sump (ECCS) screens and vortex suppressors/breakers are installed in pressurized-water reactors (PWR). The equivalent boiling-water reactor equipment is the suppression chamber ECCS suction strainers. At Dresden and Quad Cities, these ECCS suction strainers are in the scope of license renewal and are managed for aging.

The suppression chamber ECCS suction strainers are included in LRA Section 2.3.2.7, Table 2.3.2-7 under the Component Group, "Filters/Strainers (Dresden only)" with "Filter" as the component intended function, and in LRA Section 2.3.2.6, Table 2.3.2-6 under the Component Group "Filters/Strainers (Quad Cities only)" with "Filter" as the component intended function. The aging management results of the strainer (stainless steel) components that are exposed to 25-288 ^{0}C demineralized water environment are provided in Aging Management Reference 3.2.1.13, LRA Table 3.2-1.

The aging mechanism of blockage, as it applies to strainers is managed by the "Protective Coating Monitoring and Maintenance" aging management program, B.1.32, which provides for aging management of service level I coatings inside the primary containment.

RAI 2.3.1.2-5

The applicant has identified most of the reactor internals requiring AMR. However, there are a few items that normally would be considered part of reactor pressure vessel internals requiring AMR that have not been included in the submitted LRA. Please justify the following exclusions from aging management; otherwise, submit an AMR for the subject component.

- Thermal sleeves for core spray and recirculation inlet nozzles. These sleeves represent pressure boundary and direct flow to core spray spargers and jet pumps, respectively;
- Standby liquid control and core differential pressure line (SLC/core delta P line (pressure boundary PB);
- Please identify all the components that are included in Component Group "Jet pump assemblies," and also explain why sensing lines are not included in jet pump assemblies; and
- Low pressure coolant injection coupling.

Response:

The following provides clarification of either where to find the components in the LRA or the justification for excluding the component from aging management review.

- The thermal sleeves for core spray are considered to be part of the core spray lines and spargers. They are addressed in LRA Section 2.3.1.2.1, Table 2.3.1-2, Component Group – Core Spray Lines and Spargers. The recirculation inlet nozzles thermal sleeves are considered an integral part of the recirculation nozzles. They are addressed in LRA 2.3.1.1, Table 2.3.1-2, Component Group – Nozzle Safe Ends.

- The portions of the standby liquid control and core differential pressure piping located inside the reactor vessel were determined to be not in the scope of license renewal. They do not perform a safety related function and their failure would not prevent a safety related SSC from performing a safety related function. This evaluation is supported by BWRVIP-27, BWR Standby Liquid Control System / Core Plate ΔP Inspection and Flaw Evaluation Guidelines. BWRVIP-27 has been evaluated and accepted by the NRC staff. Paragraph 2.2.1 of BWRVIP-27 provides a safety assessment stating that the standby liquid control and core differential pressure internals are not essential and therefore concluded in paragraph 3.1.1 of BWRVIP-27 that no inspections are recommended.

- The Jet Pump Assemblies group is comprised of the following components.
  a. Thermal sleeve
  b. Inlet header
  c. Riser brace arm
  d. Hold down beams
  e. Inlet elbow
  f. Mixing assembly
  g. Diffuser

  BWRVIP-41, BWR Jet Assembly Inspection and Flaw Evaluation Guidelines (Section 2.3.12.7) concludes that inspection of sensing lines is essentially occurring continuously by plant operations. If a sensing line were to fail, the ability to monitor jet pump integrity would be lost. Plant Technical Specifications would require either a plant shut down or safety assessment to justify continued operation if a failure were to occur. Therefore, sensing line failure has no adverse safety consequences and no inspection is required.

- As stated in LRA Table 3.1-1, Ref. No. 3.1.1.17 low-pressure coolant injection (LPCI) couplings are not used at Dresden or Quad Cities. The low-pressure coolant injection (LPCI) coupling identified in BWRVIP-06, Safety Assessment of BWR Reactor Internals, applies to BWR/4, BWR/5 and BWR/6 reactors (Ref. Section 2.7, BWRVIP-06). The Dresden and Quad Cities reactors are a BWR/3 design. Neither site has a LPCI coupling as described in BWRVIP-06.

RAI 2.3.1.3-1

Please verify whether the pumps at Quad Cities and/or Dresden, such as the recirculation pumps, are designed with lube motor-oil collection systems, as required under 10 CFR 50, App. R, III O. If they are, please justify its exclusion from aging management; otherwise, submit an AMR for the subject component.

Response:

The reactor recirculation pumps at Quad Cities and Dresden are not equipped with oil collection systems and do not need such systems to comply with 10 CFR 50, App. R, III O. 10 CFR 50, App. R, III O requires that the reactor coolant pump (reactor recirculation pump at Quad Cities and Dresden) be equipped with an oil collection system if the containment is not inerted during normal operation. The reactor recirculation pumps at Quad Cities and Dresden are located in the drywell portions of the primary containment, which are inerted during normal operation. The

Quad Cities and Dresden Fire Hazards Analysis Reports sections for Fire Zones 1.2.1 & 1.2.2 state that there is no design-basis fire postulated for the drywell since the drywell atmosphere is inerted during normal reactor operation.

RAI 2.3.1.3-2

Please explicitly identify all of the nozzles, safe ends, vessel shell attachments and instrumentation penetrations included in Component Groups "Nozzles," "Nozzle Safe Ends" (including core delta P/SLC nozzle safe end), "Vessel Shell attachment welds," and "Penetrations" (bottom head drain, CRD stub tubes, incore instrument housings, jet pump instrumentation, other instrumentation, standby liquid control), respectively. UFSARs [Updated Final Safety Analysis Reports] for Dresden and Quad Cities do identify the reactor vessel nozzles, safe ends, vessel shell attachments, and instrumentation penetrations at these plants, but it is not clear whether all of these components are included in Table 2.3.1-1 of the LRA.

Response:
The following list identifies the individual components included in the LRA Table 2.3.1-1. Industry Component Type line items are as shown in bolded and underlined text. In some cases generic components were created to represent a population of components, as for example the CRD stub tubes. Also, there are nozzles included in the component group, "Top Head Enclosure (Top Head Nozzles)." Therefore, although not requested, the individual components for this group are also provided.

All the nozzles identified on page 3 of Quad Cities UFSAR Section 5, Appendix 5A, "Reactor Vessel Report," and on page 11 of Dresden UFSAR Section 5, Appendix 5A, "Dresden 2 Reactor Vessel," are included in LRA Table 2.3.1-1 in the Component Groups of "Nozzles" and "Penetrations."

Nozzles (Component Intended Function of Pressure Boundary)

Unit	Equip No.	Equipment Name
Q1	1-0201-N1	Recirculation Outlet Nozzles
Q1	1-0201-N2	Recirculation Discharge Nozzles
Q1	1-0201-N3	Main Steam Nozzles
Q1	1-0201-N4	Feedwater Nozzles
Q1	1-0201-N5	Core Spray Nozzles
Q1	1-0201-N9	CRD Return Line Nozzles
Q2	2-0201-N1	Recirculation Nozzles
Q2	2-0201-N2	Recirculation Discharge Nozzles
Q2	2-0201-N3	Main Steam Nozzles
Q2	2-0201-N4	Feedwater Nozzles
Q2	2-0201-N5	Core Spray Nozzles
Q2	2-0201-N9	CRD Return Line Nozzles
D2	2-0201-N1	Recirculation Nozzles
D2	2-0201-N2	Recirculation Discharge Nozzles
D2	2-0201-N3	Main Steam Nozzles
D2	2-0201-N4	Feedwater Nozzles
D2	2-0201-N5	Core Spray Nozzles
D2	2-0201-N9	CRD Return Line Nozzles
D2	2-0201-N17	Isolation Condenser Nozzles

D3	3-0201-N1	Recirculation Suction Nozzles
D3	3-0201-N2	Recirculation Discharge Nozzles
D3	3-0201-N3	Main Steam Nozzles
D3	3-0201-N4	Feedwater Nozzles
D3	3-0201-N5	Core Spray Nozzles
D3	3-0201-N9	CRD Return Line Nozzles
D3	3-0201-N17	Isolation Condenser Nozzles

Nozzle Safe Ends (Component Intended Function of Pressure Boundary)

Unit	Equip No.	Equipment Name
Q1	1-0201-N1-SE	Recirculation Suction Nozzle Safe Ends
Q1	1-0201-N2-SE	Recirculation Discharge Nozzle Safe Ends
Q1	1-0201-N3-SE	Main Steam Nozzle Safe Ends
Q1	1-0201-N4-SE	Feedwater Nozzle Safe Ends
Q1	1-0201-N5-SE	Core Spray Nozzle Safe Ends
Q1	1-0201-N5-SEEXT	Core Spray Nozzle Safe End Extension
Q1	1-0201-N6B-SE	Vessel Head Instrumentation Nozzle Safe End
Q1	1-0201-N7-SE	Vent Nozzle N7 Safe End
Q1	2-0201-N8-SE	Jet Pump Instrumentation Nozzle Safe Ends
Q1	1-0201-N9-SE	CRD Return Line Nozzle Safe End
Q1	1-0201-N10-SE	Core Delta P & SLC Nozzle Safe Ends
Q1	1-0201-N11/12-SE	Instrumentation Nozzle Safe Ends
Q2	2-0201-N1-SE	Recirculation Suction Nozzle Safe Ends
Q2	2-0201-N2-SE	Recirculation Discharge Nozzle Safe Ends
Q2	2-0201-N3-SE	Main Steam Nozzle Safe Ends
Q2	2-0201-N4-SE	Feedwater Nozzle Safe Ends
Q2	2-0201-N5-SE	Core Spray Nozzle Safe Ends
Q2	2-0201-N5-SEEXT	Core Spray Nozzle Safe End Extension
Q2	2-0201-N6B-SE	Vessel Head Instrumentation Nozzle Safe End
Q2	2-0201-N7-SE	Vent Nozzle N7 Safe End
Q2	2-0201-N8-SE	Jet Pump Instrumentation Nozzle Safe Ends
Q2	2-0201-N9-SE	CRD Return Line Nozzle Safe End
Q2	2-0201-N10-SE	Core Delta P & SLC Nozzle Safe Ends
Q2	2-0201-N11/12-SE	Instrumentation Nozzle Safe Ends
D2	2-0201-N1-SE	Recirculation Suction Nozzle Safe Ends
D2	2-0201-N2-SE	Recirculation Discharge Nozzle Safe Ends
D2	2-0201-N3-SE	Main Steam Nozzle Safe Ends
D2	2-0201-N4-SE	Feedwater Nozzle Safe Ends
D2	2-0201-N5-SE	Core Spray Nozzle Safe Ends
D2	2-0201-N5-SEEXT	Core Spray Nozzle Safe End Extension
D2	2-0201-N6B-SE	Vessel Head Instrumentation Nozzle Safe End
D2	2-0201-N7-SE	Vent Nozzle Safe End
D2	2-0201-N8-SE	Jet Pump Instrumentation Nozzle Safe Ends
D2	2-0201-N9-SE	CRD Return Line Nozzle Safe End
D2	2-0201-N10-SE	Core Delta P & SLC Nozzle Safe End
D2	2-0201-N11/12-SE	Instrumentation Nozzle Safe Ends
D2	2-0201-N17-SE	Isolation Condenser Nozzle Safe End
D3	3-0201-N1-SE	Recirculation Suction Nozzle Safe Ends
D3	3-0201-N2-SE	Recirculation Discharge Nozzle Safe Ends
D3	3-0201-N3-SE	Main Steam Nozzle Safe Ends
D3	3-0201-N4-SE	Feedwater Nozzle Safe Ends
D3	3-0201-N5-SE	Core Spray Nozzle Safe Ends

D3	3-0201-N5-SEEXT	Core Spray Nozzle Safe End Extension
D3	3-0201-N6B-SE	Vessel Head Instrumentation Nozzle Safe End
D3	3-0201-N7-SE	Vent Nozzle Safe End
D3	3-0201-N8-SE	Jet Pump Instrumentation Nozzle Safe Ends
D3	3-0201-N9-SE	CRD Return Line Nozzle Safe End
D3	3-0201-N10-SE	Core Delta P & SLC Nozzle Safe End
D3	3-0201-N11/12-SE	Instrumentation Nozzle Safe Ends
D3	3-0201-N17-SE	Isolation Condenser Nozzle Safe End

Vessel Shell Attachment Welds(Component Intended Function of Structural Support)

Generic Components were created for the attachment welds on each unit at each site:

Unit	Equip No.	Equipment Name
Q1	1-0201-LR037	Attachment Welds
Q2	2-0201-LR037	Attachment Welds
D2	2-0201-LR037	Attachment Welds
D3	3-0201-LR037	Attachment Welds

Penetrations (Component Intended Function of Pressure Boundary)

Unit	Equip No.	Equipment Name
Q1	1-0201-12	Housing In-Core Penetrations
Q1	1-0201-LR038	CRD Stub Tube Penetrations
Q1	1-0201-N8	Jet Pump Instrumentation Nozzle Penetrations
Q1	1-0201-N10	Core Delta P & SLC Nozzle Penetrations
Q1	1-0201-N11/12	Instrumentation Nozzle Penetrations
Q1	1-0201-N15	Bottom Head Drain Nozzle Penetrations
Q2	2-0201-12	Housing In-Core Penetrations
Q2	2-0201-LR038	CRD Stub Tube Penetrations
Q2	2-0201-N8	Jet Pump Instrumentation Nozzles Penetrations
Q2	2-0201-N10	Core Delta P & SLC Nozzle Penetrations
Q2	2-0201-N11/12	Instrumentation Nozzle Penetrations
Q2	2-0201-N15	Bottom Head Drain Nozzle Penetrations
D2	2-0201-12	Housing In-Core Penetrations
D2	2-0201-LR038	CRD Stub Tube Penetrations
D2	2-0201-N8	Jet Pump Instrumentation Nozzle Penetrations
D2	2-0201-N10	Core Delta P & SLC Nozzle Penetrations
D2	2-0201-N11/12	Instrumentation Nozzle Penetrations
D2	2-0201-N15	Bottom Head Drain Nozzle Penetrations
D3	3-0201-12	Housing In-Core Penetrations
D3	3-0201-LR038	CRD stub tube Penetrations
D3	3-0201-N8	Jet Pump Instrumentation Nozzles Penetrations
D3	3-0201-N10	Core Delta P & SLC Nozzle Penetrations
D3	3-0201-N11/12	Instrumentation Nozzle Penetrations
D3	3-0201-N15	Bottom Head Drain Nozzle Penetrations

Penetrations (Control Rod Drive Stub Tubes) (Component Intended Function of Structural Support)

Generic Components were created for the CRD stub tubes on each unit at each site:

Unit	Equip No.	Equipment Name
Q1	1-0201-LR038	CRD Stub Tubes Penetrations
Q2	2-0201-LR038	CRD Stub Tubes Penetrations
D2	2-0201-LR038	CRD Stub Tubes Penetrations

D3	3-0201-LR038	CRD Stub Tubes Penetrations

Top Head Enclosure (Top Head Nozzles) (Component Intended Function of Pressure Boundary)

Unit	Equip No.	Equipment Name
Q1	1-0201-N6B	Vessel Head Instrumentation Nozzle
Q1	1-0201-N7	Vent Nozzle N7
Q2	2-0201-N6B	Vessel Head Instrumentation Nozzle
Q2	2-0201-N7	Vent Nozzle N7
D2	2-0201-N6B	Vessel Head Instrumentation Nozzle
D2	2-0201-N7	Vent Nozzle
D3	3-0201-N6B	Vessel Head Instrumentation Nozzle
D3	3-0201-N7	Vent Nozzle

RAI 2.3.1.3-3

One of the intended functions of the main steam line flow restrictors is to limit steam line flow during a steam line rupture outside of primary containment until the MSIVs [main steam isolation valves] can close, thereby limiting potential radioactive release. Over the extended life of the plant, it is therefore, essential to maintain the flow area of the flow restrictors used in the CLB [current licensing basis] to calculate the amount of steam released. The staff believes that erosion/corrosion due to high energy steam flow can eventually increase this flow area beyond the value used in the CLB. The staff requests the applicant to provide the following information:

a) Are the main steam line flow restrictors, and their flow restriction function within scope? If not, please explain why not?

b) If in scope, how will the applicant determine that the flow area does not exceed more than the value used in the CLB, so that the intended functions will be maintained consistent with the CLB for the period of extended operation?

Response:

a) The main steam line flow restrictors are within the scope of license renewal. They are listed as components in two line items in LRA Table 2.3.4-1 because they have two intended functions. They are included in the component group, "Flow Elements," with a component intended function of "Pressure Boundary." They are also included in the component group, "Flow Elements," with a component intended function of "Throttle."

b) The main steam line flow restrictors are constructed of an external carbon steel pipe segment, with an internal venturi-type flow element welded into it. The venturi flow element is comprised of stainless steel.

The entry in the LRA Table 2.3.4-1 Component Group, "Flow Elements," with a component intended function of "Pressure Boundary" is for the carbon steel pipe segment that comprises the pressure boundary. The LRA Chapter 3 Aging Management References are 3.1.1.11 and 3.4.2.6. The internal aging effect/aging mechanism is wall thinning due to flow-accelerated corrosion, and is managed by the flow-accelerated corrosion program, as described in LRA Appendix B, Section B.1.11. The external environment for the pipe

segment is "containment nitrogen," and there are no identified aging effects/aging mechanisms for this environment.

The entry in the Component Group, "Flow Elements," with a component intended function of "Throttle" is for the internal stainless steel venturi-type flow element. The LRA Chapter 3 Aging Management Reference is 3.1.1.15. The aging effect/aging mechanism is crack initiation and growth due to SSC, IGSCC. It is managed by the BWR stress corrosion cracking program as described in LRA Appendix B, Section B.1.7, and by the water chemistry program as described LRA Appendix B, Section B.1.2. EPRI 1003056, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools," Appendix A – Treated Water, Section 3.1.6, states that stainless steels used in treated water environments are resistant to FAC.

RAI 2.3.2.2-1

High radiation sampling system piping and liquid sampling flow diagram LR-QDC-M-1061-1 does not include check valve 2-1402-71 within the scope of License Renewal. This valve prevents the backflow of water from the ESS fill pump discharge line back to the condensate transfer pump supply line. Failure of this valve could prevent the ESS fill pump system from supporting its intended ESF function. Please explain why this component is not within the scope of the License Renewal Program.

Response:

Valve 2-1402-71 is included within the scope of license renewal and is subject to aging management review. Boundary diagram LR-QDC-M-78 (coordinate E-7) includes valve 2-1402-71 as within the scope of license renewal requiring aging management review. Check valve 2-1402-70 (not shown on LR-QDC-M-1061-1) serves as the safety related pressure boundary that prevents the back flow of water from the ECCS keep fill pump discharge line from entering the condensate transfer system. Valve 2-1402-71 is addressed in Table 2.3.2-2 under the Component Group, "Valves (attached support)". Valve 2-1402-70 is addressed in Table 2.3.2-2, under the Component Group, "Valves". High radiation sampling system piping and liquid sampling boundary diagram, LR-QDC-1061-1, is a continuation boundary diagram where valve 2-1402-71 is shown as a dotted line for information only. The ECCS keep fill pump system intended function is therefore not jeopardized. Boundary diagram LR-QDC-1061-1 should have highlighted check valve 2-1402-70 indicating that it falls within the scope of license renewal.

RAI 2.3.2.2-2

Demineralized water system flow diagram LR-DRE-M-366 does not include the suction line, 3-3329-A-B-L, and suction isolation valve, 3-3329-A-500, for condensate make-up pump 3-3318-B within the scope of License Renewal. Failure of these system boundary components could prevent the demineralized water system from performing its ESF function. Please explain why these components are not within the scope of the License Renewal Program.

Response:

Exelon has reviewed the demineralized water system boundary diagram LR-DRE-M-366 for

Dresden and the following clarification is provided:

Demineralized water system boundary diagram LR-DRE-M-366 should have highlighted suction line, 3-3329-A-8"-L, and suction isolation valve, 3-3329-A-500, for condensate make-up pump 3-3318-A and included those components within the scope of license renewal. The suction line and the suction isolation valve are included in the scope of license renewal and are subject to aging management review. The suction piping and isolation valve are addressed in LRA Section 2.3.4.3, Table 2.3.4-3 under the Component Groups "Piping and Fittings" and "Valves". Aging Management Reference 3.4.1.3 discusses the aging management of the suction piping and isolation valve external surfaces as a carbon steel component. Aging Management References 3.4.1.2 and 3.4.1.4 discuss the aging management of the suction piping and isolation valve internal surfaces.

RAI 2.3.2.3-1

On instrument air piping diagram LR-QDC-M-24-12, line 1-47209-1" is shown within the scope of containment isolation components (PC) system that require an AMR because it provides a safety-related pressure retaining function. Lines 1-47692-1 and 1-4315A which are connected to line 1-470209-1 are not shown in PC system to require an AMR. Similarly for unit 2, lines 2-47692, 2-4315A and 2-47209A which are connected to line 2-470209 on diagram LR-QDC-M-71-7 are not shown in PC system to require an AMR. Please provide AMR for these components, or provide a justification for excluding these components from an AMR.

Response:

Those portions of instrument air lines 1-47209-1"-T and 2-47209-1"-T shaded in red on boundary diagrams LR-QDC-M-24-12 and LR-QDC-M-71-7 are non-safety related. These lines are attached to safety related portions of lines 1-47209-1"-T and 2-47209-1"-T, as shown on boundary diagrams LR-QDC-M-24-13 and LR-QDC-M-71-8. Those portions of the lines colored in red provide structural support to the safety related portions of piping colored in green. The non-safety related piping and components and components on lines 1-47209-1"-T and 2-47209-1"-T extend up to the first support in each of the three orthogonal directions. A failure in lines 1-47692-1 ¼", 1-4315A-1/4"-L, 2-47692-1 ¼", or 2-4315A-1/4"-L would not have any impact on the structural integrity of the safety related piping and components. Additionally, failure of these lines would not impact the intended function of any safety related systems. Safety related valves relied upon instrument air fail in the safe position. Therefore, these lines are not within the scope of license renewal and do not require aging management review.

RAI 2.3.2.3-2

On instrument air piping diagram LR-QDC-M-24-13, boundary breaks between PC system components that require an AMR and instrument air (IA) components are not shown. Please identify the PC system component boundary breaks and identify where the LRA addresses the AMR for these components or provide a justification for excluding these components from an AMR.

Response:

All of the piping and piping components colored in red and green on boundary diagram LR-QDC-M-24-13 have been included within the scope of license renewal and require aging management review. These components were evaluated within the Primary Containment (PC) system boundary. All components highlighted in green are safety related. All components highlighted in red are non-safety related components attached to safety related components providing structural support. The non-safety related components providing structural support include all components up to the first support in each of the three orthogonal directions. That is why portions of piping highlighted in red end abruptly at some locations. Piping and piping components that are colored in black are Instrument Air (IA) system components that are not included within the scope of license renewal and do not require aging management review. Instrument Air boundary diagram LR-QDC-M-24-13 should have been corrected to include the boundary flags designating breaks between PC system components and Instrument Air system components. LRA Section 2.3.2.3, Table 2.3.2-3, includes those components that are highlighted in green and red and included within the scope of license renewal. The components within the scope of license renewal rule are evaluated for aging management review (AMR) as follows:

(a) AMR for the valves is addressed in Aging Management References 3.2.2.14, 3.2.2.110, 3.2.2.24, 3.2.2.122, 3.2.2.22, 3.2.2.52, 3.2.2.11, 3.2.2.103, and 3.2.2.55
(b) AMR for piping and fittings is addressed in Aging Management References 3.2.2.22, 3.2.2.24, 3.2.2.55, 3.2.2.67 and 3.2.1.4.

RAI 2.3.2.3-3

On diagram LR-QDC-M-71-8, line 2-47209-1" (E-7) and line 2-4700-2" (D-10) are shown within the scope of PC system components that require an AMR because they provide a safety-related pressure retaining function. Lines 2-47775 and 2-47498 which are connected to lines 2-47209 and 2-4700 are not in PC system requiring an AMR. Please identify where the LRA addresses the AMR for these components, or provide a justification for excluding these components from an AMR.

Response:

Those portions of lines 2-47209-1" and 2-4700-2" shown on boundary diagram LR-QDC-M-71-8 that are highlighted in green are safety related and provide a pressure retaining function. The safety related boundary pressure retaining boundary ends at valves 2-4721 and 2-4799-156. Those portions of lines 2-47209-1" and 2-4700-2" highlighted in red are non-safety related and provide structural support for the safety related portions of pipe. All components highlighted in green and red are included within the scope of license renewal and require aging management. The non-safety related portions of piping falling within the scope of license renewal extended up to the first support in each of the three orthogonal directions. That is why the red highlighted lines appear to end abruptly. Field walk downs performed by Exelon identified those structural interactions with the safety related components that can affect the ability of SSCs to perform their intended functions. Failure of lines 2-47775-1/2" and 2-47498-3/4" would not have any impact on the structural integrity (interaction or attached) of the safety related piping and components. Additionally, failure of these lines would not impact the intended function of any safety related systems. Safety related valves reliant upon instrument air fail in the safe position. As such, these lines were not included within the scope of license renewal and do not require aging management review.

RAI 2.3.2.3-4

On liquid sampling system diagrams LR-QDC-M-1056-1 and LR-QDC-M-1061-1 boundary breaks between PC system components that require an AMR and other system components are not shown. Please identify the PC system component boundary breaks and identify where the LRA addresses the AMR for these components or provide a justification for excluding these components from an AMR.

Response:

Piping and piping components shown on boundary diagram LR-QDC-M-1056-1 highlighted in red or green fall within the scope of license renewal and require aging management. Those portions of pipe highlighted in red and green have been evaluated under various systems. For example, those portions of piping shown at locations B-7 & C-6 (includes valves 1-2099-417 and 1-2099-500) were evaluated with the PC system. These two stretches of pipe are bounded by high radiation sampling system piping that falls outside the scope of license renewal. Those portions of pipe highlighted in red at location G-9 on boundary diagram LR-QDC-M-1056-1 (includes valve 1-8941-701) were evaluated with the reactor recirculation system. Those components highlighted in red are non-safety related, providing structural support to safety related reactor recirculation system piping. Finally, those portions of pipe highlighted in green and red at location D-9 on boundary diagram LR-QDC-M-1056-1 (includes valve 1-1402-69) fall within the scope of license renewal and require aging management. Those components were evaluated with the core spray system and are bounded by high radiation sampling system piping that falls outside the scope of license renewal. The piping highlighted in green is safety related and the piping highlighted in red is non-safety related, providing structural support to the safety related pipe that is attached.

Piping and piping components shown on boundary diagram LR-QDC-M-1061-1 highlighted in red or green fall within the scope of license renewal and require aging management. Those portions of pipe highlighted in red and green have been evaluated under various systems. For example, those portions of piping shown at locations B-7 & C-6 (includes valves 2-2099-649 and 2-2099-394) were evaluated with the PC system. These two stretches of pipe are bounded by high radiation sampling system piping that falls outside the scope of license renewal. Those portions of pipe highlighted in red at location G-9 on boundary diagram LR-QDC-M-1061-1 (includes valve 2-8941-721) were evaluated with the reactor recirculation system. Those components highlighted in red are non-safety related, providing structural support to safety related reactor recirculation system piping. Finally, those portions of pipe highlighted in green and red at location D-9 on boundary diagram LR-QDC-M-1061-1 (includes valve 2-1402-69) fall within the scope of license renewal and require aging management. Those components were evaluated with the core spray system. These components are bounded by high radiation sampling system piping that falls outside the scope of license renewal. The core spray system piping highlighted in green is safety related and the piping highlighted in red is non-safety related, providing structural support to the safety related pipe that is attached.

Table 2.3.2-3 includes those components evaluated within the PC system boundary and provides the appropriate aging management reference for each component group. Table 2.3.1.3-5 includes those components evaluated within the reactor recirculation system boundary and provides the appropriate aging management reference for each component group. Table 2.3.2-2 includes those components evaluated within the core spray system boundary and provides the appropriate aging management reference for each component group. Boundary

diagrams LR-QDC-M-1056-1 and LR-QDC-M-1061-1 should have included the appropriate system boundary flags.

RAI 2.3.2.3-5

On Radwaste Ventilation Diagram LR-DRE-M-272, boundary breaks between PC and RW system components are shown at location A-10, but no component in PC system is shown to require an AMR. Please identify the PC system components on the above drawing and where the LRA addresses the AMR for these components or provide a justification for excluding these components from an AMR.

Response:

The components shown on boundary diagram LR-DRE-M-272 at coordinate A-9 were evaluated with the PC system and are connected to piping that is continued on the same diagram at coordinate F-3. This portion of non-safety related piping is a continuation of piping from drawings LR-DRE-M-356 (coordinate A-1) and LR-DRE-M-25 (coordinate B-1). As shown on boundary diagrams LR-DRE-M-25 (B-1) and LR-DRE-M-356 (A-1), the PC system piping highlighted in green is safety related and provides a pressure retaining function. Those portions of lines 2-1656-10" and 3-1656-10" highlighted in red on boundary diagram s LR-DRE-M-25 (B-1) and LR-DRE-M-356 (A-1) are non-safety related and provide structural support for the safety related portions of pipe colored in green. The non-safety related pipe colored in red falls within the scope of license renewal and extends up to the first support in each of the three orthogonal directions. The piping continues beyond the first seismic anchor on diagram s LR-DRE-M-25 and LR-DRE-M-356 and continues on to boundary diagram LR-DRE-M-272. The purpose of the boundary flags on boundary diagram LR-DRE-M-272 is to identify the extent of the PC system boundary. Failure of piping and piping components shown on boundary diagram LR-DRE-M-272 would not have any impact on the structural integrity or intended function of the safety related piping and components in the PC system. As such, the PC system components on boundary diagram LR-DRE-M-272 were not included within the scope of license renewal and do not require aging management review.

RAI 2.3.2.5-1 (Dresden Units Only)

For Unit 3, the system boundary between the isolation condenser and demineralized water makeup piping system for AMR is shown on flow diagram LR-DRE-M-359 (B-1) for line 3-4399-72. For Unit 2, the similar isolation boundary between the isolation condenser and demineralized water makeup piping system for AMR is not shown on flow diagram LR-DRE-M-28 (B-1) or on flow diagram M-35-1 (A-8) for line 2-4399-72. Please indicate the LR boundary for Unit 2 piping between the isolation condenser and demineralized water makeup system. Please indicate where the LRA address the AMR of these components or provide a justification for excluding these component from an AMR.

Response:

The Unit 3 the system boundary break between the isolation condenser and demineralized water makeup for AMR shown on boundary diagram LR-DRE-M-359 (B-1) for line 3-4388-4"-L (Valve 3-4399-72) is correct and represents the boundary evaluated. For Unit 2, the same boundary

break between the isolation condenser and demineralized water makeup system should have been shown on boundary diagram LR-DRE-M-28 (B-1) for line 2-4388-4"-L (Valve 2-4399-72). These components fall within the scope of license renewal. The components within the isolation condenser system boundary are included in LRA Table 2.3.2-5 under the Component Groups – "Piping and Fittings (Dresden Only)" and "Valves (Dresden Only)." The piping was evaluated for aging management under Aging Management References 3.2.1.2, 3.2.1.4, and 3.2.2.137. The valves [(2)3-4399-72] were evaluated for aging management under LRA reference numbers 3.2.1.2, 3.2.1.4, 3.2.1.12, and 3.2.2.137. The piping upstream of valve [(2)3-4399-72] is evaluated in the demineralized water makeup system boundary, and is included in LRA Table 2.3.3-19, under the Component Group – "Piping and Fittings." This piping was evaluated for aging management under Aging Management References 3.3.1.5 and 3.3.2.143.

RAI 2.3.2.5-2 (Dresden Units Only)

The LR boundary for the clean demineralized water storage tank (2/3-4300) shown on flow diagram LR-DRE-M-35-1 for AMR is not clearly indicated and, therefore it is unclear whether it is covered in isolation condenser system or in demineralized water system. The LR boundaries for line 2/3-43220-4"-H and for line to LI and LT indicate that it is covered in the isolation condenser system. The LR boundaries for line 2/3-43206-6"-H and for line 2/3 4301-3"-L indicate that it is covered in the demineralized water system. These safety-related components are relied upon to remain functional during and following the design basis events to provide makeup water to the isolation condenser for cooling. Please indicate LR boundary for the tank and connecting piping and identify where the LRA addresses the AMR for these components or provide a justification for excluding these component from an AMR.

Response:

The clean demineralized water storage tank T-105B (2/3-4300) shown on boundary diagram LR-DRE-M-35-1 was evaluated with the isolation condenser system as stated in LRA Sections 2.3.2.5 and 2.3.3.19.

Piping and components associated with the clean demineralized water storage tank (T-105B) that provide flow path to the isolation condenser make up pumps and receive recirculation flow return from the isolation condenser make up pumps are evaluated in the Isolation Condenser system boundary. Piping and components from the tank connection for the level instruments (LI and LT) and the suction piping for the clean demineralizer water pumps (2/3-4301B-3"-L) from the tank were evaluated in the clean demineralizer system boundary. Line 2/3-4301B-3"-L has the same boundary breaks as those of the piping for the LI and LT, in that the boundary break is at the piping connection to the tank (although the "ISO/DWM" flag is missing).

The LR boundary break for line 2/3-43206-6"-H (LR-DRE-M-35-1, E-9) shows that the piping connecting the tank to the isolation condenser make-up pumps (through lines 2/3-43216A-8"-H and 2/3-43216A-8"-H) was evaluated within the isolation condenser evaluation boundary. The portion of piping for line 2/3-43206-6"-H at coordinate E-9 that has been colored black should have been highlighted green to be in scope. This piping connects to valves 2/3-4399-329A/B on the suction side of dilution pumps. The piping up to and including the valves are evaluated with the make up demineralizer system boundary for aging management review.

The AMRs for those components evaluated with the isolation condenser system are included in LRA Table 2.3.2-5. They are included under the Component Groups of "Tanks (Dresden only),"

"Valves (Dresden only)," and "Piping and Fittings (Dresden only)." The AMR for the tank is addressed in Aging Management Reference 3.2.2.82 for the internal environment and Aging Management Reference 3.2.2.10 for the external environment. The AMR for the valves is addressed in Aging Management References 3.2.1.2, 3.2.1.4, and 3.2.1.12 for the internal environment and Aging Management Reference 3.2.2.15 for the external environment. The AMR for piping and fittings is addressed in Aging Management References 3.2.1.2 and 3.2.1.4 for the internal environment and Aging Management Reference 3.2.2.15 for the external environment.

The AMRs for those components evaluated with the make up demineralizer system are included in LRA Table 2.3.3-19. They are included under the Component Groups of "Valves," and "Piping and Fittings." The AMR for the valves is addressed in Aging Management Reference 3.3.2.272 for the internal environment and Aging Management Reference 3.3.2.29 for the external environment. The AMR for piping and fittings is addressed in Aging Management Reference 3.3.2.143 for the internal environment and Aging Management Reference 3.3.2.29 for the external environment.

The components discussed above are not safety-related and are not credited in any design basis event. The tank and the associated piping and components are within scope of license renewal for compliance to the Fire Protection, Anticipated Transients Without Scram, and Station Blackout 10 CFR 54.4(a)(3) regulated events.

RAI 2.3.2.5-3 (Dresden Units Only)

Table 2.3.2-5 Component Groups Requiring Aging Management Review -Isolation Condenser (Dresden only) does not list the Vacuum Breaker 2/3-4399-803 shown on Isolation Condenser makeup system flow diagram LR-DRE-M-4203 as the component requiring AMR. This safety-related component is relied upon to remain functional during and following the design basis events to maintain the pressure boundary for the essential components. Please identify where the LRA addresses the AMR of this component or provide a justification for excluding this component from an AMR.

Response:

Vacuum Breaker 2/3-4399-803, shown on Isolation Condenser makeup system boundary diagram LR-DRE-M-4203, falls within the scope of license renewal and is evaluated in LRA Table 2.3.2-5 under the Component Group, "Valves (Dresden Only)". The Aging Management Review results for this vacuum breaker are provided in Aging Management References 3.2.1.2, 3.2.1.4, and 3.2.1.12 for the internal environment and 3.2.2.137 for the external environment.

RAI 2.3.2.5-4 (Dresden Units Only)

(a) Drawing LR-DRE-M-359, Isolation Condenser Piping, identifies two diaphragm seal components within the boundaries of license renewal; however, these components are not listed in the LRA tables described above. Identify where the LRA addresses the AMR for these diaphragm seal components, or provide a justification for excluding these components from an AMR.

(b) Dresden Isolation Condenser (IC) System Description describes the presence of a loop seal and manway hatch as components in the isolation condenser system. Neither of these components is mentioned in the Tables 2.3.2-5, 3.2-1, or 3.2-2 of the LRA. Identify where the LRA addresses the AMR for these components, or provide a justification for excluding these components from an AMR.

(c) Condensate piping diagram LR-QDC-M-16-5 does not include level switch isolation valves 0-33107A and 0-33108A and connecting piping to level switch 0-3341-71A within the scope of License Renewal. Identify where the LRA addresses the AMR for these components, or provide a justification for excluding these components from an AMR.

Response:

(a) The diaphragm seals indicated on LR-DRE-M-28 & LR-DRE-M-359 are part of level transmitters LT-2-1341 and LT-3-1341, which are a filled-capillary type of differential pressure transmitter. This type of transmitter is used in applications where a constant reference leg level cannot be assured by process conditions (as for example, condensation from a two-phase fluid). The transmitters are shipped with the diaphragm seals attached to the transmitter by coils of flexible tubing, with the fill fluid already installed. These transmitters are in scope of license renewal, but do not require aging management because they are active components.

(b) The loop seals are shown on LR –DRE-M-39 (A-9) and LR-DRE-M-369 (A-9). They are needed to provide a secondary containment boundary between the isolation condenser vent header, which discharges to the reactor building exterior, and the loop seal discharge to the reactor building. The loop seals are constructed of 1-1/2 inch carbon steel piping and are included in LRA Table 2.3.2-5, with the Component Group of "Piping and Fittings (Dresden only)," and with a component intended function of "Pressure Boundary." The Aging Management References are 3.2.1.2 and 3.2.1.4 for the pipe internal environment, and 3.2.2.137 for the piping external environment. The loop seals are not depicted correctly on the boundary diagrams. The boundary drawings should have highlighted the loop seals in GREEN, with a "RBD/ISO" flag positioned after the highlighted portion.

The isolation condenser manways are part of the isolation condenser itself and are included in LRA Table 2.3.2-5, with the Component Group of "Isolation Condensers (Dresden only)," and with a component intended function of "Pressure Boundary." The manway bolting is included in LRA Table 2.3.2-5 with the Component Group of "Closure Bolting (Dresden only)," and with a component intended function of "Pressure Boundary." Table 2.3.2-5 omitted an Aging Management Reference to 3.2.2.118, which should have been credited as an Aging Management Reference for the Table 2.3.2-5 bolting line item.

(c) The isolation valves for LS-0-3341-71A and the connecting piping are in scope, and should have been highlighted on LR-QDC-M-16-5. The valve equipment piece numbers on LR-QDC-M-16-5 are 0-3399-227A and 0-3399-228A. The connecting piping is identified on the drawing as 0-33107A-1" and 0-33108A-1." The valves are included in LRA Table 2.3.4-3 with the Component Group of "Valves," and a component intended function of "Pressure Boundary." The connecting piping is included in Table 2.3.4-3 with the Component Group of "Piping and Fittings," and a component intended function of "Pressure Boundary." The internal surface Aging Management Reference for both the

valve and connecting piping line items is 3.4.1.2. The external surface Aging Management Reference for both the valve and connecting piping line items is 3.4.1.3.

RAI 2.3.2.7-1

The low pressure coolant injection (LPCI) coupling was identified in the BWRVIP-06 report as a safety-related component. It appears, however, that the component was not identified in the LRA requiring an AMR. If the component exists at Dresden and/or Quad Cities, please justify its exclusion from aging management; otherwise, submit an AMR for the subject component.

Response:

The low pressure coolant injection (LPCI) coupling identified in BWRVIP-06, BWR Vessel and Internals Project, applies to BWR/4, BWR/5 and BWR/6 reactors (Ref. Section 2.7, BWRVIP-06). The Dresden and Quad Cities reactors are BWR/3. The LPCI coupling identified in the Section 2.7 of BWRVIP-06 does not exist at Dresden. Neither site has a LPCI coupling as described in BWRVIP-06.

RAI 2.3.2.8-1

(a) The accumulators in the Standby Liquid Control (SLC) system contain synthetic butyl (rubber) bladders. The accumulators dampen the pulsation from the positive displacement pumps reducing system pressure surges. The upper side of the bladder is charged with nitrogen gas to 425-475 psig and the underside is a sodium pentaborate solution environment that receives pulsation from the SLC positive displacement pump discharge. The synthetic butyl material, nitrogen gas and sodium pentaborate environments and associated aging effects are not included in LRA Table 2.3.2-8. Include this material in the Table 2.3.2-8 and associated AMR in Table 3.2-2, or provide a justification for not including this component in the AMR.

(b) Dresden and Quad Cities UFSAR Section 9.3.5 for the SLC System indicate the presence of a sparger in the bottom of the sodium pentaborate tank that is used for mixing the boron solution. LRA Table 2.3.2-8 does not identify such a component, its material, and its environment. Identify where the LRA addresses the aging management review for this component, or provide justification for excluding this component and associated aging effects requiring management from Table 2.3.2-8 and Table 3.2.2.

Response:

(a) The standby liquid control (SLC) accumulator bladders are not in the scope of license renewal. The component intended function of the SLC accumulators is "pressure boundary." The accumulators themselves (i.e. the steel shell) are part of the system pressure boundary and are required for operability. They are safety-related and ASME Section VIII pressure vessels. The bladders, when pressurized, provide pulsation dampening, and are not required for system operability. Pulsation dampening is provided to minimize long-term degradation of system components from pressure pulses during system operation. Periodically, normally prior to performing testing of the SLC pumps, the accumulator pressure is measured and recharged as necessary. The

inability to hold a charge would be indicative of a degraded bladder and appropriate action would be taken.

(b) The standby liquid control (SLC) storage tank sparger is not in scope of license renewal. It is part of the flow path for introducing service air or clean demineralized water into the tank. It is not required for the SLC system to perform its intended functions. The service air system is a support system to the SLC system and is not required for SLC to perform its intended functions. Service air is passed through the sparger as an aid in placing chemical additions into solution or prior to gathering a SLC tank solution sample. The clean demineralized water and make up system is also a support system to the SLC system and is not required for SLC to perform its intended functions. Water in the SLC storage tank is required, but not the water supply. Any necessary clean demineralized water additions are passed through the sparger. Piping connected to the sparger external to the SLC storage tank that makes up a part of the tank pressure boundary is included in scope of license renewal.

RAI 2.3.2.9-1

While ventilation damper housings are highlighted on the ventilation flow diagrams as within the scope of license renewal, they are not identified in the applicable LRA tables as component groups requiring AMR (see the following examples):

- Standby Gas Treatment System Table 2.3.2-9
- Standby Blackout Building HVAC Table 2.3.3-10
- Reactor Building HVAC Table 2.3.3-8 (Quad Cites HVAC butterfly isolation valve housings)

Clarify whether these components are within the scope of license renewal and subject to an AMR. If so, provide an aging management review for the subject components; otherwise, provide justification for their exclusion.

Response:

The ventilation damper housings highlighted on boundary diagrams LR-DRE-M-49 and LR-QDC-M-44 for the Standby Gas Treatment System are within the scope of license renewal and subject to an aging management review. These ventilation dampers are included under the component group "Valves" found in LRA Table 2.3.2-9 with an Aging Management Reference of 3.2.2.114.

The ventilation damper housings highlighted on boundary diagrams LR-DRE-M-4356-1, 2, 3, 4, 5, and LR-QDC-M-3033-1, 2 for the Station Blackout Building HVAC System are within the scope of license renewal and subject to an aging management review. These ventilation dampers were evaluated with the Component Group, "Doors, Closure Bolts, Equip Frames" found in LRA Table 2.3.3-10 with an Aging Management Reference of 3.3.1.5.

The Quad Cities HVAC butterfly isolation valves highlighted on boundary diagrams LR-QDC M-371 and LR-QDC-M-371-1 for the Reactor Building HVAC System are within the scope of license renewal and subject to an aging management review. These ventilation dampers were evaluated with the Component Group, "Doors, Closure Bolts, Equip Frames" in LRA Table 2.3.3-

8 with an Aging Management Reference of 3.3.1.5.

In general, ventilation dampers highlighted on the ventilation flow diagrams were evaluated with the component group "Doors, Closure Bolts, Equip Frames" when the damper was comprised of a material and experienced an environment that matched a combination found in NUREG-1801. When the environment and material did not match any combination found in NUREG-1801, the ventilation dampers were evaluated with Component Group, "Valves".

RAI 2.3.2.9-2

The following five passive components associated with ventilation system ductwork are not identified as within scope of license renewal or subject to an aging management program:

- Ductwork turning vanes
- Ventilation system elastomer seals
- A ventilation equipment vibration isolator flexible connections
- Ductwork test connections
- Ductwork access doors

Clarify whether these components are within the scope of license renewal and subject to an AMR. If so, provide an aging management review for the subject components; otherwise, provide justification for their exclusion.

Response:

Ductwork turning vanes and the ductwork access doors were evaluated as part of the ductwork. The ductwork is included within the scope of license renewal and is subject to an aging management review. The ductwork is included on LRA Tables 2.3.3.7, 2.3.3.8, and 2.3.3.10 and is evaluated under the Component Group, "Doors, Closure Bolts, Equip Frames". Aging Management Reference 3.3.1.5 describes the aging management associated with all of the components included within this Component Group.

Ventilation system elastomer seals and ventilation equipment vibration isolator flexible connections are included within the scope of license renewal and are subject to an aging management review. The seals and flexible connections are included on LRA Tables 2.3.3.7, 2.3.3.8, and 2.3.3.10 and are evaluated under the Component Group, "Flex Collars, Doors, Duct and Damper Seals". Aging Management Reference 3.3.1.2 describes the aging management associated with all of the components included within this Component Group.

Ductwork test connections are within the scope of license renewal and are subject to an aging management review. The test connections are included on LRA Tables 2.3.3.7, 2.3.3.8, and 2.3.3.10 under Component Group, "Duct Fittings, Hinges, Latches". Aging Management Reference of 3.3.2.49 describes the aging management associated with all of the components included within this Component Group.

RAI 2.3.2.9-3

Clarify whether structural sealants used to maintain the power block building pressure boundary envelope (i.e., main control room, auxiliary building, fuel handling building, reactor building) at design pressure with respect to the adjacent areas are included in the scope of license renewal and subject to an aging management review. Provide information relating to structural sealants use as referenced in Table 2.1-3 on page 2.1-15 of NUREG-1800 (Standard Review Plan-License Renewal). The Standard Review Plan states that an applicant's structural aging management program is expected to address structural sealants with respect to an AMR program. If structural sealants are not in the scope of license renewal, provide justification for their exclusion.

Response:

Structural sealants used to maintain the power block building pressure boundary envelope are included in the scope of license renewal and subject to an aging management review.

The following structures have caulking and sealant within the scope of license renewal and are subject to an aging management review.

- Reactor Buildings roof joints and blowout panel seals are included in LRA Table 2.4-2 under Component Group, "Caulking/Sealants" with Aging Management Reference 3.5.2.4.
- Contaminated Condensate Storage Tanks Foundations tank seals are included in LRA Table 2.4-10 under Component Group, "Caulking/Sealants" with Aging Management Reference 3.5.2.4.
- Exhaust duct penetration sealant located in the Station Blackout Battery Room (Dresden only) and the Station Blackout Day Tank Rooms (Quad Cities only) is included in LRA Table 2.4-6 under Component Group, "Caulking/Sealants" with Aging Management Reference 3.5.2.4.
- Station Chimney sealant at manhole elevation 561' at Dresden and sealant at manhole elevation 638'-6" at Quad Cities are included in LRA Table 2.4-13 under Component Group, "Caulking/Sealants" with Aging Management Reference 3.5.2.4.
- 2/3 Isolation Condenser Pump House (Dresden, only) roof flashing to Reactor Building interface is included in LRA Table 2.4-7 under Component Group, "Caulking/Sealants" with Aging Management Reference 3.5.2.4.
- Turbine Building caulking/sealant is included in LRA Table 2.4-4 under Component Group, "Caulking/Sealants" with Aging Management References 3.5.2.3 and 3.5.2.4.
- Control Room (Both stations) and Auxiliary Electrical Equipment Room (Dresden only) penetration seal caulking/sealant are included in LRA Table 2.4-3 under Component Group, "Penetration Seals" with Aging Management Reference 3.3.1.18.

A new Component Group, Caulking/Sealants, should have been included in LRA Table 2.4-3 with a component intended function of Structural Pressure Barrier and an Aging Management Reference of 3.5.2.3, as shown below:

Table 2.4-3 Component Groups Requiring Aging Management Review - Main Control Room and Auxiliary Electric Equipment Room

Component	Component Intended Function	Aging Management Ref
Caulking/Sealants	Structural Pressure Barrier	3.5.2.3

RAI 2.3.2.9-4

The process of evaluating consumables is not described in the LRA. The applicant should state whether its evaluation process for consumables is subject to screening guidance in accordance with Table 2.1-3 of NUREG-1800. If consumables are not considered subject to NUREG-1800 scoping and screening guidance, provide a justification for their exclusion.

Response:

Exelon concurs that the process of evaluating consumables was not described in the LRA. However, the Exelon process for evaluating consumables was consistent with the screening guidance provided in Table 2.1-3 of NUREG-1800 and NRC Memo to NEI, Christopher I. Grimes to Douglas J. Walters, License Renewal Issue No. 98-12, "Consumables," March 10, 2000. The following describes the process followed by Exelon concerning consumables.

1. Group (a) subcomponents (packing, gaskets, component seals and O-rings) of pressure boundary components were not listed explicitly in scoping and screening. The pressure boundary components that include packing, gaskets, seals and O-rings as subcomponents have been designed to industry codes and standards, such as ANSI B31.1 or ASME, Section III, and do not rely on such subcomponents to maintain the structural integrity of the pressure boundary. The Dresden and Quad Cities specifications that implement the codes and standards applicable to piping and piping components do not list these as pressure boundary components and these components are not credited with maintaining the pressure boundary function.

2. Group (b) subcomponents (structural sealants) were not called out explicitly in scoping and screening. The aging management reviews for structures determined whether structural sealants were credited with an intended function and, where applicable, included them in an appropriate aging management program.

3. Group (c) consumables (oil, grease, and component filters) were not listed in scoping and screening and are not subject to aging management review because they are periodically replaced.

4. Group (d) consumables (system filters, fire extinguishers, fire hoses and air packs) were not listed in scoping and screening because these items are replaced on condition. System filters are replaced based on manufacturers' requirements. Fire extinguishers, fire hoses and air packs are periodically inspected or tested consistent with instructions that implement applicable National Fire Protection Association (NFPA) guidelines as documented in the Fire Hazards Analysis for each station.

RAI 2.3.3.1-1

The reactor building overhead crane is included in the component group "cranes" requiring AMR (Table 2.3.3-1). Table 3.3.1 lists the component group cranes as cranes including bridge and

trolleys and rail system in load handling system that require aging management for loss of material due to general corrosion and wear (AMR Ref. No. 3.3.1.14). Identify the specific components of cranes, which are within the scope of license renewal and subject to AMR.

[Note: As communicated to the cognizant members of the Exelon staff on July 9, 2003, this RAI has been combined with RAI 2.4-9 which will be issued in a separate correspondence.]

Response:

As indicated in this RAI, see the response to RAI 2.4-9, in a separate correspondence.

RAI 2.3.3.1-2

LRA Section 2.3.3.1 states that the major component of the refueling equipment system includes the refueling platform assembly which consists of refueling platform, fuel grapple, and associated equipment. List components referred to as the "associated equipment," and specify which components (if any) are within the scope of license renewal and subject to AMR.

Response:

The "associated equipment" referenced in the System Evaluation Boundary portion of LRA Section 2.3.3.1 is as delineated in the 3rd and 4th sentences of that section which read as follows:

> "...The refueling platform bridge includes a walkway, railings and a trolley mounted control cab, a main grapple hoist, the adjacent frame mounted auxiliary hoist, a reverse mounted monorail auxiliary hoist, a hinged jib arm power winch, and the reels, drives, pulleys, and sheaves required for the hoist cables and the service air lines from the self contained, refueling platform mounted air compressor. The bridge air system includes the compressor, air receiver, shutoff valves, solenoid valves, air hose retrieval assist drives, and quick disconnect fittings..."

All of the above-listed components are in scope of LR and subject to AMR.

RAI 2.3.3.1-3

LRA Section 2.3.3.1 states that the inboard main steam line plugs, vents, and regulators associated with the reactor vessel system are evaluated with the refueling equipment system. Clarify whether any of these components are within the scope of license renewal and subject to AMR.

Response:

The inboard main steam line plugs, vents, and regulators referenced in LRA Section 2.3.3.1 are temporary pieces of equipment (line plugs) installed to facilitate refueling operations. This equipment is not within scope of license renewal and, therefore, not subject to AMR.

The subject statement is located in the last sentence of the System Evaluation Boundary portion

of LRA Section 2.3.3.1. This statement does not clearly identify the affected equipment as line plugs. The statement should read as follows:

"The inboard plugs for the main steam lines, vents, and regulators associated with the reactor vessel system are evaluated with the refueling equipment system. They are temporary pieces of equipment (line plugs) installed to facilitate refueling operations and are not within the scope of license renewal. "

RAI-2.3.3.2-1

License renewal boundary drawing LR-DRE-M-32, "Shutdown Reactor Cooling Piping," (at A,7) shows a ½" pipe that is in-scope (colored Green) that goes from the shutdown cooling system (SDCS) pump 2-1002A seal cooler, to drawing LR-DRE-M-39, "Reactor Building Equipment Drains" (at A,8), where it ties into a pipe that goes from valve 2-1001-213A to the same SDCS pump shown on drawing LR-DRE-M-39. However, on drawing LR-DRE-M-39 the pipe in not shown in-scope (not color coded). The staff believes that the run of pipe shown on drawing LR-DRE-M-39 that comes from drawing LR-DRE-M-32, and the pipe it tees into, up to and including valve 2-1001-213A and the SDCS pump, should be in-scope for the same reason the portion of that pipe on drawing LR-DRE-M-32 is in-scope. This also applies to pumps 2-1002B and C on drawings LR-DRE-M-32 and 39 as well as to pumps 3-1002A, B & C on drawings LR-DRE-M-363 and 369. Please provide a justification for the exclusion of the portion of the piping shown on drawings LR-DRE-M-39 and LR-DRE-M-369.

Response:

Boundary diagrams LR-DRE-M-32, LR-DRE-M-39, LR-DRE-M-363, & LR-DRE-M-369 should have highlighted the piping from the seal coolers to the shutdown cooling pumps, up to and including pumps 2(3)-1002A, B, & C and valves 2(3)-1001-213A, B, & C. Valves 2(3)-1001-213A, B, & C are included in LRA Table 2.3.3-2, under Component Group, "Valves (Dresden only.)". The Aging Management Reference for the internal environment is 3.3.1.8. The Aging Management Reference for the external environment is 3.3.2.27. Pumps 2(3)-1002A, B, & C are included in Table 2.3.3-2, under Component Group, "Pumps (Dresden only.)". The Aging Management Reference for the internal environment is 3.3.1.8. The Aging Management Reference for the external environment is 3.3.1.5.

RAI-2.3.3.2-2

License renewal boundary drawing LR-DRE-M-32, "Shutdown Reactor Cooling Piping," (at C,9) shows relief valve RV 2-1099-29, and the associated piping to the header, in-scope (colored Green). However, the equivalent relief valve, RV 3-1099-29, on LR-DRE-M-363, "Shutdown Reactor Cooling Piping," (at C,9) is shown not in-scope (not color coded). The staff believes that RV 3-1099-29 on LR-DRE-M-363 should be in-scope for the same reason that RV 2-1099-29 on LR-DRE-M-32 is in-scope. The relief valve provides a passive intended function. Please provide a justification for the exclusion of RV 3-1099-29 on LR-DRE-M-363 and the associated piping to the main header.

Response:

Boundary diagram LR-DRE-M-363 should have highlighted valve 3-1099-29 and the associated piping to the main header. However, Dresden Station has plans to remove these valves from the plant design. Since the LRA was prepared, a modification was completed under engineering change EC 338910 that removed relief valve 3-1099-29 and replaced it with a blind flange. EC 340263, to remove relief valve 2-1099-29 from Dresden Unit 2, has not yet been implemented.

RAI 2.3.3.3-1

License Renewal Boundary Diagram LR-QDC-M-41-1 for Quad Cities Unit 1 excludes the following sections of piping from the scope of license renewal while piping at both ends of these sections is identified as in scope:

- 1-0314A-1/2"-A: section from Locations A-7 to E-9
- 1-0314B-1/2"-A: section from Locations A-4 to E-2
- 1-0314-2"-A: section from Locations A-5 to A-6
- 1-0313-1"-C: section from Locations B-5 to B-6
- 1-0315-1"-A: section from Locations B-5 to B-6

License Renewal Boundary Diagram LR-QDC-M-83-1 excludes the corresponding sections of Quad Cities Unit 2 from the scope of license renewal.

Please provide a justification for the exclusion of the above sections from the scope of license renewal and the AMR.

Response:

Non-safety related control rod drive (CRD) hydraulic piping was walked down at Quad Cities to identify those portions that could interact with safety related SSCs. Portions of the non-safety related piping were included in the scope of license renewal for either spatial considerations or because the piping is attached to safety related SSCs. Because of the proximity of the CRD hydraulic headers to safety related components, some situations exist where portions of piping in the center of a pipe run cannot spatially interact with any safety related SSCs. For this reason, they were excluded from the scope of license renewal.

RAI 2.3.3.3-2

License Renewal Boundary Diagram LR-QDC-M-41-2 for Quad Cities Unit 1 excludes the piping from the exhaust water header and fittings and the Pressure Indicator 1-0302-77 from the scope of license renewal. However, the corresponding components for Quad Cities Unit 2 are identified as in scope per 10 CFR 54.4(a)(2) (License Renewal Boundary Diagram LR-QDC-M-83-2). Please provide a justification for the exclusion of the above components of Unit 1 from the scope of license renewal and the AMR.

Response:

Non-safety related control rod drive (CRD) hydraulic piping was walked down at Quad Cities to identify those portions that could interact with safety related SSCs. Those portions of the non-

safety related piping on LR-QDC-M-41-2 and LR-QDC-M-83-2 were included in scope of license renewal for spatial interaction with safety related SSCs. The piping from the exhaust water header and fittings and the Pressure Indicator 1(2)-0302-77 cannot spatially interact with safety related SSCs and were not included in scope of license renewal. These components were incorrectly color-coded as in-scope of license renewal on LR-QDC-M-83-2 for unit 2. Boundary diagram LR-QDC-M-41-2 correctly identifies those portions falling within the scope of license renewal.

RAI 2.3.3.3-3

Several solenoid valves shown in License Renewal Boundary Diagram LR-QDC-M-41-2 for Quad Cities Unit 1, (e.g., S O1-0302-19A at Location F-1), are identified as within scope of license renewal. However, the piping connections to these valves are excluded from the scope of license renewal. Please provide a justification for the exclusion of the above components from the scope of license renewal and the AMR.

Response:

The piping in question is non-safety related instrument air system piping. The failure of this non-safety related instrument air support system piping will not affect any of the control rod drive (CRD) hydraulic system's intended functions. Loss of instrument air will cause the CRD scram valves to fail open, inserting the control rods into the core and causing other air operated CRD hydraulic system valves to fail in their fail-safe positions. There are small segments of safety related instrument air piping (such as that connecting solenoid valves SO 1-0305-117 and SO 1-0305-118) for each CRD hydraulic control unit that are included in the scope of license renewal. See boundary diagram LR-QDC-M-41-1 (coordinates E-8, E-3) as an example of the in-scope instrument air piping.

RAI 2.3.3.3-4

License Renewal Boundary Diagram LR-QDC-M-41-2 for Quad Cities Unit 1 shows the pressure indicator, Component PI 1-032-80, as within scope of license renewal. However, a similar component at the same location, pressure switch, Component PS 1-032-81 is excluded from the scope of license renewal. Please provide a justification for the exclusion of Component PS 1-032-81 from the scope of license renewal and the AMR.

Response:

Pressure Indicator PI 1-0302-80, manual instrument shutoff valve 1-0302-80, and the connecting tubing to the non-safety related instrument air system should not have been highlighted on boundary diagram LR-QDC-M-41-2. As stated in the response to RAI 2.3.3.3-3, the failure of this non-safety related instrument air support system piping will not affect any of the control rod drive hydraulic system's intended functions. Therefore, both PI-0302-80 and PS 1-0302-81 are outside the scope of license renewal.

RAI 2.3.3.3-5

License Renewal Boundary Diagram, (e.g., LR-QDC-M-41-2), identified control rod drives as within scope of license renewal. However, Table 2.3.3-3 does not list control rod drives as within scope of license renewal. Please provide a justification for the exclusion of control rod drives from Table 2.3.3-3.

Response:

The Component Groups listed in LRA Table 2.3.3-3 only include those components requiring aging management. Although control rod drives are in the scope of license renewal, they were screened as "active" components. This is consistent with NUREG 1800, Table 2.1-5, Item 29. As such they do not require aging management and were not included in LRA Table 2.3.3-3.

RAI 2.3.3.3-6

License Renewal Boundary Diagram LR-QDC-M-41-2 for Quad Cities Unit 1 shows that the license renewal boundary for 2½" piping section at Location B-10 ends at an undistinguishable location. Explain why the piping section up to and including Valve 1-0301-7 was excluded from the scope of license renewal. Similarly, explain why the corresponding piping section up to and including Valve 2-0301-7 was excluded from the scope of license renewal of Quad Cities Unit 2 (License Renewal Boundary Diagram LR-QDC-M-83-2).

Response:

Plant walk downs were performed on the non-safety related portions of the control rod drive (CRD) hydraulic system. Portions of non-safety related CRD hydraulic components depicted on boundary diagramsLR-QDC-M-41-2 and LR-QDC-M-83-2 are included in the scope of license renewal because the components could spatially interact with safety related SSCs located in the same area. The CRD pump discharge line, 1(2)-8302C-2 1/2," is included in scope from the point that the line enters the reactor building (A-10) to where that line and others downstream of it no longer can spatially interact with safety related SSCs.

RAI 2.3.3.3-7

License Renewal Boundary Diagram LR-QDC-M-83-1 for Quad Cities Unit 2 excludes the following 3/4"-diameter sections of piping between the reducer and the quick disconnect from the scope of license renewal:

- line containing Valve 2-0301-139A at Location A-7
- line containing Valve 2-0301-138A at Location A-7
- line containing Valve 2-0301-137A at Location B-7
- line containing Valve 2-0301-136A at Location C-7
- line containing Valve 2-0301-136B at Location C-4

However, License Renewal Boundary Diagram LR-QDC-M-41-1 shows that the corresponding sections of Quad Cities Unit 1 are included in the scope of license renewal.

Justify the exclusions of the above sections of Quad Cities Unit 2 from the scope of license renewal and the AMR.

Response:

The lines and valves 2-0301-136A, 2-0301-136B, 2-0301-137A, 2-0301-138A, and 2-0301-139A are included in scope of license renewal. Boundary diagram LR-QDC-M-83-1 should have highlighted the components. They are included in LRA Table 2.3.3-3, under Component Group, "NSR Vents or Drains, Piping and Valves (attached support)." The associated Aging Management Reference is 3.3.2.130.

RAI 2.3.3.3-8

License Renewal Boundary Diagram LR-DRE-M-34-1 for Dresden Unit 2 shows that the license renewal boundary for 1½" piping section at Location B-5 (cooling water pressure control station) ends at normally open Valve 2-0301-72. Explain why the piping section beyond this value was excluded from the scope of license renewal. Similarly, explain why the corresponding piping section beyond Valve 3-0301-72 was excluded from the scope of license renewal of Dresden Unit 3 (License Renewal Boundary Diagram LR-QDC-M-365-1).

Response:

At Dresden, the control rod drive (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, credit was allowed for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in scope. 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. Refer to LR-DRE-M-34-1 and LR-QDC-M-365-1.

RAI 2.3.3.3-9

License Renewal Boundary Diagram LR-DRE-M-365-1 for Dresden Unit 3 excludes the following sections of piping from the scope of license renewal:

- from Valve 3-0301-60 to and including Valve 3-0301-61 at Location B-4
- from Valve 3-0301-53 to and including Valve 3-0301-54 at Location B-2.

However, the corresponding sections of Dresden Unit 2 are included in the scope of license renewal (License Renewal Boundary Diagram LR-DRE-M-34-1).

Justify the exclusions of the above sections of Dresden Unit 3 from the scope of license renewal and the AMR.

Response:

At Dresden, the control rod drive (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, credit was allowed for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in scope. In the case of a CRD hydraulic system failure downstream of valves 3-0301-53 & 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 scope.

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 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. The portions of the piping downstream of valves 2(3)-0301-54 and 2(3)-0301-61 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.

RAI 2.3.3.3-10

License Renewal Boundary Diagram LR-DRE-M-34-1 for Dresden Unit 2 shows that the license renewal boundary ends at Valves 2-0301-67A and 2-0301-67B at Locations C-5 and B-5 (stabilizing valves). Explain why the piping section beyond these valves were excluded from the scope of license renewal. Similarly, explain why the corresponding piping sections beyond Valves 3-0301-67A and 3-0301-67B were excluded from the scope of license renewal of Dresden Unit 3 (License Renewal Boundary Diagram LR-QDC-M-365-1).

Response:

At Dresden, the control rod drive (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, credit was allowed for operator action to close accessible, normally open, manual isolation valves when establishing the in-scope boundary for systems that were in scope. In the case of a CRD hydraulic system failure downstream of valves 2-0301-67A & 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 & 67B were also not included in scope of license renewal for the same reason.

RAI 2.3.3.5-1

The license renewal boundary drawings referenced in LRA Section 2.3.3.5 are intended to identify the fire protection (FP) systems and components (SCs) that are within the scope of license renewal and subject to an aging management review (AMR). The review of these drawings and LRA Section 2.3.3.5 has resulted in the following RAIs:

(a) Section 2.1.3.5 of the LRA states that technical position papers were developed for FP. These position papers summarize the results of a detailed review of the FP program documents demonstrating compliance with 10 CFR 50.48 and 10 CFR 50 Appendix R, Sections III.G, III.J, III. L, and III.O. It is unclear that these position papers also included the licensing commitments contained in the applicant's response to Appendix A to the Branch Technical Position (BTP) Auxiliary and Power Conversion System Branch (APCSB) 9.5-1 and the SERs resulting from review of those responses. Please confirm that the scoping documents included all FP licensing commitments, including those prior to 10 CFR 50 Appendix R.

(b) LRA Section 2.3.3.5 lists "detects fires" as a system purpose and references the fire computer system which includes initiation devices. This fire detection/alarm computer system is not referenced elsewhere in the LRA, for example as part of the scoping and screening of the electrical and instrumentation systems. Please confirm that the fire detection/alarm system is included in the scope of license renewal and provide the AMR of the fire detection/alarm computer system or identify where the system is addressed in the LRA.

(c) LRA Drawing LR–DRE–M–23–1

The FP piping, valves, fittings, and fire hydrants at location B9 through D10 in Chemical Cleaning Service Water Intake Building and fire hydrants at locations A4 and E7 are not highlighted in the system flow diagram (LR–DRE–M–23–1) as components within the scope of license renewal and subject to an AMR. Additionally, the piping segment within the scope of license renewal does not end at a closed pressure boundary or an isolation valve (such as PIV 1-4199-187and 188), although these FP components perform a pressure boundary intended function. Clarify whether these FP piping, valves, and fire hydrants are in scope or justify their exclusion. If these components are not in the scope of license renewal, identify the pressure boundary interface and discuss whether the out-of-scope components can be isolated from the components relied upon to perform a pressure boundary intended function.

(d) LRA Drawing LR–DRE–M–23–4

Service water drops and transformer deluge systems are identified as being out of scope for the Unit 1 portions of the FP piping. Additionally, some of the boundary interfaces are not at a pressure boundary (not at an isolation valve). Clarify which fire suppression service water drops and transformer deluge systems and components should be within the scope of license renewal, and clarify the location of the pressure boundary interface. Justify the exclusion of fire suppression service water drops and transformer deluge systems not within the scope of license renewal.

(e) LRA Drawing LR–DRE–M–23–5

Certain fire suppression systems, such as service water drops and fire sprinkler systems, installed in the fuel handling building and maintenance shops are not highlighted in the system flow diagram (LR–DRE–M–23–5) as being within the scope of license renewal and subject to an AMR. However, the fire suppression system and its components perform a pressure boundary

intended function with rest of the FP system that is in scope and subject to an AMR for license renewal. Clarify which fire suppression SCs are within the scope of license renewal, and justify those which are excluded.

(f) LRA Drawing LR–DRE–M–4204

The fire sprinkler systems shown in the ISCO Makeup Pump Building Rooms A&B on this drawing are not enclosed in a green box as are other fire sprinkler systems in scope. Clarify if these systems are in scope of license renewal and subject to an AMR, or justify their exclusion.

(g) LRA Drawing LR–QDC–M–27–1

Certain fire hydrants (at locations D1, D2, E4, F7, G1, G2, G3, G6, and G7 associated piping, fittings, and valves), and piping, fittings, and valves (at locations A2, A3, A10, B2, and C9) are not highlighted in the system flow diagram (LR–QDC–M–27–1) as being within the scope of license renewal and subject to an AMR. It is unclear why some hydrants are circled and others are lined through. The staff believes that these components have the FP intended functions within the requirements of 10 CFR 50.48 as stated in 10 CFR 54.4(a)(3). Clarify which of the above FP SCs are within the scope of license renewal and subject to an AMR, and justify those which are excluded.

(h) LRA Drawing Legends

Boundary diagrams for the FP systems contain symbols which are not defined on those drawings or the legends, or are defined on Quad Cities drawings but not on Dresden. Clarify the symbols HC, FH, and a box with an F in it.

(i) Section 5.4.6.3 of the Dresden Nuclear Power Station UFSAR states that the Unit 2/3 diesel-driven fire pump or the Unit 1 diesel-driven fire pump automatically provide a backup supply of river water to the FP system on low system pressure. Sections 2.3.3.5 and 2.3.3.13 of the LRA state that the fire pump diesels for Dresden are evaluated with the FP system. While the fire pump diesels are considered active components and therefore may be excluded from the scope of license renewal, supporting components and subsystems of the fire pump diesels should appear in Table 2.3.3.5 of the LRA. Identify all of the components of the fire pump diesels that are long-lived and passive, and clarify which of the component types listed in LRA Table 2.3.3.5 include these components.

(j) Section 2.3.3.5 of the LRA states that the Halon fire suppression systems are within the FP system license renewal boundary. No system boundary drawings are provided for these systems. Clarify which Halon SCs are in scope of license renewal. Clarify which of the component types listed in LRA Table 2.3.3.5 include these system components.

(k) Page 5.5-7 of Amendment 2 to Quad Cities Nuclear Power Station response to BTP APCSB 9.5-1, dated February 1986, references the use of water shields or baffles over switchgear to mitigate fire suppression effects. These shields or baffles are not included within the scope of either the FP system or electrical system sections of the LRA. Confirm that these components are within the scope of the license renewal and subject to an AMR, and identify the LRA section where these components are evaluated, or justify their exclusion.

(l) Portable equipment such as fire extinguishers, self-contained breathing air packs, fire hoses, and portable ductwork are not included in the LRA. Staff believes that these components should be within the scope of the license renewal but exempt from an AMR, such that portable

equipment is typically replaced on condition. These standards require replacement of portable equipment based on their condition or performance during testing and inspection. These portable components are not long-lived and are maintained per the National Fire Protection Association (NFPA) standards, therefore an AMR is not required. Identify where in the LRA these components are identified as being within the scope of license renewal, or provide a technical justification for their exclusion.

Response:

a) The Dresden and Quad Cities Fire Protection position papers identify those systems, structures and components (SSC) relied upon to demonstrate compliance with 10 CFR 50.48. These include SSCs credited with satisfying the commitments contained in the responses to Appendix A to the Branch Technical Position (BTP) Auxiliary and Power Conversion System Branch (APCSB) 9.5-1 and the SERs resulting from the review of those responses, and SSCs credited with satisfying any fire protection SERs issued before BTP APCSB 9.5-1 was published.

b) The fire computer system, including smoke detectors, heat sensors, pressure/flow sensors, and actuation devises for pre-action systems, are within the scope of license renewal. All of the components in the system were categorized as "active" based on the determinations documented in NEI 95-10, Appendix B and are not subject to an AMR. Therefore, they not discussed in LRA Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Control Systems."

c) Boundary diagram LR-DRE-M-23-1 should have highlighted valves PIV 1-4199-187, PIV 1-4199-188, PIV 1-4199-189, PIV 1-4199-190, PIV 1-4199-194, fire hydrants FH-30, FH-31 at drawing coordinates C-10 and the piping segments associated with these valves and hydrants. The piping segment up to and including these valves and hydrants are included in the scope of license renewal. The FP piping, and components down stream of these valves are not included as part of the plant fire protection plan and do not perform functions that demonstrate compliance with 10 CFR 50.48. Fire hydrants FH-8, FH-9 and FH-10 at drawing coordinate A-4 on boundary diagram LR-DRE-M-23-1 and fire hydrant FH-33 at drawing coordinate E-7 on boundary diagram LR-DRE-M-23-1 are within the scope of license renewal. Boundary diagram LR-DRE-M-23-1 should have included those components within the scope of license renewal.

d) The portions of Unit 1 fire protection piping shown on boundary diagram LR-DRE-M-23-4 that perform functions necessary to demonstrate compliance with 10 CFR 50.48 are the fire hose stations F21 (drawing coordinate C-8), F22 (drawing coordinate C-5), F23 (drawing coordinate C-6), F27 (drawing coordinate A-5), F29 (drawing coordinate C-8), and F47 (drawing coordinate C-2), the West Aux Bay North and South Sprinkler Systems, and the piping connected to unit 2/3 fire protection piping up to and including the isolation values that connect to the Unit 1 piping. The Unit 1 fire hose stations are in scope because they are included as part of the Dresden Unit 2 and 3 fire protection plan. The West Aux Bay North System and South Sprinkler System are in scope because of the cable concentrations in the Unit 1 West Auxiliary Bay, located below the Unit 2 Control Room. All remaining piping, valves, fire hose station, service water drops, and sprinkler systems pertaining to Unit 1 are not included as part of the Dresden Unit 2 and 3 fire protection plan and do not perform functions that demonstrate compliance with 10 CFR 50.48.

Boundary diagram LR-DRE-M-23-4 contains some boundary interfaces that do not end at an isolation valve. At location A-8, the piping down stream of valve 1-4199-134 up to and including valve 1-4199-264 should not have been highlighted and does not belong within the scope of license renewal. A small portion of piping down stream of valves 1-4199-314 (drawing coordinate E-6), 1-4199-315 (drawing coordinate E-6) and 1-4199-131 (drawing coordinate D-8) should not have been highlighted. These portions of pipe do not belong within the scope of license renewal. Boundary diagram LR-DRE-M23-4 should have excluded these components from the scope of license renewal.

e) Those portions of Unit 1 fire protection piping shown on boundary diagram LR-DRE-M-23-5 that perform functions necessary to demonstrate compliance with 10 CFR 50.48 are fire hose stations F11 (drawing coordinate F-3) and F37 (drawing coordinate B-10), the Unit 1 Emergency Diesel Driven Fire Pump (drawing coordinate D-2) and Sprinkler System (drawing coordinate F-5), and the piping connected to the Unit 2/3 fire protection piping up to and including the isolation values that connect to the Unit 1 piping. Fire hose stations F11 and F37 are in scope because they are included as part of the Dresden Unit 2 and 3 fire protection plan. The Emergency Diesel Driven Fire Pump and Sprinkler System are in scope to facilitate protection of the Unit 1 Emergency Diesel Driven Fire Pump.

All remaining piping, valves, fire hose stations, service water drops, and sprinkler systems pertaining to Unit 1 are not included in the Dresden Unit 2 and 3 fire protection plan and do not perform functions necessary to demonstrate compliance with 10 CFR 50.48. Those fire protection components falling within the scope of license renewal can be isolated from those sections outside the scope of license renewal by manually closing isolation valves that are within the scope of license renewal. Degradation of any pressure retaining components located in the out-of-scope portions of the fire protection system would be identified through a drop in fire header pressure and isolated.

A review of boundary diagram LR-DRE-M-23-5 identified a boundary interface at drawing coordinate A-9 that does not at end at an isolation valve. A field walk down determined that this pipe has been cut and capped. Valve 1-4199-502-DV at drawing coordinate F-6 should have been highlighted, is within the scope of license renewal and was evaluated for aging management.

f) The fire sprinkler systems shown in the ISCO Makeup Pump Building Rooms A&B on boundary diagram LR-DRE-M-4204 are in the scope of license renewal and subject to an aging management review. This sprinkler system was highlighted in error. Boundary diagram LR-DRE-M-4204 should have included these components within the scope of license renewal. This sprinkler system was evaluated for aging along with the other sprinkler systems shown on the boundary diagram.

g) The fire hydrants on boundary diagram LR-QDC-M-27-1 at drawing coordinates D-1, D-2 and E-4 are within the scope of license renewal and require aging management. These fire hydrants should have been highlighted.

The fire hydrants at drawing coordinates F-7, G-6 and G-7 are located down stream of isolation valve 1/2-4199-278 (drawing location F-6), are not included as part of the plant fire protection plan, and do not perform functions that demonstrate compliance with 10 CFR 50.48. For these reasons, they were not included within the scope of license

renewal.

The fire hydrants at drawing coordinates G-2 and G-3 are incorrectly shown as being located upstream of isolation valve 1/2-4199-288. A field walk down verified that these hydrants are located down stream of isolation valve 1/2-4199-288 (drawing coordinate G-4). These hydrants are not included as part of the plant fire protection plan and do not perform functions that demonstrate compliance with 10 CFR 50.48.

The Exelon License Renewal Project Team could not find any fire hydrants at drawing coordinate G-1.

h) The following clarifications are provided:

HC – Fire Hose Cabinet
FH – Fire Hydrant
Box with an F in it - Hose Reel

i) The following table identifies long-lived, passive components of the fire pump diesels and the diesel fire pump subsystem along with their Component Groups listed in LRA Table 2.3.3-5.

Long-Lived, Passive Components for the Fire Pump Diesels and Diesel Fire Pump Subsystem Included in LRA Table 2.3.3-5

Equipment Description	LRA Table 2.3.3-5 Component Group
DIESEL FIRE PUMP SUCTION SCREENS	Filters/Strainers
STRAINER DIESEL FIRE PUMP DELUGE SYSTEM	Filters/Strainers
FIRE PUMP DIESEL COOLING WATER STRAINER	Filters/Strainers
DIESEL FIRE PUMP ROOM SUPPLY AIR DAMPER	Fire Dampers
FIRE PUMP DIESEL SILENCER	Mufflers
DIESEL FIRE PUMP HEADERS	Piping and Fittings
SPRINKLER SYSTEM FIRE PUMP DIESEL DAY TANK	Piping and Fittings
FIRE DIESEL SPRINKLER	Piping and Fittings
DIESEL FIRE PUMP	Pumps
SPRINKLER SYSTEM FIRE PUMP DIESEL DAY TANK	Sprinklers
FIRE PUMP DIESEL OIL DAY TANK	Tanks
DIESEL FIRE PMP DELUGE SYSTEM VALVES	Valves
DIESEL FIRE PMP CROSS-TIE VALVES	Valves
FIRE PUMP DIESEL COOLING WATER VALVES	Valves
DIESEL FIRE PMP DISCHARGE VALVES	Valves
FIRE PUMP DIESEL ENGINE LUBRICATION OIL VALVES	Valves
DIESEL FIRE PMP SUPPLY VALVES	Valves
FIRE PUMP DIESEL DAY TANK VALVES	Valves
FIRE PUMP DIESEL INSTRUMENTATION VALVES	Valves

j) A Piping and Instrumentation Drawing (P&ID) for the Halon system at Dresden station does not exist. As such, a boundary diagram was not created for that portion of the fire protection system. There are three Halon subsystems at Dresden station that are completely independent of one another. These subsystems protect the record retention vault, the process computer room and the Auxiliary Electric Equipment Room /Primary Computer Room. The Halon subsystems for the record retention vault and the process computer room are not included in the scope of license renewal because they are not included in the plant fire protection plan and do not perform functions that demonstrate compliance with 10 CFR 50.48. However, the entire subsystem supporting the Auxiliary Electric Equipment Room / Primary Computer Room is in-scope. Table 2.3.3-5 of the LRA evaluates these components in Component Groups: Piping & Fittings (includes flex hoses, hose reels, hoses, nozzles, tubing, sprinklers, and gaskets of buried components), Aging Management Reference 3.3.1.5 and 3.3.2.138; and Valves (includes nozzles), Aging Management Reference 3.3.2.23 and 3.3.2.260.

Note that the Halon bottles/cylinders are considered Consumable Fire Protection Equipment as discussed in item (12) below. They are replaced based on condition and are not considered long-lived components.

At Quad Cities, Halon is only used in areas that do not house any safe shutdown equipment (training building, records storage building and new computer room). Therefore, the Halon system at Quad Cities is not in the scope of license renewal. These Halon subsystems are not included in the scope of license renewal because they are not included in the plant fire protection plan and do not perform functions that demonstrate compliance with 10 CFR 50.48.

k) The water shields referenced in Amendment 2 to the Quad Cities Nuclear Power Station response to BTP APCSB 9.5-1 were never installed. This configuration was clarified in the Quad Cities Fire Protection Report, Volume 1, Section 4.3-3889, Revision 13, dated August 2001. Because these shields were never installed, they are not included within the scope of license renewal.

l) Portable fire protection equipment is included within the scope of license renewal but was not discussed in the LRA. Section 2.1.5.4 of the license renewal application should have been written as follows to be consistent with the NRC Letter from Christopher I. Grimes to Douglas J. Walters of NEI, dated March 10, 2000, regarding License Renewal Issue No. 98-12, "Consumables":

2.1.5.4 Consumable Fire Protection Equipment

Fire extinguishers, self-contained breathing air packs, fire hoses, and portable ductwork (smoke ejectors) are within the scope of license renewal, but are not subject to aging management because they are replaced on condition. These components are periodically inspected in accordance with National Fire Protection Association (NFPA) standards. These standards require replacement of equipment based on their condition or performance during testing and inspection. These components are not long-lived and therefore, aging management is not required.

RAI 2.3.3.7-1

Ductwork in the main control room HVAC systems is identified on ventilation system flow diagrams referenced in the LRA as within the scope of license renewal. The ductwork performs pressure boundary function. However, it is not included in the AMR results Table 2.3.3-7 of the LRA. Clarify whether the subject ductwork is subject to an AMR. If so, provide appropriate AMR results. If the ductwork is not subject to an AMR, provide justification for its exclusion.

Response:

The ductwork in the main control room HVAC systems is included within the scope of license renewal and is subject to an aging management review. The ductwork is included in LRA Table 2.3.3-7 and is evaluated under the Component Group, "Doors, Closure Bolts, Equip Frames (including dampers, duct, housings and silencers)". Aging Management Reference 3.3.1.5 describes the aging management associated with all of the components included within this Component Group.

RAI 2.3.3.7-2

The Dresden and Quad Cities ventilation systems that support use of the safe shutdown controls have not been included as part of the scoping and screening process. State whether the ventilation systems used to support the safe shutdown controls are within the scope license renewal and subject to an AMR in accordance with 10CFR54.4(a)(1) and (a)(2). If so, provide the relevant information about the components to enable the staff to complete its review of the AMR result tables in the LRA. If the ventilation systems used to support the safe shutdown controls are not in the scope of license renewal and subject to an AMR, provide justification for their exclusion.

Response:

Safe shutdown of the Dresden and Quad Cities plants from outside the Control Room is discussed in Dresden UFSAR Section 7.4.2 and Quad Cities Section 7.4.2. Neither Dresden nor Quad Cities has a dedicated safe shutdown control panel. Consequently, there is no ventilation system that specifically supports safe shutdown controls. Each station has procedures for control room evacuation that provide operator actions to be taken at various instrument and control panels located throughout the plants. The ventilation systems that serve the areas where safe shutdown equipment is located were included in the scoping and screening evaluation process. However, the Dresden and Quad Cities current licensing bases do not require that a radiological accident be postulated concurrent with a control room fire and they do not credit ventilation systems with maintaining habitability for local operation of safe shutdown equipment during an event that requires the control room to be evacuated.

RAI 2.3.3.9-1

The ECCS Corner Room HVAC systems system Table 2.3.3-9 that identifies component groups requiring AMR has not included the following in the scope of license renewal: flexible collars, damper or door gaskets, seals or other soft parts. These types of components were included in

the other HVAC systems. State whether these identified components are subject to an AMR and provide the relevant information within Table 2.3.3-9 to enable the staff to complete the license renewal review process. If these components are not subject to an AMR, provide justification for their exclusion.

Response:

The ECCS Corner Room HVAC system consists of room coolers that contain a cooling coil, a fan and a housing. There is no ductwork attached to the cooler. There are no flexible collars, damper or door gaskets, seals or other soft parts associated with the ECCS Corner Room HVAC system.

RAI 2.3.3.10-1

The Standby Blackout Building (SBO) ventilation fan housings are highlighted on the ventilation flow diagrams identified in the LRA as within scope of license renewal. While ventilation fan housings are highlighted as within the scope of license renewal, ventilation fan housings are not identified in application Table 2.3.3-10 that identify component groups requiring AMR. State whether SBO ventilation fan housings are within the scope of license renewal and subject to an AMR. If so, provide an AMR result. If the SBO ventilation fan housings are not in scope, provide justification for their exclusion.

Response:

The Station Blackout Building (SBO) ventilation fan housings highlighted on boundary diagrams LR-DRE-M-4356-1, 2, 3, 4, 5, and LR-QDC-M-3033-1, 2 for the SBO Building HVAC System are within the scope of license renewal and subject to an AMR. These ventilation fan housings were evaluated under the Component Group of "Doors, Closure Bolts, Equip Frames" in LRA Table 2.3.3-10 with an Aging Management Reference of 3.3.1.5.

RAI 2.3.3.10-2

The Dresden and Quad Cities ventilation systems used to support fuel handling has not been included as part of the scoping and screening process. State whether the ventilation systems used to support fuel handling are within the scope license renewal and subject to an AMR in accordance with 10CFR54.4(a)(1) and (a)(2). If so, provide an AMR result. If the ventilation systems used to support fuel handling are not in the scope of license renewal and subject to an AMR, provide justification for their exclusion.

Response:

Dresden UFSAR Section 15.7.3.4.3.2, Airborne Effects Over the Drywell Head Cavity, addresses airborne effects associated with design basis fuel handling accidents and states:

> "...If the noble gases are released within a couple of feet of the peripheral exhaust ducts, this activity would be removed within a short period of time to the reactor building exhaust plenum header. The radiation level in the exhaust duct would be sufficient to isolate

secondary containment..."

The Dresden UFSAR statement credits the radiation monitors in the Reactor Building Ventilation system for isolating the system and preventing further release of noble gas to the environment. This requires the Reactor Building Ventilation system to transport the noble gases released from a fuel handling accident to the radiation monitors to isolate the system. The above statement was the basis for inclusion of the entire Reactor Building Ventilation System for Dresden in the scope of license renewal.

The Quad Cities UFSAR contains a similar fuel handling accident scenario. However, the Quad Cities analysis does not credit the Reactor Building Ventilation Radiation Monitors for isolating the ventilation system. Rather, the analysis credits the radiation monitors on the refueling floor for initiating the signal that isolates the Reactor Building ventilation. UFSAR Section 15.7.2.5.3, Chimney Release Rate, addresses chimney release rates associated with design basis fuel handling accidents and states:

> "The standby gas treatment system is actuated automatically on high area radiation in the reactor building in order to control the release of fission products to the atmosphere. Monitors are located near the fuel pool, and the SBGTS would be initiated prior to the escape of fission products through the regular ventilation system..."

The refuel floor radiation monitors are relied upon for actuation of the SBGTS (and secondary containment isolation) for the Quad Cities fuel handling accident. Despite the fact that radiation monitors are contained in the Quad Cities Reactor Building Ventilation System ductwork, no mention is made of these monitors in the UFSAR for this DBA. Consequently, a determination was made not to include system components other than the isolation dampers (and selected fire dampers) in the scope of license renewal.

However, upon further consideration of the ventilation ducting, exhaust dampers and fan configuration relative to the ventilation exhaust radiation monitors do provide a basis for adding parts of the Quad Cities ventilation ducting within the scope of license renewal. The function of the radiation monitors in the exhaust duct is to ensure that excessive radiation is not released. This is done by isolating the secondary containment when the radiation level in the building effluent is above the monitors' setpoint. Appropriate monitoring of all reactor building effluent is ensured by 1) maintaining the building at a slightly negative pressure relative to atmosphere, 2) monitoring the building ventilation effluent upstream of the exhaust dampers, and 3) tripping the fans and closing the intake and exhaust dampers if the permissible effluent radiation level is exceeded or if the negative pressure on the building is not maintained. The ducting between the reactor building-to-turbine building interface and the reactor building ventilation exhaust dampers must remain intact in order to ensure that all reactor building effluent is properly monitored and that there is no potential exhaust path that bypasses the radiation monitors. As such, this additional Quad Cities ventilation ductwork is included within the scope of license renewal and will receive the same aging management as the other ductwork included within the scope.

RAI 2.3.3.13-1

Flexible hoses are included within the P&ID boundary for the fuel oil system. However, they are not listed in Table 2.3.3-13. Explain why the flexible hoses are not within the scope of license renewal.

Response:

Flexible hoses within the subject fuel oil system are within the scope of license renewal. However, the flexible hoses are periodically replaced and, therefore, considered short-lived components for the purposes of license renewal. As such, they are not subject to aging management review and are not included in the LRA table.

RAI 2.3.3.14-1

Line 1-1655-2"-L is shown on Process Sampling (PS) diagram LR-QDC-M-461-1(E-5) requiring AMR and extends to drawing M-34-1 (C-6). LR interface for AMR between PS and other systems for this line is not shown on drawing M-34-1. Similarly line 2-1655-2"-L is shown on Process Sampling diagram LR-QDC-M-463-1 (C-3) and extends to drawing M-76-1 (C-5). LR interface for AMR between PS and other systems for this line is not shown on drawing M-76-1. Please identify the boundary for these lines between PS and other systems and where the LRA addresses the AMR of these components or provide a justification for excluding these component from an AMR.

Response:

Piping and piping components shown on boundary diagram LR-QDC-M-461-1 highlighted in green fall within the scope of license renewal and require aging management. Piping shown on boundary diagram LR-QDC-M-461-1 at coordinate E-5 (includes valves 1-8803 and 1-8804) was evaluated with the PC system. Boundary diagram LR-QDC-461-1 should have included the LR boundary flag for the PC system at valve 1-8803. Remaining portions of pipe highlighted in green on boundary diagram LR-QDC-M-461-1 were evaluated with either the process sampling or primary containment systems as shown by the LR interface boundary flag on the boundary diagram.

Piping and piping components shown on boundary diagram LR-QDC-M-463-1 highlighted in green fall within the scope of license renewal and require aging management. Piping on boundary diagram LR-QDC-M-463-1 at coordinate C-2 (includes valves 2-8803 and 2-8804) was evaluated with the PC system. Boundary diagram LR-QDC-463-1 should have included the LR boundary flag for the PC system at valve 2-8803. Remaining portions of pipe highlighted in green on boundary diagram LR-QDC-M-463-1 were evaluated with either the process sampling or primary containment systems as shown by the LR interface boundary flag on the drawing.

LRA Table 2.3.2-3 includes those components evaluated within the PC system boundary and provides the appropriate aging management reference for each component group. LRA Table 2.3.3-14 includes those components evaluated within the process sampling system boundary and provides the appropriate aging management reference for each component group. Boundary diagrams LR-QDC-M-461-1 and LR-QDC-463-1 should have included the appropriate system boundary flags.

RAI 2.3.3.14-2

Line 2-9224 on drawing LR-DRE-M-178 (E-6) and line 3-9224 on drawing LR-DRE-M-421 (C-6) requiring AMR shows coming from main steam tunnel but no drawing number and co-ordinates of main steam tunnel are given for these lines. Similarly line 2-9203 on drawing LRE-DRE-M-178 (F-6) and line 3-9203 on drawing LRE-DRE-M-421 (C-9) requiring AMR shows coming from drawings M-25 and M-356 but no-coordinates of M-25 and M-356 are given for these lines. Please identify the above drawing numbers and coordinates for lines 2-9224, 3-9224, 2-9203 and 3-9204. Also identify the boundary break between PS and other systems for these lines and associated valves and where the LRA addresses the AMR of these components or provide a justification for excluding these component from an AMR.

Response:

As shown on boundary diagrams LR-DRE-M-178 and LR-DRE-M-421, the PS system piping and tubing highlighted in green is safety related and provides a pressure retaining function. This piping and tubing is evaluated with the PS system and is in the scope of license renewal requiring AMR. The piping is skid mounted (rigid) and was provided by the vendor. Piping and piping components beyond the safety related PS system boundary (colored in black) are evaluated with the PS system and are outside the scope of license renewal.

On boundary diagram LR-DRE-M-178 (E-6 and F-6), line 2-9224-1/2"-T is air sample tubing and line 2-9203-1/2"-AK is air sample piping that are not connected to the process piping and do not continue from any other boundary diagram. The arrow shown on boundary diagram LR-DRE-M-178 (that includes valves 2-8507-523, 2-8599-652, 2-8507-501 & 2-8599-630) indicates that the piping comes from the main steam tunnel and drywell. The piping is open to the atmosphere to draw air samples from the area.

LRA Section 2.3.3.14, Table 2.3.3-14, includes components evaluated within the PS system boundary and provides the appropriate aging management reference for each component group. The components within the scope of license renewal are evaluated for aging management review (AMR) as follows:

(a) AMR for the valves is addressed in Aging Management References 3.3.2.23, 3.3.2.40, 3.3.2.264 and 3.3.2.295
(b) AMR for tubing is addressed in Aging Management References 3.3.2.42, 3.3.2.254, 3.3.2.34 and 3.3.2.244.

RAI 2.3.3.15-1

The license renewal boundary drawings referenced in LRA Section 2.3.3.15 are intended to identify the CO_2 fire suppression SCs that are within the scope of license renewal and subject to AMR. The review of these drawings and LRA Section 2.3.3.15 has resulted in the following RAIs:

(a) The license renewal boundary drawing LR–DRE–M–42 does not include the CO_2 fire suppression system discharge nozzles installed in the Diesel Generators and Alternator-Exciters. The staff believes CO_2 discharge nozzles are passive and long-lived and perform a pressure boundary intended function consistent with rest of the CO_2 fire suppression system in scope. Provide basis for excluding the CO_2 fire suppression system nozzles from the scope of license renewal and subject to an AMR.

(b) Table 2.3.3-15 of LRA Section 2.3.3.15 references line item 3.3.1.5 of LRA Table 3.3.1, which addresses components in ventilation systems, diesel fuel oil systems, and emergency diesel generator systems. The components evaluated do not include the CO_2 storage tank, valves or other components. Clarify which components of the CO_2 fire suppression system are addressed by this reference, and confirm the CO_2 storage tank, valves and other components are within the scope of the license renewal and subject to an AMR.

(c) Drawing LR-QDC-M-30-3 does not show the 7.5 ton CO_2 tank as within the scope of license renewal. This is inconsistent with LRA drawing LR–DRE–M–42. The staff believes that the CO_2 storage tank should be in the scope of license renewal and subject to an AMR. Clarify whether the CO_2 storage tank at Quad Cities is in scope and subject to an AMR or provide justification for its exclusion.

Response:

Exelon has reviewed LRA Section 2.3.3.15 and the referenced boundary diagrams. The following clarifications are provided.

(a) The CO_2 discharge nozzles for Dresden Station are included in the scope of license renewal and are subject to the same aging management as the Quad Cities CO_2 discharge nozzles. The CO_2 discharge nozzles are addressed in Table 2.3.3-15 under the Component Group, "Piping and Fittings". Aging Management Reference 3.3.1.5 addresses the aging management of the external surface of the carbon steel CO_2 discharge nozzles. Aging Management Reference 3.3.2.138 addresses the aging management of the internal surface of the CO_2 discharge nozzles. License renewal boundary diagram, LR-DRE-M-42should have highlighted the CO_2 fire suppression system discharge nozzles indicating that they were within the scope of license renewal.

(b) The CO_2 storage tank, valves, and other components fall within the scope of license renewal and are subject to an aging management review. They are included under Component Groups "Piping and Fittings", "Tanks", "Tubing", and "Valves" in Table 2.3.3.15. The external surface of these components is evaluated in Aging Management Reference 3.3.1.5 and the internal surfaces are evaluated in Aging Management References 3.3.2.138, 3.3.2.212, 3.3.2.234, 3.3.2.260, and 3.3.2.268.

(c) Exelon concurs that the 7.5 ton CO_2 tank falls within the scope of license renewal. License renewal boundary diagram LR-QDC-M-30-3 should have highlighted the 7.5 ton CO_2 tank within the scope of license renewal. These tanks are addressed in Table 2.3.3-15 under the Component Group, "tanks". Aging Management Reference 3.3.1.5 addresses the aging management of the external surface of the carbon steel CO_2 tanks and Aging Management Reference 3.3.2.212 addresses the aging management of the internal surface.

RAI 2.3.3.16-1

The staff observed that there are no references to buried piping in Table 2.3.3-16 of the License Renewal Application. Please provide the basis for not identifying any buried SW piping in Table 2.3.3-16.

Response:

Exelon has reviewed LRA Section 2.3.3.16, Table 2.3.3-16, and agrees with NRC staff that there is no aging management reference in Table 2.3.3-16 for the external surface of buried piping. The buried service water piping is included within scope of license renewal. Section 2.3.3.16, Table 2.3.3-16, should have included the subject buried piping under the component group "Piping and Fittings (Dresden Only)" with "pressure boundary" as the component intended function. Aging Management Reference 3.3.1.16 discusses the aging management of the buried piping external surfaces as a carbon steel component in Open-Cycle Cooling Water System (Service Water). Aging Management Reference 3.3.1.15 discusses the aging management of the piping internal surfaces as a carbon steel component in Open-Cycle Cooling Water System (Service Water). Aging Management Reference 3.3.1.16 was inadvertently omitted in the LRA Section 2.3.3.16, Table 2.3.3-16. Aging Management Reference 3.3.1.16 should have been included in Table 2.3.3-16 as an Aging Management Reference for buried service water piping.

RAI-2.3.3.18-1

The staff observed that on the TBCCW system piping flow diagram LR-DRE-M-21 the control rod drive system drain valve 2-3868-B-500 (for pump 2-382-3B) and the associated piping from the header to the drain valve is not shown as in-scope. The corresponding piping and drain valve (2-3868-A-500) for the pump 2-382-3A are shown as within scope on LR-DRE-M-21. Also, not shown as in-scope is a portion of the piping from valve 2-3837-A-500 to the drain valve 2-3867-A-500 (near pump 2-382-3A). Failure of these lines could prevent the system from performing its intended function, which is to provide a flow path for control rod drive pump cooling during Appendix R fire. The piping is passive, long-lived and not subject to qualified life or specified time period and it performs an intended safety function of maintaining system integrity. Please provide basis for exclusion of the valve and piping identified above.

Response:

Exelon believes that NRC staff intended to reference pumps 2-302-3A and 2-302-3B rather than 2-382-3A and 2-382-3B.

The control rod drive system drain valve 2-3868-B-500 (for pump 2-302-3B) and the associated piping from the header to the drain valve 2-3868-B-500 (coordinate C-4) on the boundary diagram should have been highlighted in green. Also, the portion of the piping from valve 2-3837-A-500 to the drain valve 2-3867-A-500 (near pump 2-302-3A), including the drain valve (coordinate D-4), should have been highlighted in green. The subject valves and piping are in scope of license renewal. LRA Section 2.3.3.18, Table 2.3.3-18 includes the subject piping and valve under Component Groups "Piping and Fitting" and "Valves". Aging Management Reference 3.3.1.5, discusses the aging management of the piping and the drain valve external surfaces as a carbon steel component. Aging Management References 3.3.1.13, and 3.3.2.267 discuss the aging management of the valve internal surface as a carbon steel component. Aging Management References 3.3.1.13 and 3.3.2.137 discuss the aging management of the piping external surfaces as a carbon steel component.

RAI 2.3.3.19-1

Section 2.3.3.19 of the LRA states that, at Dresden, the demineralized water makeup system distribution header provides emergency makeup water to the spent fuel pools. However, the LRA does not cite this purpose as an intended function of the system for license renewal, and the license renewal boundary diagrams of the demineralized water system and fuel pool cooling system do not show the components necessary for this purpose as being within the scope of license renewal. Please provide the basis for concluding that emergency spent fuel pool makeup is not an intended function of the demineralized water makeup system according to the criteria referenced by 10 CFR 54.4(b).

Response:

The demineralized water makeup system provides emergency makeup water to the spent fuel pools, but this function is not a credited function in the current licensing basis and, therefore, it is not a license renewal intended function. The Dresden fuel pool cooling system is a non-safety related closed-loop system that was included within the scope of license renewal because it can spatially interact with safety-related SSCs [10 CFR 54.4(a)(2)]. The complete loss of fuel pool cooling could result in overheating of fuel rods stored in the fuel pool if makeup systems were not activated and the fuel pool were allowed to boil away. However, this is not a design or licensing basis event and several hours would be available for restoration of makeup systems. Makeup systems available include the condensate transfer system, the demineralized water makeup system, and the fire water systems, any of which could be connected by hoses to provide makeup to the spent fuel pool. For these reasons, emergency spent fuel pool makeup is not an intended function of the demineralized water makeup system

RAI 2.3.3.19-2

License renewal boundary diagrams LR-DRE-M-11-2, LR-QDC-M-12-2, and LR-QDC-M12-3 provide a legend for interpreting most, but not all, of the symbols used on the license renewal boundary diagrams submitted with the LRA. So that the staff may verify that the scoping and screening results in the LRA are in accordance with the criteria of 10 CFR 54.4 and 10 CFR 54.21, please identify the following symbols that the staff could not locate in the legend:

(from license renewal boundary diagram LR-DRE-M-366 (E-3))

(from license renewal boundary diagram LR-QDC-M-58-4 (C-8))

(from license renewal boundary diagram LR-DRE-M-1239-3 (F-6))

Also, what do a small square and an asterisk in a circle next to the square represent (e.g., as shown with Component PI 1-032-80 in License Renewal Boundary Diagram LR-QDC-M-41-2 for Quad Cities Unit 1)?

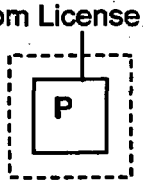
Response:

Exelon believes that NRC requested interpretation of the following symbols:

- From License Renewal boundary drawing LR-DRE-M-366 (E-3):

The symbol denotes a 1" clean demineralized water line with a 1" angle valve.

- From License Renewal boundary drawing LR-QDC-M-58-4 (C-8):



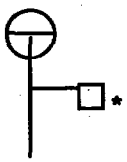
The symbol denotes a 1-½" clean demineralized water line with a hose valve located in a floor valve pit adjacent to the fuel pool.

- From License Renewal boundary drawing LR-DRE-M-1239-3 (F-6):

The symbol denotes a valve per the vendor installation standard.

- From License Renewal boundary drawing LR-QDC-M-41-2 (E-2):

A small square and an asterisk in the circle denote a sample test tap with instrument calibration point.



RAI 2.3.3.19-3

On license renewal boundary diagram LR-QDC-M-58-1 (grid location D-2), an oil drain line for clean demineralized water pump 1/2-4303B is not highlighted as being within the scope of license renewal. Similar oil drain lines for the "A" and "C" clean demineralized water pumps are highlighted as being within scope. For this reason, it is not clear to the staff whether the absence of highlighting on the oil drain line for the "B" pump is an oversight or is justified. Therefore, in light of 10 CFR 54.4(a), please provide the basis for not including this oil drain line (including the piping, valve, and fitting) within the scope of license renewal.

Response:

The oil drain line for clean demineralized water pump ½-4303B is in the scope of license renewal similar to oil drain lines for the "A" and "C" clean demineralized water pumps. Boundary diagram LR-QDC-M-58-1 should have highlighted the components including them within the scope of license renewal. LRA Section 2.3.3.19, Table 2.3.3-19 includes the subject piping and valve components under component group "Piping and Fittings (spatial interaction)" with leakage boundary (spatial) intended function. Aging Management Reference 3.3.2.143, discusses the aging management of the piping and fitting component external surfaces as a carbon steel component. Aging Management Reference 3.3.1.5, discusses the aging management of the piping and fitting internal surface as a carbon steel component.

RAI 2.3.3.19-4

On license renewal boundary diagrams LR-DRE-M-35-1 and LR-DRE-M-366, there are numerous occurrences of piping and other components that are not highlighted as being within the scope of license renewal which are connected to piping lines in the demineralized water makeup system that are highlighted as being within scope. It is not apparent to the staff why the unisolable portions of these connected, unhighlighted piping lines (up to the first isolation valve(s)) are not considered to be within the scope of license renewal, in accordance with 10 CFR 54.4(a), to ensure that the in-scope piping line is capable of performing its intended function for license renewal. Particular occurrences of this method of highlighting include the following:

- At grid location D-7 on diagram LR-DRE-M-35-1, unhighlighted piping line 2-4304-2"-L connects to in-scope piping line 2/3-4304-4"-L;
- At grid locations D-6/7 on diagram LR-DRE-M-35-1, 6 unhighlighted piping lines and components connect to in-scope piping line 2/3-4304-4"-L;
- At grid location D-5 on diagram LR-DRE-M-35-1, unhighlighted piping line 2/3-4355-2"-L connect to in-scope piping line 2-4307-4"-L;
- At grid location C-5 on diagram LR-DRE-M-35-1, unhighlighted piping line 2/3-4311-3"-L connect to in-scope piping line 2-4307-4"-L;
- At grid location C-5 on diagram LR-DRE-M-35-1, the highlighting on piping line 2-4307-4"-L ends abruptly at the connection to piping line 2-4313-4"-L, and does not include the piping and other components prior to the downstream isolation valves;
- At grid location F-5 on diagram LR-DRE-M-366, the highlighting on piping line 3-4304-4"-L ends abruptly at the unisolable connection to piping line 3-4313-4"-L, and does not include the piping and other components prior to the downstream isolation valve;
- At grid location D/E-2 on diagram LR-DRE-M-366, three unhighlighted piping lines connect to in-scope piping line 3-4313-4"-L

Please provide the basis for concluding that the successful performance of the intended functions of the demineralized water makeup system does not require the integrity of these unisolable piping lines and other connected components, and that their failure would not prevent other systems from satisfactorily accomplishing their intended functions for license renewal. (As appropriate, a single response may be provided, or each occurrence may be justified individually.) Additionally, if any components are brought within scope in response to this RAI, please evaluate whether an AMR is required for the additional components in accordance with 10 CFR 54.21(a)(1).

Response:

During the scoping process, credit was taken for operator action to close accessible, normally open manual isolation valves when establishing the in-scope boundary for systems that were in scope of license renewal. In the event of a system failure downstream of an in-scope isolation

valve, closing an accessible valve included within the scope of license renewal would re-establish the system integrity necessary to enable the pressure boundary to perform its credited intended function. This eliminated the need for placing the downstream components within the scope of license renewal.

The following manual isolation valves and associated piping were inadvertently not highlighted as being within the scope of license renewal. These components will be in scope of license renewal and are managed for aging:

2-4303-500	3-4305-500	2-3-4311-500
2-4308-500	3-4399-706	2/3-4399-67
2-4308-501	3-4399-707	2/3-5799-1113
2-4309-500	3-4399-708	2/3-5799-1115
2-4399-730	3-4399-709	
2-4399-732	3-4399-710	Line 2-4386-1"-L with valve
2-4399-792	3-4399-711	(coordinate D-4)

Boundary diagrams LR-DRE-M-35-1, and LR-DRE-M-366 and LR-DRE-M-4457 should have highlighted these valves and associated piping as being within the scope of license renewal. Valves 2/3-5799-1113 and 2/3-5799-1115 are not shown on boundary diagram LR-DRE-M-35-1.

LRA Section 2.3.3.19, Table 2.3.3-19 includes above listed valves under component group "Valve" and piping under "Piping and Fittings" with "pressure boundary" as the component intended function. Aging Management Reference 3.3.1.5 discusses the aging management of valves and piping external surfaces as a carbon steel component. Aging Management Reference 3.3.2.272 discusses the aging management of the valve internal surfaces as a carbon steel component. Aging Management Reference 3.3.2.143 discusses the aging management of piping and fitting internal surfaces as a carbon steel component.

RAI 2.3.3.20-1

At grid location E-7 on license renewal boundary diagram LR-QDC-M-725-3, the return path for the residual heat removal service water from the control room HVAC refrigeration condensing unit (i.e., piping line 1/2-57483-3"-0) is not highlighted as being within the scope of license renewal past locked-open valve 0-5799-388. It is not apparent to the staff why the return path is not considered be within the scope of license renewal from valve 0-5799-388 to the point of ultimate discharge (the discharge line continues onto diagrams LR-QDC-M-725-3 and LR-QDC-M-28-1). Please provide the basis for concluding that the piping and other associated components necessary to discharge the flow of residual heat removal service water returning from the control room HVAC refrigeration condensing unit do not meet the license renewal scoping criteria of 10 CFR 54.4(a). Additionally, if any components are brought within scope in response to this RAI, please evaluate whether an AMR is required for the additional components in accordance with 10 CFR 54.21(a)(1).

Response:

The associated flow path is required for performance of control room HVAC refrigeration condensing unit. The subject line was inadvertently left out of scope on the boundary diagram. The boundary diagram should have included the path (up to and including valves required to

maintain the path) in the scope of LR. A number of existing boundary diagrams should have also reflected the components in the flow path in the scope of license renewal. They are:

LR-QDC-M-22-1, Service Water Piping
LR-QDC-M-22-3, Service Water Piping – Diesel Generator Cooling Water
LR-QDC-M-22-5, Service Water Piping
LR-QDC-M-725-3, Control Room HVAC

The components and piping sections discussed above are in the scope of license renewal. These components are represented in Table 2.3.3.20 under Component Groups "Piping and Fittings," "Valves," and "Orifice Bodies". Aging Management References 3.3.1.15, 3.3.1.27, 3.3.2.280, and 3.3.2.279 discuss aging management applicable to the internal surfaces of the added piping and components. Aging Management References 3.3.2.23, 3.3.2.300, 3.3.2.40, and 3.3.2.26 discuss aging management applicable to the external surfaces of the added piping and components.

RAI 2.3.3.20-2

On license renewal boundary diagram LR-QDC-M-79 (grid location A-3), a temperature element connected to the outlet line 2-1043A-14"-L from the residual heat removal heat exchanger is not highlighted as being within the scope of license renewal. The absence of highlighting on this temperature element contrasts with the treatment of similar temperature elements connected to in-scope piping on this diagram (e.g., at grid locations A-2, A-8, and A-9) and at these grid locations on diagram LR-QDC-M-37. For this reason, it is not clear to the staff whether the absence of highlighting on the temperature element at grid location A-3 is an oversight or is justified. Therefore, in light of 10 CFR 54.4(a), please provide the basis for not including this temperature element within the scope of license renewal.

Response:

The subject instrument was inadvertently not highlighted on the boundary diagram. Boundary diagram LR-QDC-M-79 should have highlighted the temperature element and associated tap (thermowell) in the scope of the Rule. The temperature element is not part of the pressure boundary. Temperature elements are active components and do not require aging management.

Component group "Piping and Fittings" of LRA Section 2.3.3.20, Table 2.3.3-20 is applicable to the added tap. Aging Management Reference 3.3.1.15 discusses aging management applicable to the internal surfaces of the tap. Aging Management Reference 3.3.1.5 discusses aging management applicable to the external surfaces of the tap.

RAI 2.3.3.20-3

The treatment of the four corrosion coupon holders on license renewal boundary diagrams LR-QDC-M-37 and LR-QDC-M-79 is inconsistent. The piping and valves connecting the coupon holders to the outlet line from the residual heat removal heat exchanger are shown as being within the scope of license renewal for each of these coupon holders except for the one located at C-8 on diagram LR-QDC-M-37. Also, the corrosion coupon holder at B-3 of this diagram is

the only one of the four that shows the holder itself as being within scope. It is not clear to the staff whether these inconsistencies in highlighting constitute an oversight or are justified. Therefore, in light of 10 CFR 54.4(a), please explain the scoping discrepancies identified by the staff regarding the corrosion coupon holders.

Response:

The coupon holder (1-1005B) and associated isolation valve (1-1099-36B) located at C-8 on boundary diagram LR-QDC-M-37 are in scope for LR but were inadvertently not highlighted. Boundary diagram LR-QDC-M-37 should have highlighted the coupon holder and its associated isolation valve (and tap line) in the scope of license renewal. The coupon holder (1-1005A) located at B-3 of LR-QDC-37 is appropriately identified on the boundary diagram as in scope of license renewal.

Coupon holders (2-1005A and 2-1005B) located at C-3 and C-8 of boundary diagram LR-QDC-M-79 are in scope for LR but were inadvertently not highlighted. Boundary diagram LR-QDC-M-79 should have highlighted these coupon holders in scope of license renewal.

LRA Section 2.3.3.20, Table 2.3.3-20 includes the above listed components under component groups "Piping and Fittings," and "Valves." Aging Management Reference 3.3.1.15 addresses aging management of the internal component surfaces. Aging Management Reference 3.3.2.26 discusses the aging management of the external component surfaces.

RAI 2.3.3.20-4

On license renewal boundary diagram LR-QDC-M-37 (grid location D-9), a segment of piping (1-10111C-1"-D) connected to in-scope piping line 1-1003C-12"-D is not highlighted as being within the scope of license renewal. The absence of highlighting on this segment of piping contrasts with the treatment of similar piping segments on this diagram (e.g., at grid locations D-2, F-2, and F-9). For this reason, it is not clear to the staff whether the absence of highlighting on the piping segment located at grid location D-9 is an oversight or is justified. Therefore, in light of 10 CFR 54.4(a), please provide the basis for not including this piping segment within the scope of license renewal.

Response:

Boundary diagram LR-QDC-M-37 should have included the line (and pipe cap) in the scope of license renewal. LRA Section 2.3.3.20, Table 2.3.3-20 includes the above listed line under component group "Piping and Fittings." Aging Management Reference 3.3.1.15 discusses the aging management of the line's internal surfaces. Aging Management Reference 3.3.2.26 discusses the aging management of the line's external surfaces as a carbon steel component.

RAI 2.3.3.20-5

The LRA includes flow elements as an individual entry in the AMR results tables for many of the systems in which they are depicted as being within the scope of license renewal on the associated license renewal boundary diagrams (e.g., demineralized water makeup system and containment cooling service water system). However, for the residual heat removal service

water system, the AMR results in LRA Table 2.3.3-20 do not include an entry for flow elements, despite the fact that flow elements are depicted as being within scope on license renewal boundary diagrams LR-QDC-M-79 (grid locations C-1 and B-10) and LR-QDC-M-37 (grid locations B-1 and B-10). Therefore, in light of the screening criteria set forth in 10 CFR 54.21(a)(1), please provide the basis for not including flow elements as an entry in LRA Table 2.3.3-20

Response:

LRA Tables 2.3.3-20, 2.3.3-19 and 2.3.3-21 identify the component groups requiring AMR for the residual heat removal service water, demineralized water makeup, and containment cooling service water systems respectively. The component groups identified in these tables were derived from component types identified in each site's component maintenance database (Passport). The designation of these database component types was not uniformly provided at the two sites. Consequently, the database included component type designations corresponding to "flow elements," "restricting orifices," and "orifice bodies," interchangeably to represent orifice bodies. Similarly, the component groups "flow elements," "restricting orifices," and "orifice bodies," as identified in the cited Chapter 2 tables describe orifice bodies serving pressure/leakage boundary or throttle functions.

The subject flow elements 2-1041-A, 2-1041-B, 1-1041-A, and 1-1041-B are depicted at the cited locations on boundary diagrams LR-QDC-M-79 and LR-QDC-M-37. LRA Table 2.3.3-20 includes entries for orifice bodies with component intended functions of "Pressure Boundary" and "Throttle" to address these flow elements.

RAI 2.3.3.21-1

License renewal boundary diagrams LR-DRE-M-29-2 (Unit 2) and LR-DRE-M-360-2 (Unit 3) show that a high degree of similarity exists between the containment cooling service water systems for Units 2 and 3. Accordingly, the license renewal scoping results are also similar. One difference noted by the staff, however, is that in-scope instruments such as pressure indicators and flow transmitters are highlighted in green on diagram LR-DRE-M-29-2 and in red on diagram LR-DRE-M-360-2. Please explain the basis for this discrepancy so that the staff can verify compliance with 10 CFR 54.4(a).

Response:

The subject instruments and associated upstream non-safety related piping are in scope of license renewal because they meet the requirements of 10 CFR 54.4(a)(2) regarding non-safety related components attached to safety related components. Boundary diagrams LR-DRE-M-29-2 and LR-DRE-360-2 should have highlighted these components in red.

RAI 2.3.3.21-2

On license renewal boundary diagram LR-DRE-M-360-2 (grid location A-5), a segment of piping connected to in-scope piping line 3-15112-3"-H is not highlighted as being within the scope of license renewal. It is not apparent to the staff why the unisolable portions of this connected, unhighlighted piping line (at least up to the first isolation valve) is not considered to be within the

scope of license renewal, in accordance with 10 CFR 54.4(a), to ensure that the in-scope piping line is capable of performing its intended function for license renewal. Also, the treatment of this piping segment appears to be inconsistent with similar segments on this diagram. Therefore, in light of 10 CFR 54.4(a), please provide the basis for not including this piping segment and associated components within the scope of license renewal.

Response:

Boundary diagram LR-DRE-360-2 should have highlighted this pipe segment in green to designate that the components are in the scope of license renewal. Aging management for these components is found in Table 2.3.3-21 under Component Group, "Piping and Fittings (Dresden only)(includes manifolds, tubes, and thermowells)". Aging management for the external environment is found in Aging Management Reference 3.3.2.40. Aging management for the internal environment is found in Aging Management Reference 3.3.1.15.

RAI 2.3.3.21-3

License renewal boundary diagram LR-DRE-M-22 (grid location D-7/8) depicts the discharge line for the containment cooling service water that cools the control room HVAC refrigeration condensing unit (i.e., piping line 2/3-39252-3"-0) discharging to the circulating water discharge header. (The upstream portion of this line continues on diagram LR-DRE-M-3121.) Although the piping and associated components along the intended flowpath are highlighted as being within the scope of license renewal, there are a number of unisolable piping lines connected to the in-scope flowpath at grid location D-7/8 that are not highlighted as being within scope, including the following:

- piping line 2/3-3936-3"-0
- piping line 2/3-3921-6"-0
- piping line 2-3915-16"-0

Please provide the basis for concluding that the successful performance of the intended functions of the containment cooling service water system does not require the integrity of these unisolable piping lines and other connected components, and that their failure would not prevent other systems from satisfactorily accomplishing their intended functions for license renewal. (As appropriate, a single response may be provided, or each occurrence may be justified individually.) Additionally, if any components are brought within scope in response to this RAI, please evaluate whether an AMR is required for the additional components in accordance with 10 CFR 54.21(a)(1).

Response:

Boundary diagram LR-DRE-M-22 should have highlighted these lines in green to reflect inclusion of them in the scope of license renewal. The associated flow path is required for performance of control room HVAC refrigeration condensing unit.

Aging management references for these components can be found in LRA Table 2.3.3.21 under Component Groups "Piping and Fittings," "Valves," and "Orifice Bodies". Aging Management References 3.3.1.15, 3.3.1.27, 3.3.2.280, and 3.3.2.279 discuss aging management applicable

to the internal surfaces of the added piping and components. Aging Management References 3.3.2.23, 3.3.2.300, 3.3.2.40, and 3.3.2.26 discuss aging management applicable to the external surfaces of the added piping and components.

RAI 2.3.3.22-1

Section 2.3.3.22 of the LRA states that, for both Dresden and Quad Cities, an ice-melt line and gate are required to ensure that the intended function of the ultimate heat sink can be fulfilled. The AMR results in LRA Table 2.3.3-22 appears to include the ice melt line in the piping and fittings category. However, it is not clear whether the ice melt gates are included in one of the entries in this table. Therefore, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), please state whether the ice melt gates are within the scope of license renewal and subject to an AMR. Additionally, if the ice melt gates are not considered to be within scope and subject to an AMR, please provide a justification.

Response:

The ice melt gates are included on LRA Table 2.3.3-22, under the Component Group, "Valves". Additionally, the "Dresden only" description should have been deleted from LRA Table 2.3.3-22 as shown below.

Table 2.3.3-22 Component Groups Requiring Aging Management Review – Ultimate Heat Sink

Component Group	Component Intended Function	Aging Management Ref
Valves	Pressure Boundary	3.3.2.278, 3.3.2.300

RAI 2.3.3.22-2

Section 2.3.3.22 of the LRA indicates that, for Dresden, stop logs must be used to isolate the center compartment of the crib house to allow the suction of the containment cooling service water pumps to be flooded. Thus, the stop logs would appear to perform a pressure boundary function to ensure that the ultimate heat sink is capable of performing its intended function for license renewal. However, the staff could not locate an entry for stop logs in LRA Table 2.3.3-22. Therefore, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), please state whether the stop logs are within the scope of license renewal and subject to an AMR. Additionally, if the stop logs are not considered to be within scope and subject to an AMR, please provide a justification.

Response:

The stop logs are needed to support the Ultimate Heat Sink and should have been added to Table 2.3.3-22 and Table 3.3-2 as shown below.

Table 2.3.3-22 Component Groups Requiring Aging Management Review – Ultimate Heat Sink

Component Group	Component Intended Function	Aging Management Ref
Stop Logs (Dresden only)	Structural Pressure Barrier	3.3.2.304

Table 3.3-2 Aging management review results for the auxiliary systems that are not addressed in NUREG-1801 (Continued)

Ref No	Component Group	Material	Environment	Aging Effect	Aging Management Program	Discussion
3.3.2.304	Stop Logs	Aluminum	Air, moisture, and humidity <100° C (<212°F)	None	None	NUREG-1801 does not address aluminum stop logs. Aluminum is reactive, but develops an oxide film that protects it from further corrosion. No viable aging effects exist in the indoor environment for aluminum stop logs.

RAI 2.3.3.23-1

The design objectives of the spent fuel pool cooling and cleanup system for Dresden 2/3 are to handle the spent fuel pool cooling load and to maintain pool water clarity. Spent fuel pool cooling pumps take suction from the skimmer surge tanks; circulate the warm pool water to the heat exchanger, filter, and demineralizer; and discharge the cooled water back to the spent fuel pool through two parallel lines (2-1910A-6"-K and 2-1910B-6"-K). In the Dresden 2/3 P&I drawings (LR-DRE-M-31 and LR-DRE-M-362), the following portions were highlighted as within scope:

- A portion of one (2-1910B-6"-K) of the two lines as within the scope of license renewal per 10 CFR 54.4(a)(2). The parallel line (2-1910A-6"-K) was not highlighted as within the scope of license renewal.

- A portion of the drain line (from the globe valve, 3-1901-11, to the 6"x4" reducer), which collects the drains from the reactor well and the reactor well seal rupture drain, as within the scope of license renewal per 10 CFR 54.4(a)(2).

No discussion was provided in LRA to justify why only the above cited portions of the spent fuel pool cooling and cleanup system are included in the scope of license renewal and subject to an AMR. The staff believes that the entire spent fuel pool cooling and cleanup system is within the scope of license renewal per 10 CFR 54.4(a)(2) and the passive and long-lived components of the system should be subject to an AMR. Please provide detailed discussion to clarify and justify why only the above cited portions of the spent fuel pool cooling and cleanup system are included in the scope of license renewal and subject to an AMR.

Response:

A plant walk-down determined that the red-highlighted portion of line 2-1910B-6"-K shown on boundary diagram LR-DRE-M-31 is in scope of license renewal because it is physically located such that leakage or spray from this line could spatially interact with safety related primary containment isolation valve AOV 2-1601-23. Because of this spatial relationship, the highlighted portion of the line was determined to be in scope of license renewal per 10 CFR 54.4(a)(2). The pipe line 2-1910A-6"-K, which is shown as a parallel line on boundary diagram LR-DRE-M31, does not have a similar spatial relationship to any safety related components. Consequently, it was not identified as within the scope of license renewal per 10 CFR 54.4(a)(2).

A plant walk-down determined that the red-highlighted portion of the drain line (from globe valve 3-1901-11 to the 6"X4" reducer) as shown on boundary diagram LR-DRE-M-362 is physically located such that leakage from this line could spatially interact with safety related primary containment isolation valve AOV 3-1601-23. Because of this spatial relationship, the highlighted portion of the line was determined to be in scope of license renewal per 10 CFR 54.4(a)(2).

Exelon does not consider the entire Dresden spent fuel pooling cooling and cleanup system to be within the scope of license renewal per 10 CFR 54.4(a)(2). The fuel pool cooling and cleanup system is a non-safety related closed-loop system that is normally in continuous operation. In normal operation, the fuel pool cooling and cleanup system interfaces directly with the spent fuel pool, which is a Class I structure, and during refueling operations it may be aligned to support filling or draining the reactor cavity and/or the equipment storage pool. The non-safety related reactor building closed cooling water system provides the cooling medium for the fuel pool cooling heat exchangers and the non-safety related demineralized water makeup system is the normal make-up water supply for the fuel storage pool. All penetrations into the pool are located above a fixed height from the bottom such that there is always a safe level of water above the fuel. The two spent fuel pool cooling system return lines to the spent fuel pool each have openings in the pipe about 6 inches below the pool surface to act as antisiphon devices by allowing air into the pipe to break the vacuum if siphoning begins. This precludes uncontrolled draining of the spent fuel pool in the event of a pipe break. Except as discussed in the preceding paragraphs, the fuel pool cooling and cleanup system is not located near safety related equipment that could be affected by failure of fuel pool cooling and cleanup system components.

The complete loss of fuel pool cooling could result in overheating of fuel rods stored in the fuel pool if makeup systems were not activated and the fuel pool were allowed to boil away. However, this is not a design or licensing basis event and several hours would be available for restoration of makeup systems. Makeup systems available include the condensate transfer system, the demineralized water makeup system, and the fire water system, any of which could be connected by hoses to provide makeup to the spent fuel pool. Calculations performed as part of the extended power uprate evaluation determined that with a complete loss of cooling to the spent fuel pool, it would take at least 8 hours for the Dresden fuel pool to reach 212 F. This would provide adequate time to establish alternative sources of make-up water to the pool. Because failure of the fuel pool cooling system does not threaten to cause consequential failure of other safety related systems or components (except as identified in the first two paragraphs) and because postulated failure of the fuel pool cooling system allows ample time to implement alternative make-up to the fuel pool, failure of the fuel pool cooling system is not considered a failure of a non-safety related system whose failure could prevent satisfactory accomplishment of any of the safety related functions identified in 10 CFR 54.4(a)(1). Thus, the Dresden fuel pool cooling system is not, in general, classified as a system within the scope of license renewal under the criterion of 10 CFR 54.4(a)(2).

RAI 2.3.3.23-2

In LRA Table 2.2-1, applicant stated that because of differences in plant equipment lay out, some of the fuel pool cooling system piping at Dresden can potentially fall in a way to cause failure of near-by safety related equipment. A similar equipment layout does not exist at the Quad Cities plant.

The design objectives of the spent fuel pool cooling and cleanup system for Quad Cities plant are to handle the spent fuel pool cooling load and to maintain pool water clarity. The staff believes that the entire spent fuel pool cooling and cleanup system is within the scope of license renewal per 10 CFR 54.4(a)(2) and the passive and long-lived components of the system should be subject to an AMR. Please provide detailed discussion to justify why the spent fuel pool cooling and cleanup system is not within the scope of license renewal per 10 CFR 54.4(a)(2), and the justification for excluding the passive and long-lived components of the system from an AMR.

Response:

Exelon does not consider the Quad Cities spent fuel pooling cooling and cleanup system to be within the scope of license renewal per 10 CFR 54.4(a)(2). The fuel pool cooling and cleanup system is a non-safety related closed-loop system that is normally in continuous operation. In normal operation, the fuel pool cooling and cleanup system interfaces directly with the spent fuel pool, which is a Class I structure, and during refueling operations it may be aligned to support filling or draining the reactor cavity and/or the equipment storage pool. The non-safety related reactor building closed cooling water system provides the cooling medium for the fuel pool cooling heat exchangers and the non-safety related demineralized water makeup system is the normal make-up water supply for the fuel storage pool. All penetrations into the pool are located above a fixed height from the bottom such that there is always a safe level of water above the fuel. Antisiphon devices are installed on the return lines approximately one foot below normal water level to prevent any line rupture outside the fuel pool from draining the pool. A plant walkdown during scoping and screening did not identify any safety related components that could be spatially affected by failure of Quad Cities' fuel pool cooling and cleanup system piping or components.

The complete loss of fuel pool cooling could result in overheating of fuel rods stored in the fuel pool if makeup systems were not activated and the fuel pool were allowed to boil away. However, this is not a design or licensing basis event and several hours would be available for restoration of makeup systems. Makeup systems available include the condensate transfer system, the demineralized water makeup system and the fire water system, any of which could be connected by hoses to provide makeup to the spent fuel pool. Calculations performed as part of the extended power uprate evaluation determined that with a complete loss of cooling to the spent fuel pool, it would take at least 13.5 hours for the Quad Cities fuel pool to reach 212°F. This would provide adequate time to establish alternative sources of make-up water to the pool. Because failure of the fuel pool cooling system does not threaten to cause consequential failure of other safety related systems or components and because postulated failure of the fuel pool cooling system allows ample time to implement alternative make-up to the fuel pool, failure of the fuel pool cooling system is not considered a failure of a non-safety related system whose failure could prevent satisfactory accomplishment of any of the safety related functions identified in 10 CFR 54.4(a)(1). Thus, the Quad Cities fuel pool cooling system is not classified as a system within the scope of license renewal under the criterion of 10 CFR 54.4(a)(2).

RAI 2.3.3.27-1

Nitrogen Auxiliary Tank 2/3-8554 is shown on diagram LR-DRE-M-4215 in the drywell nitrogen inerting system require an AMR because this tank provides a pressure-retaining function for the safety-related components. Valve 2/3-8599-761 (D-7) and associated 1" line which connects to above tank is shown as not requiring an AMR review. Also valve 2/3-8599-807 and 803 and connecting pipe and muffler (E-6) is shown as not requiring an AMR review. Please indicate where the LRA addresses the AMR of these components or provide a justification for excluding these components from an AMR.

Response:

Exelon has reviewed the LR boundary diagram LR-DRE-M-4215 for the drywell nitrogen inerting system and the following clarification is provided.

Valve 2/3-8599-761 (D-7) and its associated 1" line are in scope of license renewal and are managed for aging. Boundary diagram LR-DRE-M-4215 should have highlighted this component within the scope of license renewal. Similarly, valves 2/3-8599-807 and 2/3-8599-803 and the connecting piping should have been highlighted indicating that they are within the scope of license renewal. The muffler and piping beyond the safety relief valve, 2/3-8599-803, are not in scope of license renewal since these components do not support the pressure boundary intended function.

Aging Management References for these components can be found in LRA Table 2.3.3-27 under component group "Valves" and piping under "Piping and Fittings" with "pressure boundary" as the component intended function. Aging Management Reference 3.3.2.25 discusses the aging management of the valve external surface as a Brass or Bronze component. Aging Management Reference 3.3.2.260 discusses the aging management of the valve internal surface as a Brass or Bronze component. Aging Management Reference 3.3.1.5 discusses the aging management of the piping external surface as a carbon steel component. Aging Management Reference 3.3.2.138 discusses the aging management of piping and fitting internal surfaces as a carbon steel component.

RAI 2.3.3.27-2

Nitrogen Purge Vaporizer 1/2-8713 is shown on diagram LR-QDC-M-34-3 (C-2) in the drywell nitrogen inerting system to require an AMR because this tank provides a pressure-retaining function for the safety-related components. Lines ½–57163 and ½ -57522 which connects to the vaporizer tank are shown as not requiring an AMR review. Please indicate where the LRA addresses the AMR of these components or provide a justification for excluding these components from an AMR.

Response:

The LR boundary diagram LR-QDC-M-34-3 should have highlighted the piping as being within the scope of license renewal. LRA Section 2.3.3.24 addresses the aging management of lines 1/2 –57522-3"-O and 1/2-57163-1 ¼"-O. Lines 1/2 –57522-3"-O and 1/2-57163-1 ¼"-O to the

steam vaporizer are within the scope of license renewal and have an intended function of "spatial interaction". LRA Table 2.3.3-24 includes the piping under Component Group "Piping and Fittings (spatial interaction)". Aging Management Reference 3.3.1.5 addresses the aging management of the piping external surface. Aging Management Reference 3.3.2.142 addresses the aging management of the piping internal surface.

RAI 2.3.3.28-1

The staff observed that license renewal boundary drawing LR-QDC-M-70 (B-8), Safe Shutdown Make-up Pump (SSMP) System, shows a 2" pipe that is in-scope (Green) that comes from the service water (SW) system (LR-QDC-M-69-1, F-8) indicating that the water supply for the SSMP room cooler is supplied from SW. LRA Scoping and Screening Results, Section 2.3.3.28, states that the SSMP room coolers are evaluated with the service water system, and LRA Section 2.3.3.16 states that the SW loads include the SSMP room cooler for Quad Cities. However, on SW scoping drawing LR-QDC-M-69-1(F-8) that portion of the SW system is not shown in scope.

Since the SW system shown on LR-QDC-M-69-1, which can supply SW to the SSMP system at the tie-in at F-7, is shown not in-scope, please identify the in-scope source of water for the SSMP room cooler and any resultant changes to Table 2.3.3-16 and affected AMPs.

Response:

Although service water is supplied to the SSMP room cooler during routine operation, the service water system is not credited for compliance with 10CFR50.48. When the room cooler is credited during a fire, the service water supply is isolated by closing valve 1/2-2901-25 and a fire water system source (evaluated in Section 2.3.3.5) is then provided by opening valve 1/2-2901-9 (See LR-QDC-M-70, coordinates B-8 and C-8). These valves are included in Table 2.3.3-28, under component group "Valves (Quad Cities only)." They are included in LRA Table 3.3-1, under Aging Management References 3.3.1.5 and 3.3.1.19.

The SSMP room coolers are evaluated in Section 2.3.3.28, "Safe Shutdown Makeup Pump System (Quad Cities Only)," and are included in Table 2.3.3-28, under Component Groups "Air Handlers Heating/Cooling (Aux & RW HVAC)(Quad Cities only) – Pressure Boundary" and "Air Handlers Heating/Cooling (Aux & RW HVAC)(Quad Cities only) – Heat Transfer." They are included in LRA Table 3.3-2, under Aging Management References 3.3.2.7, 3.3.2.8, 3.3.2.9, and 3.3.2.21.

There are no resultant changes to LRA Table 2.3.3-16.

RAI 2.3.3.28-2

The staff observed that license renewal boundary drawing LR-QDC-M-70 (B-8), Safe Shutdown Make-up Pump (SSMP) System, shows a 2" pipe that is in-scope (Green) that goes to the service water (SW) system (LR-QDC-M-69-1, D-6) indicating that the water return from the SSMP room cooler goes to the SW system and eventually to the circulating water system (LR-QDC-M-28-1, D-5). LRA Scoping and Screening Results, Section 2.3.3.28, states that the SSMP room coolers are evaluated with the service water system. However, on LR-QDC-M-69-1(D-6) the SW system piping from the tie-in from the SSMP system to the tie-in to the circulating water system is shown not in scope.

Since SW, as shown on LR-QDC-M-69-1, from where the pipe from the SSMP ties in at D-6 to where it goes to the circulating water system (LR-QDC-M-28-1, D-5) at G-6 is not shown in-scope please identify the in-scope water discharge path for the SSMP room cooler and any resultant changes to Table 2.3.3-16 and affected AMPs.

Response:

Although service water is supplied to the SSMP room cooler during routine operation, the service water system is not credited for compliance with 10CFR50.48. When the room cooler is credited during a fire, the service water supply is isolated by closing valve 1/2-2901-25, and a fire water system source (evaluated in LRA Section 2.3.3.5) is then provided by opening valve 1/2-2901-9 (See LR-QDC-M-70, B-8 & C-8).

The room cooler cooling water discharge piping is not reconfigured during a fire. The discharge line (line 1/2-2908-2"-L) exits the SSMP room and connects to the service water discharge line from the 0-4709 Instrument Air Compressor (line 0-39115-2"-O), which in turn discharges into the Unit Two 42" standpipe (line 2-4407-42"-L). The standpipe then connects to the discharge flume via the Unit 2 circulating water discharge piping. Only the SSMP room cooler discharge piping and components within the SSMP room, as highlighted on boundary diagram LR-QDC-M-70, are within the scope of license renewal. The SSMP room cooler discharge piping and components are evaluated in LRA Section 2.3.3.28, "Safe Shutdown Makeup Pump System (Quad Cities Only)," and are included in Table 2.3.3-28, under Component Groups "Piping and Fittings (Quad Cities only)(includes spectacle flanges)" and "Valves (Quad Cities only)," with component intended functions of "Pressure Boundary." The loss of the component function of "Pressure Boundary" for cooling water discharge piping and components outside of the SSMP room would not prevent the SSMP system from performing its intended functions.

There are no resultant changes to LRA Table 2.3.3-16.

RAI 2.3.3.28-3

License renewal boundary diagram LR-QDC-M-70 depicts the safe shutdown makeup system. At grid location F-2, piping line 1-2905-4"-B is shown as continuing at grid location D-9 on diagram LR-QDC-M-46-1. Although the staff examined diagram LR-QDC-M-46-1, this line could not be located. In the place where the staff expected to find the safe shutdown makeup pump system discharge line (based upon the staff's examination of LR-QDC-M-87-1), an end-capped line is depicted on LR-QDC-M-46-1. Please clarify where the safe shutdown makeup pump system discharge line connects to high pressure injection system discharge line, so that the staff may verify that the license renewal scoping boundaries for this system comply with 10 CFR 54.4(a).

Response:

When the safe shutdown makeup pump (SSMP) system was initially installed at Quad Cities, the SSMP discharged into the HPCI pump discharge line on both units. The HPCI pump discharge line connects into the "B" reactor feedwater line on both units. A recent modification on Unit 1 moved the SSMP discharge line to connect directly into the "B" reactor feedwater line and capped the stub where it used to connect to the HPCI pump discharge line.

Quad Cities UFSAR Section 5.4.6.5, "Safe Shutdown Makeup Pump System," and LRA Section 2.3.3.28, "Safe Shutdown Makeup Pump system (Quad Cities Only)," accurately describe the different flow paths for the two units, but because of the timing of the modification installation and issuance of the "For Record" drawings not all LR boundary diagrams associated with the SSMP system reflected the change in the Unit 1 flow path prior to issuance of the LRA to the NRC. The continuation flag for line 1-2905-4"-B on LR-QDC-M-70, coordinate F-2, should point to M-15-1 (LR-QDC-M-15-1), coordinate F-1. LR-QDC-M-15-1, coordinate F-1, should show line 1-2905-4"-B continuing from M-70 (LR-QDC-M-70) and connecting to the "B" reactor feedwater line between the discharge side of check valve 1-0220-59B and the HPCI line 1-2304-14"-C connection to the "B" reactor feedwater. LR-QDC-M-46-1 correctly depicts the capped line for the original connection to the HPCI line.

RAI 2.3.3.28-4

The LRA includes flow elements as an individual entry in the AMR results tables for many of the systems in which they are depicted as being within the scope of license renewal on the associated license renewal boundary diagrams (e.g., demineralized water makeup system and containment cooling service water system). However, for the safe shutdown makeup pump system, the AMR results in LRA Table 2.3.3-28 do not include an entry for flow elements, despite the fact that they are depicted as being within scope on license renewal boundary diagram LR-QDC-M-70 (grid location D-5). Therefore, in light of the screening criteria set forth in 10 CFR 54.21(a)(1), please provide the basis for not including flow elements as an entry in LRA Table 2.3.3-28.

Response:

There are four components in the safe shutdown makeup pump system with an assigned plant component type of "flow element." These four components are included in different Component Groups in LRA Table 2.3.3-28. Refer to boundary diagram LR-QDC-M-70.

(a) Flow element FE 1/2-2941-04 (coordinate D-5) is included with the Component Group, "Restricting Orifices (Quad Cities only)", containing a component intended function of "Pressure Boundary."

(b) Restricting orifice RO 1/2-2941-21 (coordinate E-4) is included with the Component Group, "Restricting Orifices (Quad Cities only)", containing a component intended function of "Throttle."

(c) Spectacle flanges SF 1/2-2951 and SF 1/2-2951 (coordinates C-8, D-7) are included with the Component Group, "Piping and Fittings (Quad Cities only)(includes spectacle flanges)", containing a component intended function of "Pressure Boundary."

RAI 2.3.3.28-5

On license renewal boundary diagram LR-QDC-M-70 (grid location F-4), a segment of piping connected to in-scope piping is not highlighted as being within the scope of license renewal. This segment of piping is part of a piping line that is highlighted as being within the scope of license renewal on either side of the unhighlighted segment, and there are no valves or other

pressure boundaries that isolate the unhighlighted segment. It is not apparent to the staff why the unhighlighted segment of piping is not considered to be within scope to ensure that the in-scope portions of the piping line are capable of performing their intended function for license renewal. Therefore, in light of 10 CFR 54.4(a), please provide the basis for not including the unhighlighted piping segment within the scope of license renewal.

Response:

The piping segment in question on LR-QDC-M-70 (F-4) is actually an instrument electrical lead. See LR-QDC-M-12-2 (E-7) for a clarification of boundary diagram symbols. It was correct not to highlight the questioned section. There are more sections of instrument electrical leads on LR-QDC-M-70 that are highlighted, but which should not have been. One example is the connection between the motor operators for MO 2-2901-08 (C-3), MO 1-2901-08 (D-3), and MO ½-2901-07 (E-4). Another example is the connection between the motor operator for MO ½-2901-05 and the safe shutdown makeup pump ½-2901. When creating boundary diagrams for mechanical systems, it was the convention not to highlight instrument electrical leads. Based on this, LR-QDC-M-70 should not have highlighted the instrument electrical leads.

RAI 2.3.4.1-1

USAR section 15.6.5.5, contains a discussion on the radiological dose analysis performed for the control room in accordance with guidance of NUREG-0737 Item III.D.3.4. Credit is taken for iodine plateout on surfaces of steam lines and condenser and radioactive decay prior to release. In assessing radioactive releases via the MSIV leakage pathway, MSIV leakage is assumed to pass through three different volumes which provide holdup and plateout. The volumes are the main steam piping section between the inboard and outboard isolation valves, the piping between the outboard isolation valves and the turbine stop valves, and the piping between the turbine stop valves and the turbine condenser complex. The licensee has identified post accident plateout of MSIV seat leakage as a system intended function of the main steam system. The staff believes that in addition to the plateout function, the main steam system also provide for post accident containment and holdup of MSIV bypass leakage, and that pressure boundary integrity for portions of the main steam system that are required to contain bypass leakage must be maintained during the post accident period. Please clarify whether post accident containment and holdup should be included as an intended function for the main steam system, and if not please provide justification for its exclusion.

Response:

The main steam system intended function, identified in Section 2.3.4.1 of the LRA as "Post accident plateout of MSIV seat leakage" should have read as follows:

> Post accident holdup and plate out of MSIV seat leakage – provides volumes for holdup and surfaces for plate out of elemental and particulate iodine resulting from MSIV bypass leakage.

The Dresden and Quad Cities UFSARs do not explicitly identify "containment" as a system function in conjunction with post accident and plate out of MSIV seat leakage.

RAI 2.3.4.1-2

As stated in RAI 2.3.4.1-1, the staff believes that post accident containment, plateout and holdup of MSIV bypass leakage is a system intended function of the main steam system. Therefore, the SSCs necessary to ensure this intended function, are in scope of license renewal per 10 CFR54.4 (a). Hence, the steam drain lines and turbine bypass piping should be in scope of license renewal and subject to an AMR. License renewal boundary drawings LR-DRE-M-12-2, LR-DRE-M-345-2, LR-QDC-M-13-2, and LR-QDC-M-60-2 indicate that turbine bypass piping from the main steam line equalization header to the condenser, and the main steam piping from the equalization header up to and including the main steam stop valves are not in scope. Please provide a justification for the exclusion of these section of main steam system piping and their associated components.

Response:

Exelon agrees that these sections of piping and their components are within the scope of license renewal. The LR boundary diagram should have included these components within the scope of license renewal as described below.

LR-DRE-M-12-2 should have highlighted the 30" equalizing header, the main steam lines up to and including the main turbine stop valves, the 18" bypass piping from the equalizing header to the bypass valves, the bypass valves, and the 8" bypass piping from the bypass valves to the main condenser all within the scope of license renewal. Lines that branch off from these main pipes are not classified as in scope for LR because they do not provide an MSIV leakage pathway to the main condenser.

LR-DRE-M-345-2 should have highlighted the 30" equalizing header, the main steam lines up to and including the main turbine stop valves, the 18" bypass piping from the equalizing header to the bypass valves, the bypass valves, and the 8" bypass piping from the bypass valves to the main condenser all within the scope of license renewal. Lines that branch off from these main pipes are not classified as in scope for LR because they do not provide an MSIV leakage pathway to the main condenser.

LR-QDC-M-13-2 should have highlighted the 30" equalizing header, the main steam lines up to and including the main turbine stop valves, the 18" bypass piping from the equalizing header to the bypass valves, the bypass valves, and the 8" bypass piping from the bypass valves to the main condenser all within the scope of license renewal. Lines that branch off from these main pipes are not classified as in scope for LR because they do not provide an MSIV leakage pathway to the main condenser.

LR-QDC-M-60-2 should have highlighted the 30" equalizing header, the main steam lines up to and including the main turbine stop valves, the 18" bypass piping from the equalizing header to the bypass valves, the bypass valves, and the 8" bypass piping from the bypass valves to the main condenser all within the scope of license renewal. Lines that branch off from these main pipes are not classified as in scope for LR because they do not provide an MSIV leakage pathway to the main condenser.

These changes will result in additional main steam line piping and fittings, valves and restricting orifices being added to the scope of license renewal with an intended function of "containment, hold up and plateout." These newly identified components are the same types of components as have already been evaluated. The material for these newly identified components is carbon

steel, and their environment is 228°C (550°F) steam. These components will be included in the AMPs currently applicable for the main steam system piping and piping components. These AMPs are identified in LRA Aging Management References 3.4.1.4, 3.4.1.5 and 3.4.2.5.

The following lines should have been included in LRA Table 2.3.4-1:

Component	Component Intended Function	Aging Management Ref
Piping and Fittings	Containment, hold up and plateout	3.4.1.4, 3.4.1.5, 3.4.2.5
Restricting Orifices	Containment, hold up and plateout	3.4.1.4, 3.4.1.5, 3.4.2.5
Valves	Containment, hold up and plateout	3.4.1.4, 3.4.1.5, 3.4.2.5

RAI 2.3.4.1-3

The main steam line drain lines provide a MSIV leakage pathway to the condenser which has an intended function of post accident containment, holdup and plateout of MSIV bypass leakage. Therefore, the main steam drain piping from the main steam line to the condenser is in scope of license renewal per 10 CFR 54.4(a). However, only the Dresden unit 2 boundary drawing shows the entire drain line to the condenser as being in scope of license renewal. Dresden unit 3, and Quad Cities Units 1 & 2, shows only drain line sections on drawings LR-DRE-M-345-2, LR-QDC-M-13-2, and LR-QDC-M-60-2 respectively as being in scope of license renewal. A review of these drawing indicate that the drain lines are continued on Dresden Unit3 drawing M-370, and Quad Cities drawings M-26, and M-73 for Units 1 and 2 respectively. The staff believes that main steam drain line section that goes to the condenser, shown on the above mentioned drawing should be included as in scope of license renewal. Please provide a justification for the exclusion of the main steam drain line piping shown on drawings LR-DRE-M-370, and Quad Cities drawing M-26 and M-73, for which no boundary drawings were provided. Also indicate weather boundary drawing exist for Quad Cities drawings M-26 and M-73 and provide these drawings.

Response:

Exelon agrees that the continuation of the in-scope drain line to its point of interface with the main condenser is within the scope of license renewal. Boundary diagrams LR-DRE-M-345-2, LR-QDC-M-13-2 and LR QDC-M-60-2, should have highlighted this piping as described below.

On LR-DRE-M-345-2 (drawing coordinate D-6), the continuation arrow for pipe 3-3009-2½" to M-370 should have been highlighted to show that the continuation is within the scope of license renewal.

On LR-DRE-M-370 (drawing coordinate E-5), the piping continuation from the continuation arrow up to the point of interface with the main condenser should have been highlighted as within the scope of license renewal.

On LR-QDC-M-13-2 (drawing coordinate D-2), the continuation arrow for pipe 1-3009-3" to M-26

should have been highlighted to show that the continuation is within the scope of license renewal. Pipe 1-3009-3" connects to a 12" drain line (1-3017-12") upstream of the main condenser. This 12" drain line is also included within the scope of license renewal and requires the same aging management as line 1-3009-3".

On LR-QDC-M-60-2 (drawing coordinate D-2), the continuation arrow for pipe 2-3009-3" to M-73 should have been highlighted to show that the continuation is in scope of license renewal. Pipe 2-3009-3" connects to a 12" drain line (2-3017-12") upstream of the main condenser. This 12" drain line is also included within the scope of license renewal and requires the same aging management as line 2-3009-3".

These changes will result in additional main steam line piping being added to the scope of license renewal with an intended function of "containment, hold up and plateout." This newly identified piping is the same type of piping that has already been evaluated. The material for these newly identified piping is carbon steel, and its environment is 228°C (550°F) steam. This additional piping is included in the AMPs currently applicable for main steam system piping. These AMPs are identified in Aging Management References 3.4.1.4, 3.4.1.5 and 3.4.2.5.

The following line should have been included in LRA Table 2.3.4-1:

Component	Component Intended Function	Aging Management Ref
Piping and Fittings	Containment, hold up and plateout.	3.4.1.4, 3.4.1.5, 3.4.2.5

RAI 2.3.4.1-4

Acoustic flow sensoring devices, flow elements FE-261-60A, and FE-261-60D on boundary drawing LR-DRE-M-12-1, for Dresden Unit 2, are not shown to be within scope. However, the corresponding devices for the B and C steam lines, flow elements FE-261-60B, and FE-261-60C are included in scope. Please provide justification for the exclusion of these components.

Response:

LRA boundary diagrams LR-DRE-M-12-1 should have highlighted acoustic flow sensing devices, flow elements 2-261-60A and 2-261-60D. Flow elements 2-261-60A, and 2-261-60D are within the scope of license renewal.

RAI 2.3.4.1-5

The portion of the SRV discharge lines inside the wetwell, and their associated T-quenchers are not identified as in scope in Dresden drawings LR-DRE-M-25, and LR-DRE-M-356. In addition the T-quenchers for Dresden or Quad Cities have not been included in Table 2.3.4-1. The staff believes that the SRV discharge lines and T-quenchers are in scope of license renewal per 10 CFR 54.4(a)(1). Please provide a justification for exclusion of these components.

Response:

The complete SRV discharge lines and the associated T-quenchers shown on LRA boundary diagrams LR-DRE-M-25, and LR-DRE-M-356 should have been highlighted. The SRV discharge lines and T-quenchers are within the scope of license renewal. The SRV discharge lines and T-quenchers were not explicitly called out, but they are included in LRA Table 2.3.4-1 under Component Group, "Piping and Fittings". The applicable Aging Management Reference is 3.4.2.6 for the external environment and 3.2.1.3 for the internal environment.

RAI 2.3.4.2-1

Section 2.3.4-2 of the LRA lists the intended functions for the feedwater system. The feedwater system interfaces with the primary containment and is safety related for the portion of the system from the reactor vessel to the outermost primary containment isolation valve. Containment isolation is not listed as an intended function. Please provide justification for not including containment isolation as an intended function for the feedwater system.

Response:

The portion of the feedwater system from the RPV to the outermost safety related check valve (primary containment isolation valve) has the intended function of containment isolation. The containment isolation intended function should have been included in LRA section 2.3.4.2 for Dresden and Quad Cities stations. This does not affect the aging management of the in-scope components for the feedwater system. The components providing primary containment isolation also have an intended function of pressure boundary. Aging management for these affected components is discussed in LRA Section 2.3.4.2, Table 2.3.4-2.

RAI 2.3.4.2-2

In Dresden Unit 3 drawing LR-DRE-M-347,(E-2) the 3/4" line just inside the outermost check valve shows to be in scope only through valve 3-3299-54, the valve 3-3299-120 and corresponding piping section after the valve is not shown to be in scope. In all other similar piping sections connected to safety related piping the section of piping immediately downstream of the safety related piping is included in scope per 10 CFR 54.4 (a)(2). Please justify the exclusion of this section of piping from the scope for license renewal

Response:

Line 3-32142-3/4"-C on LR boundary diagram LR-DRE-M-347 (E-2) is a feedwater drain line that includes drain valve 3-3299-54 (inboard, safety related) and 3-3299-120 (outboard, non-safety related). Non-safety related outboard drain valve 3-3299-120 and the associated piping beyond the safety boundary are in scope of license renewal for 10 CFR 54.4 (a)(2) criteria. Boundary diagram LR-DRE-M-347 should have highlighted these components to include the outboard drain valve 3-3299-120 and the associated piping beyond the safety boundary within the scope of license renewal.

Aging management for these components is addressed in LRA Table 2.3.4-2 under Component Group "NSR Vents or Drains, Piping and Valves (attached supports)" with the component intended function of "structural integrity (attached)". Aging Management Reference 3.4.2.30

discusses the aging management of the valve and piping internal and external surfaces.

RAI 2.3.4.2-3

According to Table 3.1-1 (Reference No. 3.1.1.13), an AMR is not needed for Feedwater and Control Rod drive (CRD) return line nozzles which have been capped. Please explain why the capped section/nozzle of the CRD return line is not in scope since it provides a pressure boundary function. Table 3.1-1, Reference No. 3.1.1.13, references the aging management program, Appendix B.1.6, for these nozzles. In LRA Appendix B.1.6, the applicant states that the Dresden/Quad Cities programs do not provide for the augmented inspections specified in NUREG-0619 for the control rod drive return line nozzles, because the nozzles have been capped. However, Section 8.2 of NUREG-0619 requires various augmented inspections depending on how the capped line was rerouted. Explain how the line was rerouted, and provide the applicable augmented inspection for these pressure boundary nozzles as required by NUREG-0619.

Response:

Exelon believes the NRC staff intended to state that "Table 3.1-1, Reference No. 3.1.1.13, references the aging management program, Appendix B.1.6, for Control Rod Drive (CRD)return line nozzles" rather than both the Feed Water and CRD return nozzles. Aging Management Reference 3.1.1.13 is consistent with NUREG-1801 with the exception that it only applies to BWR Control Rod Drive Return Line Nozzles (Appendix B.1.6). Feedwater nozzles are discussed in LRA Section B.1.5.

The CRD capped return line was not rerouted. It was cut and capped at the CRD nozzle and the piping inside the primary containment was removed and capped at the primary containment piping penetration. NUREG-1801, XI.M6 "BWR Control Rod Drive Return Line Nozzle" program element 2 states that mitigation can also be accomplished by confirmation of proper return flow capability, two-pump operation, and cutting and capping the CRDRL nozzle without rerouting. Since the CRD return line was not rerouted, NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking" augmented inspection for CRD return line nozzle is not required as stated in LRA Appendix B.1.6.

RAI 2.3.4.3-1

In Quad Cities drawing LR-QDC-M-16-5,(D-5), lines 0-33107A and 0-33108A, and valves 0-3399-227A and 0-3399-228A are identified as not in scope for license renewal. These lines connect level switch LS 0-3341-71A, which is shown as in scope, to line 0-3348, which is also shown to be in scope. Please clarify whether these SSCs should be included in scope for license review.

Response:

Isolation valves 0-3399-227A and 0-3399-228A for LS-0-3341-71A and the connecting piping 0-33107A-1" and 0-33108A-1" are in scope of license renewal. Boundary diagram LR-QDC-M-16-5 should have highlighted these components designating them within the scope of license renewal. Aging management for the valves is addressed in LRA Table 2.3.4-3, under the

Component Group, "Valves," and component intended function of "Pressure Boundary." Aging management for the connecting piping is addressed in LRA Table 2.3.4-3, under the Component Group, "Piping and Fittings," and component intended function of "Pressure Boundary." The Aging Management Reference for the internal surfaces of both the valves and connecting piping is 3.4.1.2. The Aging Management Reference for the external surface of both the valve and connecting piping is 3.4.1.3.

RAI 2.3.4.4-1

In Section 2.3.4.4 of the LRA it is indicated that an expansion joint is fitted between each low-pressure turbine exhaust hood and condenser inlet connection. These expansion joints are not included as a component group requiring AMR in table 2.3.4-4. Please justify the exclusion of the expansion joints from the list of components requiring AMR.

Response:

The condenser does not need a "pressure boundary" function. Hold-up of radioiodines and noble gases that leak past the closed MSIVs is credited in the Dresden and Quad Cities Loss of Coolant Accident (LOCA) and Control Rod Drop Accident (CRDA) analyses (see table below). Hold-up is a function of the main condenser volume and leak rate. The Dresden and Quad Cities analyses assume the main condensers leak to the atmosphere at a rate of 1% per day throughout the accident. This value is a generic licensing basis assumption in SRP 15.4.9, "Radiological Consequences of Control Rod Drop Accident." This assumed leakage is larger than the actual leakage past the closed MSIVs into the main condenser. Therefore the condenser does not have to be leak tight.

Hierarchy of Main Condenser Functions in UFSAR Safety Analyses			
UFSAR Accident	Main Condenser Intended Function		Remarks
	Dresden	Quad Cities	
LOCA – Offsite Dose	Condenser is not credited.	Condenser is not credited.	Dresden's SEP evaluation of MSIV leakage occurs at turbine stop valves.
LOCA – Control Room Dose	Condenser is credited for plateout and hold-up of MSIV leakage activity.	Condenser is credited for plateout and hold-up of MSIV leakage activity.	Leakage rate of 1%/day is assumed from SRP 15.4.9. Plateout is based on removal rate.
CRDA – Offsite Dose	Condenser is credited for plateout of 90% of iodine and hold-up with 1%/day leakage in scenario 1.	Condenser is credited for plateout of 90% of iodine for mechanical vacuum pump (MVP) release path.	Plateout fraction is assumed from SRP 15.4.9.

CRDA – Control Room Dose	Not applicable.	Condenser is credited for plateout of 90% of iodine for MVP release path.	See above remark.

The low pressure turbine exhaust hoods and the expansion joint between them and the condenser shell are not in scope of license renewal because they are not part of the MSIV leakage pathway to the main condenser. The turbine condenser complex is not assumed to be leak tight after an accident. The SRP accepts that the condition of the condenser is unaffected by the accident. The ability of the condenser to operate in the steam power conversion cycle during the license renewal period demonstrates integrity commensurate with the assumed performance in the SRP. During a LOCA or CRDA (Dresden scenario 1) with reactor trip and loss of offsite power, main steam is isolated and the condenser loses vacuum as it slowly approaches atmospheric conditions. There is no leakage from the condenser during this phase of the accident. Changes in barometric pressure could cause the condenser to "breathe" when it finally reaches nominal atmospheric conditions. The assumption of 1% continuous external leakage throughout the accident is ample to account for the net effects of small leaks in the post-accident period.

10 CFR 50.67, "Accident source term," was published in the Federal Register on December 23, 1999. This regulation provides a mechanism for operating license holders who seek to revise the current source term to do so, provided limiting criteria on offsite exposure and control room habitability are not exceeded. Regulatory Guide 1.183, "Alternate Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," was published in July 2000 to provide regulatory guidance for the implementation of alternate source terms (AST).

On October 10, 2002, Exelon submitted a request for amendments to the Dresden and Quad Cities Facility Operating Licenses to support application of an AST methodology. The submittal states that the use of AST changes only the regulatory assumptions regarding the analytical treatment of DBAs. The NRC has not yet approved this submittal. The main condenser would no longer be credited for hold up or plate-out of iodine. The main condenser could have been removed from scope of LR based on this, but was not because NRC approval has not been obtained. However, at this time, the main condenser remains within the scope of license renewal.

RAI 2.3.4.4-2

In Table 2.3.4-4 the condenser shell is not included as a component group requiring AMR. The staff feels that this component is necessary to support the system intended function, and provides the component intended function of containment holdup and plateout, thus should be included in table 2.3.4-4. Please justify the exclusion of the condenser shell from the list of components requiring AMR.

Response:

The condenser shell is included in Table 2.3.4-4, in the Component Group of "Main Condenser Hotwells, False Floors (includes hatches)." LRA Table 3.4-2, Aging Management Reference 3.4.24, addresses carbon steel material with an internal environment of steam. LRA Table 3.4-2, Aging Management Reference 3.4.27, addresses carbon steel material with an external

environment of air, moisture, and humidity < 100°C (212°F).

RAI 2.3.4.6-1

The portion of turbine oil system line 2-2362-2 shown on drawing QDC-M-48-1 (G1) and continued on QDC-M-87-3 (D6) that goes to the unit 2 HPCI oil junction box is not identified as being in scope. The corresponding line to the unit 1 oil junction box is shown as in scope. Please indicate weather this portion of the line should be included in scope and weather drawing QDC-M-87 should be included as a reference to LRA section 2.3.4.6.

Response:

At the time that Exelon was completing the scoping and screening of the turbine oil system, a modification installation was in progress to remove both the Quad Cities Unit 1 and Unit 2 HPCI dirty oil transfer pumps and associated piping. As part of the modification, the 2-inch non-safety related lines that penetrate the HPCI oil junction box were to be cut and capped. At the time that the scoping and screening was being performed, the HPCI turbine oil transfer line 2-2362-2" to the Unit 2 HPCI system was cut and capped prior to entering the HPCI oil junction box. Therefore, the small portion of non-safety related turbine oil piping downstream of the cap was not included in scope of license renewal. The Unit 1 line had not yet been cut and capped, and was therefore included in scope. The present status is that the modification is complete and the lines on both units have been cut and capped.

RAI 3.3.2.4.5-1

The review of LRA Section 3.3 has resulted in the following RAIs:

a) LRA Tables 3.3-1 and 3.3-2 do not identify any aging effects on FP buried piping, fittings and tanks. However, these components are exposed to soil and groundwater environment, and are subject to general, pitting and crevice corrosion, and microbiological influenced corrosion (MIC) that may result in loss of material. Provide justification for not identifying any aging effect/mechanism for these FP SCs.

b) LRA Tables 3.3-1,and 3.3-2 do not identify any aging effects on fire hose stations. However, fire hose stations are exposed to a warm and moist environment, and are subject to pitting and corrosion that may result in loss of material. Provide justification for not identifying any aging effect/mechanism for these FP SCs.

c) LRA Tables 3.3-1 and 3.3-2 do not identify any aging effects on Halon/CO_2 total flooding fire suppression SCs including nozzles, valves, piping, fittings, tubing, hose stations, and tanks. The line items with reference numbers, 3.3.2.138, 3.3.2.212, and 3.3.2.234 of LRA Table 3.3.2 state that the piping and nozzles components of the CO_2 system do not require an aging management program (AMP), citing a dry gas atmosphere. However, these component types are exposed to a warm and moist environment in the turbine building, and are subject to pitting and corrosion that may result in loss of material. Provide justification for not identifying any aging effect/mechanism for these FP SCs.

Response:

Exelon has reviewed the LRA Section 3.3 and the following clarification is provided.

a) Fire Protection buried piping and fittings that are exposed to soil and groundwater environment are addressed in LRA Section 2.3.3.5, Table 2.3.3-5, under Component Group "Piping and Fittings (includes flex hose, hose reels, hoses, nozzles, tubing, sprinklers, and gaskets of buried fire mains)". These components are subject to pitting and crevice corrosion and microbiological influenced corrosion (MIC) that may result in loss of material. The aging management results for this component group are provided in LRA Table 3.3-2 (Aging Management References 3.3.2.33, 3.3.2.131, and 3.3.2.154). There are no tanks in the Fire Protection system that are exposed to soil and groundwater environment (buried tank). These components are evaluated for loss of material (pitting, crevice corrosion, selective leaching and MIC), and changes in material properties (elastomer degradation and loss of resiliency) aging effects/mechanisms.

b) Fire hose stations include fire hoses, hose reels, piping, and valves. NUREG 1801 considers fire hose station as a piping component in the Fire Water System aging management program, B1.19 (NUREG-1801 XI.M27). The fire hose station is addressed in LRA Section 2.3.3.5, Table 2.3.3-5 under the Component Group "Piping and Fittings (includes flex hose, hose reels, hoses, nozzles, tubing, sprinklers, and gaskets of buried fire mains)". The aging management results of the carbon steel components that are exposed to warm and moist air environment are provided in Aging Management Reference 3.3.2.144, Table 3.3-2, under the Component Group "Piping and Fittings". These components are subject to general pitting and crevice corrosion, which may result in loss of material.

c) A dry gas atmosphere is an internal environment of the Halon/CO_2 suppression systems and is associated with aging reference numbers, 3.3.2.138, 3.3.2.212, and 3.3.2.234 on Table 3.3-2. That table provides aging management results for the internal dry gas environment. Aging Management Reference 3.3.1.5 on Table 3.3.1 provides the aging management results of external surfaces for carbon steel components that are subject to pitting and corrosion, which may result in loss of material. The aging management results for the external surfaces of brass and bronze components are provided in Aging Management Reference 3.3.2.23 in Table 3.3.2.

RAI B.1.18-1

The review of LRA Appendix B, Section B.1.18 has resulted in the following RAIs:

(a) The line item with reference number 3.3.2.62 of LRA Table 3.3-2 states that cementitious fire proofing does not require an AMP, because "a non-aggressive," vibration free plant indoor environment is not conducive to promoting aging of cementitious fireproofing. However, industry experience, including previous experience at the Dresden Nuclear Power Station, has shown that deterioration of the steel under the coating may cause the cementitious material to become separated from the steel, and in some cases fall off. Provide justification for not having an AMP that will assure its integrity of the cementitious fire proofing.

(b) LRA Appendix B, Section B.1.18, Fire Protection, states that, "With enhancements the fire protection program is consistent with the ten elements of aging management program XI.M26, "Fire Protection," specified in NUREG-1801 with following exceptions...."

In order for the staff to evaluate the adequacy of the applicant's FP AMP and reach a conclusion that it is consistent with NUREG-1801, the staff requests that the applicant follow the guidelines provided in the NUREG-1801 for FP AMP. NUREG-1801 contains the staff's generic evaluation of the existing plant program and documents the technical basis for the determining where existing programs are adequate without modification and where existing programs should be augmented for the extended period of operation. The frequencies identified in Appendix B, Section B.1.18 exceed those committed to in the applicant's FP program.

Clarify if the plant FP programs include surveillance requirements consistent with regulatory guidelines, and if the activities defined in B.1.18 are in addition to the inspections provided under the FP program.

Response:

(a) Upon review of Aging Management Reference 3.3.2.62, Exelon agrees that cementitious fire proofing requires aging management due to separation caused by deterioration of the structural steel under the coating. The structural steel coatings are currently inspected as part of aging management program, B.1.18, "Fire Protection". This also applies to Aging Management Reference 3.3.2.63, for ceramic fiber fire wrap.

(b) Exelon concluded in Section B.1.18 that after the enhancements discussed in Appendix B, Section B.1.18, Subsection "Enhancements" are implemented, the Dresden and Quad Cities fire protection program will be consistent to the ten element program described in NUREG-1801, XI.M26, "Fire Protection". However, after the enhancements are implemented, the following exceptions will still exist:

(1) NUREG 1801, XI.M26, Element 4 states that a visual inspection of fire barrier walls, ceilings, and floors is to be performed at least once every refueling outage to ensure timely detection of concrete cracking, spalling, and loss of material before there is a loss of intended function. The Dresden and Quad Cities fire protection program requires inspection of concrete fire barrier walls, ceilings, and floors once every five years, which exceeds the stated frequency of NUREG 1801, XI.M26. This inspection interval, which is in excess of NUREG 1801 guidance, has been justified for the following reasons:

- Station fire protection program inspections and other similar station inspections have not found any significant aging effect that required extensive corrective action for any concrete structure within the scope of license renewal. Typically, concrete cracks that have been observed have been attributed to normal concrete shrinkage occurring during construction and are non-active.

- The environment surrounding Dresden and Quad Cities is non-aggressive for concrete.

- Industry guidance contained in ACI 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete Structures," indicates that a five-year inspection frequency for concrete components is adequate for timely identification and correction of degraded conditions prior to loss of intended function.

- The fire protection program has provisions to allow for the number of components monitored and the frequency of inspections to be adjusted, to ensure the level of effort is commensurate with the existing degradation mechanisms that are identified.

(2) NUREG 1801, XI.M26, Element 4 states that VT-1 or equivalent penetration seal inspections and VT-3 or equivalent fire door inspections are to be performed. Personnel performing seal and fire door inspections at Dresden and Quad Cities are not qualified to American Society for Nondestructive Testing requirements. However, personnel performing these inspections are trained and experienced in fire protection program requirements. The quality of the fire barrier penetration seal and fire door inspections are equivalent to the VT-1 and VT-3 inspections as is evidenced by the history of identifying conditions requiring maintenance, repair or replacement.

(3) NUREG 1801, XI.M26, Element 3 states that fire doors are visually inspected at least once bi-monthly for holes in the skin of the door and that clearances are also checked at least once bi-monthly as part of an inspection program. It also states that function tests of fire doors are performed daily, weekly, or monthly (plant-specific) to verify the operability of automatic hold-open, release, closing mechanisms, and latches. The Dresden and Quad Cities fire protection program provides for an in-depth inspection for condition and operability of fire doors once per operating cycle, which exceeds the stated frequency of NUREG 1801, XI.M26. Dresden checks fire door clearances as part of their operating cycle inspection. Quad Cities does not check door clearances as part of their operating cycle inspection, but does check fire door clearances after maintenance has been performed on a fire door. This inspection interval in excess of NUREG 1801 is justified because the fire doors most likely to experience excessive wear are those that are subject to the most frequent use. Most frequently used doors, such as those in normal and high traffic areas, are additionally monitored by normal plant operation during periodic fire marshal tours, operator rounds, and security patrols.

The combination of in-depth inspections and monitoring by personnel performing tours, rounds and patrols has been effective in identifying degraded doors and taking corrective action as necessary. Door degradation has been due to wear and physical damage. No instance of door assembly loss of material due to corrosion has been identified.

(4) NUREG 1801, XI.M26, Element 4 states that a periodic function test and visual inspection performed at least once every six months detects degradation of the halon and carbon dioxide fire suppression systems before the loss of the component intended function. The Quad Cities and Dresden halon and carbon dioxide fire suppression systems are currently tested and inspected every 18 months. However, the Technical Requirements Manual permits a testing frequency of once every two years. Either of these frequencies exceeds the stated frequency of NUREG 1801, XI.M26, but are considered sufficient to ensure system availability and operability based on station operating history that indicates no occurrence of aging related events have adversely affected system operation.

(5) NUREG 1801, XI.M26, Element 6 states that any signs of corrosion and mechanical damage of the halon or carbon dioxide fire suppression system are not acceptable. The Dresden and Quad Cities program requires that signs of aging degradation on the external surfaces of the halon or carbon dioxide fire suppression systems be evaluated and corrective action be taken as required. Although this method could result in minor corrosion or mechanical damage being evaluated as acceptable, this approach provides reasonable assurance that corrective actions appropriate to the severity of the observed degradation will be implemented prior to loss of system or component intended functions.

(6) NUREG 1801, XI.M26, Element 5 states that the performance of the fire pump is monitored during the periodic test to detect any degradation in the fuel supply lines and that periodic testing provides data (e.g., pressure) necessary for trending. The Dresden and Quad Cities diesel-driven fire pump test results and the Dresden isolation condenser diesel-driven makeup pump test results are not trended. Instead, in the event the predetermined acceptance criteria are not met an engineering evaluation is conducted to determine the operability of the pump and the need for corrective action. This method is justified, given that there have been no reports of loss of function of the Dresden or Quad Cities diesel driven fire pumps as a result of the inability of the fuel oil system to deliver fuel to the engine and there have been no reports of loss of material or flow blockage of the Dresden isolation condenser makeup pump fuel oil subsystem.

The activities described in Dresden and Quad Cities LRA, Appendix B, Section B.1.18 comprise the Dresden and Quad Cities fire protection program. Other than as stated in the "Response" Sections (2)(a) through (2)(f), the Dresden and Quad Cities fire protection program surveillance requirements are consistent with the regulatory guidelines as stated in NUREG-1801, XI.M26, "Fire Protection."

Both LRA Aging Management References 3.3.2.62 and 3.3.2.63 should have read as follows:

Ref No	Component Group	Material	Environment	Aging Effect/ Mechanism	Aging Management Program	Discussion
3.3.2.62	Fire Proofing	Cementitious Fire Proofing	Indoor	Separation/ deterioration of steel	Fire Protection (B.1.18)	NUREG-1801 does not address cementitious fireproofing in an indoor environment.
3.3.2.63	Fire Wrap	Ceramic Fiber	Indoor	Separation/ deterioration of steel	Fire Protection (B.1.18)	NUREG-1801 does not address ceramic fiber fire wrap in an indoor environment.

LRA Section A.1.18 on Page A-8 (Dresden, Units 2 and 3) of the LRA should have read as follows:

The fire protection aging management program includes a fire barrier inspection program and a diesel-driven fire pump inspection program. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals; fire wraps and fire proofing; fire barrier walls, ceilings, and floors; flood barrier penetration seals that also serve as fire barrier seals; and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The program includes surveillance tests of fuel oil systems for the diesel-driven fire pumps and isolation condenser diesel-driven makeup pumps to ensure that the fuel supply lines can perform intended functions. The program also includes visual inspections and periodic operability tests of halon and carbon dioxide fire suppression systems based on NFPA codes.
Prior to the period of extended operation, the program will be revised to include:
Inspection of oil spill barriers
Inspection of external surfaces of the halon system and the carbon dioxide system

- Periodic capacity tests of the isolation condenser makeup pumps
- Specific fuel supply leak inspection criteria for fire pumps and isolation condenser makeup pumps during tests
- Specific inspection criteria for fire doors
- Inspection frequencies for fire doors and spill barriers"

LRA Section A.1.18 on Page A-32 (Quad Cities, Units 1 and 2) of the LRA should have read as follows:

The fire protection aging management program includes a fire barrier inspection program and a diesel-driven fire pump inspection program. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals; fire wraps and fire proofing; fire barrier walls, ceilings, and floors; flood barrier penetration seals that also serve as fire barrier seals; and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The program includes surveillance tests of fuel oil systems for the diesel-driven fire pumps to ensure that the fuel supply line can perform intended functions. The program also includes visual inspections and periodic operability tests of the carbon dioxide fire suppression system based on NFPA codes.
Prior to the period of extended operation, the program will be revised to include:

- Inspection of oil spill barriers
- Inspection of external surfaces of the carbon dioxide systems
- Specific fuel supply leak inspection criteria for fire pumps
- Specific inspection criteria for fire doors

LRA Section B.1.18 program Description paragraph 3 on Page B-38 of the LRA should have read as follows:

"The program provides for visual inspection of fire barrier penetration seals, fire wraps, fire proofing, and flood barrier penetration seals that also serve as fire barrier seals for signs of degradation, such as damage, holes, cracking, and loss of material, through periodic inspection, surveillance and maintenance activities. The inspections are implemented through station procedures. Flood barrier penetration seal inspections are part of the structures monitoring program."

RAI B.1.19-1

The review of LRA Appendix B, Section B.1.19 has resulted in the following RAI:

LRA Appendix B, Section B.1.19, Fire Water System states that, "With enhancements the fire water system aging management program is consistent with the ten elements of aging management program XI.M27, "Fire Water System," specified in NUREG-1801with following exceptions...."

In order for the staff to evaluate the adequacy of the applicant's FP AMP and reach a conclusion that it is consistent with NUREG-1801, the staff requests the applicant to follow the guidelines provided in the NUREG-1801 and interim staff guidance for FP AMP [Staff Guidance (ISG)-04, "Aging Management of Fire Protection Systems for License Renewal" (ADAMS Accession # ML022260137, dated December 3, 2002]. NUREG-1801 contains the staff's generic evaluation of the existing plant programs and documents the technical basis for determining where existing programs are adequate without modification and where existing programs should be augmented for the extended period of operation. Clarify the flow rates and testing frequencies of the underground loop flow tests and describe the plant procedure for this testing.

Response:

Part (1) of this response compares the Dresden and Quad Cities fire water system program against the NUREG-1801, XI.M27, "Fire Water System," program and identifies where exceptions will still exist. Included in Part (1) is a discussion of how Dresden and Quad Cities are addressing Interim Staff Guidance (ISG)-04. Part (2) of the response discusses Dresden and Quad Cities underground loop flow testing.

(1) Exelon concluded in the Dresden and Quad Cities LRA, Appendix B, Section B.1.19, "Fire Water System", that the Dresden and Quad Cities fire water system program, after the enhancements discussed in Appendix B, Section B.1.19, Subsection "Enhancements" are implemented, will be consistent with the ten-element program described in NUREG-1801, XI.M27, "Fire Water System," with certain exceptions. Although not stated in the LRA, after the enhancements are implemented, the fire water system program will be also be consistent with the NRC staff recommendations for fire water systems as provided in Interim Staff Guidance ISG-04, "Aging Management of Fire Protection Systems for License Renewal."

Exelon evaluated the Dresden and Quad Cities fire water system program against the attributes of the ten elements of NUREG-1801, XI.M27 and after the enhancements are implemented, the following exceptions will still exist:

(a) NUREG 1801, XI.M27, Element 3 states that NRC GL 89-13 recommends periodic flow testing of infrequently used loops of the fire water system at the maximum design flow to ensure that the system maintains its intended function. Flow tests at the maximum design flow are not practicable for Dresden and Quad Cities. Instead, the Dresden and Quad Cities flow tests analyze the system hydraulic resistance. Dresden measures underground piping pressure drops at given flows for selected segments of underground fire mains and compares them to pre-calculated allowable pressure drops for the same segments at the given flows. The measured pressure drop must be equal to or less than the allowable. The measured results are also compared with those of previous tests to identify adverse trends. Quad Cities takes pressure measurements and calculates the friction loss coefficients ("C" factor) for the various sections of the underground fire mains. The calculated "C" factor must be equal to or greater than 80 for all piping tested. The calculated results are compared with those of previous tests to

identify adverse trends. A low "C" factor (Quad Cities method) or a large pressure drop (Dresden method) may be indicative of either fouling or leakage of the underground fire mains.

(b) NUREG 1801, XI.M27, "Program Description," states that the aging management program (XI.M27) applies to water-based fire protection systems that are tested in accordance with the applicable National Fire Protection Association (NFPA) codes and standards.

The Dresden and Quad Cities fire water systems may not in all cases be tested in accordance with NFPA codes, but in these cases, technical justifications for the deviations are documented. NFPA codes were used in the design of active fire protection systems (i.e., fire suppression and detection systems). Similarly, inspection and periodic testing is performed in accordance with corporate and station procedures developed using NFPA codes as guidance. Corporate Procedure ER-AA-610, "Performance Based Evaluations for Fire Protection" ensures that performance based evaluations that result in surveillance frequencies that exceed those specified in site-specific NFPA codes of record serve as the deviation justification. Where code deviations are required or desirable, they are made under the intent of the code and documented in the NFPA Code Deviation Report at each site in accordance with CC-AA-211, "Fire Protection Program." Revision to the NFPA Code Deviation Report is necessary unless the report has previously addressed the deviation.

(c) Interim staff Guidance (ISG)-04 was issued on December 3, 2002. Included as part of ISG-04 is an amended ten-element aging management program, XI.M27, "Fire Water System." Exelon evaluated the Dresden and Quad Cities fire water system program against the staff recommendations for fire water systems included in ISG-04 with the following conclusions:

- In Element 3 of the amended XI.M27, the staff provides for the option of performing wall thickness evaluations in lieu of testing at maximum design flow. The flow testing discussed in (1)(a) is not performed at maximum design flow, but Dresden and Quad Cities will perform wall thickness measurements.

- In Element 4 of the amended XI.M27, the staff recommends that the applicant perform a baseline pipe wall thickness evaluation of the fire protection piping using a non-intrusive means of evaluating wall thickness, such as volumetric inspection, to detect general corrosion before the current license term expires. The staff also recommends that the applicant perform pipe wall thickness evaluations at plant-specific intervals during the period of extended operation. As an alternative to non-intrusive testing, the amended XI.M27 allows for a visual inspection of the internal surface of the fire protection piping upon each entry to the system for routine or corrective maintenance as long as it can be demonstrated that inspections are performed on a representative number of locations on a reasonable basis.

  Dresden and Quad Cities will perform periodic non-intrusive fire protection piping wall thickness measurements. These non-intrusive inspections will be

conducted prior to the end of the current term and repeated on a frequency not exceeding every 10 years.

Element 4 of the amended XI.M27 also states that if the environmental and material conditions that exist on the interior surfaces of the below grade fire protection piping are similar to the conditions that exist within the above grade piping, the results of the inspections of the above grade fire protection piping can be extrapolated to evaluate the condition of below grade piping.

The below grade fire mains at both Dresden and Quad Cities are comprised of uncoated carbon steel. The internal environment of the below grade fire mains at both Dresden and Quad Cities is "raw water," the same as NUREG-1801 Reference VII.G.6-a. Therefore, the results of the inspections of above grade fire protection uncoated carbon steel piping with a raw water environment can be extrapolated to evaluate to the condition of the below grade fire mains.

- In Element 4 of the amended XI.M27, the staff recommends, in accordance with NFPA 25, that sprinkler head testing be performed at year 50 of sprinkler system service life, not year 50 of plant operation, with subsequent sprinkler head testing every 10 years thereafter. Representative samples of Dresden and Quad Cities sprinkler heads will be submitted to a testing laboratory prior to being in service 50 years. This testing will be repeated on a frequency not exceeding every 10 years.

(2) The following paragraphs answer the last part of the RAI, "Clarify the flow rates and testing frequencies of the underground loop flow tests and describe the plant procedure for this testing."

Flow testing is conducted at five-year intervals at Dresden and Quad Cities. As stated in Section (1)(a) of the response above, tests are not performed at the maximum design flow. By themselves, the absolute values of the flows achieved during testing at both Dresden and Quad Cities provide no indication of the condition of the underground fire mains. Utilizing the Dresden test procedure, test conditions are established to provide flow rates within a pre-determined range corresponding to a table of pre-calculated allowable pressure drops vs. flows. For the Cross Tie Flow Test, these pre-determined flows range from 2500 gpm to 3500 gpm. For the Yard Loop Flow Test, these pre-determined flows range from 900 gpm to 1300 gpm.

The Quad Cities test procedure methodology ("C" factor) employs the installation of four Underwriter's playpipes on each of the three pipe segments to be tested. Sequential tests are performed on each segment with one, two, three, and four playpipes flowing. Total flows and "C" factors are calculated for each combination of flowing playpipes. For each pipe segment, the "C" factors for each separate flow scenario are compared and the most appropriate one is chosen. Since more accurate "C" factors are obtained when calculated for higher flows, it is most likely that the one calculated for four flowing playpipes will be chosen. During the last flow test performed at Quad Cities the highest calculated flows for each of the three segments, each with four playpipes flowing, were 2296 gpm, 2562 gpm, and 2547 gpm.