Attachment 1

Response to SER Open Item 2.1-1

Response to Open Item

OI-2.1-1: (Section 2.1.3.1.2 - Application of the Scoping Criteria in 10 CFR 54.4(a)(2))

The applicant did not provide an adequate basis in its response to staff RAI 2.1-2. The staff determined that the applicant did not provide a sufficient basis for limiting consideration of fluid spray interactions to only those non-safety related SSCs located within 20 feet of an active safety related SSCs. The staff requires additional clarification regarding the capability of active and passive safety-related SSCs located greater than 20 feet from a potential spray source to tolerate wetting, the specific operating experience that was relied upon to determine that it was not credible for fluid sprays to affect equipment greater than 20 feet from a failure location, specific methods to detect leakage in normally accessible and inaccessible areas, and justification for use of exposure duration in limiting the scope of potential failure mechanisms considered during scoping.

Response:

Exelon has revised the methodology utilized in the scoping of non safety related moderate energy piping systems that have the potential to spatially interact with safety related systems. Specifically, Exelon has eliminated the 20 foot separation criterion previously utilized to exclude moderate energy systems from the scope of License Renewal. The revised methodology assumes that all safety related components, active as well as passive, could be adversely affected by spray or wetting from a non safety moderate energy system located in the same general area of the plant. As such, early detection of leakage was also eliminated from the revised scoping methodology.

Under the revised scoping methodology, all components from moderate energy non-safety related systems located in the same general area as a safety related component (active or passive) will be included within the scope of license renewal. "General area" is defined as the same floor (elevation) of a major building with no barrier walls between the fluid source and the safety related component. Barrier walls were defined as barriers that form the boundary of a room on the same elevation of a major building separating the safety related components from a spray or leak generated by a non safety related component located on the other side of the barrier wall. All barrier walls credited for protection of safety related components were previously included within the scope of license renewal during the scoping of structures and are included in the structures monitoring aging management program described in section B.1.30 of the license renewal application and the masonry wall aging management program described in section B.1.29 of the license renewal application.

While both sites contain similar systems and equipment, the location of specific systems and equipment does vary between sites. For example, the safety related standby gas treatment system at Dresden Station is located in the Turbine Building while the same system is located in the Reactor Building at Quad Cities. Because this system resides in two different physical locations at each site, it will spatially interact with different non-safety related piping systems. This explains why some non-safety related systems are included within the scope of license renewal at one site, but not the other. It also explains why the scoping boundaries for the same non-safety related system can vary between sites.

Following the revised methodology described above, the boundaries of several non-safety related systems previously included within the scope of license renewal were expanded. Additionally, several non-safety related systems previously excluded from the scope of license renewal were added to the scope for the first time at one or both sites. Also, the boundaries of non-safety related sections of safety related systems (e.g. emergency diesel generator cooling water and residual heat removal service water) were expanded. Scoping changes resulting from the revised methodology are summarized in Table 1 below.

Table 1
Scoping Changes to Systems Resulting from the Scoping Methodology Change

System (LRA Section #)	Scoping Change
Reactor Recirculation (2.3.1.3.1)	The system boundary was expanded at Quad Cities. However, the system did not require boundary expansion at Dresden.
Control Rod Drive Hydraulic (2.3.3.3)	The piping boundary was expanded at Dresden and Quad Cities.
Reactor Water Clean up System (2.3.3-4)	The system boundary was expanded at Dresden. The reactor water clean up system boundary did not require an expansion at Quad Cities.
Diesel Generator Cooling Water System (LRA Section 2.3.3-12)	The piping boundary was expanded at Quad Cities. However, the system did not require boundary expansion at Dresden.
Service Water (2.3.3.16)	The piping boundary was expanded at Dresden and Quad Cities.
Reactor Building Closed Cooling Water (2.3.3.17)	The piping boundary was expanded at Dresden and Quad Cities.
Turbine Building Closed Cooling Water (2.3.3.18)	The piping boundary was expanded at Dresden. The system was added to the scope at Quad Cities.
Demineralized Water Makeup (2.3.3.19)	The piping boundary was expanded at Dresden and Quad Cities.
RHR Service Water (2.3.3.20)	The piping boundary was expanded at Quad Cities. Dresden does not have an RHR Service Water System.
Plant Heating (2.3.3—24)	The piping boundary was expanded at Dresden The system did not require boundary expansion at Quad Cities.
Fuel Pool Cooling and Filter Demineralizer (2.3.3.23)	The piping boundary was expanded at Dresden. The system was added to the scope at Quad Cities.
Circulating Water (2.3.3.29)	The system was added to the scope at Dresden and Quad Cities.
Dresden Laundry Treatment System (2.3.3.30)	The system was added to the scope at Dresden. The laundry system was not added to the scope at Quad Cities because system components are not physically located in the same general area as safety related equipment.

Zinc Injection System (2.3.3.31)	The system was added to the scope at Dresden and Quad Cities.
Main Steam (2.3.4.1)	The piping boundary was expanded at Dresden and Quad Cities.
Feedwater (2.3.4.2)	The piping boundary was expanded at Dresden and Quad Cities.
Condensate and Condensate Storage (2.3.4.3)	The piping boundary was expanded at Dresden and Quad Cities.
Main Condenser (2.3.4.4)	The Main Condenser at Quad Cities can spatially interact with a safety related pipe in the same general area. As such, an additional intended function (spatial interaction) has been credited. No such piping configuration exists at Dresden.
Main Turbine and Auxiliary System (2.3.4.5)	The piping boundary was expanded at Dresden and Quad Cities.
Turbine Oil (2.3.4.6)	The system boundary was expanded at Quad Cities. The system was added to the scope at Dresden.
Main Generator and Auxiliaries (Stator Water Cooling) (2.3.4.7)	The system boundary was expanded at Quad Cities. The system was added to the scope at Dresden.
Extraction Steam System (2.3.4.8)	The system was added to the scope at Quad Cities. The extraction steam system was not added to the scope at Dresden because system components are not physically located in the same general area as safety related equipment.
Feedwater Heater Drains and Vents (2.3.4.9)	The system was added to the scope at Quad Cities. The feedwater heater drains and vents were not added to the scope at Dresden because system components are not physically located in the same general area as safety related equipment.

Revisions to the LRA Resulting From Scoping Methodology Changes

The following pages describe the revisions made to the LRA as a result of the scoping methodology change described above. The boundary changes are described for each system along with associated changes to the LRA. Only changes to the LRA resulting from the methodology change are shown for each system. Additions to LRA table line items are shown as **bolded** text, and removals from the table line items are shown as "strike-through" text. Entire tables are not repeated; only those line items containing changes.

To assist the NRC staff with the review of each boundary expansion, one set of hand marked up boundary diagrams are provided with this transmittal. The set of hand marked boundary diagrams includes existing diagrams included in the original LRA transmittal that were revised to capture expanded system boundaries along with new boundary diagrams that were not provided with the original LRA. All of the components discussed in this RAI response were added to the scope of license renewal under criteria 54.4(a)(2). Original boundary diagrams included with the LRA distinguished those components included in the scope of license renewal under 54.4(a)(2) by highlighting them in red. Components added to the scope of license renewal as a result of the methodology change were highlighted in pink on the revised and new boundary diagrams distinguishing them from other components previously included within the scope under 54.4(a)(2).

As a result of the scoping changes, all of the aging management programs were evaluated for impact. Because all of the scoping changes involved the expansion of similar equipment in the same environments, only one aging management program had to revised. Prior to the change in scoping methodology, aging management program, B.2.7, Generator Stator Water Chemistry Activities, had previously only applied to Quad Cities station. Since the stator water cooling system was added to the scope of license renewal at Dresden, this aging management program was revised to also apply to Dresden station. No other aging management program changes were required.

Finally, this submittal contains the description of five non safety related systems that had previously been excluded from the scope of license renewal at both sites. Because the existing LRA does not contain a scoping summary for each system or aging management assessment for each system, a new scoping summary and aging management assessment has been provided. Marked up boundary diagrams have been provided for each system. The systems affected are:

- Circulating Water (New LRA Section 2.3.3.29)
- Laundry (New LRA Section 2.3.3.30)
- Zinc Addition (New LRA Section 2.3.3.31)
- Extraction Steam (New LRA Section 2.3.4.8)
- Feedwater Heater Vents and Drains (New LRA Section 2.3.4.9)

Reactor Recirculation (LRA Section 2.3.1.3.1)

Additional piping and components from the reactor recirculation system were added to the scope of license renewal at Quad Cities due to the potential for spatial interaction with safety related components. Specifically, the recirculation motor generator oil subsystem was added to the scope of license renewal at Quad Cities. All of the components shown on revised boundary diagrams LR-QDC-M-35-4 and LR-QDC-M-77-4 have been included within the scope of license renewal. The system did not require a boundary expansion at Dresden because the physical plant layout is different than Quad Cities at this location.

The resulting changes to the LRA include the following:

a. Aging management references for the components added to the scope of license renewal are already included in Table 2.3.1-5 Component Groups Requiring Aging Management Review – Reactor Recirculation System. Two new component groups were added to LRA Table 2.3.1-5. The additional line items to Table 2.3.1-5 are shown below.

Component	Component Intended Function	Aging Management Ref
Pumps (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.1.2.66, 3.1.2.67**
Tanks (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.1.2.3, 3.1.2.68**

Control Rod Drive Hydraulic (LRA Section 2.3.3.3)

The system boundaries for the control rod drive hydraulic system at both Dresden and Quad Cities were expanded under the revised scoping methodology due to the potential for spatial interaction with safety related components. All of the control rod drive hydraulic components shown on revised boundary diagrams LR-DRE-M-34-1, LR-DRE-M-365-1, LR-DRE-M-419-4, LR-QDC-M-41-4, and LR-QDC-M-83-4 have been included within the scope of license renewal. Isolated vent and drain piping was excluded from the scope because the piping does not contain any fluid that could spatially interact with safety related equipment in the general area.

The resulting changes to the LRA include the following:

a. Aging management references for the components added to the scope of license renewal are already included in Table 2.3.3-3, Component Groups Requiring Aging Management Review – Control Rod Drive Hydraulic System". Four new component groups were added to LRA Table 2.3.3-3 and one additional aging management reference was added to a single component group. The additional and revised line items to Table 2.3.3-3 are shown below.

Component	Component Intended Function	Aging Management Ref
Filters/Strainers (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.8**
Pumps (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.25, 3.3.2.40**
Tubing (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.25, 3.3.2.40**
Restrictive Orifices (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.8**
Valves (spatial interaction)	Leakage Boundary (spatial)	**3.3.1.5,** 3.3.1.8, 3.3.1.25, 3.3.2.40

The four new component groups shown above are for Quad Cities only because the same components at Dresden are already in the scope with a different component intended function.

Reactor Water Clean up System (LRA Section 2.3.3-4)

Additional piping and components from the reactor water clean up system were added to the scope of license renewal at Dresden. Specifically, associated piping components lines 2-3324-1"-H , 2/3-1223-8-LX, and 2-3318-1-L on revised boundary diagram LR-DRE-M-30 and lines 2/3-1223-8"-H, 3-5503-4"-H, and 2-5508-4"-H on new boundary diagram LR-DRE-M-45-1 were added to the scope of license renewal due to the potential for spatial interaction with safety related equipment. This boundary expansion includes more of the same type of components already represented on Table 2.3.3-4 of the LRA. As such, no changes to Table 2.3.3-4 were required.

The resulting changes to the LRA include the following:

a. A new boundary diagram, LR-DRE-M-45-1, was added to the License Renewal Boundary Diagram References in Section 2.3.3-4

Diesel Generator Cooling Water System (LRA Section 2.3.3-12)

Additional piping and components from the diesel generator cooling water system were added to the scope of license renewal at Quad Cities. Specifically, associated piping components from the gland seal water supply to the diesel generator cooling water pumps have been added to the scope of license renewal due to the potential for spatial interaction with the safety related diesel cooling water pumps. Components added include a gland seal water tank, piping, valves, and associated instrumentation. The system did not require a boundary expansion at Dresden because of a different diesel cooling water pump design that does not require gland seal water. Components added to the scope of license renewal are shown on revised boundary diagrams LR-QDC-M-22-3, LR-QDC-M-69-3, and new boundary diagram LR-QDC-M-23.

The resulting changes to the LRA include the following:

a. A new boundary diagram, LR-QDC-M-23, was added to the License Renewal Boundary Diagram References in Section 2.3.3-12

b. Aging management references for the components added to the scope of license renewal are already included in Table 2.3.3-12, "Component Groups Requiring Aging Management Review – Diesel Generator Cooling Water System,". One new component group was added to LRA Table 2.3.3-12 and one additional aging management reference was added to a single component group. The additional and revised line items to Table 2.3.3-12 are shown below.

Component	Component Intended Function	Aging Management Ref
Tanks (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.15**
Valves (spatial interaction)	Leakage Boundary (spatial)	3.3.1.15, 3.3.1.27, 3.3.2.23, 3.3.2.24, 3.3.2.40, 3.3.2.41, 3.3.2.279, 3.3.2.281, **3.3.2.281**, 3.3.2.300

Service Water (LRA Section 2.3.3.16)

The system boundaries for the service water system at both Dresden and Quad Cities were expanded under the revised scoping methodology due to the potential for spatial interaction with safety related components. All of the service water components shown on revised boundary diagrams LR-QDC-M-22-4, LR-QDC-M-22-5, LR-QDC-M-69-4, LR-QDC-M-69-5, LR-DRE-M-22, LR-DRE-M-355 have been included within the scope of license renewal. Additional service water piping components shown on revised boundary diagrams LR-QDC-M-69-1 and LR-QDC-M-22-1 and new boundary diagrams LR-DRE-M-1011-5, LR-DRE-M-3486 and LR-DRE-M-3496 have also been included in the scope.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-DRE-M-1011-5, LR-DRE-M-3486 and LR-DRE-M-3496, were added to the License Renewal Boundary Diagram References in Section 2.3.3-16

b. Aging management references for the components added to the scope of license renewal are already included in Table 2.3.3-16, "Component Groups Requiring Aging Management Review – Service Water System. Three new component groups were added to LRA Table 2.3.3-16 and additional aging management references were added to two component groups. The additional and revised line items to Table 2.3.3-16 are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.1.15, **3.3.2.40**
Strainer Bodies (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.15**
Tanks (spatial interaction) (Dresden only)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.15**
Tubing (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.15, 3.3.2.40**
Valves (spatial interaction)	Leakage Boundary (spatial)	**3.3.1.5,** 3.3.1.15, 3.3.1.27, 3.3.2.23, **3.3.2.40**, 3.3.2.279, 3.3.2.280, 3.3.2.281, 3.3.2.300

Reactor Building Closed Cooling Water (LRA Section 2.3.3.17)

The system boundaries for the reactor building closed cooling water system at both Dresden and Quad Cities were expanded under the revised scoping methodology due to the potential for spatial interaction with safety related components. All of the reactor building closed cooling system components shown on revised boundary diagrams LR-DRE-M-20, LR-DRE-M-353, LR-QDC-M-33-1, LR-QDC-M-33-2, LR-QDC-M-75-1, and LR-QDC-M-75-2 have been included within the scope of license renewal.

The resulting changes to the LRA include the following:

a. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.3-17, Component Groups Requiring Aging Management Review – Reactor Building Closed Cooling Water System. Two new component groups were added to LRA Table 2.3.3-17 and a revision was made to two additional aging management references deleting "Quad Cities only". The additional and revised line items to Table 2.3.3-17 are shown below

Component	Component Intended Function	Aging Management Ref
Heat Exchangers (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.3.1.5, 3.3.2.77, 3.3.2.78
Piping and Fittings (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.3.1.5, 3.3.1.13, 3.3.2.40
Pumps (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.13**
Tubing (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.13, 3.3.2.40**

Turbine Building Closed Cooling Water (LRA Section 2.3.3.18)

Additional piping and components from the turbine building closed cooling water system were added to the scope of license renewal at Dresden Station. Specifically, all of the turbine building closed cooling pumps, heat exchangers, piping, valves, surge tank, and other passive system components have been added to the scope due to the potential for spatial interaction with safety related components in the same general area. All of the components shown on revised boundary diagrams LR-DRE-M-21, LR-DRE-M-354-1 and LR-DRE-M-354-2 have been added to the scope of license renewal. Additional components added to the scope along with system boundary flags are shown on revised boundary diagrams LR-DRE-M-177-1, LR-DRE-M-177-4, LR-DRE-M-178, LR-DRE-M-419-1, LR-DRE-M-419-4, LR-DRE-M-420, LR-DRE-M-421 and new boundary diagrams LR-DRE-M-37-7, LR-DRE-M-37-10, LR-DRE-M-367-4, and LR-DRE-M-367-6.

The turbine building closed cooling water system had previously been excluded from the scope of license renewal at Quad Cities. However, the system has been added to the scope of license renewal as a result of the scoping methodology change. Specifically, all of the turbine building closed cooling pumps, heat exchangers, piping, valves, surge tank, and other passive system components have been added to the scope. Due to the potential for spatial interaction with safety related components in the same general area. Equipment highlighted on revised boundary diagram LR-QDC-M-462-3, and new boundary diagrams LR-QDC-M-21 LR-QDC-M-68, LR-QDC-M-459-1, LR-QDC-M-459-3, and LR-QDC-M-462-1 have been added to the scope.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-DRE-M-367-4, LR-DRE-M-367-6, LR-DRE-M-37-7, LR-DRE-M-37-10, LR-QDC-M-21 and LR-QDC-M-68, LR-QDC-M-459-1, LR-QDC-M-459-3, LR-QDC-M-462-1, and LR-QDC-M-462-3 were added to the License Renewal Boundary Diagram References in Section 2.3.3-18.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.3-18, Component Groups Requiring Aging Management Review – Turbine Building Closed Cooling Water System. Four new component groups were added to LRA Table 2.3.3-18 LRA as shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.13, 3.3.2.137**
Valves (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.13, 3.3.2.267**
Pumps (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.13, 3.3.2.319**
Tanks (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.1.5, 3.3.1.13, 3.3.2.211**

The four new component groups shown above are for Quad Cities only because the same components at Dresden are already in the scope with a different component intended function.

Demineralized Water Makeup (LRA Section 2.3.3.19)

Additional piping and components from the demineralized water makeup system were included within the scope of license renewal at Dresden and Quad Cities. Specifically, associated piping components located in the Turbine Building that could spatially interact with safety related components in the same general area have been added to the scope of license renewal. *Piping components shown on revised boundary diagrams* LR-DRE-M-177-1, LR-DRE-M-419-1, LR-DRE-M-35-1, LR-DRE-M-366, LR-DRE-M-269-3, LR-QDC-M-58-1 LR-QDC-58-3, LR-QDC-M-462-3, and new boundary diagrams LR-QDC-M-31, LR-QDC-M-459-1, LR-QDC-M-459-3, LR-QDC-M-462-1, LR-DRE-M-177-3, LR-DRE-M-419-3, LR-DRE-M-35-2, and LR-DRE-M-530-1 were also added to the scope of license renewal.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-QDC-M-31, LR-QDC-M-459-1, LR-QDC-M-459-3, LR-QDC-M-462-1, LR-DRE-M-35-2, LR-DRE-M-177-3, LR-DRE-M-419-3, and LR-DRE-M-530-1 were added to the License Renewal Boundary Diagram References in Section 2.3.3-19.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.3-19, Component Groups Requiring Aging Management Review – Makeup Demineralizer System. One new component group was added to LRA Table 2.3.3-19 and additional aging management references were added to two component groups. The additional and revised line items to Table 2.3.3-19 are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, **3.3.2.40,** 3.3.2.143, **3.3.2.316**
Tubing (spatial interaction)	**Leakage Boundary (spatial)**	**3.2.3.34, 3.3.2.318**
Valves (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.1.25, 3.3.2.40, 3.3.2.257, 3.3.2.272, **3.3.2.317**

RHR Service Water (LRA Section 2.3.3.20)

Section 2.3.3.20 of the LRA describes the RHR Service Water system at Quad Cities which was originally included within the scope of license renewal. The RHR service water pumps are contained in vaults that have non-safety related sumps. The purpose of the sumps is to collect and transfer water outside of the vaults. Following the revised scoping methodology, the sump pumps and associated piping can spatially interact with the safety related RHR service water pumps. As such, all of the components shown on new boundary diagrams LR-QDC-M-22-2 and LR-QDC-M-69-2 were added to the scope of license renewal.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-QDC-M-22-2 and LR-QDC-M-69-2, were added to the License Renewal Boundary Diagram References in Section 2.3.3-20.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.3-20, Component Groups Requiring Aging Management Review – Residual Heat Removal System. Two new component groups were added to LRA Table 2.3.3-20 and are shown below.

Component	Component Intended Function	Aging Management Ref
NSR Vents or Drains, Piping and Valves (spatial interaction) (Quad Cities only)	Leakage Boundary (spatial)	3.3.2.130
Pumps (spatial interaction) (Quad Cities only)	Leakage Boundary (spatial)	3.3.1.15, 3.3.2.26

Fuel Pool Cooling and Filter Demineralizer System (LRA Section 2.3.3.23)

Additional piping and components from the fuel pool cooling system were added to the scope of license renewal at Dresden Station. Specifically, all of the fuel pool cooling pumps, heat exchangers, piping, valves and other passive system components have been added to the scope due to the potential for spatial interaction with safety related components in the same general area. All of the components shown on revised boundary diagrams, LR-DRE-M-31, LR-DRE-M-362, with the exception of the fuel pooling cooling filters, demineralizers, and skimmer surge tanks, which reside in their own vaulted areas, physically isolated from safety related equipment such that they can not spatially interact, have been added to the scope of license renewal. Additionally, components shown on new boundary diagram, LR-DRE-M-50, have been added to the scope of license renewal.

The fuel pool cooling system had previously been excluded from the scope of license renewal at Quad Cities. However, the system has been added to the scope of license renewal as a result of the scoping methodology change due to the potential for spatial interaction with safety related components in the same general area. Components added to the scope of license renewal at Quad Cities are shown on revised boundary diagrams LR-QDC-M-38, and LR-QDC-M-80.

The resulting changes to the LRA include the following:

a. "(In-Scope for Dresden Only)" is removed from the Section 2.3.3.23 heading.
b. Quad Cities Station UFSAR Reference Section 9.1.3 is added under Sub-section "UFSAR References."
c. The "(Dresden only)" qualification is removed from Sub-section "System Intended Functions," "Preclude adverse effects on safety-related SSCs."
d. New boundary diagram, LR-DRE-M-50 was added to the License Renewal Boundary Diagram References in Section 2.3.3-23.
e. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.3-23, "Component Groups Requiring Aging Management Review – Fuel Pool Cooling and Filter Demineralizer System. One new component group was added to LRA Table 2.3.3-23 and additional aging management references were added to three component groups. References to "Dresden only" were also deleted. The additional and revised line items to Table 2.3.3-23 are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction) ~~(Dresden only)~~	Leakage Boundary (spatial)	3.3.1.1, **3.3.1.5, 3.3.2.21,** 3.3.2.40, **3.3.2.143, 3.3.2.145, 3.3.2.302**
Pumps (spatial interaction)	**Leakage Boundary (spatial)**	**3.3.2.182, 3.3.2.300**
Sight Glasses (spatial interaction) ~~(Dresden only)~~	Leakage Boundary (spatial)	3.3.1.5, 3.3.2.198, 3.3.2.199
Valves (spatial interaction) ~~(Dresden only)~~	Leakage Boundary (spatial)	**3.3.1.1**, 3.3.1.5, **3.3.2.21, 3.3.2.40, 3.3.2.272**, 3.3.2.273, **3.3.2.314**

Plant Heating Steam (LRA Section 2.3.3-24)

Additional piping and components from the plant heating system were added to the scope of license renewal at Dresden. Specifically, heating system components located in the Unit 2/3 Crib House shown on new boundary diagram LR-DRE-M-175-1 were added to the scope of license renewal due to the potential for spatial interaction with safety related equipment. This boundary expansion includes more of the same type of components already represented on Table 2.3.3-24 of the LRA. As such, no changes to Table 2.3.3-24 were required.

The resulting changes to the LRA include the following:

a. A new boundary diagram, LR-DRE-M-175-1, was added to the License Renewal Boundary Diagram References in Section 2.3.3-24

b. There were no changes required to Table 2.3.3-24 of the LRA.

Circulating Water System (LRA Section 2.3.3.29)

As a result of the revised scoping methodology, portions of the circulating water systems at Dresden and Quad Cities were added to the scope of license renewal. The circulating water system is a non-safety related system that could spatially interact with portions of the safety related emergency diesel cooling water system at both sites. At Quad Cities, only the Unit 1 circulating water system can spatially interact with safety related components. For this reason, only the Unit 1 circulating water system was added to the scope of license renewal at Quad Cities. Section 2.3.3.29, Circulating Water System has been created for NRC staff review.

System Purpose

The purpose of the circulating water system is to remove the heat rejected from the main condenser.

System Operation

The circulating water system at Dresden takes supply from the Dresden cooling lake (with makeup from the Kankakee River) or directly from the Kankakee River, directs the flow through the condenser, and discharges it back to the Dresden cooling lake and/or the Illinois River system. The circulating water system at Quad Cities takes suction directly from the Mississippi River, discharges the flow through the condenser, and directs it back to the river.

The circulating water system on each unit has three circulating water pumps which deliver water from the crib house intake to the condenser water boxes. Each pump suction is sectionalized to permit dewatering of one pit for maintenance while the remaining two pumps are in operation. Upstream of each circulating water pump is a bar-grille trash rack with a rake for periodic removal of river debris followed by traveling screens for the removal of debris. Each pump is provided with a shutoff valve at its discharge. At the condenser pit, the circulating water pipe becomes a supply header to the main condenser. Circulating water flows through the condenser and exits via outlet water boxes. From the outlet water boxes, the circulating water flows through discharge piping to the discharge canal at Dresden and the Mississippi River at Quad Cities. Appropriate piping and valving is provided to permit reversing flow through the condenser thereby cleaning the tubes.

System Evaluation Boundary

The circulating water system boundary begins with the trash rake and traveling screens prior to entry into the circulating water system. The system boundary continues at each circulating water pump suction where water is pumped by the circulating water pumps through a discharge shutoff valve and piping into a supply header that leads to the main condenser the inlet water boxes. The circulating water system boundary ends where water exits the condenser via the discharge piping. Isolation valves are located at the inlet and outlet of the water boxes to allow for flow reversal through the main condenser.

UFSAR References

Dresden Station UFSAR Section(s): 10.4.5

Quad Cities Station UFSAR Section(s): 10.4.5

License Renewal Boundary Diagram References

Dresden Station: LR-DRE-M-36

Quad Cities Station: LR-QDC-M-28-1

System Intended Functions

Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

Component Groups Requiring Aging Management

LRA Table 2.3.3-29 "Component Groups Requiring Aging Management Review – Circulating Water System"

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.1.15
Valves (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.1.15
Pumps (spatial interaction) (Dresden only)	Leakage Boundary (spatial)	3.3.2.31, 3.3.2.179, 3.3.2.180

Laundry Waste Treatment System (LRA Section 2.3.3.30 (Dresden only)

As a result of the revised scoping methodology, a portion of the laundry waste treatment system at Dresden was added to the scope of license renewal. Non-safety related laundry waste treatment system piping could spatially interact with safety related electrical switchgear at Dresden. As a result, Section 2.3.3.30, Laundry Waste Treatment System has been created for NRC staff review.

System Purpose

The purpose of the laundry waste treatment system is to collect potentially radioactive water for liquid radwaste processing.

System Operation

The laundry drain tank of the laundry waste treatment system collects liquid waste generated from the laundry facility which includes the Dresden Unit 1 laundry room, the maintenance shop floor drains, and the access control building personnel decontamination station drains. The liquid waste is pumped to the Dresden Unit 2/3 liquid radwaste system for sampling.

System Evaluation Boundary

The laundry system boundary includes the laundry accumulator tank, drain tank vault sump eductor, laundry drain tank, laundry drain pump, and associated piping, valves and instruments.

UFSAR References

Dresden Station UFSAR Section(s): 1.2.4.4.11

Quad Cities Station UFSAR Section(s): N/A

License Renewal Boundary Diagram References

Dresden Station: LR-DRE-M-1003

Quad Cities Station: N/A

System Intended Functions

Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

Component Groups Requiring Aging Management

LRA Table 2.3.3-30 'Component Groups Requiring Aging Management Review – Laundry System,"

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction) (Dresden only)	**Leakage Boundary (spatial)**	**3.3.2.130**

While the laundry waste treatment system includes the laundry accumulator tank, drain tank vault sump eductor, laundry drain tank, laundry drain pump, and associated piping, valves and instruments, only discharge piping transferring water to radwaste is located in the same general area the includes safety related electrical switchgear. For that reason, only piping and fittings require aging management.

Zinc Injection System (LRA Section 2.3.3.31)

As a result of the revised scoping methodology, the zinc injection system at both sites was added to the scope of license renewal. The zinc injection system is a non-safety related system that could spatially interact with safety related piping. Section 2.3.3.31, Zinc Injection System has been created for NRC staff review.

System Purpose

The purpose of the zinc injection system is to reduce the amount of Cobalt-60 buildup on recirculation piping in the primary containment and reduce dose rates in the drywell during outages.

System Operation

The zinc injection system is mounted on a skid near the reactor feedwater pumps. A tap on the feedwater pump discharge header provides flow to a vessel on the skid which contain zinc oxide pellets and returns to the feedwater pump suction header. The driving force for the injection is the differential pressure between the discharge and suction of the feedwater pumps. The zinc oxide dilution rate is controlled by varying the flow through the skid with a manually operated flow control valve.

System Evaluation Boundary

The zinc injection system boundary includes the all associated piping, inline manual isolation globe valves, rupture discs, and strainers.

UFSAR References

Dresden Station UFSAR Section(s): 5.4.3.7

Quad Cities Station UFSAR Section(s): 10.4.7.2

License Renewal Boundary Diagram References

Dresden Station: LR-DRE-M-14, LR-DRE-M-16, LR-DRE-347, LR-DRE-M-349, LR-DRE-M-4431 and LR-DRE-M-4431A

Quad Cities Station: LR-QDC-M-15-1, LR-QDC-M-15-4, LR-QDC-M-17, LR-QDC-M-62-1, LR-QDC-M-62-4, and LR-QDC-M-64.

System Intended Functions

Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

Component Groups Requiring Aging Management

LRA Table 2.3.3-31 Component Groups Requiring Aging Management Review – Zinc Injection System

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.2.143
Tubing (spatial interaction)	Leakage Boundary (spatial)	3.3.2.40, 3.3.2.321
Valves (spatial interaction)	Leakage Boundary (spatial)	3.3.1.5, 3.3.2.40, 3.3.2.272, 3.3.2.317

Strainers, rupture discs, and the vessel containing zinc pellets were evaluated in the "Piping and Fittings" component group for aging management.

Main Steam (LRA Section 2.3.4.1)

The system boundaries for the main steam system at both Dresden and Quad Cities were expanded under the revised scoping methodology. Specifically, plant walkdowns of the Turbine Buildings at each site identified several main steam instrumentation racks containing small bore pipe and tubing that could spatially interact with safety related equipment in the same general area. The additional piping components added from the instrument racks are shown on revised boundary diagrams LR-QDC-CID-13-2, LR-QDC-CID-60-2, LR-DRE-M-12-2, LR-DRE-M-345-2, and new boundary diagrams LR-QDC-CID-14 and LR-QDC-CID-61. Finally, plant walkdowns of the Turbine Building at Dresden station identified several main steam lines supplying steam to the radwaste reboilers that are routed in the same general areas containing safety related components. These lines are shown on revised boundary diagram LR-DRE-M-722 and were included within the scope of license renewal due to the potential for spatial interaction with safety related equipment.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-QDC-CID-14 and LR-QDC-CID-61, were added to the License Renewal Boundary Diagram References in Section 2.3.4-1.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-1 Component Groups Requiring Aging Management Review – Main Steam. Three new component groups were added to LRA Table 2.3.4-1 and are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.4, 3.4.2.5, 3.4.2.11, 3.4.2.35
Tubing (spatial interaction)	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.47
Valves (spatial interaction)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.4, 3.4.2.5, 3.4.2.11, 3.4.2.54

Feedwater (LRA Section 2.3.4.2)

The feedwater system boundary was previously expanded to include all high pressure system piping and components in response to RAI 2.1-2b. As a result of the scoping methodology change described above, the entire feedwater system at both Dresden and Quad Cities are included within the scope of license renewal. All of the feedwater piping components shown on revised boundary diagrams LR-QDC-M-15-1, LR-QDC-M-62-1, LR-DRE-M-14, and LR-DRE-M-347 have been included within the scope of license renewal. Feedwater sample lines shown on revised boundary diagrams LR-QDC-M-459-3, LR-DRE-M-177-2, LR-DRE-M-419-2, and LR-DRE-M-420 were also added to the scope of license renewal.

The resulting changes to the LRA include the following:

a. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-2, Component Groups Requiring Aging Management Review – Feed Water System. Two new component groups were added to LRA Table 2.3.4-2 and additional aging management references were added to two component groups. The additional and revised line items to Table 2.3.4-2 are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.3, 3.4.1.4, 3.4.2.5, 3.4.2.6, **3.4.2.11, 3.4.2.35**
Pumps (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3, 3.4.1.4**
Tubing (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.2.11, 3.4.2.47**
Valves (spatial interaction)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.3, 3.4.1.4, 3.4.2.5, 3.4.2.13, **3.4.2.11**, 3.4.2.54

Condensate and Condensate Storage System (LRA Section 2.3.4.3)

The system boundaries for the condensate and condensate storage system at both Dresden and Quad Cities were expanded under the revised scoping methodology due to the potential for spatial interaction with safety related components. The following scope changes were made.

At Dresden, all of the condensate transfer pumps, condensate jockey pumps, and associated suction and discharging piping shown on boundary diagrams LR-DRE-M-35-1 and LR-DRE-M-366 were added to the scope of license renewal. At Quad Cities, the same pumps and associated suction and discharge piping shown on boundary diagram LR-QDC-M-16-1 were added to the scope of license renewal.

With the exception of the condensate demineralizers, steam jet air ejectors, condensate piping in the heater bays (Dresden only) and gland steam condensers, which reside in their own rooms isolated from safety related equipment, the entire condensate and condensate storage systems at Dresden and Quad Cities were added to the scope of license renewal. All of the components on boundary diagram LR-DRE-M-35-1 with the exception of the Dresden Unit 1 contaminated demineralized water storage tank were added to the scope of license renewal. The Dresden Unit 1 contaminated demineralized water storage tank is located outside of the plant away from any safety related equipment. Condensate piping and components highlighted on the revised and new boundary diagrams listed below have been added to the scope of license renewal:

Quad Cities	Dresden
LR-QDC-M-16-1 (revised)	LR-DRE-M-13 (new)
LR-QDC-M-16-2 (revised)	LR-DRE-M-15 (revised)
LR-QDC-M-16-3 (new)	LR-DRE-M-15-2 (new)
LR-QDC-M-16-4 (revised)	LR-DRE-M-16 (new)
LR-QDC-M-16-5 (revised)	LR-DRE-M-17-1 (new)
LR-QDC-M-17 (revised)	LR-DRE-M-17-2 (new)
LR-QDC-M-18-1 (new)	LR-DRE-M-17-3 (new)
LR-QDC-M-18-2 (new)	LR-DRE-M-35-1 (revised)
LR-QDC-M-18-3 (new)	LR-DRE-M-43-1 (revised)
LR-QDC-M-42-1 (new)	LR-DRE-M-48 (revised)
LR-QDC-M-63-1 (revised)	LR-DRE-M-177-1 (revised)
LR-QDC-M-63-2 (revised)	LR-DRE-M-177-2 (revised)
LR-QDC-M-63-3 (new)	LR-DRE-M-177-3 (new)
LR-QDC-M-63-4 (revised)	LR-DRE-M-177-4 (revised)
LR-QDC-M-64 (revised)	LR-DRE-M-346 (new)
LR-QDC-M-65-1 (new)	LR-DRE-M-348 (revised)
LR-QDC-M-65-2 (new)	LR-DRE-M-349 (new)
LR-QDC-M-65-3 (new)	LR-DRE-M-350-1 (new)
LR-QDC-M-84-1 (new)	LR-DRE-M-350-2 (new)
LR-QDC-M-459-1 (new)	LR-DRE-M-366 (revised)
LR-QDC-M-459-2 (new)	LR-DRE-M-371-1 (revised)
LR-QDC-M-462-1 (new)	LR-DRE-M-419-1 (revised)
LR-QDC-M-462-2 (new)	LR-DRE-M-419-2 (revised)
	LR-DRE-M-419-3 (new)
	LR-DRE-M-419-4 (revised)

The resulting changes to the LRA include the following:

a. New boundary diagrams: LR-DRE-M-13, LR-DRE-M-15-2, LR-DRE-M-16, LR-DRE-M-17-1, LR-DRE-M-17-2, LR-DRE-M-17-3, LR-DRE-M-177-3, LR-DRE-M-346, LR-DRE-M-349, LR-DRE-M-350-1, LR-DRE-M-350-2, LR-DRE-M-419-3, LR-QDC-M-16-3, LR-QDC-M-18-1, LR-QDC-M-18-2, LR-QDC-M-18-3, LR-QDC-M-42-1, LR-QDC-M-63-3, LR-QDC-M-65-1, LR-QDC-M-65-2, LR-QDC-M-65-3, LR-QDC-M-84-1, LR-QDC-M-359-1, LR-QDC-M-459-2, LR-QDC-M-462-1, and LR-QDC-M-462-2 were added to the License Renewal Boundary Diagram References in Section 2.3.4-3.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-3, Component Groups Requiring Aging Management Review – Condensate and Condensate Storage System. Four new component groups were added to LRA Table 2.3.4-3 and additional aging management references were added to one component group. The additional and revised line items to Table 2.3.4-3 are shown below.

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction) ~~(Dresden only)~~	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.3, 3.4.1.4 **3.4.2.11, 3.4.2.35**
Pumps (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3**
Tanks (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3, 3.4.1.4**
Tubing (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.2.11, 3.4.2.47**
Valves (spatial interaction)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3, 3.4.1.4** **3.4.2.11, 3.4.2.54**

Main Condenser (LRA Section 2.3.4.4)

The Main Condenser was originally included within the scope license renewal at both Dresden and Quad Cities because they provide for post accident containment holdup and plateout of main steam isolation valve bypass leakage. The Main Condenser at Quad Cities station is a non-safety related component that resides in the same general area as the discharge piping from the emergency diesel cooling water system. As such, the potential for spatial interaction could occur and an additional system component function and appropriate aging management has been assigned. This change only applies to Quad Cities as the same physical equipment configuration does not exist at Dresden.

The resulting changes to the LRA include the following:

a. The intended function listed below will be added to the list of System Intended Functions in section 2.3.4.4

   Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-4, Component Groups Requiring Aging Management Review – Main Condenser. Two new component groups were added to LRA Table 2.3.4-4 and are shown below.

Component	Component Intended Function	Aging Management Ref
Main Condenser Hotwells, False Floors (Includes hatches (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.4.2.24, 3.4.2.27**
Main Condenser Waterboxes, Hatches (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.4.2.27, 3.4.2.28**

Main Turbine and Auxiliary System (LRA Section 2.3.4.5)

The original scoping results described in section 2.3.4.5 of the LRA included a portion of the main turbine electrohydraulic control (EHC) at both sites due to spatial interaction with some safety related components. However, portions of the EHC system were excluded from the scope of license renewal because of they were separated from safety related components by a distance greater than 20 feet. The change in scoping methodology has resulted in the addition of the entire system within the scope of license renewal at both sites. All of the associated EHC piping and components shown on revised boundary diagrams LR-QDC-M-2022-2, LR-QDC-M-2022-4, LR-DRE-M-5650-2, and LR-DRE-M-5650-5 were added to the scope of license renewal. Additional components such as EHC pumps, coolers, strainers, filters, accumulators, and the EHC fluid reservoir were added to the scope of license renewal and are shown on new boundary diagrams LR-QDC-M-2022-1, LR-QDC-M-2022-3, LR-DRE-M-5650-1, and LR-DRE-M-5650-4.

The resulting changes to the LRA include the following:

a. New boundary diagrams, LR-QDC-M-2022-1, LR-QDC-M-2022-3, LR-DRE-M-5650-1, and LR-DRE-M-5650-4, were added to the License Renewal Boundary Diagram References in Section 2.3.4-5.

b. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-5 Component Groups Requiring Aging Management Review – Main Turbine and Auxiliary Systems. Three new component groups were added to LRA Table 2.3.4-5 and are shown below.

Component	Component Intended Function	Aging Management Ref
Filters/Strainers (spatial interaction)	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.56
Pump Casings (spatial interaction)	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.57
Tanks (spatial interaction)	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.58

EHC coolers, strainers, and filters were evaluated with the "Filters/Strainers" component group for aging management. The EHC reservoirs were evaluated with the "Tanks" component group. Accumulators were evaluated with an existing component group already included in Table 2.3.4-5 titled "Accumulators".

Turbine Oil system (LRA Section 2.3.4.6)

The original scoping results described in section 2.3.4.6 of the license renewal application only included a portion of the turbine oil system (Hydrogen Seal Oil) at Quad Cities. The change in scoping methodology has resulted in the addition of the turbine oil system within the scope of license renewal at both sites. This includes the hydrogen seal oil subsystem at Dresden. Components highlighted on revised boundary diagrams, LR-QDC-M-48-1, LR-QDC-M-48-5, LR-QDC-M-48-9 and LR-DRE-M-41-1 and new boundary diagrams, LR-DRE-M-5350-1, LR-DRE-M-5350-3, LR-QDC-M-48-2, LR-QDC-M-48-6 have been included within the scope of license renewal.

The resulting changes to the LRA include the following:

a. "(In-Scope for Quad Cities Only)" is removed from the Section 2.3.4.6 heading.

b. Under Sub-section "System Evaluation Boundary," the second paragraph is changed to read, "At Dresden and Quad Cities, portions of this system are in proximity to safety related electrical components."

c. Under Sub-section "UFSAR References," the Dresden Station UFSAR reference is changed from "Not applicable" to "None."

d. "(In-Scope for Quad Cities Only)" is removed from the Table 2.3.4-6 heading.

e. New boundary diagrams LR-DRE-M-5350-1, LR-DRE-M-5350-3, LR-QDC-M-48-2, LR-QDC-M-48-6, were added to the License Renewal Boundary Diagram References in Section 2.3.4-6.

f. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-6, "Component Groups Requiring Aging Management Review - Turbine Oil System. The words "Quad Cities only" were removed from six component groups on LRA Table 2.3.4-6 shown below.

Component	Component Intended Function	Aging Management Ref
Closure Bolting ~~(Quad Cities only)~~	Pressure Boundary	3.4.1.6
Filters/Strainers (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.1.3, 3.4.2.16
Piping and Fittings (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.1.3, 3.4.2.32
Pump Casings (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.9, 3.4.2.37
Tanks (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.1.3, 3.4.2.43
Valves (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.1.3, 3.4.2.50

Main Generator and Auxiliaries (LRA Section 2.3.4.7)

The original scoping results described in section 2.3.4.7 of the LRA only included a portion of the main generator and auxiliaries (Stator Cooling) at Quad Cities. However, portions of the stator cooling system were excluded from the scope of license renewal because of they were separated from a safety related component by a distance greater than 20 feet. The change in scoping methodology has resulted in the addition of the entire system within the scope of license renewal at both sites.

Specifically, all of the associated piping and components shown on revised boundary diagrams LR-QDC-M-2020-1 and LR-QDC-M-2020-2 and new boundary diagrams LR-DRE-M-355A and LR-DRE-M-22A were added to the scope of license renewal.

The resulting changes to the LRA include the following:

a. "(In-Scope for Quad Cities Only)" is removed from the Section 2.3.4.7 heading.

b. Under Sub-section "System Evaluation Boundary," the second paragraph is changed to read, "At Dresden and Quad Cities, portions of this system are in proximity to safety related electrical components."

c. Under Sub-section "UFSAR References," the Dresden Station UFSAR reference is changed from "Not applicable" to "UFSAR Section 8.3."

d. "(In-Scope for Quad Cities Only)" is removed from the Table 2.3.4-7 heading.

e. New boundary diagrams, LR-DRE-M-355A and LR-DRE-M-22A, are added to the License Renewal Boundary Diagram References in Section 2.3.4-7.

f. Aging management references for the components added to the scope of license renewal are already included in LRA Table 2.3.4-7, Component Groups Requiring Aging Management Review – Main Generator and Auxiliaries. The words "Quad Cities only" were removed from six component groups on LRA Table 2.3.4-7 shown below.

Component	Component Intended Function	Aging Management Ref
Heat Exchangers (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.20
Housings (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.21
Piping and Fittings (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.33
Pumps (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.38
Tanks (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.44
Valves (spatial interaction) ~~(Quad Cities only)~~	Leakage Boundary (spatial)	3.4.2.11, 3.4.2.52

g. The words "Quad Cities only" are removed from the heading in Appendix B, Section B.2.7, "Generator Stator Water Chemistry Activities.

h. The words, "Not Used", in Dresden Appendix A, Section A.2.7, are replaced by the aging management program description below.

A.2.7 Generator Stator Water Chemistry Activities

The generator stator water chemistry activities aging management program manages loss of material and cracking aging effects by monitoring and controlling water chemistry. Generator stator water chemistry control maintains high purity water in accordance with General Electric guidelines for stator cooling water systems. Generator stator water is continuously monitored for conductivity and an alarm annunciates if conductivity increases to a predetermined limit."

Extraction Steam System (LRA Section 2.3.4.8)

As a result of the revised scoping methodology, the extraction steam system was added to the scope of license renewal at Quad Cities. Specifically, the entire extraction steam piping system was added to the scope of license renewal because the system could spatially interact with safety related pipe located in the feedwater heater area. Section 2.3.4.8, Extraction Steam System, has been created for NRC staff review.

System Purpose

The purpose of the extraction steam system is to preheat feedwater as it passes through the feedwater heaters prior to being returned to the reactor vessel.

System Operation

Steam is extracted from various points on the main turbine and is routed along with water from the moisture separator drains to the feedwater heaters. This steam is added to heat the condensate and feedwater which flows through the tube side of the feedwater heaters. Extraction steam provides the major heat source during normal operation of the feedwater heaters.

System Evaluation Boundary

The extraction steam system boundary includes piping and valves that supply extraction steam from the low pressure turbine exhaust piping interface to the A, B, and C feedwater heaters and flash tanks. This includes pipe, valves, and associated instrumentation.

UFSAR References

Dresden Station UFSAR Section(s): N/A

Quad Cities Station UFSAR Section(s): 10.1, 10.4

License Renewal Boundary Diagram References

Dresden Station: N/A

Quad Cities Station: LR-QDC-M-14, LR-QDC-M-61

System Intended Functions

Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

Component Groups Requiring Aging Management

LRA Table 2.3.4-8 Component Groups Requiring Aging Management Review – Extraction Steam System

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction) (Quad Cities only)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.3, 3.4.1.4
Valves (spatial interaction) (Quad Cities only)	Leakage Boundary (spatial)	3.4.1.2, 3.4.1.3, 3.4.1.4

Feedwater Heater Drains and Vents (LRA Section 2.3.4.9)

As a result of the revised scoping methodology, the feedwater heater drains and vents system at Quad Cities was added to the scope of license renewal. The feedwater heater drains from the moisture drain tanks, the A, B, C, and D feedwater heaters, and feedwater heater flash tanks and drain tanks at Quad Cities are non-safety related components that could spatially interact with safety related pipe located in the same general area.

The feedwater heater vents are also included within this system but contain non-condensible gases that could not spatially interact (spray) with the same safety related pipe. As such, only drain piping and associated components from the heater drain system have been included within the scope of license renewal. Section 2.3.4.9, Feedwater Heater Drains and Vents System, has been created for NRC staff review.

System Purpose

The purpose of the feedwater heater drains is to establish and maintain the desired level of condensate in the feedwater heater shells. The purpose of the feedwater heater vent system is to remove non-condensible gases from the heater shells and tubes during start-up and power operation.

System Operation

The feedwater heater system is divided into three parallel strings. Each string contains three low pressure heaters, A, B, and C and one high pressure heater D. Condensate cascades from the D high pressure heaters to the A, B, and C low pressure heaters in each string. The condensate exits the A low pressure heaters and is routed through a heater flash tank and low pressure feedwater drain coolers in each string. Drainage is ultimately routed to the main condenser.

The feedwater heater drain and vent system is comprised of the piping and components that connect each of the flash tanks, heaters, and coolers. The feedwater heaters, coolers, and tanks were evaluated in the feedwater system and the condensate and condensate make up systems. Each of the feedwater heaters contains a normal and emergency drain that maintains the normal operating water levels in each heater shell. Each heater drain line contains a flow control valve that maintains normal heater shell water level. When inputs to each feedwater heater exceed the ability of the normal drain level control valve to maintain the normal water level, an emergency drain valve opens to restore the normal operating water level. Condensate from each heater drain cascades from the D high pressure heaters down through the C, B and A heaters respectively.

Each heater also contains two sets of vent lines to remove non-condensible gases during start up and operation. The start up vents are only used during start up conditions to assist the normal vent system. The start up vents are closed during normal operation. The non-condensible gases from the heater shells and tubes are routed to the main condenser for collection and removal by the off-gas system.

System Evaluation Boundary

The evaluation boundary for the feedwater heater drain system is comprised of all the piping, valves, and other piping components that connect the moisture separator drain tanks to the feedwater heaters (A,B,C, D). The boundary continues with the piping components that connect the feedwater heaters to the heater flash tanks, the main condenser, and the low pressure feedwater drain coolers. The evaluation boundaries for the feedwater heater vents portion of the system includes the piping and valves from the feedwater heaters to the main condenser.

UFSAR References

Dresden Station UFSAR Section(s): N/A

Quad Cities Station UFSAR Section(s): 10.4.7.2

License Renewal Boundary Diagram References

Dresden Station: N/A

Quad Cities Station: LR-QDC-M-66-1 and LR-QDC-M-19-1

System Intended Functions

Preclude adverse effects on safety –related SSCs – Non-safety related components that could be a hazard to safety related SSCs maintain sufficient integrity so that the intended function of safety related SSCs is not adversely affected.

Component Groups Requiring Aging Management

LRA Table 2.3.4-9 Component Groups Requiring Aging Management Review – Feedwater Heater Drains and Vents Quad Cities Only

Component	Component Intended Function	Aging Management Ref
Piping and Fittings (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3, 3.4.1.4**
Valves (spatial interaction) (Quad Cities only)	**Leakage Boundary (spatial)**	**3.4.1.2, 3.4.1.3, 3.4.1.4**

LRA Table 3.1.2 Aging management review results for the reactor vessel and internals that are not addressed in NUREG- 1801 revise to read as follows

Ref No	Component Group	Material	Environment	Aging Effect/Mechanism	Aging Management Program	Discussion
3.1.2.66	Pumps	Cast Iron	Lubricating oil (with contaminants and/or moisture)	Loss of material/ General pitting crevice corrosion	One-Time Inspection (B.1.23)	NUREG-1801 does not address cast iron in a Lubricating oil (with contaminants and/or moisture) environment.
3.1.2.67	Component External Surfaces (pumps)	Cast Iron	Air, moisture, and humidity < 100°C (212°F)	Loss of material/ Pitting and crevice corrosion	Bolting Integrity (B.1.12)	NUREG-1801 does not address cast iron in the plant indoor environment.
3.1.2.68	Tanks	Carbon Steel	Lubricating oil (with contaminants and/or moisture)	Loss of material/ General galvanic pitting and crevice corrosion	One-Time Inspection (B.1.23)	NUREG-1801 does not address carbon steel in a Lubricating oil (with contaminants and/or moisture) environment.

LRA Table 3.3-2 Aging management review results for the auxiliary systems that are not addressed in NUREG- 1801 revise to read as follows

Ref No	Component Group	Material	Environment	Aging Effect/Mechanism	Aging Management Program	Discussion
3.3.2.314	Valves	Aluminum	<90°C (<194°F) treated water	Loss of material/ Pitting and crevice corrosion	Water Chemistry (B.1.2)	NUREG-1801 does not address aluminum in a reactor grade water environment.
3.3.2.316	Piping and Fittings	Stainless Steel	Treated Water	Loss of material/ Pitting and crevice corrosion	Water Chemistry (B.1.2) and One-Time Inspection (B.1.23)	NUREG-1801 does not address non safety related components in a treated water environment.
3.3.2.317	Valves	Stainless Steel	Treated Water	Loss of material/ Pitting and crevice corrosion	Water Chemistry (B.1.2) and One-Time Inspection (B.1.23)	NUREG-1801 does not address non safety related components in a treated water environment.
3.3.2.318	Tubing	Copper	Treated Water	Loss of material/ General galvanic pitting and crevice corrosion	Water Chemistry (B.1.2) and One-Time Inspection (B.1.23)	NUREG-1801 does not address copper in a treated water environment.
3.3.2.319	Pumps	Cast Iron	Chemically treated demineralized water < 90°C (194°F) (TTA-Nitrite based chemical treatment)	Crack initiation and growth/ Stress corrosion cracking intergranular stress corrosion cracking	Closed-Cycle Cooling Water System (B.1.14)	NUREG-1801 does not consider cracking in closed cooling water environments.
3.3.2.321	Tubing	Stainless Steel	Treated Water	Loss of material/ Pitting and crevice corrosion	Water Chemistry (B.1.2) and One-Time Inspection (B.1.23)	NUREG-1801 does not address non safety related components in a treated water environment.

LRA Table 3.4.2 Aging management review results for the steam and power conversion systems that are not addressed in NUREG- 1801 revise to read as follows

Ref No	Component Group	Material	Environment	Aging Effect/Mechanism	Aging Management Program	Discussion
3.4.2.56	Filters/Strainers	Stainless Steel	Turbine EHC Fluid	Loss of material/ Pitting and crevice corrosion	One-Time Inspection (B.1.23), and Lube Oil Monitoring Activities (B2.5)	NUREG-1801 does not address stainless steel components in a turbine EHC fluid environment.
3.4.2.57	Pumps	Stainless Steel	Turbine EHC Fluid	Loss of material/ Pitting and crevice corrosion	One-Time Inspection (B.1.23), and Lube Oil Monitoring Activities (B2.5)	NUREG-1801 does not address stainless steel components in a turbine EHC fluid environment.
3.4.2.58	Tanks	Stainless Steel	Turbine EHC Fluid	Loss of material/ Pitting and crevice corrosion	One-Time Inspection (B.1.23), and Lube Oil Monitoring Activities (B2.5)	NUREG-1801 does not address stainless steel components in a turbine EHC fluid environment.

Attachment 2

Response to RAI B.1.16-01 Supplemental Information Request

RAI B.1.16-01 Supplemental Information Request (Compressed Air)

1. Exelon stated that corrosion, corrosion products, and dirt buildup identified in instrument air system piping, positioners, and valve operators actually occurred in the process fluid portions of these components, not the instrument air portion.
   a) Is this process fluid portion in the scope of license renewal? What was corrective action for this?
   b) Discuss how this re-analysis was performed (i.e. review of work orders, documents, etc.) to determine that problem was not in-scope portion of instrument air. It would be helpful if this was discussed in the cover letter or background section of the revision submitted to the staff.

Response:

a) The process fluid portions come from several different systems. Most of these components are in the scope of license renewal (e.g. CRD hydraulic accumulators, Reactor Water Clean Up valve, HPCI valve, HVAC drain valve, Fire Pump solenoid, etc.). The only components that are not in the scope of license renewal are components that have been abandoned in place due to previous modifications.

The corrective actions varied for the specific components. The components were cleaned (removed corrosion) or replaced, tested and returned to service.

b) The Aging Management Review (AMR) report for the "Gas and Ventilation Air Environment" was reviewed. All of the Operating Experience entries (Work Orders) for this AMR that indicated the cause of the problem was due to "Loss of Material" (corrosion) at Dresden were listed. This list included twenty-six Work Orders. The review determined that in no case was the discussed problem associated with the instrument air supplied side of an in-scope component.

2. Is the Dresden air receiver listed in Table 3 of the LRA? If the air receiver is not within scope of license renewal, why is aging management performed in the AMP?
   a) The staff could not find the air receiver in the LRA.
   b) The compressed air system is not in scope of license renewal since it is fail-safe.
   c) Explain which air system components are in-scope? Is air needed to operate the MSIVs and PORVs? LRA identifies the following compressed air components:
      1. RC - valves, tubing
      2. ESF - tank, piping, fittings, tubing, valves
      3. Aux - piping, fitting, valve, strainers, filters, tubing
      4. SPCS - accumulators, filters/strainer, valves.

Response:

The Dresden air receiver tank is not listed in the LRA because the receiver tank is outside the scope of license renewal. The aging management performed is not to

mitigate aging of the receiver tank, but is performed to prevent moisture accumulation in the receiver tank as a mitigating function for the downstream portion of the instrument air system.

The portions of the instrument air system that are in the scope of license renewal include the supply to the Outboard MSIVs, CRDs, and safety related HVAC dampers. The components include local accumulators and boundary check valves.

Additionally, the Drywell Pneumatic System, which is also in the scope of license renewal, supplies the compressed nitrogen for the Inboard MSIVs and Electromatic Relief Valves.

3. Exelon stated that trap failure was determined to be the cause of corrosion in the air receiver.
   a) Has the root cause of the trap failure been determined?
   b) Are there similar traps in-scope for license renewal and have the corrective actions been implemented for these traps?

Response:

   a) See 7c below.
   b) No, there are no similar traps in the instrument air system that are in-scope for license renewal.

4. The revised AMP/SER drafted by Exelon states that "Dresden has experienced recent occurrences of corrosion, corrosion product buildup, and dirt in the instrument air system receivers and dryers." Explain the occurrences other than the air receiver failure.

Response:

The original AMP in LRA Section B.1.16 made this incorrect statement. Per response 1.b above, Exelon has since determined there were no other instrument air occurrences after the 1994 failure. The revised AMP attached to this response has corrected the statement in question.

5. The revised AMP/SER drafted by Exelon contains the statement, "The applicant indicates that Dresden and Quad Cities have not experienced a failure of a pneumatic component within the scope of license renewal due to corrosion, corrosion product buildup, or dirt since 1993. This experience is consistent with the implementation of corrective actions in response to GL 88-14." Explain the failure that occurred in 1993 and how the corrective actions in response to GL 88-14 corrected this problem.

Response:

The date of the air receiver tank failure was April 30, 1994. The threaded piping on the inlet side of the 2A instrument air receiver tank broke, allowing the system to

depressurize. This piping is not in the scope of license renewal. The corrective actions associated with the event are discussed in 7c below.
There was no specific failure of a pneumatic component within the scope of license renewal in 1993. The intent of the quoted statement was to describe the favorable operating experience for pneumatic components since implementation of GL 88-14. The wording of the attached AMP has been clarified to address this point.

6. What will final revision look like? It should be a revised AMP write-up from the LRA, not a markup of the SER.

Response:

The revised LRA Section A.1.16 (Dresden only) and revised AMP B.1.16 are provided. In addition, a suggested revision to SER Commitment No. 16 is included.

A.1.16 Compressed Air Monitoring [Dresden]

The compressed air monitoring aging management program consists of inspection, monitoring, and testing of the entire system, including (1) pressure decay testing, visual inspections, and walkdowns of various system locations; and (2) preventive monitoring that checks air quality at various locations in the system to ensure that dewpoint, particulates, and suspended hydrocarbons are kept within the specified limits. This program is consistent with responses to NRC Generic Letter 88-14, "Instrument Air Supply Problems," and ANSI/ISA-S7.3-1975, "Quality Standard for Instrument Air." Prior to the period of extended operation, the program will be enhanced to include inspections of instrument air distribution piping based on EPRI TR-108147, "Compressor and Instrument Air System Maintenance Guide," and periodic blowdown of instrument air ~~distribution piping~~ receiver tanks.

This change requires a revision to the commitment 16 in Appendix A of the SER:

Appendix A – D/QCNPS Commitment List Associated with Renewal of the Operating Licenses				
Item Number	Commitment	UFSAR Supplement Location (LRA App. A)	Implementation Schedule	Source
16) Compressed Air Monitoring	Existing program is credited. The program will be enhanced to include periodic inspections on those portions of the instrument air distribution piping in the scope of license renewal. The program will also include additional air sample points representative of the in-scope piping. Additionally, at Dresden only, periodic blowdowns will be provided of the instrument air ~~distribution piping~~ receiver tanks.	A.1.16	Prior to the period of extended operation	LRA Section B.1.16 and response to Supplemental RAI B.1.16-01, letter RS-04-073, dated May 18,2004

B.1.16 Compressed Air Monitoring (Revision)

Description

The compressed air monitoring aging management program activities manage loss of material due to general, crevice, and pitting corrosion for portions of the instrument air system within the scope of license renewal. Program activities consist of air quality testing, pressure decay testing, and visual inspections at various system locations. The activities are consistent with Dresden and Quad Cities responses to NRC Generic Letter 88-14, "Instrument Air Supply Problems," and ANSI/ISA-S7.3-1975, "Quality Standard for Instrument Air." Testing and monitoring activities are implemented through station specific procedures and associated predefined tasks.

NUREG-1801 Consistency

With enhancements the compressed air monitoring aging management program is consistent with the ten elements of aging management program XI.M24, "Compressed Air Monitoring," specified in NUREG-1801 with the following exceptions.

Exceptions to NUREG-1801

NUREG-1801 indicates that the program is based on responses to GL 88-14 and INPO SOER 88-01, "Instrument Air System Failures," as well as EPRI NP-7079-1990, EPRI TR-108147, "Compressor and Instrument Air System Maintenance Guide," ASME OM-S/G-1998 and ANSI/ISA-S7.0.01-1996. The Dresden and Quad Cities programs are based on the guidance provided in the GL 88-14 and ANSI/ISA-S7.3-1975 documents, which are part of the current licensing basis. Enhancements include inspection of instrument air distribution piping based on EPRI TR-108147.

NUREG-1801 indicates that inservice inspection and testing is performed to verify proper air quality, and confirm that maintenance practices, emergency procedures and training are adequate to ensure that the intended function of the air system is maintained. Inservice inspections at Dresden and Quad Cities do not verify air quality because air quality testing is performed in accordance with specific procedures based on ANSI/ISA-S7.3-1975. Maintenance practices, emergency procedures, and training are plant performance issues that are not directly related to aging management of the instrument air systems. Aging management consists of air quality tests and pressure decay tests of MSIV and safety/relief valve pneumatic systems including accumulators, piping, and check valves, and periodic inspections to verify the integrity of the systems.

Enhancements

- The program will provide for new periodic inspections for those portions of instrument air distribution piping at Dresden and Quad Cities that are within the scope of the rule.

- The program will provide for periodic blowdowns of instrument air ~~distribution piping~~ receiver tanks located upstream of the instrument air system dryers at Dresden.

Enhancements are scheduled for implementation prior to the period of extended operation.

Operating Experience

Dresden has experienced ~~recent occurrences of~~ corrosion, corrosion product buildup, and dirt buildup in instrument air system receiver tanks and dryers leading to a receiver tank connection failure in 1994. ~~piping, positioners, and valve operators.~~ The program enhancement of crediting periodic blowdowns of instrument air receiver tanks ~~distribution piping~~ addresses this condition. No similar failure has occurred at Dresden since the receiver tank blowdowns were implemented.

Dresden and Quad Cities have ~~has~~ not experienced a failure of a pneumatically operated ~~pneumatic~~ component within the scope of license renewal due to ~~corrosion, corrosion product buildup, or dirt buildup since 1993~~ aging effects in the instrument air system since implementation of ~~This experience is consistent with the implementation of~~ corrective actions in response to GL 88-14.

Dresden and Quad Cities have experienced equipment failures including MSIVs, dampers, and process valves due to instrument air leaks. These failures were to individual components and did not propagate to other components within the system. Dresden and Quad Cities have not experienced a common mode failure caused by the instrument air system. The Dresden and Quad Cities enhancements of performing predefined tasks that require periodic inspections of instrument air distribution piping address this condition.

Conclusion

The compressed air monitoring aging management program provides reasonable assurance that loss of material aging effects are adequately managed so that the intended functions of the instrument air components within the scope of license renewal are maintained during the period of extended operation.

7. Need to answer all ACRS questions:
    a) What impact has the Dresden compressed air blowdown program had on the reliability of the system, if any?
    b) What are the proposed fixes if the blowdown program does not solve the problem?
    c) Has the root cause of the moisture been identified?

Response:

a) There have been no additional failures since 1994. Although the trap was replaced with a more reliable design, no changes to the preventive maintenance activities were necessary other than implementing the receiver tank blowdowns.

b) The compressor receiver tank, moisture separator, drain traps and portions of the inlet and discharge pipe were replaced. A check valve was installed at the receiver discharge to prevent header depressurization following a tank, compressor, relief valve or pipe failure. The inlet/outlet piping was replaced using

a stainless steel material and an epoxy coating was applied to the interior of the receiver tanks. An improved moisture trap design was installed which is much less susceptible to debris plugging. Periodic blowdowns of the air receiver tanks through the drain trap are performed to prevent moisture buildup. These corrective actions have been effective in preventing recurrence.

c) Moisture and condensation are a natural byproduct of compressing air. The root cause of the failure was oxidation of the carbon steel pipe in the presence of moisture leading to mechanical failure of the threaded portion of the inlet air supply piping to the Unit 2A Instrument Air Receiver Tank. The layered appearance of the oxide indicates the corrosion had taken place over a period of years, the pipe eventually failed when it could no longer withstand system operating pressure. Contributing to this failure were the receiver tank inlet and discharge connections, which were threaded versus welded.
A manual drain valve was connected at the base of the moisture separator. A 12 x 5 inch rectangular section was cut from the moisture separator to facilitate destructive examination. The tank base drain location was found plugged solid with debris, approximately two to three inches of rust and scale had accumulated in the base of the tank. The moisture separator drain trap was connected at a sight glass port five (5) inches above the base of the tank. Although the available documentation does not explicitly state that the debris prevented the trap from performing its function, the trap replacement and blowdowns of the receiver tank have prevented recurrence of the failure.

RAI 2.1-1 SUPPLEMENTAL INFORMATION REQUEST BOUNDARY DIAGRAMS

	Dresden	Quad Cities	Total
New	32	33	65
Revised	39	42	81
Total	71	75	146

Quad Cities

LR-QDC-CID-13-2 R
LR-QDC-CID-14 N
LR-QDC-CID-60-2 R
LR-QDC-CID-61 N
LR-QDC-M-14 N
LR-QDC-M-15-1 R
LR-QDC-M-15-4 N
LR-QDC-M-16-1 R
LR-QDC-M-16-2 R
LR-QDC-M-16-3 N
LR-QDC-M-16-4 R
LR-QDC-M-16-5 R
LR-QDC-M-17 R
LR-QDC-M-18-1 N
LR-QDC-M-18-2 N
LR-QDC-M-18-3 N
LR-QDC-M-19-1 N
LR-QDC-M-21 N
LR-QDC-M-22-1 R
LR-QDC-M-22-2 N
LR-QDC-M-22-3 R
LR-QDC-M-22-4 R
LR-QDC-M-22-5 R
LR-QDC-M-23 N
LR-QDC-M-28-1 N
LR-QDC-M-31 N
LR-QDC-M-33-1 R
LR-QDC-M-33-2 R
LR-QDC-M-35-4 R
LR-QDC-M-38 R
LR-QDC-M-41-4 R
LR-QDC-M-42-1 N
LR-QDC-M-48-1 R
LR-QDC-M-48-2 N
LR-QDC-M-48-5 R
LR-QDC-M-48-6 N
LR-QDC-M-48-9 R
LR-QDC-M-58-1 R
LR-QDC-M-58-3 R
LR-QDC-M-61 N
LR-QDC-M-62-1 R
LR-QDC-M-62-4 N
LR-QDC-M-63-1 R
LR-QDC-M-63-2 R
LR-QDC-M-63-3 N
LR-QDC-M-63-4 R
LR-QDC-M-64 R
LR-QDC-M-65-1 N
LR-QDC-M-65-2 N
LR-QDC-M-65-3 N
LR-QDC-M-66-1 N
LR-QDC-M-68 N
LR-QDC-M-69-1 R
LR-QDC-M-69-2 N
LR-QDC-M-69-3 R
LR-QDC-M-69-4 R
LR-QDC-M-69-5 R
LR-QDC-M-75-1 R
LR-QDC-M-75-2 R
LR-QDC-M-77-4 R
LR-QDC-M-80 R
LR-QDC-M-83-4 R
LR-QDC-M-84-1 N
LR-QDC-M-459-1 N
LR-QDC-M-459-2 N
LR-QDC-M-459-3 R
LR-QDC-M-462-1 N
LR-QDC-M-462-2 N
LR-QDC-M-462-3 R
LR-QDC-M-2020-1 R
LR-QDC-M-2020-2 R
LR-QDC-M-2022-1 N
LR-QDC-M-2022-2 R
LR-QDC-M-2022-3 N
LR-QDC-M-2022-4 R

Dresden

LR-DRE-M-12-2 R
LR-DRE-M-13 N
LR-DRE-M-14 R
LR-DRE-M-15 R
LR-DRE-M-15-2 N
LR-DRE-M-16 R
LR-DRE-M-17-1 N
LR-DRE-M-17-2 N
LR-DRE-M-17-3 N
LR-DRE-M-20 R
LR-DRE-M-21 R
LR-DRE-M-22 R
LR-DRE-M-22A N
LR-DRE-M-30 R
LR-DRE-M-31 R
LR-DRE-M-34-1 R
LR-DRE-M-35-1 R
LR-DRE-M-35-2 N
LR-DRE-M-36 R
LR-DRE-M-37-7 N
LR-DRE-M-37-10 N
LR-DRE-M-41-1 R
LR-DRE-M-43-1 R
LR-DRE-M-45-1 N
LR-DRE-M-48 R
LR-DRE-M-50 N
LR-DRE-M-175-1 N
LR-DRE-M-177-1 R
LR-DRE-M-177-2 R
LR-DRE-M-177-3 N
LR-DRE-M-177-4 R
LR-DRE-M-178 R
LR-DRE-M-269-3 R
LR-DRE-M-345-2 R
LR-DRE-M-346 N
LR-DRE-M-347 R
LR-DRE-M-348 R
LR-DRE-M-349 N
LR-DRE-M-350-1 N
LR-DRE-M-350-2 N
LR-DRE-M-353 R
LR-DRE-M-354-1 R
LR-DRE-M-354-2 R
LR-DRE-M-355 R
LR-DRE-M-355A N
LR-DRE-M-362 R
LR-DRE-M-365-1 R
LR-DRE-M-366 R
LR-DRE-M-367-4 N
LR-DRE-M-367-6 N
LR-DRE-M-371-1 R
LR-DRE-M-419-1 R
LR-DRE-M-419-2 R
LR-DRE-M-419-3 N
LR-DRE-M-419-4 R
LR-DRE-M-420 R
LR-DRE-M-421 R
LR-DRE-M-530-1 N
LR-DRE-M-722 R
LR-DRE-M-1003 N
LR-DRE-M-1011-5 N
LR-DRE-M-3486 N
LR-DRE-M-3496 N
LR-DRE-M-4431 N
LR-DRE-M-4431A N
LR-DRE-M-5350-1 N
LR-DRE-M-5350-3 N
LR-DRE-M-5650-1 N
LR-DRE-M-5650-2 R
LR-DRE-M-5650-4 N
LR-DRE-M-5650-5 R