

5. REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

In accordance with Title 10, Part 54, of the *Code of Federal Regulations* (10 CFR Part 54), the Advisory Committee on Reactor Safeguards (ACRS) will review the license renewal application (LRA) for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2. The ACRS Subcommittee on Plant License Renewal will continue its detailed review of the LRA after this report is issued. The applicant and the staff will meet with the full committee to discuss issues associated with the review of the LRA. After the ACRS completes its review of the LRA and the safety evaluation report (SER), the full committee will issue a report discussing the results of its review. This report will be included in an update to this SER. The staff will address any issues and concerns identified in that report.

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6. CONCLUSIONS

The staff reviewed the license renewal application for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2, in accordance with Commission regulations and the NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," dated July 2001. The standards for issuance of renewed license are provided in Title 10, Section 54.29, of the *Code of Federal Regulations* (10 CFR 54.29).

On the basis of its evaluation of the application, as discussed above, the staff concludes that the requirements of 10 CFR 54.29(a) have been met, and all open items and confirmatory items of this safety evaluation report have been resolved.

The staff notes that any requirements of Subpart A of 10 CFR Part 51 are documented in the final plant-specific supplement to the Generic Environmental Impact Statements issued on June 29, 2004 for Dresden, and June 30, 2004, for Quad Cities.

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APPENDIX A

COMMITMENTS FOR LICENSE RENEWAL

During the review of the Dresden/Quad Cities Nuclear Power Station (D/QCNPS) license renewal application (LRA) by the U.S. Nuclear Regulatory Commission (NRC) staff, the applicant made commitments related to aging management programs (AMPs) to manage aging effects of structures, systems, and components (SSCs) before the period of extended operation. The following table lists these commitments, along with the implementation schedule and the source of the commitment.

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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
1) ASME Code, Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	Existing program is credited. Both Dresden and Quad Cities will be implementing RI-ISI and its alternative inspections for Class 1 and 2 piping within the scope of license renewal. The requirements of ASME Code, Section XI will be implemented in accordance with 10 CFR 50.55(a).	A.1.1	Prior to the period of extended operation	LRA Section B.1.1; Response to RAI 3.1-25 and RAI B.1.1, letter RS-03-181, dated October 3, 2003
2) Water Chemistry	Existing program is credited. The program will be enhanced to provide increased sampling to verify corrective actions are taken to address abnormal chemistry conditions. The Quad Cities procedure for turbine building sample panel collection will be revised to assure maintenance of the integrity of chemistry samples.	A.1.2	Prior to the period of extended operation	LRA Section B.1.2
3) Reactor Head Closure Studs	Existing program is credited.	A.1.3	Ongoing	LRA Section B.1.3
4) BWR Vessel ID Attachment Welds	Existing program is credited	A.1.4	Ongoing	LRA Section B.1.4
5) BWR Feedwater Nozzle	Existing program is credited. The program will be enhanced to implement the recommendations of Revision 1, Version A of report GE-NE-523-A71-0594-A, Revision 1, which was approved by the NRC staff.	A.1.5	Prior to the period of extended operation	LRA Section B.1.5; Response to Supplemental RAI B.1.5, letter RS-03-223, dated November 21, 2003
6) BWR Control Rod Drive Return Line Nozzle	Existing Program is Credited	A.1.6	Ongoing	LRA Section B.1.6

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7) BWR Stress Corrosion Cracking	Existing program is credited. The program will be enhanced to include an additional ultrasonic examination of the Quad Cities Unit 2 reactor vessel head crack (detected in 1990) to verify that the relevant indication has remained essentially unchanged. The examination will be completed by the end of 2018 (plus or minus 2 years).	A.1.7	End of 2018 (plus or minus 2 years)	LRA Section B.1.7; Response to Supplemental RAI 3.1-1, letter RS-03-235, dated December 17, 2003
8) BWR Penetrations	Existing program is credited.	A.1.8	Ongoing	LRA Section B.1.8

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Item Number	Commitment	UFSAR Supplement Location (LRA App. A)	Implementation Schedule	Source
9) BWR Vessel Internals	<p>Existing program is credited. The program will be enhanced as follows:</p> <p>(1) Additional inspections will be performed when new inspection techniques and tooling are developed, incorporated into applicable BWRVIP document(s), and approved by the NRC.</p> <p>(2) Dresden and Quad Cities agree to perform inspections of the top guide similar to inspections of the control rod drive housing guide tube. However, Exelon reserves the right to modify the above agreed upon inspection program should the BWRVIP-26 be revised in the future.</p> <p>(3) Exelon has made commitments to ensure that the Dresden and Quad Cities steam dryers will maintain their structural integrity at EPU power levels for long-term operation and will not generate loose parts. These commitments have been submitted to the NRC for acceptance in a letter dated May 12, 2004. Should Exelon's plans not be successful, Exelon will include the steam dryers in the scope of license renewal under 10 CFR 54.4(a)(2) and will provide the appropriate aging management in accordance with 10 CFR 54.37(b).</p>	A.1.9	As approved by the NRC	LRA Section B.1.9; Response to RAIs 4.2-BWRVIPs and B.1.9, letter RS-03-181, dated October 3, 2003; responses to Supplemental RAIs 4.2-BWRVIP and B.1.9(d), letter RS-03-223, dated November 21, 2003; RS-04-080, dated May 27, 2004

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Item Number	Commitment	UFSAR Supplement Location (LRA App. A)	Implementation Schedule	Source
10) Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	An aging management program will be implemented for thermal aging and neutron irradiation embrittlement of CASS reactor internal components within the scope of license renewal. A component specific evaluation for the loss of fracture toughness will be included. For those components where the loss of fracture toughness may affect the function of the component, an inspection will be performed as part of the ISI program.	A.1.10	Prior to the period of extended operation	LRA Section B.1.10
11) Flow-Accelerated Corrosion	Existing program is credited. The program will be enhanced to include portions of the main steam and the reactor vessel head vent systems that are within the scope of license renewal.	A.1.11	Prior to the period of extended operation	LRA Section B.1.11, response to RAI 3.1-18, letter RS-03-181, dated October 3, 2003
12) Bolting Integrity	Existing program is credited. The program will be enhanced to do the following: (1) Credit periodic in-service Inspection piping and component preventive maintenance inspections, system engineering walkdowns, and routine walkdowns to inspect for leakage and visual indications of loose bolts; trend walkdown results (2) Manage the loss of preload for closure bolting in the reactor vessel system, recirculation pumps, reactor recirculation valves, reactor vessel head vent valves, and the reactor pressure boundary portion of all other systems. (3) Credit periodic inspections of the closure bolting in accordance with the ASME Code Section XI requirements. (4) Inspect bolted joints of diesel generator system components, component bolted joint inspections in high-humidity/moisture areas (pump vaults), and reactor vessel-to-ring girder bolting. (5) Enhance implementing procedure to reference NUREG-1339.	A.1.12	Prior to the period of extended operation	LRA Section B.1.12; response to Supplemental RAI 3.5-13, letter RS-03-227, dated December 5, 2003; response to RAI 3.1-13, letter RS-03-181, dated October 3, 2003; response to Supplemental RAI 3.1-13, letter RS-03-223, dated November 21, 2003; response to RAI B.1.12(d), letter RS-03-181, dated October 3, 2003

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Item Number	Commitment	UFSAR Supplement Location (LRA App. A)	Implementation Schedule	Source
13) Open-Cycle Cooling Water Program	Existing program is credited. The program will be enhanced to include periodic inspections of cooling water pump internal linings, additional heat exchangers and sub-components, external surfaces of various submerged pumps, components in the high humidity/moisture environments of the pump vaults, and piping. At Dresden only, periodic visual inspections will be performed of strainer internals in the CCSW supply line to the main control room HVAC.	A.1.13	Prior to the period of extended operation	LRA Section B.1.13; response to Supplemental RAI B.1.13(a), letter RS-03-235, dated December 17, 2003
14) Closed-Cycle Cooling Water Program	Existing program is credited. The program will be enhanced to provide monitoring of specific parameters in accordance with EPRI TR-107396 guidance. This will include provisions for monitoring parameters such as pH, specific gravity, freeze point, reserve alkalinity, percent glycol and suspended solids in glycol based systems as appropriate. At Dresden, the program will include monitoring of pH and ammonia in the diesel generator jacket water.	A.1.14	Prior to the period of extended operation	LRA Section B.1.14
15) Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Existing program is credited. The program will be enhanced to include specific inspections for rail wear and proper crane travel on the rails, and for corrosion of crane structural components.	A.1.15	Prior to the period of extended operation	LRA Section B.1.15
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 receiver tanks.	A.1.16	Prior to the period of extended operation	LRA Section B.1.16; response to Supplemental RAI B.1.16-01, letter RS-04-073, dated May 18, 2004
17) BWR Reactor Water Cleanup System	Existing program is credited.	A.1.17	Ongoing	LRA Section B.1.17

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18) Fire Protection	<p>Existing program is credited. The program will be enhanced as follows:</p> <p>(1) Specific guidance will be provided to check fire doors for wear and holes in skin. At Quad Cities only, the program will be revised to include the requirement to check fire door clearances.</p> <p>(2) Periodic inspections will be performed for corrosion on the external surfaces of piping and components for the carbon dioxide systems; and for the external surfaces of the Dresden halon system.</p> <p>(3) Specific guidance will be provided for examining the fire pumps and the Dresden isolation condenser makeup pump diesel fuel supply systems for leaks during pump tests.</p> <p>(4) Periodic capacity tests will be performed on the Dresden isolation condenser diesel-driven makeup pumps.</p> <p>(5) At Dresden, frequency of inspections will be provided for fire doors and spill barriers.</p> <p>(6) The program will be revised to perform a visual inspection (VT-1 or equivalent) on a 10% sample population of each type of fire seal on a refueling outage frequency. Additionally, the program will be revised to expand the sample population by 10% if any of the inspected seals are found to have abnormal degradation that could prevent the seal from performing its intended function.</p>	A.1.18	Prior to the period of extended operation	LRA Section B.1.18; response to Supplemental RAI B.1.18-01, letter RS-03-222, dated November 20, 2003; NRC Aging Management Program Audit Report, dated April 23, 2004
19) Fire Water System	<p>Existing program is credited. The program will be enhanced as follows:</p> <p>(1) Periodic non-intrusive wall thickness measurements will be provided of selected portions of the fire water system.</p> <p>(2) Periodic inspections will be performed on the external surfaces of submerged fire pumps, outdoor fire hydrants, and outdoor transformer deluge system components.</p> <p>(3) Sampling of sprinklers will be performed in accordance with NFPA 25, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems."</p>	A.1.19	Prior to the period of extended operation	LRA Section B.1.19

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20) Above-ground Carbon Steel Tanks	Existing program is credited. The program will be enhanced as follows: (1) Periodic system engineer walkdowns will be performed on the nitrogen storage tanks utilizing stand-alone procedures. (2) At Quad Cities, a one-time UT thickness inspection will be performed of the aluminum condensate storage tank or demineralized water storage tank. (3) At Dresden, periodic internal/external inspections of the aluminum storage tanks will be performed, and periodic UT thickness inspections will be performed of the bottoms will be performed	A.1.20	Prior to the period of extended operation	LRA Section B.1.20; responses to Supplemental RAIs B.1.2 and B.1.20, letter RS-03-222, dated November 20, 2003; NRC Aging Management Program Inspection Report 05000237/2003010(DRS); 05000249/2003010(DRS); 05000254/2003014(DRS); 05000265/2003014(DRS), dated December 5, 2003
21) Fuel Oil Chemistry	Existing program is credited. The program will be enhanced to include inspection of the fuel oil storage tank interiors for corrosion during regularly scheduled tank cleanings.	A.1.21	Prior to the period of extended operation	LRA Section B.1.21; response to RAI B.1.21, letter RS-03-180, dated October 3, 2003
22) Reactor Vessel Surveillance	Existing program is credited. The program will be enhanced as follows: (1) The Integrated Surveillance Program (ISP) for the license renewal period (in accordance with proposed BWRVIP-116) will be implemented when approved by the NRC. (2) If BWRVIP-116 is not approved, a plant-specific surveillance plan will be provided for the license renewal period in accordance with Appendices G and H to 10 CFR Part 50	A.1.22	Prior to the period of extended operation	LRA Section 3.1.1.1.4, LRA Section B.1.22, response to RAI B.1.22, letter RS-03-181, dated October 3, 2003; response to Supplemental RAI B.1.22, letter RS-03-223, dated November 21, 2003

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23) One-Time Inspection	<p>One-time inspection sampling will be performed on the following:</p> <ul style="list-style-type: none"> (1) at Dresden, spent fuel pool cooling and demineralizer system components for corrosion in stagnant locations (2) condensate and torus water components for corrosion in stagnant locations (3) compressed gas system piping components for corrosion (4) compressed gas system flexible hoses for age related degradation (5) lower sections of carbon steel fuel oil and lubricating oil tanks for reduced thickness (6) fuel oil and lubricating oil piping and components for corrosion (7) control room ventilation, EDG ventilation, SBO building ventilation, reactor building ventilation, and standby gas treatment system components for loss of material (8) HPCI lubrication oil hoses for age related degradation (9) non-safety-related vent and drain components for age related degradation (10) 10 CFR 54.4(a)(2) components for corrosion (11) piping exposed to containment atmosphere for loss of material (12) torus saddle supports to confirm condition of drywell radial beam lubrite baseplates (13) 10% of high and medium risk butt welds in ASME Code, Class 1, NPS < 4 in. piping (14) stainless steel components in CRD hydraulic system and stainless steel clevis pins in torus water environment for stress corrosion cracking; clevis pin interface with uncoated carbon steel in torus water environment for galvanic corrosion (15) sample of stainless steel standby liquid control system components not in reactor coolant pressure boundary section of SBLC system for cracking 	A.1.23	Prior to the period of extended operation	LRA Sections 3.2.1.1.3, 3.2.1.1.5, 3.5.1.1.6, and B.1.23; response to Supplemental RAI B.1.23-2.1, letter RS-04-014 dated January 26, 2004; response to RAIs 3.5-7 and 3.1-9, letter RS-03-201 dated October 3, 2003; response to Supplemental RAI 3.1-21(b), letter RS-03-223, dated November 21, 2003; response to Supplemental RAIs B.1.2, B.1.2-1, and 3.1-21(a), letter RS-03-238, dated December 22, 2003; responses to Supplemental RAIs 3.5-15 and 3.5-17, letter RS-03-227, dated December 5, 2003; letter RS-04-046, dated December 25, 2004

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24) Selective Leaching of Materials	A sample of components that are made of susceptible materials will be visually inspected for evidence of selective leaching. The sample will be expanded if failed conditions are identified.	A.1.24	Prior to the period of extended operation	LRA Section B.1.24
25) Buried Piping and Tanks Inspection	Existing program is credited. The program will be enhanced as follows: (1) A one-time visual inspection will be performed on the external surface of a section of buried ductile iron fire main piping (including a mechanical joint). (2) A one-time internal UT of one buried steel tank per site will be performed. (3) At Quad Cities, periodic leakage checks will be performed on buried carbon steel fuel oil storage tanks.	A.1.25	Prior to the period of extended operation	LRA Section B.1.25; response to RAI B.1.25, letter RS-03-181, dated October 3, 2003; response to Supplemental RAI B.1.25-1, letter RS-04-046, dated March 25, 2004
26) ASME Code, Section XI, Subsection IWE	Existing program is credited. The program will be enhanced as follows: (1) The program will be based on the latest edition and addenda, which is approved by the NRC 12 months prior to the end of the current 120-month inspection interval. (2) The program will be updated in accordance with 10 CFR 50.55(a). (3) Additional inspections of the Dresden Unit containment shell for corrosion will be provided. (4) Requirements will be provided in Quad Cities procedures to ensure that sand pocket drains are clear. (5) The pressurized testing methodology will be credited for managing the aging of bellows.	A.1.26	Prior to the period of extended operation	Response to RAI B.1.26, letter RS-03-180, dated October 3, 2003; responses to Supplemental RAIs 2.4-3, 3.5-5, 4.7.2.2-1, and 4.7.2.2-02, letter RS-03-227, dated December 5, 2003; response to Supplemental RAI B.1.27, letter RS-04-046, dated March 25, 2004; LRA Section B.1.26, response to RAI 3.5-6, letter RS-03-227, dated December 5, 2003

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27) ASME Code, Section XI, Subsection IWF	Existing program is credited. The program will be enhanced to include inspection of Class MC component supports consistent with NUREG-1801, Chapter III, Section B1.3. The ASME Code, Section XI, Subsection IWF program will manage the aging of the following Class MC supports: (1) Biological Shield to Containment Stabilizer (2) RPV Male Stabilizer Attached to Outside of Drywell Shell (3) RPV Female Stabilizer and Anchor Rods (4) Suppression Chamber Ring Girder Vertical Supports and Base Plates (5) Suppression Chamber Saddle Supports and Base Plates (6) Suppression Chamber Seismic Restraints and Base Plates (7) Vent Header Vertical Column Supports	A.1.27	Prior to the period of extended operation	LRA Section B.1.27; Open Item 3.5.2.3.2.2-1; response to RAI 3.5-7, letter RS-03-180, dated October 3, 2003; response to Supplemental RAI 2.4-2, letter RS-03-0227, dated December 5, 2003; response to Supplemental RAI B.1.27, letter RS-04-046, dated March 25, 2004
28) Appendix J of 10 CFR Part 50,	Existing program is credited.	A.1.28	Ongoing	LRA Section B.1.28
29) Masonry Wall Program	Existing program is credited.	A.1.29	Ongoing	LRA Section B.1.29

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30) Structures Monitoring Program	<p>Existing program is credited. The program will be enhanced to add the following which will be implemented prior to the period of extended operation:</p> <p>(1) inspections of structural steel components in secondary containment, flood barriers, electrical panels and racks, junction boxes, instrument panels and racks, and offsite power structural components and their foundations, and the Quad Cities discharge canal weir as part of the ultimate heat sink</p> <p>(2) periodic reviews of chemistry data on below-grade water to confirm that the environment remains non-aggressive for aggressive chemical attack of concrete or corrosion of embedded steel</p> <p>(3) inspection of a sample of non-insulated indoor piping external surfaces at locations immediately adjacent to periodically inspected piping supports and inspection of standard components such as snubbers, struts, and spring cans.</p> <p>(4) program reference to specific insulation inspection criteria for existing cold weather preparation and inspection procedures for outdoor insulation, and the establishment of new inspections for various indoor area piping and equipment insulation</p> <p>(5) inspection parameters for non-structural joints, roofing, grout pads and isolation gaps</p> <p>(6) Extension of inspection criteria to the structural steel, concrete, masonry walls, equipment foundations, and component support sections of the program</p> <p>(7) VT-3 visual inspections of 15% of the non-exempt Class MC pipe supports once every 10 years</p>	A.1.30	Prior to the period of extended operation	LRA Sections B.1.30, 3.3.1.2.1, 3.5.1.1.7, 3.5.1.2.6, and 3.5.1.2.7; response to Supplemental RAI B.1.30, letter RS-03-227, dated December 5, 2003; response to Supplemental RAI B.1.27, letter RS-04-046, dated March 25, 2004; response to Open Item 3.5.2.3.2-1, letter RS-04-057, dated April 9, 2004 and letter RS-04-088 dated June 22, 2004, teleconference summary dated July 13, 2004.

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Item Number	Commitment	UFSAR Supplement Location (LRA App. A)	Implementation Schedule	Source
31) RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	Existing program is credited. The program will be enhanced to add the following: (1) monitoring of crib house concrete walls and slabs with an opposing side in contact with river water (2) inspection for structural integrity of concrete and steel components and identification of specific types of components to be inspected (3) periodic monitoring of the Dresden discharge outfall concrete structure (4) at Quad Cities, periodic inspections of the concrete of the discharge flume/canal and the weir gate in the discharge canal	A.1.31	Prior to the period of extended operation	LRA Section B.1.31; response to Supplemental RAIs 3.5-12 and B.1.31, letter RS-03-227, dated December 5, 2003
32) Protective Coating Monitoring and Maintenance Program	Existing program is credited. The program will be enhanced as follows: (1) visual inspection of Service Level I coatings near sumps or screens associated with the emergency core cooling system (2) pre-inspection review of previous reports so that trends can be identified for the program (3) analysis of coating failures to determine reasons for failures	A.1.32	Prior to the period of extended operation	LRA Section B.1.32
33) Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	A program will be developed that is consistent with NUREG-1801 AMP XI.E1 for electrical cables and connections installed in adverse localized environments not subject to 10 CFR 50.49 environmental qualification requirements.	A.1.33	Prior to the period of extended operation	LRA Section B.1.33; response to RAI B.1.33-3, letter RS-03-177, dated October 3, 2003
34) Metal Fatigue of Reactor Coolant Pressure Boundary	Existing program is credited. The program will be enhanced to utilize the EPRI-licensed FatiguePro computer program for monitoring fatigue at bounding locations for reactor pressure vessel, Class I piping, torus, torus vents, and torus attached piping and penetrations, SRV discharge lines, and the Dresden isolation condenser.	A.1.34, A.3.4	Prior to the period of extended operation.	LRA Sections 4.3.1, 4.3.2, 4.3.3.1, 4.6.1, 4.6.2 and B.1.34; response to RAI B.1.34, letter RS-03-180, dated October 3, 2003

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35) Environmental Qualification (EQ) of Electrical Components	Existing program is credited.	A.1.35	Ongoing	LRA Section B.1.35
36) Boraflex Monitoring	Existing program is credited.	A.1.36	Ongoing	LRA Section B.1.36
37) Electrical Cables Not Subject to 10 CFR 50.49 Environmental Requirements Used in Instrument Circuits	A program will be developed to manage aging of cables in sensitive instrumentation circuits with low-level signals in the Nuclear Instrumentation Systems and Radiation Monitoring Systems. The program will include a review of calibration and surveillance results, and cable testing every 24 months (SRM, IRM circuits) for cable aging degradation before the period of extended operation and every 10 years thereafter. This program applies to the cables of the Nuclear Instrumentation Systems which includes source range monitors, intermediate range monitors, local power range monitors, and Radiation Monitoring Systems which includes drywell high range radiation monitors, main steam line radiation monitors, and the steam jet air ejector radiation monitors.	A.1.37	Prior to the period of extended operation	LRA Section B.1.37; Responses to RAIs 3.6-9 and B.1.33-1, letter RS-03-177, dated October 3, 2003; response to Supplemental RAI 3.6-09, letter RS-03-238, dated December 22, 2003
38) Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Requirements	At Dresden, a new condition monitoring program will be provided in accordance with NUREG-1801, AMP XI.E3 to manage aging of five inaccessible medium-voltage cables feeding the service water pumps. The cables will be tested at least once every ten years. The end of the cribhouse duct bank will be inspected annually to verify that the duct run is not plugged with debris.	A.1.38	Prior to the period of extended operation	LRA Section B.1.38; Response to Supplemental RAI 3.6-3, letter RS-03-222, dated November 20, 2003
39) Corrective Action Program	Existing program is credited.	A.2.1	Ongoing	LRA Section B.2.1

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40) Periodic Inspection of Non-EQ, Non-Segregated Electrical Bus Ducts	<p>A program will be developed and implemented to periodically inspect non-segregated bus ducts that connect the reserve auxiliary transformers (RATs) to 4160V ESS buses, the non-segregated bus ducts that connect the EDG to the ESS buses, and, for Dresden only, the non-segregated bus ducts that connect ESS buses. The bus duct internal components and materials will be visually inspected for signs of aging degradation. The program will include the following:</p> <p>(1) inspection of accessible normally energized non-segregated bus duct internal components such as insulation materials, bus duct support pieces, gaskets, insulating boots, taped connections, and bus bar sleeves for material surface anomalies for non-segregated bus duct that connects the RATs to the 4160V ESS buses</p> <p>(2) inspection of bus bar insulation material at the accessible bolted connections of the non-segregated bus duct that connects the RATs to the 4160V ESS buses</p> <p>(3) inspection of 10% of the splice insulation material at the bolted connections (including all visible insulation in both directions beyond the location of the bolted connection splice insulation inspected) for the non-segregated bus duct that connects the EDG to the ESS buses and, for Dresden only, the non-segregated bus duct that connects the ESS buses for signs of aging degradation that indicate possible loose connections</p> <p>(4) inspections for the presence of dirt or moisture in the bus duct</p>	A.2.2	Prior to the period of extended operation	LRA Section B.2.2; response to RAI 3.6-4, letter RS-03-177, dated October 3, 2003; responses to Supplemental RAIs 3.6-4, 3.6-7, and B.2.2-01, letter RS-03-227, dated December 5, 2003; response to Supplemental RAI B.2.2-1, letter RS-03-238, dated December 22, 2003.

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41) Periodic Inspection of Ventilation System Elastomers	Existing program is credited. The program will be enhanced to include inspection of aging of all elastomers, flexible boots, access door seals and gaskets, filter seals and gaskets, and RTV silicone used as a duct sealant, in the components of the SBO ventilation and Reactor Building ventilation systems for Dresden, and the SBO ventilation and EDG Room ventilation systems for Quad Cities. The inspections will be performed to detect cracking, loss of material, and other evidence of aging. Tests of seals for hardening will be included if evidence of aging is found.	A.2.3	Prior to the period of extended operation	LRA Section B.2.3; letter RS-03-235, dated December 17, 2003
42) Periodic Testing of Drywell and Torus Spray Nozzles	Existing program is credited.	A.2.4	Ongoing	LRA Section B.2.4
43) Lubricating Oil Monitoring Activities	Existing program is credited. The program will be enhanced to include those components exposed to an environment of lubricating oil in the following systems: (1) the reactor core isolation cooling system (Quad Cities only) (2) the main generator hydrogen seal oil system (Quad Cities only) (3) the high pressure coolant injection system (4) the emergency diesel generator and auxiliaries system (5) the station blackout diesel system (6) the electro-hydraulic control system	A.2.5	Prior to the period of extended operation	LRA Section B.2.5; Response to RAI B.1.23-2, letter RS-03-180, dated October 3, 2003; Supplemental RAIs B.1.23-02.3 and B.1.23-02.4, letter RS-04-014, dated January 26, 2004

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
44) Heat Exchanger Test and Inspection Activities	An aging management program will be developed and implemented for heat exchangers in the scope of license renewal that are not tested and inspected by the Open-Cycle Cooling Water System and Closed-Cycle Cooling Water System aging management programs. Specifically, for the Dresden isolation condensers, the augmentation activities identified in NUREG-1801, lines IV.C1.4-a and IV.C1.4-b to manage loss of material and cracking will also be included in this aging management program, and will provide the following: (1) temperature and radioactivity monitoring of the shell-side (cooling) water (2) eddy current testing of the tubes (3) visual inspections of the channel head, tube sheets, and internal surfaces of the shell	A.2.6	Prior to the period of extended operation	LRA Section B.2.6; response to Supplemental RAI 3.1-11, letter RS-03-223, dated November 21, 2003; response to Supplemental RAI 3.1-11, letter RS-03-238, dated December 22, 2003
45) Generator Stator Water Chemistry Activities	Existing program is credited.	A.2.7	Ongoing	LRA Section B.2.7
46) Periodic Inspection of Plant Heating System	An aging management program will be developed and implemented to inspect components in the Plant Heating system once before the end of the current operating term and periodically at intervals not to exceed once every 5 years during the period of extended operation.	A.2.8	Prior to the period of extended operation	LRA Section B.2.8; Response to RAI B.1.23, letter RS-04-046, dated March 25, 2004
47) Time-Limited Aging Analysis (TLAA) - Neutron Embrittlement of the Reactor Vessel and Internals	Revised P-T limits will be prepared and submitted to the NRC for approval prior to the start of the extended period of operation using an approved fluence methodology for Dresden and Quad Cities.	A.3.1.5	Prior to the period of extended operation	LRA Section 4.2.5; response to RAI 4.3.0, letter RS-03-180, dated October 3, 2003

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
48) TLAA - Metal Fatigue	The Dresden Unit 2 jet pump riser braces will be repaired or replaced prior to the period of extended operation.	A.3.2.2.1	Prior to the period of extended operation	LRA Section 4.3.2.2; response to RAI 4.3.0, letter RS-03-180, dated October 3, 2003; response to RAI 4.3.2.2, letter RS-03-180, dated October 3, 2003
	Plant-specific calculations will be performed for applicable locations identified in NUREG/CR 6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components," for older-vintage BWR plants, to assess potential effects of reactor coolant on component fatigue life in accordance with 10 CFR 54.21(c)(1)(ii). Exelon reserves the right to modify this position in the future based on the results of industry activities currently underway, or based on other results of improvements in methodology, subject to NRC approval prior to changes in this position.	A.3.2.4	Prior to the period of extended operation	LRA Section 4.3.4; response to Supplemental RAI 4.3.4, letter RS-03-235, dated December 17, 2003
49) TLAA - Environmental Qualification of Electrical Equipment	A reanalysis will be applied to EQ components now qualified for the current operating term of 40 years. The EQ Binders for components within the scope of 10 CFR 50.49 will be updated to include environmental conditions associated with EPU implementation together with an extended operating period of 60 years.	A.3.3	Prior to the period of extended operation	LRA Section 4.4; response to RAI 4.3.0, letter RS-03-180, dated October 3, 2003

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
50) TLAA - Other Plant-Specific TLAAs	The corrosion rate assumptions used in the calculation of the drywell steel plate remaining thickness at the sand pocket level will be confirmed by a Dresden Unit 3 UT inspection prior to the period of extended operation. The results will be used to revise the associated corrosion calculation and validate that an acceptable wall thickness will remain to the end of the 60-year licensed operating period.	A.3.5.2.1	Prior to the period of extended operation	LRA Section 4.7.2.2
	The corrosion rate assumptions used in the calculation of the ECCS Suction strainer flange remaining thickness will be confirmed by an ultrasonic inspection. One bounding inspection will be performed and results will be used to validate the corrosion rate for both sites. Based upon the results of the inspection, a revised galvanic corrosion calculation will be performed to ensure acceptable wall thickness to the end of the 60-year licensed operating period.	A.3.5.2.2	Prior to the period of extended operation	LRA Section 4.7.2.3

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APPENDIX B CHRONOLOGY

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) staff and Exelon Generation Company, LLC (Exelon), related to the NRC staff's review, under Title 10, Part 54, of the *Code of Federal Regulations* (10 CFR Part 54), of Exelon's license renewal application (LRA) for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2. All documents, with the exception of those containing proprietary information, have been placed in the Commission's Public Document Room, at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and are available electronically from the Public Electronic Reading Room found on the Internet at <http://www.nrc.gov/reading-rm.html>. From this site, the public can gain access to the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of the NRC's public documents in the Publicly Available Records (PARS) component of ADAMS. The ADAMS accession numbers for each document are included below.

January 3, 2003	Letter from Mr. Jeffrey A. Benjamin, Exelon Generating Company, LLC (Exelon) to the NRC, submitting the application for the renewal of the operating licenses for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2 (Accession No. ML030090203)
January 24, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the Notice of Receipt and Availability of the application for the renewal of the operating licenses for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2 (Accession No. ML030240603)
February 7, 2003	Letter from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the Aging Management Review Aid and revised table links between LRA Chapters 2 and 3 (Accession No. ML030500245)
February 26, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the Notice of Acceptance for Docketing and Opportunity for Hearing associated with the application for the renewal of the operating licenses for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2 (Accession No. ML030570654)
April 17, 2003	Letter from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the Corrected Fluence Tables for Dresden Nuclear Power Station, Units 2 and 3, associated with LRA (Accession No. ML031190598)
May 5, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding revision to the NRC's review schedule (Accession No. ML031260004)

July 21, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the first set of Request for Additional Information (RAIs) associated with the LRA (Accession No. ML032020080)
July 21, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the second set of Request for Additional Information associated with the LRA (Accession No. ML032020170)
August 4, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the third set of Request for Additional Information associated with the LRA (Accession No. ML032180267)
August 4, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the fourth set of Request for Additional Information associated with the LRA (Accession No. ML032180382)
August 7, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding the fifth set of Request for Additional Information associated with the LRA (Accession No. ML032310093)
September 9, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding a Supplemental Request for Additional Information associated with the LRA (Accession No. ML032530371)
October 3, 2003	Letter (RS-03-177) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML032810579)
October 3, 2003	Letter (RS-03-178) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML032810563)
October 3, 2003	Letter (RS-03-179) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML032810692)
October 3, 2003	Letter (RS-03-180) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML032820273)
October 3, 2003	Letter (RS-03-181) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML032810682)
October 15, 2003	Letter (RS-03-201) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested additional information (Accession No. ML033010396)

October 20, 2003	Letter from the NRC to Mr. John L. Skolds, Exelon, forwarding an Inspection-related Open Item associated with the LRA (Accession No. ML032940056)
November 14, 2003	E-mail from T. Kim to A. Fulvio
November 20, 2003	Letter (RS-03-222) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033320342)
November 21, 2003	Letter (RS-03-223) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033360714)
December 5, 2003	Letter (RS-03-227) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033500404)
December 12, 2003	Letter (RS-03-232) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033580647)
December 17, 2003	Letter (RS-03-235) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033580635)
December 22, 2003	Letter (RS-03-238) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML033640630)
January 26, 2004	Letter (RS-04-14) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML040340487)
February 3, 2004	Letter (RS-04-020) from Mr. Patrick R. Simpson, Exelon, to the NRC, Consolidated List of Commitments for License Renewal (Accession No. ML040420164)
March 5, 2004	Letter (RS-04-039) from Mr. Patrick R. Simpson, Exelon, to the NRC, Amendment to the Application for Renewed Operating Licenses for Dresden and Quad Cities Nuclear Power Stations (Accession No. ML040711186)
March 25, 2004	Letter (RS-04-046) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting the requested supplemental information (Accession No. ML040900466)
April 9, 2004	Letter (RS-04-057) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting responses to the draft SER Open Items and Confirmatory Items (Accession No. ML041070456)
April 23, 2004	Audit Report Related to the License Renewal Application for Dresden Nuclear Power Station and Quad Cities Nuclear Power Station
May 18, 2004	Letter (RS-04-073) from Mr. Patrick R. Simpson, Exelon, to the NRC, submitting supplemental information (Accession No. ML041480178)

May 27, 2004	Letter (RS-04-080) from Mr. Keith R. Jury, Exelon, to the NRC, License Renewal Commitment for Scoping of Steam Dryers and the Dresden and Quad Cities Nuclear Power Stations (Accession No. ML041550270)
June 22, 2004	Letter (RS-04-088) from Mr. Patrick R. Simpson, Exelon to the NRC, submitting supplemental information (Accession No. ML041820207)
June 29, 2004	Final Supplement 17 to the Generic Environmental Impact Statement Regarding License Renewal for Dresden Nuclear Power Station, Units 2 and 3 (Accession Number ML041830675)
June 30, 2004	Final Supplement 16 to the Generic Environmental Impact Statement Regarding License Renewal for Quad Cities Nuclear Power Station, Units 1 and 2 (Accession Number 041830462)
July 13, 2004	Summary of telephone conference held on July 13, 2004, between the U.S. Nuclear Regulatory Commission and the Exelon Generation Company Regarding the Resolution of Open Item 3.5.2.3.2-1 and Confirmatory Item 3.0.3.14.2-1

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APPENDIX C

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K. Chang	Technical Support
K. Corp	Technical Support
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P. Y. Chen	Technical Support
S. Coffin	Management Supervision
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J. Fair	Mechanical Engineering
T. Ford	Reactor Systems
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Plant Systems
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Environmental Project Manager

Mechanical Engineering

CONTRACTORS

Contractor

Technical Area

Argonne National Laboratory

Reactor Vessel, Internals, Reactor Coolant System,
and Auxiliary Systems

Brookhaven National Laboratory

Containment, Structures, and Component Supports

Information Systems Laboratories

Fire Protection and Aging Management Programs

Pacific Northwest National Laboratory

Engineered Safety Features and Steam/Power
Conversion Systems

APPENDIX D REFERENCES

This appendix lists the references used in preparing the safety evaluation report associated with the license renewal application for the Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2.

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BWRVIP-38, "Shroud Support Inspection and Flaw Evaluation Guidelines," September 1997

BWRVIP-41, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," October 1997

BWRVIP-47, "BWR Lower Plenum Inspection and Flaw Evaluation Guidelines," December 1997

BWRVIP-48, "Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines," March 1998

BWRVIP-49, "Instrument Penetration Inspection and Flaw Evaluation Guidelines," March 1998

BWRVIP-74, "BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines," September 1999.

BWRVIP-75, "Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules (NUREG-0313)," October 1999

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10 CFR 50.34, "Contents of application; technical information," Section (a)(1)

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10 CFR 50.55a, "Codes and Standards"

10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Light water Nuclear Power Reactors for Normal Operation"

10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events"

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