

## **5 REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS**

The Advisory Committee on Reactor Safeguards (ACRS) will review the section of the license renewal application for the Peach Bottom Atomic Power Station, Units 2 and 3 that is required by 10 CFR Part 54,. The ACRS Subcommittee on Peach Bottom License Renewal will continue its detailed review of the LRA after this report is issued. Exelon and the staff will meet with the subcommittee and the full committee to discuss issues associated with the review of the LRA.

After the ACRS completes its review of the Peach Bottom LRA and the 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.

## **6 CONCLUSIONS**

The staff reviewed the Peach Bottom Atomic Power Station, Units 2 and 3, license renewal application in accordance with Commission regulations and the NRC draft "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," dated September 1997. The Commission's regulations for issuance of a renewed license are in 10 CFR 54.29.

On the basis of its evaluation of the application, as discussed above, the staff has determined that it will be able to conclude that the requirements of 10 CFR 54.29(a) have been met when the open items and confirmatory items identified in Sections 1.4 and 1.5 of this safety evaluation report have been formally resolved.

The staff notes that any requirements of Subpart A of 10 CFR Part 51 will be documented in the final plant-specific supplement to the Generic Environmental Impact Statement. If the resolution of Subpart A of requirements is favorable, the staff will be able to conclude that the requirements of 10 CFR 54.29(b) have been met.

## APPENDIX A CHRONOLOGY

This appendix contains a chronological listing of routine licensing correspondence between the U.S. Nuclear Regulatory Commission (NRC) staff and Exelon Generation Company, LLC (Exelon), regarding the NRC staff's review of the Peach Bottom Atomic Power Station (PBAPS), Unit 2 and 3, license renewal application (LRA) (Docket Nos. 50-277 and 50-278).

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|-------------------|--|
| July 2, 2001      | In a letter signed by J. Benjamin, Exelon submitted its application to renew the operating licenses of Peach Bottom Atomic Power Station, Units 2 and 3. In its submittal, Exelon provided the original of the application, 17 paper copies and 30 copies of the application on CD-ROM.      |
| July 2, 2001      | In a letter signed by J. Benjamin, Exelon submitted four sets of boundary drawings to the NRC.   |
| July 18, 2001     | In a letter signed by D. Matthews, NRC informed Exelon that the NRC had received its application to renew the operating licenses of Peach Bottom Atomic Power Station, Units 2 and 3, on July 2, 2001, and that Mr. Raj Anand was appointed as the project manager for the Peach Bottom LRA. |
| July 25, 2001     | NRC published a <i>Federal Register</i> notice (FRN) of the receipt of the Peach Bottom Atomic license renewal application.  |
| August 27, 2001   | In a letter signed by R. Anand, NRC issued a summary of the public meeting held on August 14, 2001. In this meeting, Exelon made a presentation to the NRC staff and members of the public regarding information contained in the Peach Bottom LRA.  |
| August 31, 2001   | NRC published an "acceptance for docketing and opportunity for hearing" <i>Federal Register</i> notice (FRN) regarding the Peach Bottom LRA.   |
| September 5, 2001 | In a letter signed by D. Matthews, NRC informed Exelon that the NRC staff determined that the contained information in the Peach Bottom LRA submitted on July 2, 2001, was acceptable for docketing and sufficient for the staff to begin its review.  |
| October 26, 2001  | In a letter signed by R. Anand, NRC issued the summary of a public meeting between the staff and Exelon representatives. The meeting was held on September 24 and 25, 2001, to discuss the scoping and screening methodology and electrical sections of the PBAPS LRA.                       |
| October 30, 2001  | In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the scoping and screening methodology discussed in Section 2.1 of the Peach Bottom LRA.   |

November 5, 2001 In a letter to Exelon signed by R. Anand, the NRC staff issued a summary of the public meeting held on October 22, 2001. In this meeting Exelon provided clarifications of the scoping and screening process discussed in the Peach Bottom LRA.

November 16, 2001 In a letter to Exelon signed by R. Anand, the NRC staff provided the schedule for the review of the Peach Bottom Atomic Power Station, Unit 2 and 3, LRA.

November 16, 2001 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's request for additional information (RAI) dated October 30, 2001, regarding Section 2.1-1 of the Peach Bottom LRA.

December 14, 2001 In a letter signed by R. Anand to Exelon, the NRC staff provided the findings of its audit of the scoping and screening methodology use in the Peach Bottom LRA.

January 23, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the scoping and screening methodology discussed in Section 2.1.2 of the Peach Bottom LRA.

January 23, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the aging management of electrical and instrument and control discussed in Section 3.6 of the Peach Bottom LRA.

January 23, 2002 In a letter signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on December 26, 2001, to clarify information provided by Exelon in Section 3.2 of the Peach Bottom LRA.

January 28, 2002 In a letter signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on January 16, 2002, to clarify information provided by Exelon in Section 3.5 of the Peach Bottom LRA.

January 30, 2002 In a letter signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on January 3, 2002, to clarify information provided by Exelon in Section 4.3 of the Peach Bottom LRA.

February 4, 2002 In a letter signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on February 4, 2002 to clarify information provided by Exelon in Section 2.3 of the Peach Bottom LRA.

February 6, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the aging management of the reactor

coolant system, the engineered safety feature systems, the auxiliary systems, and the steam and power conversion systems as discussed in Sections 3.1, 3.2, 3.3, and 3.4 of the Peach Bottom LRA.

- February 7, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding time-limited aging analyses, identification of TLAAs, reactor vessel embrittlement, metal fatigue, and reactor vessel main steam nozzle cladding removal corrosion allowance as discussed in Sections 4.0, 4.1, 4.2, 4.3, and 4.7.1 of the Peach Bottom LRA.
- February 28, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAI dated January 23, 2002, regarding Section 2.1.2 of the Peach Bottom LRA.
- March 1, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the aging management of containment, structure, and component supports as discussed in Section 3.5 of the Peach Bottom LRA.
- March 1, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the scoping and screening results for reactor coolant system, engineered safety features systems, and auxiliary systems as discussed in Sections 2.3.1, 2.3.2, and 2.3.3 of the Peach Bottom LRA.
- March 6, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the aging management activities as discussed in Appendix B of the Peach Bottom LRA.
- March 12, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the aging management activities as discussed in Appendix B of the Peach Bottom LRA.
- March 12, 2002 In a letter to Exelon signed by R. Anand, the NRC staff requested additional information regarding the plant-level scoping, and screening results for mechanical, structures, component supports, and electrical and instrumentation and controls as discussed in the Sections 2.2, 2.3, 2.4, and 2.5 of the Peach Bottom LRA.
- March 12, 2002 In a letter to Exelon signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on January 22, 2002, to clarify information provided by Exelon in Sections 3.3 and 3.4 of the Peach Bottom LRA.
- March 13, 2002 In a letter to Exelon signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on January 22, 2002, to clarify information provided by Exelon in Sections 3.1 and 3.2 of the Peach Bottom LRA.

April 5, 2002 In a letter to Exelon signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on February 20, 2002, to clarify information provided by Exelon in Section 2.0 of the Peach Bottom LRA.

April 29, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated January 23, 2002, regarding Section 3.6 of the Peach Bottom LRA.

April 29, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 12, 2002, regarding the Appendix B aging management activities discussed in the Peach Bottom LRA.

May 01, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated February 7, 2002, regarding Section 4.0 of the Peach Bottom LRA.

May 06, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 1, 2002, regarding Section 2.3 of the Peach Bottom LRA.

May 06, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated February 6, 2002, regarding Sections 3.1, 3.2, 3.3, and 3.4 of the Peach Bottom LRA.

May 14, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 6, 2002, regarding Appendix B aging management activities discussed in the Peach Bottom LRA.

May 21, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 1, 2002, regarding Section 3.5 of the Peach Bottom LRA.

May 21, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated January 23, February 6, February 28, and May 6, 2002, regarding RAI 2.1.2-3.

May 22, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 12, 2002, regarding Section 2.0 of the Peach Bottom LRA.

May 31, 2002 In a NRC Region I letter to Exelon, signed by W. Lanning, the staff submitted Inspection Report 50-277/02-09, 50-278/02-09 concerning the scoping and screening of systems, structures, and components discussed in the Peach Bottom LRA.

- June 10, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAIs dated March 12, 2002, regarding Section 4.2-7 of the Peach Bottom LRA.
- July 18, 2002 In a letter to Exelon signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on June 17, 2002 to clarify information provided by Exelon concerning reactor vessel internals fatigue and embrittlement in Section 4.3.2 of the Peach Bottom LRA.
- July 18, 2002 In a letter to Exelon signed by R. Anand, NRC issued a summary of a teleconference between the staff and Exelon representatives. This teleconference was held on January 23 and March 12, 2002, to clarify information provided by Exelon concerning scoping and aging management of electrical and instrumentation and controls in Sections 2.5 and 3.6 of the Peach Bottom LRA.
- July 30, 2002 In a letter signed by M. Gallagher, Exelon submitted its response to the NRC staff's RAI concerning fire protection activities, aging effects for carbon steel piping in an outdoor environment, and recovery path during station blackout system (SBO).
- August 6, 2002 In a letter signed by P. Kuo, NRC informed Exelon that David L. Solorio was appointed Project Manager for the Peach Bottom LRA.

## **APPENDIX B**

### **REFERENCES**

This appendix lists the references used in preparing the safety evaluation report on the review of the license renewal application for Peach Bottom Atomic Power Station, Units 2 and 3, under Docket Numbers 50-277 and 50-278.

#### **AMERICAN CONCRETE INSTITUTE (ACI)**

ACI 301, "Specifications for Structural Concrete for Buildings"

ACI 318-63, "Building Code Requirements for Reinforced Concrete"

#### **AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)**

ASME Boiler and Pressure Vessel Code, July 1989

ASME Boiler and Pressure Vessel Code, Section III, Rules for Construction of Nuclear Power Plant Components (through Summer 1979 addenda)

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components

ASME Boiler and Pressure Vessel Code, Section XI, Appendix G (1995 edition through 1996 addenda)

#### **AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

ASTM A307, "Standard Specification for Carbon Steel Bolts and Steels, 60,000 psi Tensile Strength"

ASTM A325, "Standard Specification for Structural Bolts, Steel, Heat-Treated, 120 ksi and 105 ksi Minimum Tensile Strength"

ASTM A490, "Standard Specification for Heat-Treated Steel Structural Bolts, 150ksi Minimum Tensile Strength"

ASTM D975-1981, "Standard Specification for Diesel Fuel Oils"

#### **AMERICAN WATER WORKS ASSOCIATION (AWWA)**

AWWA C203, "AWWA Standard for Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied," 1966

#### **BOILING WATER REACTOR VESSEL AND INTERNALS PROJECT (BWRVIP)**

BWRVIP-05, "BWR RPV Shell Weld Inspection Recommendations," September 1995



BWRVIP-18, "Core Spray Internals Inspection and Flaw Evaluation Guidelines," July 1996

BWRVIP-25, "BWR Core Plate Inspection and Flaw Evaluation Guidelines," October 1999

BWRVIP-26, "Top Guide Inspection and Flaw Evaluation Guidelines," December 1996

BWRVIP-27, "Standby Liquid Control System/Core Plate  $\Delta P$  Inspection and Flaw Evaluation Guidelines," April 1997

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

BWRVIP-76, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines," December 1999

#### **BULLETINS (BL)**

NRC BL-80-11, "Masonry Wall Design," May 1980

#### **CODE OF FEDERAL REGULATIONS**

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

10 CFR 50.48, "Fire Protection"

10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants"

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"

10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants"

10 CFR 50.63, "Loss of All Alternating Current Power"

10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"

10 CFR Part 50, Appendix G, "Fracture Toughness Requirements"

10 CFR Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements"

10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions"

10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants"

10 CFR Part 100, "Reactor Site Criteria"

### **ELECTRIC POWER RESEARCH INSTITUTE (EPRI)**

EPRI NP-5461, "Component Life Estimation: LWR Structural Materials Degradation Mechanisms," September 1987

EPRI NP-5769, "Degradation and Failure of Bolting in Nuclear Power Plants," Vols. 1 and 2, Project 2520-7, 1998

EPRI NSAC/202-L, "Recommendations for an Effective Flow-Accelerated Corrosion Program"

EPRI TR-103515, "BWR Water Chemistry Guidelines," BWRVIP-29

EPRI TR-103840 "BWR Containment License Renewal Industry Report; Revision 1" July 1994

EPRI TR-103842, "Class I Structures Industry Report"

EPRI TR-104873, "Methodologies and Processes to Optimize Environmental Qualification Replacement Internals," February 1996

EPRI TR-105747, "Guidelines for Reinspection of BWR Core Shrouds," BWRVIP-07, February 1996

EPRI TR-105759, "An Environmental Factor Approach to Account for Reactor Water Effects in Light Water Reactor Pressure Vessel and Piping Evaluations"

EPRI TR-106092, "Evaluation of Thermal Aging Embrittlement for Cast Austenitic Stainless Steel Components in LWR Coolant Systems," September 1997

EPRI TR-106740, "BWR Core Spray Internals and Flaw Evaluation Guidelines," BWRVIP-18, July 1996

EPRI TR-107079, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines," Revision 2, BWRVIP-01, October 1996

EPRI TR-107285, "BWR Top Guide Inspection and Flaw Evaluation Guidelines," BWRVIP-26, December 1996

EPRI TR-107286, "BWR Standby Liquid Control System/Core Plate P Inspection and Flaw Evaluation Guidelines," BWRVIP-27, April 1997

EPRI TR- 107396, "Closed Cooling Water Chemistry Guidelines," October 1997

EPRI TR-107515, "Evaluation of Thermal Fatigue Effects on Systems Requiring Aging Management Review for License Renewal for the Calvert Cliffs Nuclear Power Plant"

EPRI TR-107521 related to void swelling

EPRI TR-107943, "Environmental Fatigue Evaluations of Representative BWR Components"

EPRI TR-108705, "BWR Vessel and Internals Project, Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection"

EPRI TR-108727, "BWR Lower Plenum Inspection and Flaw Evaluation Guidelines," BWRVIP-47, December 1997

EPRI TR-108728, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," BWRVIP-41, October 1997

EPRI TR-108823, "BWR Shroud Support Inspection and Flaw Evaluation Guidelines," BWRVIP-38, September 1997

EPRI TR-108724, "Bessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines," BWRVIP-48, February 1998

EPRI TR-110356, "Evaluation of Environmental Thermal Fatigue Effects on Selected Components in a Boiling Water Reactor Plant"

EPRI TR-112214, "BWR Vessel and Internals Project, Proceedings: BWRVIP Symposium, November 12-13, 1998"

EPRI TR-113596, "BWR Vessel and Internals Project BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines"

EPRI TR-114232, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines," BWRVIP-76, November 1999

EPRI TR-113596, "BWR Vessel and Internals Project BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines," BWRVIP-74, September 1999

EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines"

### **GENERIC LETTERS (GLs)**

NRC GL 79-20, "Information Requested on PVR Feedwater Lines"

NRC GL 85-20, "Resolution of Generic Issue 69: High Pressure Injection/Makeup Nozzle Cracking in Babcock and Wilcox Plants," November 11, 1985

NRC GL 88-01, "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping," 1989

NRC GL 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations"

NRC GL 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment"

NRC GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

NRC GL 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," June 1990

NRC GL 91-17, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," October 1991

NRC GL 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity," May 18, 1995

NRC GL 92-08, "Thermo-Lag 330-1 Fire Barriers," December 1992

NRC GL 96-04, "Boraflex Degradation in Spent Fuel Pool Storage Racks"

### **GENERIC SAFETY ISSUES (GSIs)**

GSI-166, "Adequacy of the Fatigue Life of Metal Components"

GSI-168, "Environmental Qualification of Electrical Components"

GSI-190, "Fatigue Evaluation of Metal Components for 60-year Plant Life"

### **INFORMATION NOTICES (INs)**

NRC IN 87-65, "Lesson Learned from Regional Inspection of Applicant Actions in Response to IE Bulletin 80-11, 'Masonry Wall Design'"

NRC IN 91-46, "Degradation of Emergency Diesel Generator Fuel Oil Deliver Systems," July 1991

NRC IN 92-20, "Inadequate Local Leak Rate Testing," March 1992

### **INSPECTION AND AUDIT REPORTS**

Peach Bottom Atomic Power Station—NRC Inspection Report Nos. 50-277/02-09, 50-278/02-09, May 31, 2002

Peach Bottom Atomic Power Station—NRC Inspection Report Nos. 50-277/02-09, 50-278/02-09, **(In process of being issued)**

### **INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)**

ANS/IEEE Std. 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Storage Batteries for Generating Stations and Substations"

IEEE Std. 323-1974, "Qualifying Class 1E Equipment for Nuclear Power Generating Stations," 1974

IEEE 43-1974, "Recommended Practice for Testing Insulation Resistance of Rotating Machinery"

IEEE 95-1977, "Recommended Practice for Insulation Testing of Large AC Rotating Machinery with High Direct Voltage"

### **NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

NFPA-25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems"

### **NUCLEAR ENERGY INSTITUTE**

NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54—The License Renewal Rule," Revision 0, March 1996

NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54—The License Renewal Rule," Revision 1, January 2000

NEI/NRC License Renewal Work Shop, Reference Documents, October 29, 1997

### **NUREG REPORTS**

NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," July 2001

NUREG-1801, Generic Aging Lessons Learned Report, July 2001

NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment"

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants"

NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking, Resolution of Generic Technical Activity A 10," November 1980

NUREG-0737, "Clarification of TMI Action Plan Requirements"

NUREG-1275, Volume 3, "Operating Experience Feedback Report—Service Water System Failure and Degradations"

NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," 1990

NUREG-1526, "Lessons Learned from Early Implementation of Maintenance Rule at Nine Nuclear Power Plants"

NUREG-1568, "License Renewal Demonstration Program: NRC Observations and Lessons Learned," December 1996

NUREG/CR-5704, "Effects of LWR Coolant Environment on Fatigue Design Curves of Austenitic Stainless Steels," April 1999

NUREG/CR-6260, "Application of NUREG/CR-5999, 'Interim Fatigue Curves to Selected Nuclear Power Plant Components'"

NUREG/CR-6335, "Fatigue Strain-Life Behavior of Carbon and Low-Alloy Steels, Austenitic Stainless Steels, and Alloy 600 in LRA Environments," August 1995

NUREG/CR-6384, "Literature Review of Environmental Qualification of Safety-Related Electric Cables," Vol. 1, April 1996, (Brookhaven National Laboratory, Prepared for U. S. Nuclear Regulatory Commission)

NUREG/CR-6583, "Effects of LWR Coolant Environments in Fatigue Design Curves of Carbon and Low-Alloy Steels"

### **REGULATORY GUIDES (RGs)**

NRC RG DG 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses"

NRC RG 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors"

NRC RG 1.46, Revision 0, "Protection Against Pipe Whip Inside Containment," withdrawn August 11, 1985

NRC RG 1.89, Rev. 1, "Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Power Plants"

NRC RG1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988

#### **STRUCTURAL INTEGRITY ASSOCIATES**

SIR-99-078, Revision A, "Development of Class 1 Piping Fatigue Formulas and Fatigue Usage Estimates for the Hatch Nuclear Power Plant, Units 1 and 2," June 1999

#### **U.S. DEPARTMENT OF ENERGY (DOE)**

SAND 93-7070.UC-523, "Aging Management Guideline for Commercial Nuclear Power Plants - Heat Exchangers" (July 1984)

SAND 96-0344, "Aging Management Guideline for Commercial Nuclear Power Plants - Electrical Cables and Terminations," United States Department of Energy

#### **USA STANDARDS INSTITUTE (USAS)**

ANSI USAS B31.1.0, "USA Standard Code for Pressure Piping," 1968

ANSI USAS B31.7, "USA Standard Code for Pressure Piping, Nuclear Power Piping," 1968

USAS B31.7, "Nuclear Power Piping"

**APPENDIX C  
PRINCIPAL CONTRIBUTORS**

<u>NAME</u>	<u>RESPONSIBILITY</u>
E. Andruszkiewicz	Structural Engineering
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G. Bagchi	Structural Engineering
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B. Boger	Technical Support
R. Hoefing	Legal Counsel
W. Burton	Technical Support
J. Calvo	Technical Support
C. Casto	Technical Support
S. Chey	Administrative Support
B. Elliot	Structural Engineering
Z. Fu	Chemical Engineering
J. Fair	Mechanical Engineering
G. Galletti	Technical Support
G. Georgiev	Structural Engineering
P. Gill	Electrical Engineering
J. Guo	Plant Systems
J. Hannon	Plant Systems
G. Hatchett	Plant Systems
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S. Hoffman	Technical Support
G. Holahan	Technical Support
M. Khanna	Materials Engineering
P. Kleene	Technical Editing
P.T. Kuo	Management Oversight
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T. Quay	Technical Support



J. Rajan  
M. Razzaque  
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D. Thatcher  
A. Smith  
A. Williamson  
J. Wermiel  
R. Young

Mechanical Engineering  
Reactor Systems  
Reactor Systems  
Electrical Engineering  
Mechanical Engineering  
Technical Support  
Mechanical Engineering  
Technical Support  
Reactor Systems  
Plant Systems

### **CONTRACTORS**

#### Contractor

Argonne National Laboratory (ANL)  
Information Systems Laboratory (ISL)

#### Technical Area

Aging Management Reviews  
Plant-Level Scoping Results

