

## WSES-FSAR-UNIT-3

### 1.8 COMPARISON OF WATERFORD 3 DESIGN WITH NRC REGULATORY GUIDES

#### 1.8.1 INTRODUCTION

The Regulatory Guides applicable to Waterford 3 are those referenced in the PSAR. The PSAR and Amendments referenced the Regulatory Guides 1.1 through 1.38 which are relevant to the Waterford design (e.g., PWR).

This section presents a comparison of Waterford 3 plant design with the recommendations presented in the NRC Regulatory Guides 1.1 through 1.96. Regulatory Guide 1.96 Revision 0, May 1975 was issued six months after the Construction Permit date (November 14, 1974) and represents a time when the project was over 50 percent complete in engineering design. A reference to the FSAR sections which the applicable design features are discussed is also provided. Where the design differs from the Regulatory Guide, alternative methods of providing an equivalent level of safety have been utilized; these differences are discussed or reference is made to the appropriate FSAR sections.

In addition, some Regulatory Guides beyond 1.96 have been discussed in the responses to some NRC questions such as 032.3 and 032.6.

##### 1.8.1.1 REGULATORY GUIDE 1.1, NET POSITIVE SUCTION HEAD FOR EMERGENCY CORE COOLING AND CONTAINMENT HEAT REMOVAL PUMPS (Revision 0, November 1970)

Waterford 3 design meets the recommendations of Regulatory Guide 1.1 with the following qualification:

The available NPSH for the safeguard pumps (low pressure and high pressure safety injection pumps and containment spray pumps) is calculated, using a saturated sump model. The containment is assumed to be at the saturation pressure corresponding to the containment sump temperature.

The subject of this Regulatory Guide is discussed in FSAR Subsections 6.2.2.3.2.1 and 6.3.2.2.2.3.

##### 1.8.1.2 REGULATORY GUIDE 1.2, THERMAL SHOCK TO REACTOR PRESSURE VESSELS (Revision 0, November 1970)

Waterford 3 is consistent with the recommendations of Regulatory Guide 1.2. The Heavy Section Steel Technology (HSST) program is discussed in FSAR Subsection 5.3.1.6.

##### 1.8.1.3 REGULATORY GUIDE 1.3, ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A LOSS-OF-COOLANT ACCIDENT FOR BOILING WATER REACTORS (Revision 2, June 1974)

Regulatory Guide 1.3 is not applicable to Waterford 3.

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### 1.8.1.4 REGULATORY GUIDE 1.4, ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A LOSS-OF-COOLANT ACCIDENT FOR PRESSURIZED WATER REACTORS (Revision 2, June 1974)

→(DRN 04-1619, R14)

The Loss of Coolant Accident evaluation presented in FSAR Subsection 15.6 utilized the Alternative Source Term dose methodology in accordance with Regulatory Guide 1.183 requirements. As such this Regulatory Guide is no longer applicable to Waterford 3.

←(DRN 04-1619, R14)

### 1.8.1.5 REGULATORY GUIDE 1.5, ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A STEAM LINE BREAK ACCIDENT FOR BOILING WATER REACTORS (Revision 0, March 1971)

Regulatory Guide 1.5 is not applicable to Waterford 3.

### 1.8.1.6 REGULATORY GUIDE 1.6 INDEPENDENCE BETWEEN REDUNDANT STANDBY (ONSITE) POWER SOURCES AND BETWEEN THEIR DISTRIBUTION SYSTEMS (Revision 0, March 1971)

→(DRN 01-758, R11-A)

Waterford 3 design meets the recommendations of Regulatory Guide 1.6. The subject of this Regulatory Guide is discussed in FSAR Subsection 8.3.1.2.3.

←(DRN 01-758, R11-A)

### 1.8.1.7 REGULATORY GUIDE 1.7, CONTROL OF COMBUSTIBLE GAS CONCENTRATIONS IN CONTAINMENT FOLLOWING A LOSS-OF-COOLANT ACCIDENT (Revision 0, March 1971)

Waterford 3 design meets the recommendations of Regulatory Guide 1.7. The subject of this Regulatory Guide is discussed in FSAR Subsection 6.2.5.

### 1.8.1.8 REGULATORY GUIDE 1.8, PERSONNEL SELECTION AND TRAINING (Revision 1, September 1975)

Waterford 3 personnel selection and training are consistent with the recommendations of Regulatory Guide 1.8. The subject of this Regulatory Guide is discussed in FSAR Chapter 13 and QA Program Manual.

→(LBDCR 14-010, R308)

### 1.8.1.9 REGULATORY GUIDE 1.9, SELECTION OF DIESEL GENERATOR SET CAPACITY FOR STANDBY POWER SUPPLIES (Revision 0, March 1971 and Revision 4, March 2007)

The subject of this Regulatory Guide is discussed in FSAR Subsection 8.3.1.2.4. IEEE Standard 387 is discussed in FSAR Subsection 8.3.1.2.20. Waterford 3 was originally licensed to Regulatory Guide 1.9 Revision 0. All historic requirements such as the original design criteria, factory production testing, initial type tests, preoperational testing have been completed and approved by the NRC. The historic requirements remain approved to Regulatory Guide 1.9 Revision 0. New or ongoing activities such as surveillance testing, periodic testing, and modifications meet Regulatory Guide 1.9 Revision 4 requirements with the following exceptions and clarifications.

Regulatory Guide 1.9 Revision 4 Clause 1.8 states a trip should be implemented with two or more measurements for each trip parameter with coincident logic provisions for trip actuations. NUREG-0787 Section 8.3.1 provides the NRC review and approval of the current Waterford 3 configuration. For design basis accident conditions, all protective trips except diesel overspeed and generator differential trips are bypassed.

←(LBDCR 14-010, R308)

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→(LBDCR 14-010, R308)

Regulatory Guide 1.9 Revision 4 Clause 2.2 states that jumpers and other nonstandard configurations or arrangements should not be used after initial equipment startup testing. Jumpers (nonstandard configuration) are utilized for surveillance tests and are proceduralized to preclude errors. The diesel is not operable during the nonstandard configurations.

Regulatory Guide 1.9 Revision 4 Table 1 shows that protective trip bypass tests are performed at refueling intervals. Regulatory Guide 1.9 Clause 2.2.11 includes the diesel overspeed and generator differential trips in this testing which are performed as part of the maintenance program. The diesel overspeed trip and generator differential trip tests are performed on the diesel maintenance schedule.

←(LBDCR 14-010, R308)

1.8.1.10 REGULATORY GUIDE 1.10, MECHANICAL (CADWELD) SPLICES IN REINFORCING BARS OF CATEGORY I CONCRETE STRUCTURES (Revision 1, January 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.10. The subject of this regulatory guide is discussed in FSAR Section 3.8.

1.8.1.11 REGULATORY GUIDE 1.11, INSTRUMENT LINES PENETRATING PRIMARY REACTOR CONTAINMENT (Revision 0, March 1971)

Waterford 3 design meets the recommendations of Regulatory Guide 1.11. The subject of this Regulatory Guide is discussed in FSAR Subsections 6.2.4.1.3 and 7.1.2.7.

1.8.1.12 REGULATORY GUIDE 1.12, INSTRUMENTATION FOR EARTHQUAKES (Revision 1, April 1974)

Waterford 3 design meets the recommendations of Regulatory Guide 1.12 with the qualifications indicated in FSAR Subsection 3.7.4.1.

→(DRN 01-758, R11-A)

1.8.1.13 REGULATORY GUIDE 1.13, SPENT FUEL STORAGE FACILITY DESIGN BASES (Revision 0, March 1971)

←(DRN 01-758, R11-A)

Waterford 3 design meets the recommendations of Regulatory Guide 1.13 with the qualification indicated in FSAR Subsection 9.1.4.3. The subject of this Regulatory Guide is discussed in FSAR Subsections 9.1.1, 9.1.2, 9.1.3 and 9.1.4. In FSAR Subsection 15.7.3.4, Revision 1 of Regulatory Guide 1.13 (12/75) is compared with analysis assumptions.

1.8.1.14 REGULATORY GUIDE 1.14 REACTOR COOLANT PUMP FLYWHEEL INTEGRITY (Revision 0, October 1971)

Waterford 3 design meets the recommendations of Regulatory Guide 1.14 for flywheel design and fabrication. The subject of this Regulatory Guide is discussed in FSAR Subsection 5.4.1.4. Technical Specifications discuss flywheel inspection to the requirements of Revision 1 of Regulatory Guide 1.14 (August, 1975).

1.8.1.15 REGULATORY GUIDE 1.15, TESTING OF REINFORCING BARS FOR CATEGORY I CONCRETE STRUCTURES (Revision 1, December 1972)

Waterford 3 meets the recommendations of Regulatory Guide 1.15. The subject of this Regulatory Guide is discussed in FSAR Section 3.8.

1.8.1.16 REGULATORY GUIDE 1.16, REPORTING OF OPERATING INFORMATION APPENDIX A TECHNICAL SPECIFICATIONS (Revision 4, August 1975)

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Waterford 3 meets the recommendations of Regulatory Guide 1.16 to the extent not superseded by 10 CFR 50.73. The subject of this Regulatory Guide is discussed in FSAR Subsection 14.2.7.2 and Technical Specifications.

1.8.1.17 REGULATORY GUIDE 1.17, PROTECTION OF NUCLEAR POWER PLANTS AGAINST INDUSTRIAL SABOTAGE (Revision 0, June 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.17. The subject of this Regulatory Guide is discussed in the Security Plan.

1.8.1.18 REGULATORY GUIDE 1.18, STRUCTURAL ACCEPTANCE TEST FOR CONCRETE PRIMARY REACTOR CONTAINMENTS (Revision 1, December 1972)

The subject of this Regulatory Guide is not applicable to the Waterford 3 design.

1.8.1.19 REGULATORY GUIDE 1.19 NONDESTRUCTIVE EXAMINATION OF PRIMARY CONTAINMENT LINER WELDS (Revision 1, August 1972)

The subject of this Regulatory Guide is not applicable to The Waterford SES Unit 3 design.

1.8.1.20 REGULATORY GUIDE 1.20, COMPREHENSIVE VIBRATION ASSESSMENT PROGRAM FOR REACTOR INTERNAL DURING PREOPERATIONAL AND INITIAL STARTUP TESTING (Revision 2, May 1976)

Waterford 3 meets the recommendations of Regulatory Guide 1.20. The subject of this Regulatory Guide is discussed in FSAR Subsection 14.2.7.

1.8.1.21 REGULATORY GUIDE 1.21, MEASURING, EVALUATING, AND REPORTING RADIOACTIVITY IN SOLID WASTES AND RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND GASEOUS EFFLUENTS FROM LIGHT-WATER-COOLED NUCLEAR POWER PLANTS (Revision 1, June 1974)

Waterford 3 meets the recommendations of Regulatory Guide 1.21 as specified in Chapters 11 and 12.

1.8.1.22 REGULATORY GUIDE 1.22, PERIODIC TESTING OF PROTECTION SYSTEM ACTUATION FUNCTIONS (Revision 0, February 1972)

Waterford 3 meets the recommendations of Regulatory Guide 1.22. The subject of this Regulatory Guide is discussed in FSAR Sections 7.2 and 7.3.

→(EC-1837, R301)

1.8.1.23 REGULATORY GUIDE 1.23, METEOROLOGICAL PROGRAMS IN SUPPORT OF NUCLEAR POWER PLANTS (Proposed Revision 1, September 1980)

←(EC-1837, R301)

Waterford 3 meets the recommendations of Regulatory Guide 1.23. The subject of this Regulatory Guide is discussed in FSAR Subsection 2.3.3.

1.8.1.24 REGULATORY GUIDE 1.24, ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF A PRESSURIZED WATER REACTOR RADIOACTIVE GAS STORAGE TANK FAILURE (Revision 0, March 1972)

→(DRN 04-1619, R14)

The Pressurized Water Reactor Radioactive Gas Storage Tank Failure is no longer required to be evaluated by the Standard Review Plan, therefore this event has been deleted from the FSAR. As such this Regulatory Guide is no longer applicable to Waterford 3.

←(DRN 04-1619, R14)

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- 1.8.1.25 REGULATORY GUIDE 1.25, ASSUMPTIONS USED FOR EVALUATING THE POTENTIAL RADIOLOGICAL CONSEQUENCE OF A FUEL HANDLING ACCIDENT IN THE FUEL HANDLING AND STORAGE FACILITY FOR BOILING AND PRESSURIZED WATER REACTORS (Revision 0, March 1972)

➔(DRN 04-1619, R14)

The Fuel Handling Accident evaluation presented in FSAR Subsection 15.7 utilized the Alternative Source Term dose methodology in accordance with Regulatory Guide 1.183 requirements. Thus, Waterford 3 meets the recommendations of Regulatory Guide 1.25 except where superseded by Regulatory Guide 1.183.

←(DRN 04-1619, R14)

- 1.8.1.26 REGULATORY GUIDE 1.26, QUALITY GROUP CLASSIFICATIONS AND STANDARDS (Revision 2, June 1975)

Waterford 3 meets the recommendations of Regulatory Guide 1.26 with the qualification indicated in FSAR Subsection 3.2.2.

- 1.8.1.27 REGULATORY GUIDE 1.27, ULTIMATE HEAT SINK FOR NUCLEAR POWER PLANTS (Revision 2, January 1976)

Regulatory Guide 1.27 positions do not exactly apply to the wet-dry cooling tower combination for the Waterford 3 project. However, all concerns raised in the Regulatory Guide are satisfied. A description of the Ultimate Heat Sink is presented in FSAR Subsection 9.2.5.

- 1.8.1.28 REGULATORY GUIDE 1.28, QUALITY ASSURANCE PROGRAM REQUIREMENTS (DESIGN AND CONSTRUCTION) (Revision 0, June 1972)

Waterford 3 meets the recommendations of Regulatory Guide 1.28.

- 1.8.1.29 REGULATORY GUIDE 1.29, SEISMIC DESIGN CLASSIFICATION (Revision 1, August 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.29 with the qualification indicated in FSAR Subsections 3.2.1 and 8.3.1.2.6.

- 1.8.1.30 REGULATORY GUIDE 1.30, QUALITY ASSURANCE REQUIREMENTS FOR THE INSTALLATION, INSPECTION, AND TESTING OF INSTRUMENTATION AND ELECTRIC EQUIPMENT (Revision 0, August 1972)

Waterford 3 meets the recommendations of Regulatory Guide 1.30. The subject of this Regulatory Guide is discussed in the QA Program Manual, FSAR Section 7.3 and Subsection 14.2.7.

- 1.8.1.31 REGULATORY GUIDE 1.31, CONTROL OF STAINLESS STEEL WELDING (Revision 0, August 1972)

The Waterford SES Unit 3 design is consistent with the recommendation of the Interim Position (BTP MTEB 5-1) on Regulatory Guide 1.31 with the qualification indicated in FSAR Subsections 5.2.3.4.2.1 and 6.1.1.1.1.

➔(EC-2800, R307)

The replacement CEDM design is consistent with Regulatory Guide 1.31, Control of Stainless Steel Welding (Revision 3, April 1978). Revision 2 incorporated BTP MTEB 5.1. Revision 3 supersedes prior revisions and BTP MTEB 5-1.

←(EC-2800, R307)

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- 1.8.1.32 REGULATORY GUIDE 1.32, CRITERIA FOR SAFETY-RELATED ELECTRIC POWER SYSTEMS FOR NUCLEAR POWER PLANTS (Revision 0, August 1972)

Waterford 3 design meets the recommendations of Regulatory Guide 1.32. The design also complies with positions of Revision 1, dated March 1976, with the qualification indicated in FSAR Subsection 8.3.1.2.8.

- 1.8.1.33 REGULATORY GUIDE 1.33, QUALITY ASSURANCE PROGRAM REQUIREMENTS (OPERATION) (Revision 2, February 1978)

Waterford 3 meets the recommendations of Regulatory Guide 1.33 with certain exceptions and clarifications as described in the QA Program Manual. The subject of this Regulatory Guide is discussed in FSAR Section 13.5 and the QA Program Manual.

- 1.8.1.34 REGULATORY GUIDE 1.34, CONTROL OF ELECTROSLAG WELD PROPERTIES (Revision 0, December 1972)

This Regulatory Guide is not applicable to Waterford 3 design.

- 1.8.1.35 REGULATORY GUIDE 1.35, INSERVICE INSPECTION OF UNGROUTED TENDONS IN PRESTRESSED CONCRETE CONTAINMENT STRUCTURES (Revision 2, January 1976)

This Regulatory Guide is not applicable to Waterford 3 design.

- 1.8.1.36 REGULATORY GUIDE 1.36, NONMETALLIC THERMAL INSULATION FOR AUSTENITIC STAINLESS STEEL (Revision 0, February 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.36. The subject of this Regulatory Guide is discussed in FSAR Subsection 6.1.1.1.4.

- 1.8.1.37 REGULATORY GUIDE 1.37, QUALITY ASSURANCE REQUIREMENTS FOR CLEANING OF FLUID SYSTEMS AND ASSOCIATED COMPONENTS OF WATER-COOLED NUCLEAR POWER PLANTS (Revision 0, March 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.37. The subject of this Regulatory Guide is discussed in the QA Program Manual and Subsections 4.5.2.5, 5.4.2, 6.1.1.1.3 and 10.3.6.

- 1.8.1.38 REGULATORY GUIDE 1.38, QUALITY ASSURANCE REQUIREMENTS FOR PACKAGING, SHIPPING, RECEIVING, STORAGE, AND HANDLING OF ITEMS FOR WATER-COOLED NUCLEAR POWER PLANTS (March, 1973 and Revision 2, May 1977)

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Waterford 3 meets the recommendations of Regulatory Guide 1.38. The subject of this Regulatory Guide is discussed in the QA Program Manual.

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1.8.1.39 REGULATORY GUIDE 1.39, HOUSEKEEPING REQUIREMENTS FOR WATER-COOLED NUCLEAR POWER PLANTS (Revision 2, September 1977)

Waterford 3 meets the recommendations of Regulatory Guide 1.39. The subject of this Regulatory Guide is discussed in the QA Program Manual and FSAR Subsections 3.8.3, 9.5.1 and 14.2.7.

1.8.1.40 REGULATORY GUIDE 1.40, QUALIFICATION TESTS OF CONTINUOUS-DUTY MOTORS INSTALLED INSIDE THE CONTAINMENT OF WATER COOLED NUCLEAR POWER PLANTS (Revision 0, March 1973)

➔(EC-40281, R307)

Waterford 3 meets the recommendations of Regulatory Guide 1.40. Table 6.2-21 indicates motors were qualified to IEEE 334-1974/1994

←(EC-40281, R307)

1.8.1.41 REGULATORY GUIDE 1.41, PREOPERATIONAL TESTING OF REDUNDANT ONSITE ELECTRIC POWER SYSTEMS TO VERIFY PROPER LOAD GROUP ASSIGNMENTS (Revision 0, March 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.41. The subject of this Regulatory Guide is discussed in FSAR Subsections 8.3.1.2.10 and 14.2.7.

1.8.1.42 REGULATORY GUIDE 1.42, INTERIM LICENSING POLICY ON AS LOW AS PRACTICABLE FOR GASEOUS RADIOIODINE RELEASES FROM LIGHT-WATER-COOLED NUCLEAR POWER REACTORS (Revision 1, March 1974)

This Regulatory Guide is considered to be functionally obsolete due to the adoption of the revised Appendix I to 10CFR50. The detailed assumptions for releases, and system supplied, to meet the guidelines of Appendix I to 10CFR50 are given in FSAR Subsections 11.2.3 and 11.3.3.

1.8.1.43 REGULATORY GUIDE 1.43, CONTROL OF STAINLESS STEEL WELD CLADDING OF LOW-ALLOY STEEL COMPONENTS (Revision 0, May 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.43. The subject of this Regulatory Guide is discussed in FSAR Subsection 5.2.3.3.2.1.

1.8.1.44 REGULATORY GUIDE 1.44, CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL (Revision 0, May 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.44. The subject of this Regulatory Guide is discussed in FSAR Subsection 6.1.1.1 and with qualifications as described in Subsection 5.2.3.4.1.1.1.

1.8.1.45 REGULATORY GUIDE 1.45, REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE DETECTION SYSTEMS (Revision 0, May 1973)

➔(EC-5000082437, R301; EC-19087, R305)

Waterford 3 meets the recommendations of Regulatory Guide 1.45 with the following exception and clarification:

Only two of the four Leakage Detection methods will meet the sensitivity requirements of Regulatory Guide position C.5. The subject of this Regulatory Guide is discussed in FSAR Subsection 5.2.5.

Note: Revision 1 of RG 1.45 was used to determine the acceptability of the Waterford 3 pressurizer surge line leak-before-break (LBB) analysis as reported in Sections 3.6.3 and 5.2.5.

←(EC-5000082437, R301; EC-19087, R305)

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### 1.8.1.46 REGULATORY GUIDE 1.46, PROTECTION AGAINST PIPE WHIP INSIDE CONTAINMENT (May 1973)

→(DRN 03-2054, R14)

Waterford 3 complies with the Regulatory Guide recommendations for ASME Section III Code Class I pipe for the primary coolant loop, with the following clarification:

→(EC-19087, R305)

Waterford 3 complies with the modified GDC 4 (1987) allowance to credit leak-before-break (LBB) technology to exclude breaks in the primary coolant loop and the pressurizer surge line from consideration of mechanical (dynamic) effects. The next limiting pipe breaks are the remaining branch line pipe breaks (BLPBs), whose effects are evaluated for power uprate to 3716 MWt. A discussion of LBB is contained in Section 3.6.3.

←(DRN 03-2054, R14; EC-19087, R305)

Waterford 3 complies with the Regulatory Guide recommendations for ASME Section III Code Class I pipe with the following exceptions and clarifications. Piping systems other than primary coolant loop:

Regulatory Position C.1.a - The intersection of two pipes of similar diameters is considered as an intermediate stress point per AEC's letter of July 20, 1973 from Mr. R. Maccary of AEC to Mr. H. Oslick of Ebasco.

Regulatory Position C.1.b - The consideration of pipe breaks during testing is excluded due to the relatively small time period that such testing conditions exist. The exclusion is consistent with the proposed Regulatory Guide for pipe rupture outside the containment, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," dated March 15, 1974.

For ASME Section III, Code Class 2 & 3, Waterford 3 has utilized the recommendations of NRC Branch Technical Positions APCSB 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," and MEB 3-1, "Determination of Break Locations and Dynamic Effects Associated with the Postulated Rupture of Piping," for all piping inside the containment. The subject of this Regulatory Guide is discussed in FSAR Section 3.6.

→(DRN 06-802, R15)

Regulatory Guide 1.46 was withdrawn on March 1, 1985 and superseded with the July 1981 revision of SRP 3.6.2, "Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of piping." The SRP contained Branch Technical Position (BTP) MEB 3-1 Revision 1, "Postulated Rupture Locations in Fluid System Piping Inside and Outside Containment." The MEB was revised in Generic Letter (GL) 87-11 (BTP MEB 3-1 Rev. 2), "Relaxation in Arbitrary Intermediate Pipe Rupture Requirements," to delete the requirements for arbitrary intermediate pipe ruptures. Therefore, Waterford 3 also complies with BTP MEB 3-1 Rev. 2 contained in GL 87-11 for the deletion of arbitrary intermediate pipe ruptures.

←(DRN 06-802, R15)

→(DRN 99-2321, R11)

### 1.8.1.47 REGULATORY GUIDE 1.47. BYPASSED AND INOPERABLE STATUS INDICATION FOR NUCLEAR POWER PLANT SAFETY SYSTEMS. (Revision 0, May 1973)

The subject of this Regulatory Guide is discussed in FSAR Section 7.5.1.8.

←(DRN 99-2321, R11)

### 1.8.1.48 REGULATORY GUIDE 1.48, DESIGN LIMITS AND LOADING COMBINATIONS FOR SEISMIC CATEGORY I FLUID SYSTEM COMPONENTS (Revision 0, May 1973)



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The Waterford SES Unit 3 complies with Regulatory Guide 1.48 with the following exceptions and clarifications:

Regulatory Position C.8.a - ASME Code Class 2 & 3 components meet the requirements of the loading combination of Regulatory Position C.8.a.(1). The emergency stress limit of Regulatory Position C.8.a.(2) will not be used. Instead, a stress limit of 1.8 Sh will be used, based on ASME Code Case 1606, November 5, 1973 and AEC Regulatory Guide 1.84, June 1974.

Regulatory Position C.8.b - For the faulted loading combination, Class 2 and 3 components meet the guidance of ASME Section III, Code Case 1606 (November 5, 1973) and AEC Regulatory Guide 1.84, June 1974 which stipulates an allowable stress (at temperature) of 2.4 Sh. The subject of this Regulatory Guide is discussed in FSAR Subsection 3.9.3.

1.8.1.49 REGULATORY GUIDE 1.49, POWER LEVELS OF NUCLEAR POWER PLANTS  
(Revision 1, December 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.49.

1.8.1.50 REGULATORY GUIDE 1.50, CONTROL OF PREHEAT TEMPERATURE  
FOR WELDING OF LOW-ALLOY STEEL (Revision 0, May 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.50 with the qualifications indicated in Subsection 5.2.3.3.2.1.

1.8.1.51 REGULATORY GUIDE 1.51, INSERVICE INSPECTION OF ASME CODE  
CLASS 2 AND 3 NUCLEAR POWER PLANT COMPONENTS  
(Revision 0, May 1973)

Regulatory Guide 1.51 was withdrawn by the NRC.

1.8.1.52 REGULATORY GUIDE 1.52, DESIGN, TESTING, AND MAINTENANCE  
CRITERIA FOR ATMOSPHERE CLEANUP SYSTEM AIR FILTRATION  
AND ADSORPTION UNITS OF LIGHT-WATER-COOLED NUCLEAR  
POWER PLANTS (Revision 0, June 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.52 with the qualification indicated in FSAR Table 6.5-1. Revision 0 (6-73) was used for design. Revision 2 (3/78) was used for preoperational, startup and maintenance testing as discussed in FSAR Subsection 14.2.7.9. Revision 2 (3/78) was employed during the startup test program as discussed in FSAR Subsection 14.2.7.9.

1.8.1.53 REGULATORY GUIDE 1.53, APPLICATION OF THE SINGLE-FAILURE  
CRITERION TO NUCLEAR POWER PLANT PROTECTION SYSTEMS  
(Revision 0, June 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.53. The subject of this Regulatory Guide is discussed in Section 7.2

1.8.1.54 REGULATORY GUIDE 1.54, QUALITY ASSURANCE REQUIREMENTS FOR  
PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR POWER  
PLANTS (Revision 0, June 1973)

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Waterford 3 meets the recommendations of Regulatory Guide 1.54 with the qualifications indicated in FSAR Subsection 6.1.2.

1.8.1.55 REGULATORY GUIDE 1.55, CONCRETE PLACEMENT IN CATEGORY I STRUCTURES (Revision 0, June 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.55 with the qualifications indicated in FSAR Subsection 3.8.3.

1.8.1.56 REGULATORY GUIDE 1.56, MAINTENANCE OF WATER PURITY IN BOILING WATER REACTORS (Revision 0, June 1973)

This Regulatory Guide is not applicable to Waterford 3.

1.8.1.57 REGULATORY GUIDE 1.57, DESIGN LIMITS AND LOADING COMBINATIONS FOR METAL PRIMARY REACTOR CONTAINMENT SYSTEM COMPONENTS (Revision 0, June 1973)

For the steel containment vessel, Waterford 3 project complies with Regulatory Guide with the following exceptions or clarifications:

1. The structural design criteria covers initial and final test conditions, normal operating condition, cold shutdown condition and two postulated accident conditions.
2. The structural design criteria does not include the load combination of post-accident flooding plus 1/2 SSE.
3. Fatigue evaluation is not contemplated in the containment vessel design.

The subject of this Regulatory Guide is discussed in FSAR Subsection 3.8.2.

1.8.1.58 REGULATORY GUIDE 1.58, QUALIFICATION OF NUCLEAR POWER PLANT INSPECTION, EXAMINATION, AND TESTING PERSONNEL (Revision 1, Sept 1980)

Waterford 3 meets the recommendations of Regulatory Guide 1.58. The subject of this Regulatory Guide is discussed in the Quality Assurance Program Manual.

1.8.1.59 REGULATORY GUIDE 1.59, DESIGN BASIS FLOODS FOR NUCLEAR POWER PLANTS (Revision 1, April 1976)

Waterford 3 design meets the recommendations of Regulatory Guide 1.59. The subject of this Regulatory Guide is discussed in FSAR Section 2.4.

1.8.1.60 REGULATORY GUIDE 1.60, DESIGN RESPONSE SPECTRA FOR SEISMIC DESIGN OF NUCLEAR POWER PLANTS (Revision 1, December 1973)

The subject of this Regulatory Guide is discussed in FSAR Subsection 3.7.1.

1.8.1.61 REGULATORY GUIDE 1.61, DAMPING VALUES FOR SEISMIC DESIGN OF NUCLEAR POWER PLANTS (Revision 0, October 1973)

The subject of this Regulatory Guide is discussed in FSAR Section 3.7.

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1.8.1.62 REGULATORY GUIDE 1.62, MANUAL INITIATION OF PROTECTIVE ACTIONS (Revision 0, October 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.62. The subject of this Regulatory Guide is discussed in FSAR Subsections 7.2.1.1.1.11 and 7.2.2.3.2.

1.8.1.63 REGULATORY GUIDE 1.63, ELECTRIC PENETRATION ASSEMBLIES IN CONTAINMENT STRUCTURES FOR WATER-COOLED NUCLEAR POWER PLANTS (Revision 0, October 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.63. The subject of this Regulatory Guide is discussed in FSAR Subsections 8.3.1.1.4 and 14.2.7.

1.8.1.64 REGULATORY GUIDE 1.64, QUALITY ASSURANCE REQUIREMENTS FOR THE DESIGN OF NUCLEAR POWER PLANTS (Revision 2, June 1976)

Waterford 3 meets the recommendations of Regulatory Guide 1.64. The subject of this Regulatory Guide is discussed in FSAR Section 17.2.

1.8.1.65 REGULATORY GUIDE 1.65, MATERIALS AND INSPECTIONS FOR REACTOR VESSEL CLOSURE STUDS (Revision 0, October 1973)

The subject of this Regulatory Guide is discussed in FSAR Subsections 5.3.1.7 and 14.2.7.

1.8.1.66 REGULATORY GUIDE 1.66, NONDESTRUCTIVE EXAMINATION OF TUBULAR PRODUCTS (Revision 0, October 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.66 with the qualifications indicated in FSAR Subsection 5.2.3.3.2.4.

1.8.1.67 REGULATORY GUIDE 1.67, INSTALLATION OF OVERPRESSURE PROTECTION DEVICES (Revision 0, October 1973)

Waterford 3 design meets the recommendations of Regulatory Guide 1.67.

1.8.1.68 REGULATORY GUIDE 1.68, PREOPERATIONAL AND INITIAL STARTUP TEST PROGRAMS FOR WATER-COOLED POWER REACTORS (Revision 2, August 1978)

Waterford 3 meets the recommendations of Regulatory Guide 1.68 with the qualification indicated in FSAR Subsection 14.2.7.13.

1.8.1.69 REGULATORY GUIDE 1.69, CONCRETE RADIATION SHIELDS FOR NUCLEAR POWER PLANTS (Revision 0, December 1973)

Waterford 3 meets the recommendations of Regulatory Guide 1.69 with the qualification indicated in FSAR Subsection 12.3.2.4.

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1.8.1.70 REGULATORY GUIDE 1.70, STANDARD FORMAT AND CONTENT OF SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS (Revision 2, September 1975)

The recommendations of Regulatory Guide 1.70, Revision 2, were followed in preparing this FSAR.

1.8.1.71 REGULATORY GUIDE 1.71, WELDER QUALIFICATION FOR AREAS OF LIMITED ACCESSIBILITY (Revision 0, December 1973)

The subject of this Regulatory Guide is discussed in FSAR Subsections 5.2.3.3.2.3, 6.1.1.1.3 and 4.5.2.4.5 and with qualifications as discussed in Subsection 10.3.6.

1.8.1.72 REGULATORY GUIDE 1.72, SPRAY POND PLASTIC PIPING (Revision 0, December 1973)

This Regulatory Guide is not applicable to Waterford 3.

1.8.1.73 REGULATORY GUIDE 1.73, QUALIFICATION TESTS OF ELECTRIC VALVE OPERATORS INSTALLED INSIDE THE CONTAINMENT OF NUCLEAR POWER PLANTS (Revision 0, January 1974)

Waterford 3 meets the recommendations of Regulatory Guide 1.73.

1.8.1.74 REGULATORY GUIDE 1.74, QUALITY ASSURANCE TERMS AND DEFINITIONS (Revision 0, February 1974)

Waterford 3 meets the recommendations of Regulatory Guide 1.74. The subject of this Regulatory Guide is discussed in the QA Program Manual.

1.8.1.75 REGULATORY GUIDE 1.75, PHYSICAL INDEPENDENCE OF ELECTRICAL SYSTEMS (Revision 1, January 1975)

Waterford 3 SES Unit 3 design ensures that separation criteria as required by Regulatory Guide 1.75 is met. The subject of this Regulatory Guide is discussed in FSAR Subsections 8.3.1.2.13 and 9.5.1.

1.8.1.76 REGULATORY GUIDE 1.76, DESIGN BASIS TORNADO FOR NUCLEAR POWER PLANTS (Revision 0, April 1974)

Waterford 3 design basis tornado parameters are presented in FSAR Subsection 3.3.2.

1.8.1.77 REGULATORY GUIDE 1.77, ASSUMPTIONS USED FOR EVALUATING A CONTROL ROD EJECTION ACCIDENT FOR PRESSURIZED WATER REACTORS (Revision 0, May 1974)

→(DRN 04-1619, R14)

The Control Rod Ejection evaluation presented in FSAR Subsection 15.4 utilized the Alternative Source Term dose methodology in accordance with Regulatory Guide 1.183 requirements. Thus, Waterford 3 meets the recommendations of Regulatory Guide 1.77 except where superseded by Regulatory Guide 1.183.

←(DRN 04-1619, R14)

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- 1.8.1.78 REGULATORY GUIDE 1.78, ASSUMPTIONS FOR EVALUATING THE HABITABILITY OF A NUCLEAR POWER PLANT CONTROL ROOM DURING A POSTULATED HAZARDOUS CHEMICAL RELEASE (Revision 0, June 1974)

The subject of this Regulatory Guide is discussed in FSAR Subsections 2.2.3.3 and 6.4.4.2.

- 1.8.1.79 REGULATORY GUIDE 1.79, PREOPERATIONAL TESTING OF EMERGENCY CORE COOLING SYSTEMS FOR PRESSURIZED WATER REACTORS (Revision 1, September 1975)

Waterford 3 meets the recommendation of Regulatory Guide 1.79 with the qualification indicated in FSAR Subsection 14.2.7.15.

- 1.8.1.80 REGULATORY GUIDE 1.80, PREOPERATIONAL TESTING OF INSTRUMENT AIR SYSTEMS (Revision 0, June 1974)

Waterford 3 will meet the recommendations of Regulatory Guide 1.80 with the qualifications indicated in Subsection 14.2.7.16.

- 1.8.1.81 REGULATORY GUIDE 1.81, SHARED EMERGENCY AND SHUTDOWN ELECTRIC SYSTEMS FOR MULTI-UNIT NUCLEAR POWER PLANTS (Revision 1, January 1975)

The subject of this Regulatory Guide is not applicable to Waterford 3.

- 1.8.1.82 REGULATORY GUIDE 1.82, SUMPS FOR EMERGENCY CORE COOLING AND CONTAINMENT SPRAY SYSTEMS (Revision 0, June 1974)

Waterford 3 design meets the recommendations of Regulatory Guide 1.82 with the qualifications indicated in FSAR Subsection 6.2.2.2.1.

- 1.8.1.83 REGULATORY GUIDE 1.83, IN-SERVICE INSPECTION OF PRESSURIZED WATER REACTOR STEAM GENERATOR TUBES (Revision 1, July 1975)

→(EC-8458, R307)

Regulatory Guide 1.83 (Revision 1) was withdrawn on November 12, 2009. Inservice Inspection of steam generator tubes is performed in accordance with the Technical Specifications.

←(EC-8458, R307)

- 1.8.1.84 REGULATORY GUIDE 1.84, CODE CASE ACCEPTABILITY-ASME SECTION III DESIGN AND FABRICATION

Waterford 3 design meets the recommendations of Regulatory Guide 1.84 with the qualifications indicated in FSAR Subsections 5.2.1.2.1 and 3.8.2.

- 1.8.1.85 REGULATORY GUIDE 1.85, CODE CASE ACCEPTABILITY-ASME SECTION III MATERIALS

Waterford 3 meets the recommendations of Regulatory Guide 1.85 with the qualifications indicated in FSAR Subsections 5.2.1.2.2 and 3.8.2.

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1.8.1.86 REGULATORY GUIDE 1.86, TERMINATION OF OPERATING  
LICENSES FOR NUCLEAR REACTORS (June 1974)

Waterford 3 project will meet the recommendations of Regulatory Guide 1.86, or other guidance extant at the time of decommissioning.

1.8.1.87 REGULATORY GUIDE 1.87, CONSTRUCTION CRITERIA FOR  
CLASS I COMPONENTS IN ELEVATED TEMPERATURE REACTORS  
(SUPPLEMENT TO ASME SECTION III, CODE CASES 1592,  
1593, 1594, 1595 and 1596) (Revision 1, June 1975)

The subject of this Regulatory Guide is not applicable to the Waterford 3 design.

1.8.1.88 REGULATORY GUIDE 1.88, COLLECTION, STORAGE AND MAINTENANCE  
OF NUCLEAR POWER PLANT QUALITY ASSURANCE RECORDS  
(Revision 2, October 1976)

Waterford 3 meets the recommendations of Regulatory Guide 1.88. The subject of this Regulatory Guide is discussed in FSAR Subsection 14.2.7.17 and QA Program Manual.

1.8.1.89 REGULATORY GUIDE 1.89, QUALIFICATION OF CLASS 1E  
EQUIPMENT FOR NUCLEAR POWER PLANTS (November 1974)

Waterford 3 meets the recommendations of Regulatory Guide 1.89. The subject of this Regulatory Guide is discussed in FSAR Subsection 8.3.1.2.

1.8.1.90 REGULATORY GUIDE 1.90, INSERVICE INSPECTION OF PRESTRESSED  
CONCRETE CONTAINMENT STRUCTURES WITH GROUTED TENDONS  
(November 1974)

The subject of this Regulatory Guide is not applicable to the Waterford 3.

1.8.1.91 REGULATORY GUIDE 1.91, EVALUATION OF EXPLOSIONS  
POSTULATED TO OCCUR ON TRANSPORTATION ROUTES NEAR  
NUCLEAR POWER PLANT SITES (January 1975)

Waterford 3 meets the recommendations of Regulatory Guide 1.91.

1.8.1.92 REGULATORY GUIDE 1.92, COMBINATION OF MODES AND SPATIAL  
COMPONENTS IN SEISMIC RESPONSE ANALYSIS  
(Revision 0, December 1974)

The mode and spatial component combinations used are discussed in FSAR Subsections 3.7.1, 3.7.2, and 3.7.3.

1.8.1.93 REGULATORY GUIDE 1.93, AVAILABILITY OF ELECTRIC POWER  
SOURCES (December 1974)

Waterford 3 meets the recommendations of Regulatory Guide 1.93.

- 1.8.1.94 REGULATORY GUIDE 1.94, QUALITY ASSURANCE REQUIREMENTS FOR INSTALLATION, INSPECTION, AND TESTING OF STRUCTURAL CONCRETE AND STRUCTURAL STEEL DURING THE CONSTRUCTION PHASE OF NUCLEAR POWER PLANTS (Revision 1, April 1976)

The quality assurance requirements for installation, inspection, and testing of structural concrete and structural steel during construction are discussed in QA Program Manual.

→(DRN 01-758, R11-A)

- 1.8.1.95 REGULATORY GUIDE 1.95, PROTECTION OF NUCLEAR POWER PLANT CONTROL ROOM OPERATORS AGAINST AN ACCIDENTAL CHLORINE RELEASE (February 1975)

←(DRN 01-758, R11-A)

Waterford 3 meets the recommendations of Regulatory Guide 1.95. The subject of this Regulatory Guide is discussed in FSAR Subsections 2.2.3.3, 6.4.4.2, and 14.2.7.18.

- 1.8.1.96 REGULATORY GUIDE 1.96, DESIGN OF MAIN STEAM ISOLATION VALVE LEAKAGE CONTROL SYSTEMS FOR BOILING WATER REACTOR NUCLEAR POWER PLANTS (Revision 1, June 1976)

The subject of this Regulatory Guide is not applicable to Waterford 3.

→(DRN 01-758, R11-A)

- 1.8.1.97 REGULATORY GUIDE 1.97, INSTRUMENTATION FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS TO ASSESS PLANT AND ENVIRONS CONDITIONS DURING AND FOLLOWING AN ACCIDENT (Revision 3, December 1983)

←(DRN 01-758, R11-A)

→(DRN 01-26, R11-A; 01-758, R11-A)

A complete report of the compliance of Waterford 3 with the recommendations of Regulatory Guide 1.97 and the schedule of completion of the various instruments is provided to the NRC in letter W3F1-91-0019.

This letter was supplemented by letter W3F1-97-0120. Additional information regarding conformance to Regulatory Guide 1.97 can be found in Section 7.5.1.7.

←(DRN 01-26, R11-A; 01-758, R11-A)

→(DRN 01-758, R11-A; 01-1281, R12)

- 1.8.1.109 CALCULATION OF ANNUAL DOSE TO MAN FROM ROUTINE RELEASES OF REACTOR EFFLUENTS FOR THE PURPOSE OF EVALUATING COMPLIANCE WITH 10 CFR PART 50, APPENDIX I (March 1976)

Waterford 3 meets the recommendations of Regulatory Guide 1.109 as discussed in FSAR Subsections 11.2.3, 11.3.3, 12.2.2, and 15.7.3.15.1.

- 1.8.1.111 METHODS FOR ESTIMATING ATMOSPHERIC TRANSPORT AND DISPERSION OF GASEOUS EFFLUENTS IN ROUTINE RELEASES FROM LIGHT-WATER-COOLED REACTORS (March 1976)

Waterford 3 meets the recommendations of Regulatory Guide 1.111 as discussed in FSAR Subsection 2.3.5.1.

←(DRN 01-1281, R12)

→(EC-26965, R305)

- 1.8.1.133 LOOSE PART DETECTION PROGRAM FOR THE PRIMARY SYSTEM OF LIGHT WATER COOLED REACTOR

Waterford 3 meets the recommendations of Regulatory Guide 1.133 as discussed in UFSAR Subsection 4.4.6.1 and modified by NRC Technical Specification Amendment 104.

←(EC-26965, R305)

- 1.8.1.143 REGULATORY GUIDE 1.143, DESIGN GUIDANCE FOR RADIOACTIVE WASTE MANAGEMENT SYSTEMS, STRUCTURES, AND COMPONENTS INSTALLED IN LIGHT-WATER-COOLED NUCLEAR POWER PLANTS (Revision 1, October 1979)

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→(EC-47424, R308)

The liquid, gaseous and solid waste management systems conform with Regulatory Guide 1.143 requirements with the following exception. The piping and valve design, construction, inspection and testing requirements meet ANSI B31.1 and/or ANSI B31.3 standards.

←(EC-47424, R308)  
→(DRN 03-2054, R14)

1.8.1.145

REGULATORY GUIDE 1.145, ATMOSPHERIC DISPERSION MODELS FOR POTENTIAL ACCIDENT CONSEQUENCE ASSESSMENTS AT NUCLEAR POWER PLANTS (REVISION 0, AUGUST 1979)

Waterford 3 meets the recommendations of Regulatory Guide 1.145 as discussed in FSAR Subsection 2.3.4.

←(DRN 03-2054, R14)  
→(DRN 04-1619, R14)

1.8.1.183

REGULATORY GUIDE 1.183, ALTERNATIVE RADIOLOGICAL SOURCE TERMS FOR EVALUATING DESIGN BASIS ACCIDENTS AT NUCLEAR POWER REACTORS (Revision 0, July 2000)

The design basis accident dose analyses contained in Chapter 15 utilized the Alternative Source Term methodology in accordance with Regulatory Guide 1.183 requirements. Waterford 3 meets or exceeds the recommendations of this Regulatory Guide with the following exceptions and clarifications.

The breathing rates assumed for the control room and off-site doses uses a more accurate value of  $3.47E-4$  m<sup>3</sup>/s versus the rounded up  $3.5E-4$  m<sup>3</sup>/s specified in the regulatory guidance.

Regulatory Guide 1.183, Section 5.1 of Appendix E states "For facilities with traditional generator specifications (both per generator and total of all generators), the leakage should be apportioned between the affected and unaffected steam generators in such a manner that the calculated dose is maximized." For the accident sequences presented in Chapter 15, the primary-to-secondary side steam generator tube leakage is specified on a per steam generator basis.

Regulatory Guide 1.183, Appendix A, recommends that a flashing fraction of 10% be applied to the ESF liquid leakage term assumed in the loss of coolant accident dose analysis for the duration of the event. Waterford 3 conservatively uses a value of 10% for the first 24 hours of the event, however, the value is reduced to 2% thereafter. The 2% value is roughly a factor of 10 greater than what would be expected based on the post-LOCA safety injection sump temperature profile.

←(DRN 04-1619, R14)