U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

NUREG-1929, Vol. 1

Safety Evaluation Report

Related to the License Renewal of Beaver Valley Power Station, Units 1 and 2

Docket Nos. 50-334 and 50-412

FirstEnergy Nuclear Operating Company

Office of Nuclear Reactor Regulation

AVAILABILITY OF REFERENCE MATERIALS IN NRC PUBLICATIONS

NRC Reference Material

As of November 1999, you may electronically access NUREG-series publications and other NRC records at NRC's Public Electronic Reading Room at http://www.nrc.gov/reading-rm.html. Publicly released records include, to name a few, NUREG-series publications; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigative reports; licensee event reports; and Commission papers and their attachments.

NRC publications in the NUREG series, NRC regulations, and *Title 10, Energy*, in the Code of *Federal Regulations* may also be purchased from one of these two sources.

1. The Superintendent of Documents
   U.S. Government Printing Office
   Mail Stop SSOP
   Washington, DC 20402-0001
   Internet: bookstore.gpo.gov
   Telephone: 202-512-1800
   Fax: 202-512-2250
2. The National Technical Information Service
   Springfield, VA 22161-0002
   www.ntis.gov
   1-800-553-6847 or, locally, 703-605-6000

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: U.S. Nuclear Regulatory Commission
Office of Administration
Reproduction and Mail Services Branch
Washington, DC 20555-0001
E-mail: DISTRIBUTION@nrc.gov
Facsimile: 301-415-2289

Some publications in the NUREG series that are posted at NRC's Web site address http://www.nrc.gov/reading-rm/doc-collections/nuregs are updated periodically and may differ from the last printed version. Although references to material found on a Web site bear the date the material was accessed, the material available on the date cited may subsequently be removed from the site.

Non-NRC Reference Material

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, and transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at—

The NRC Technical Library
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

American National Standards Institute
11 West 42nd Street
New York, NY 10036-8002
www.ansi.org
212-642-4900

Legally binding regulatory requirements are stated only in laws; NRC regulations; licenses, including technical specifications; or orders, not in NUREG-series publications. The views expressed in contractor-prepared publications in this series are not necessarily those of the NRC.

The NUREG series comprises (1) technical and administrative reports and books prepared by the staff (NUREG-XXXX) or agency contractors (NUREG/CR-XXXX), (2) proceedings of conferences (NUREG/CP-XXXX), (3) reports resulting from international agreements (NUREG/IA-XXXX), (4) brochures (NUREG/BR-XXXX), and (5) compilations of legal decisions and orders of the Commission and Atomic and Safety Licensing Boards and of Directors' decisions under Section 2.206 of NRC's regulations (NUREG-0750).

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

NUREG-1929, Vol. 1

Safety Evaluation Report

Related to the License Renewal of Beaver Valley Power Station, Units 1 and 2

Docket Nos. 50-334 and 50-412

FirstEnergy Nuclear Operating Company

Manuscript Completed: October 2009
Date Published: October 2009

Office of Nuclear Reactor Regulation

ABSTRACT

This safety evaluation report (SER) documents the technical review of the Beaver Valley Power Station (BVPS), Units 1 and 2, license renewal application (LRA) by the United States (US) Nuclear Regulatory Commission (NRC) staff (the staff). By letter dated August 27, 2007, FirstEnergy Nuclear Operating Company (FENOC or the applicant) submitted the LRA in accordance with Title 10, Part 54, of the *Code of Federal Regulations*, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." FENOC requests renewal of the Units 1 and 2, operating licenses (Facility Operating License Numbers DPR-66 and NPF-73, respectively) for a period of 20 years beyond the current expirations at midnight January 29, 2016, for Unit 1, and at midnight May 27, 2027, for Unit 2.

BVPS is located approximately 17 miles west of McCandless, PA. The NRC issued the construction permits for Unit 1 on June 26, 1970, and on May 3, 1974, for Unit 2. The NRC issued the operating licenses for Unit 1 on July 2, 1976, and on August 14, 1987, for Unit 2. Units 1 and 2 are of a dry subatmospheric pressurized water reactor design. Westinghouse Electric supplied the nuclear steam supply system and Stone and Webster originally designed and constructed the balance of the plant. The licensed power output of each unit is 2900 megawatt thermal with a gross electrical output of approximately 972 megawatt electric.

This SER presents the status of the staff's review of information submitted through June 04, 2009, the cutoff date for consideration in the SER. Section 6.0 provides the staff's final conclusion on the review of the BVPS LRA.

TABLE OF CONTENTS

ABSTRACT iii
TABLE OF CONTENTS v
ABBREVIATIONS xv
INTRODUCTION AND GENERAL DISCUSSION 1-1
1.1 Introduction 1-1
1.2 License Renewal Background 1-2
1.2.1 Safety Review 1-3
1.2.2 Environmental Review 1-4
1.3 Principal Review Matters 1-5
1.4 Interim Staff Guidance 1-6
1.5 Summary of Open Items 1-7
1.6 Summary of Proposed License Conditions 1-8
STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW 2-1
2.1 Scoping and Screening Methodology 2-1
2.1.1 Introduction 2-1
2.1.2 Summary of Technical Information in the Application 2-1
2.1.3 Scoping and Screening Program Review 2-2
2.1.3.1 Implementation Procedures and Documentation Sources for Scoping and Screening 2-3
2.1.3.2 Quality Assurance Controls Applied to LRA Development 2-5
2.1.3.3 Training 2-6
2.1.3.4 Conclusion of Scoping and Screening Program Review 2-6
2.1.4 Plant Systems, Structures, and Components Scoping Methodology 2-7
2.1.4.1 Application of the Scoping Criteria in 10 CFR 54.4(a)(1) 2-7
2.1.4.2 Application of the Scoping Criteria in 10 CFR 54.4(a)(2) 2-11
2.1.4.3 Application of the Scoping Criteria in 10 CFR 54.4(a)(3) 2-19
2.1.4.4 Plant-Level Scoping of Systems and Structures 2-22
2.1.4.5 Mechanical Scoping 2-24
2.1.4.6 Structural Scoping 2-26
2.1.4.7 Electrical Scoping 2-27
2.1.4.8 Scoping Methodology Conclusion 2-28
2.1.5 Screening Methodology 2-28
2.1.5.1 General Screening Methodology 2-28
2.1.5.2 Mechanical Component Screening 2-29
2.1.5.3 Structural Component Screening 2-30
2.1.5.4 Electrical Component Screening 2-32
2.1.5.5 Conclusion for Screening Methodology 2-33
2.1.6 Summary of Evaluation Findings 2-33
2.2 Plant Level Scoping Results 2-33
2.2.1 introduction 2-33
2.2.2 Summary of Technical Information in the Application 2-34
2.2.3 Staff Evaluation 2-34
2.2.4 Conclusion 2-37
2.3 Scoping and Screening Results: Mechanical Systems 2-38
2.3.1 Reactor Vessel, Internals, and Reactor Coolant System 2-41
2.3.1.1 Reactor Vessel 2-41

2.3.1.2 Reactor Vessel Internals....2-43
2.3.1.3 Reactor Coolant System....2-45
2.3.2 Engineered Safety Features....2-47
2.3.2.1 Containment Depressurization System....2-47
2.3.2.2 Residual Heat Removal System....2-49
2.3.2.3 Safety Injection System....2-51
2.3.3 Auxiliary Systems....2-53
2.3.3.1 Area Ventilation Systems - Control Areas....2-54
2.3.3.2 Area Ventilation Systems - Plant Areas....2-56
2.3.3.3 Boron Recovery and Primary Grade Water System....2-61
2.3.3.4 Building and Yard Drains System....2-62
2.3.3.5 Chemical and Volume Control System....2-64
2.3.3.6 Chilled Water System....2-66
2.3.3.7 Compressed Air System....2-67
2.3.3.8 Containment System....2-72
2.3.3.9 Containment Vacuum and Leak Monitoring System....2-74
2.3.3.10 Domestic Water System....2-76
2.3.3.11 Emergency Diesel Generators and Air Intake and Exhaust System....2-77
2.3.3.12 Emergency Diesel Generators - Air Start System....2-78
2.3.3.13 Emergency Diesel Generators - Crankcase Vacuum System....2-81
2.3.3.14 Emergency Diesel Generators - Fuel Oil System....2-82
2.3.3.15 Emergency Diesel Generators - Lube Oil System....2-85
2.3.3.16 Emergency Diesel Generators - Water Cooling System....2-86
2.3.3.17 Emergency Response Facility Substation System (Common)....2-88
2.3.3.18 Fire Protection Systems....2-92
2.3.3.19 Fuel Pool Cooling and Purification System....2-113
2.3.3.20 Gaseous Waste Disposal System....2-115
2.3.3.21 Liquid Waste Disposal System....2-116
2.3.3.22 Post-Accident Sample System....2-118
2.3.3.23 Post-Design Basis Accident Hydrogen Control System....2-121
2.3.3.24 Primary Component and Neutron Shield Tank Cooling Water System....2-122
2.3.3.25 Radiation Monitoring System....2-123
2.3.3.26 Reactor Plant Sample System....2-125
2.3.3.27 Reactor Plant Vents and Drains System....2-128
2.3.3.28 River Water System (Unit 1 Only)....2-130
2.3.3.29 Security Diesel Generator System (Common)....2-131
2.3.3.30 Service Water System (Unit 2 Only)....2-133
2.3.3.31 Solid Waste Disposal System....2-136
2.3.3.32 Supplementary Leak Collection and Release System....2-138
2.3.4 Steam and Power Conversion Systems....2-140
2.3.4.1 Auxiliary Feedwater System....2-141
2.3.4.2 Auxiliary Steam System....2-144
2.3.4.3 Building Services Hot Water Heating System....2-145
2.3.4.4 Condensate System (Unit 1 Only)....2-146
2.3.4.5 Glycol Heating System (Unit 1 Only)....2-147
2.3.4.6 Main Feedwater System....2-148

2.3.4.7 Main Steam System 2-151
2.3.4.8 Main Turbine and Condenser System 2-154
2.3.4.9 Steam Generator Blowdown System 2-156
2.3.4.10 Water Treatment System 2-158
2.4 Scoping and Screening Results 2-160
2.4.1 Alternate Intake Structure (Common) 2-161
2.4.1.1 Summary of Technical Information in the Application 2-161
2.4.1.2 Staff Evaluation 2-162
2.4.1.3 Conclusion 2-163
2.4.2 Auxiliary Building 2-163
2.4.2.1 Summary of Technical Information in the Application 2-163
2.4.2.2 Staff Evaluation 2-164
2.4.2.3 Conclusion 2-164
2.4.3 Boric Acid Tank Building (Unit 1 Only) 2-165
2.4.3.1 Summary of Technical Information in the Application 2-165
2.4.3.2 Staff Evaluation 2-165
2.4.3.3 Conclusion 2-166
2.4.4 Cable Tunnel 2-166
2.4.4.1 Summary of Technical Information in the Application 2-166
2.4.4.2 Staff Evaluation 2-166
2.4.4.3 Conclusion 2-167
2.4.5 Chemical Addition Building (Unit 1 Only) 2-167
2.4.5.1 Staff Evaluation 2-167
2.4.5.2 Conclusion 2-167
2.4.6 Condensate Polishing Building (Unit 2 Only) 2-168
2.4.6.1 Summary of Technical Information in the Application 2-168
2.4.6.2 Staff Evaluation 2-168
2.4.6.3 Conclusion 2-168
2.4.7 Control Building (Unit 2 Only) 2-168
2.4.7.1 Summary of Technical Information in the Application 2-168
2.4.7.2 Staff Evaluation 2-169
2.4.7.3 Conclusion 2-169
2.4.8 Decontamination Building 2-170
2.4.8.1 Summary of Technical Information in the Application 2-170
2.4.8.2 Staff Evaluation 2-170
2.4.8.3 Conclusion 2-171
2.4.9 Diesel Generator Building 2-172
2.4.9.1 Summary of Technical Information in the Application 2-172
2.4.9.2 Staff Evaluation 2-172
2.4.9.3 Conclusion 2-173
2.4.10 Emergency Outfall Structure (Unit 2 Only) 2-173
2.4.10.1 Summary of Technical Information in the Application 2-173
2.4.10.2 Staff Evaluation 2-174
2.4.10.3 Conclusion 2-174
2.4.11 Emergency Response Facility Diesel Generator Building (Common) 2-174
2.4.11.1 Summary of Technical Information in the Application 2-174
2.4.11.2 Staff Evaluation 2-175
2.4.11.3 Conclusion 2-175
2.4.12 Emergency Response Facility Substation Building (Common) 2-176

2.4.12.1 Summary of Technical Information in the Application 2-176
2.4.12.2 Staff Evaluation 2-176
2.4.12.3 Conclusion.....2-177
2.4.13 Equipment Hatch Platform 2-177
2.4.13.1 Summary of Technical Information in the Application 2-177
2.4.13.2 Staff Evaluation 2-178
2.4.13.3 Conclusion.....2-179
2.4.14 Fuel Building 2-179
2.4.14.1 Summary of Technical Information in the Application 2-179
2.4.14.2 Staff Evaluation 2-180
2.4.14.3 Conclusion.....2-181
2.4.15 Gaseous Waste Storage Vault 2-181
2.4.15.1 Summary of Technical Information in the Application 2-181
2.4.15.2 Staff Evaluation 2-182
2.4.15.3 Conclusion.....2-182
2.4.16 Guard House (Common).....2-183
2.4.16.1 Summary of Technical Information in the Application 2-183
2.4.16.2 Staff Evaluation 2-183
2.4.16.3 Conclusion.....2-183
2.4.17 Intake Structure (Common).....2-183
2.4.17.1 Summary of Technical Information in the Application 2-183
2.4.17.2 Staff Evaluation 2-184
2.4.17.3 Conclusion.....2-184
2.4.18 Main Steam and Cable Vault.....2-185
2.4.18.1 Summary of Technical Information in the Application 2-185
2.4.18.2 Staff Evaluation 2-186
2.4.18.3 Conclusion.....2-186
2.4.19 Pipe Tunnel.....2-186
2.4.19.1 Summary of Technical Information in the Application 2-186
2.4.19.2 Staff Evaluation 2-187
2.4.19.3 Conclusion.....2-187
2.4.20 Primary Demineralized Water Storage Tank Pad and Enclosure.....2-188
2.4.20.1 Summary of Technical Information in the Application 2-188
2.4.20.2 Staff Evaluation 2-189
2.4.20.3 Conclusion.....2-190
2.4.21 Primary Water Storage Building (Unit 1 Only) 2-190
2.4.21.1 Summary of Technical Information in the Application 2-190
2.4.21.2 Staff Evaluation 2-190
2.4.21.3 Conclusion.....2-191
2.4.22 Reactor Containment Building.....2-191
2.4.22.1 Summary of Technical Information in the Application 2-191
2.4.22.2 Staff Evaluation 2-192
2.4.22.3 Conclusion.....2-198
2.4.23 Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings 2-198
2.4.23.1 Summary of Technical Information in the Application 2-198
2.4.23.2 Staff Evaluation 2-198
2.4.23.3 Conclusion.....2-199
2.4.24 Relay Building (Common) 2-199
2.4.24.1 Summary of Technical Information in the Application 2-199

2.4.24.2 Staff Evaluation 2-200
2.4.24.3 Conclusion 2-200
2.4.25 Safeguards Building 2-201
2.4.25.1 Summary of Technical Information in the Application 2-201
2.4.25.2 Staff Evaluation 2-201
2.4.25.3 Conclusion 2-202
2.4.26 Service Building 2-202
2.4.26.1 Summary of Technical Information in the Application 2-202
2.4.26.2 Staff Evaluation 2-203
2.4.26.3 Conclusion 2-204
2.4.27 Solid Waste Building (Unit 1 Only) 2-204
2.4.27.1 Summary of Technical Information in the Application 2-204
2.4.27.2 Staff Evaluation 2-205
2.4.27.3 Conclusion 2-205
2.4.28 South Office and Shops Building (Common) 2-206
2.4.28.1 Summary of Technical Information in the Application 2-206
2.4.28.2 Staff Evaluation 2-206
2.4.28.3 Conclusion 2-206
2.4.29 Steam Generator Drain Tank Structure (Unit 1 Only) 2-207
2.4.29.1 Summary of Technical Information in the Application 2-207
2.4.29.2 Staff Evaluation 2-207
2.4.29.3 Conclusion 2-207
2.4.30 Switchyard (Common) 2-208
2.4.30.1 Summary of Technical Information in the Application 2-208
2.4.30.2 Staff Evaluation 2-208
2.4.30.3 Conclusion 2-208
2.4.31 Turbine Building 2-209
2.4.31.1 Summary of Technical Information in the Application 2-209
2.4.31.2 Staff Evaluation 2-209
2.4.31.3 Conclusion 2-210
2.4.32 Valve Pit 2-210
2.4.32.1 Summary of Technical Information in the Application 2-210
2.4.32.2 Staff Evaluation 2-211
2.4.32.3 Conclusion 2-212
2.4.33 Waste Handling Building (Unit 2 Only) 2-212
2.4.33.1 Summary of Technical Information in the Application 2-212
2.4.33.2 Staff Evaluation 2-212
2.4.33.3 Conclusion 2-213
2.4.34 Water Treatment Building (Unit 1 Only) 2-213
2.4.34.1 Summary of Technical Information in the Application 2-213
2.4.34.2 Staff Evaluation 2-213
2.4.34.3 Conclusion 2-214
2.4.35 Yard Structures 2-214
2.4.35.1 Summary of Technical Information in the Application 2-214
2.4.35.2 Staff Evaluation 2-214
2.4.35.3 Conclusion 2-215
2.4.36 Bulk Structural Commodities 2-215
2.4.36.1 Summary of Technical Information in the Application 2-215
2.4.36.2 Staff Evaluation 2-216
2.4.36.3 Conclusion 2-218

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls Systems 2-218
2.5.1 Electrical and Instrumentation and Controls Systems 2-219
2.5.1.1 Summary of Technical Information in the Application 2-219
2.5.1.2 Staff Evaluation 2-220
2.5.1.3 Conclusion 2-221
2.6 Conclusion for Scoping and Screening 2-221
AGING MANAGEMENT REVIEW RESULTS 3-1
3.0 Applicant's Use of the Generic Aging Lessons Learned Report 3-1
3.0.1 Format of the License Renewal Application 3-2
3.0.1.1 Overview of Table 1s 3-2
3.0.1.2 Overview of Table 2s 3-3
3.0.2 Staff's Review Process 3-4
3.0.2.1 Review of AMPs 3-5
3.0.2.2 Review of AMR Results 3-6
3.0.2.3 UFSAR Supplement 3-6
3.0.2.4 Documentation and Documents Reviewed 3-6
3.0.3 Aging Management Programs 3-6
3.0.3.1 AMPs Consistent with the GALL Report 3-11
3.0.3.2 AMPs Consistent with the GALL Report with Exceptions or Enhancements 3-100
3.0.3.3 AMPs Not Consistent with or Not Addressed in the GALL Report 3-152
3.0.4 QA Program Attributes Integral to Aging Management Programs 3-188
3.0.4.1 Summary of Technical Information in the Application 3-188
3.0.4.2 Staff Evaluation 3-189
3.0.4.3 Conclusion 3-190
3.1 Aging Management of Reactor Vessel, Reactor Vessel Internals, and Reactor Coolant System 3-190
3.1.1 Summary of Technical Information in the Application 3-190
3.1.2 Staff Evaluation 3-190
3.1.2.1 AMR Results Consistent with the GALL Report 3-211
3.1.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-217
3.1.2.3 AMR Results Not Consistent with or Not Addressed in the GALL Report 3-256
3.1.3 Conclusion 3-262
3.2 Aging Management of Engineered Safety Features 3-262
3.2.1 Summary of Technical Information in the Application 3-262
3.2.2 Staff Evaluation 3-263
3.2.2.1 AMR Results Consistent with the GALL Report 3-273
3.2.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-281
3.2.2.3 AMR Results Not consistent with or Not Addressed in the GALL Report 3-303
3.2.3 Conclusion 3-309
3.3 Aging Management of Auxiliary Systems 3-309
3.3.1 Summary of Technical Information in the Application 3-310
3.3.2 Staff Evaluation 3-310

3.3.2.1 AMR Results Consistent with the GALL Report 3-328
3.3.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-345
3.3.2.3 AMR Results Not Consistent with or Not Addressed in the GALL Report 3-379
3.3.3 Conclusion 3-497
3.4 Aging Management of Steam and Power Conversion Systems 3-497
3.4.1 Summary of Technical Information in the Application 3-498
3.4.2 Staff Evaluation 3-498
3.4.2.1 AMR Results Consistent with the GALL Report 3-506
3.4.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-515
3.4.2.3 AMR Results Not Consistent with or Not Addressed in the GALL Report 3-532
3.4.3 Conclusion 3-546
3.5 Aging Management of Containments, Structures, and Component Supports 3-546
3.5.1 Summary of Technical Information in the Application 3-547
3.5.2 Staff Evaluation 3-547
3.5.2.1 AMR Results Consistent with the GALL Report 3-559
3.5.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-565
3.5.2.3 AMR Results Not Consistent with or Not Addressed in the GALL Report 3-585
3.5.3 Conclusion 3-611
3.6 Aging Management of Electrical and Instrumentation and Controls System 3-611
3.6.1 Summary of Technical Information in the Application 3-611
3.6.2 Staff Evaluation 3-611
3.6.2.1 AMR Results Consistent with the GALL Report 3-615
3.6.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended 3-617
3.6.2.3 AMR Results Not Consistent with or Not Addressed in the GALL Report 3-623
3.6.3 Conclusion 3-625
3.7 Conclusion for Aging Management Review Results 3-625
TIME-LIMITED AGING ANALYSES 4-1
4.1 Identification of Time-Limited Aging Analyses 4-1
4.1.1 Summary of Technical Information in the Application 4-1
4.1.2 Staff Evaluation 4-2
4.1.3 Conclusion 4-2
4.2 Reactor Vessel Neutron Embrittlement 4-3
4.2.1 Neutron Fluence Values 4-3
4.2.1.1 Summary of Technical Information in the Application 4-3
4.2.1.2 Staff Evaluation 4-5
4.2.1.3 UFSAR Supplement 4-6
4.2.1.4 Conclusion 4-6
4.2.2 Pressurized Thermal Shock 4-6
4.2.2.1 Summary of Technical Information in the Application 4-6
4.2.2.2 Staff Evaluation 4-9
4.2.2.3 UFSAR Supplement 4-16
4.2.2.4 Conclusion 4-16

4.2.3 Charpy Upper Shelf Energy 4-16
4.2.3.1 Summary of Technical Information in the Application 4-16
4.2.3.2 Staff Evaluation 4-18
4.2.3.3 UFSAR Supplement 4-20
4.2.3.4 Conclusion 4-20
4.2.4 Pressure-Temperature Limits 4-20
4.2.4.1 Summary of Technical Information in the Application 4-20
4.2.4.2 Staff Evaluation 4-21
4.2.4.3 UFSAR Supplement 4-23
4.2.4.4 Conclusion 4-23
4.3 Metal Fatigue 4-24
4.3.1 Class 1 Fatigue 4-25
4.3.1.1 Unit 2 RHR Piping and Unit 2 Charging Line 4-26
4.3.1.2 Unit 2 Steam Generator Manway Bolts and Tubes 4-28
4.3.1.3 Unit 1 and Unit 2 Pressurizers 4-29
4.3.2 Non-Class 1 Fatigue 4-32
4.3.2.1 Piping and In-Line Components 4-33
4.3.2.2 Pressure Vessels, Heat Exchangers, Storage Tanks, Pumps, and Turbine Casings 4-34
4.3.3 Generic Industry Issues on Fatigue 4-37
4.3.3.1 Thermal Stresses in Piping Connected to Reactor Coolant Systems (NRC Bulletin 88-08) 4-37
4.3.3.2 Pressurizer Surge Line Thermal Stratification (NRC Bulletin 88-11) 4-40
4.3.3.3 Effects of Primary Coolant Environment on Fatigue Life 4-42
4.3.4 Nuclear Steam Supply System Transient Cycle Projection For 60-Year Operation 4-50
4.3.4.1 Summary of Technical Information in the Application 4-50
4.3.4.2 Staff Evaluation 4-50
4.3.4.3 UFSAR Supplement 4-52
4.3.4.4 Conclusion 4-53
4.4 Environmental Qualification of Electric Equipment 4-53
4.4.1 Summary of Technical Information in the Application 4-53
4.4.2 Staff Evaluation 4-54
4.4.3 UFSAR Supplement 4-54
4.4.4 Conclusion 4-55
4.5 Concrete Containment Tendon Prestress 4-55
4.5.1 Summary of Technical Information in the Application 4-55
4.5.2 Staff Evaluation 4-55
4.5.3 UFSAR Supplement 4-55
4.5.4 Conclusion 4-55
4.6 Containment Liner Plate, Metal Containment, and Penetrations Fatigue 4-55
4.6.1 Containment Liner Fatigue 4-55
4.6.1.1 BVPS 1 Containment Liner 4-55
4.6.1.2 BVPS 2 Containment Liner 4-57
4.6.1.3 UFSAR Supplement 4-57
4.6.1.4 Conclusion 4-58
4.6.2 Containment Liner Corrosion Allowance 4-58
4.6.2.1 Summary of Technical Information in the Application 4-58
4.6.2.2 Staff Evaluation 4-58

4.6.2.3 UFSAR Supplement 4-59
4.6.2.4 Conclusion 4-59
4.6.3 Containment Liner Penetration Fatigue 4-59
4.6.3.1 BVPS 1 Containment Liner Penetration Fatigue 4-59
4.6.3.2 BVPS 1 Containment Penetration Bellows 4-62
4.6.3.3 BVPS 2 Containment Liner Penetration Fatigue 4-63
4.7 Other Time-Limited Aging Analyses 4-66
4.7.1 Piping Subsurface Indications (Unit 1 Only) 4-66
4.7.1.1 Summary of Technical Information in the Application 4-66
4.7.1.2 Staff Evaluation 4-67
4.7.1.3 UFSAR Supplement 4-74
4.7.1.4 Conclusion 4-74
4.7.2 Reactor Vessel Underclad Cracking (Unit 1 Only) 4-74
4.7.2.1 Summary of Technical Information in the Application 4-74
4.7.2.2 Staff Evaluation 4-75
4.7.2.3 UFSAR Supplement 4-76
4.7.2.4 Conclusion 4-76
4.7.3 Leak-Before-Break 4-77
4.7.3.1 Main Coolant Loop Piping Leak-Before-Break 4-77
4.7.3.2 Pressurizer Surge Line Piping Leak-Before-Break 4-81
4.7.3.3 Branch Line Piping Leak-Before-Break (Unit 2 Only) 4-84
4.7.4 High-Energy Line Break Postulation 4-86
4.7.4.1 Summary of Technical Information in the Application 4-86
4.7.4.2 Staff Evaluation 4-87
4.7.4.3 UFSAR Supplement 4-89
4.7.4.4 Conclusion 4-89
4.7.5 Settlement of Structures (Unit 2 Only) 4-89
4.7.5.1 Summary of Technical Information in the Application 4-89
4.7.5.2 Staff Evaluation 4-90
4.7.5.3 UFSAR Supplement 4-91
4.7.5.4 Conclusion 4-92
4.7.6 Crane Load Cycles 4-92
4.7.6.1 Summary of Technical Information in the Application 4-92
4.7.6.2 Staff Evaluation 4-93
4.7.6.3 UFSAR Supplement 4-94
4.7.6.4 Conclusion 4-94
4.8 Conclusion for TLAAs 4-94
REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS 5-1
CONCLUSION 6-1
APPENDIX A: BVPS UNITS 1 AND 2 LICENSE RENEWAL COMMITMENTS A-1
APPENDIX B: CHRONOLOGY B-1
APPENDIX C: PRINCIPAL CONTRIBUTORS C-1
APPENDIX D: REFERENCES D-1

List of Tables

Table 3.0.3-1 BVPS Aging Management Programs 3-6
Table 3.1-1 Staff Evaluation for Reactor Vessel, Reactor Vessel Internals, and Reactor Coolant System Components in the GALL Report 3-191
Table 3.2-1 Staff Evaluation for Engineered Safety Features Components in the GALL Report 3-263
Table 3.3-1 Staff Evaluation for Auxiliary System Components in the GALL Report 3-311
Table 3.4-1 Staff Evaluation for Steam and Power Conversion Systems Components in the GALL Report 3-499
Table 3.5-1 Staff Evaluation for Containments, Structures and Component Supports in the GALL Report 3-548
Table 3.6-1 Staff Evaluation for Electrical and Instrumentation and Controls in the GALL Report 3-612

ABBREVIATIONS

AC	alternating current
ACI	American Concrete Institute
ACU	air conditioning unit
ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Document Access and Management System
AEM	aging effect/mechanism
AERM	aging effect requiring management
AFW	auxiliary feedwater
AISC	American Institute of Steel Construction
AMP	aging management program
AMR	aging management review
AMSAC	ATWS Mitigation System Actuation Circuitry
ANSI	American National Standards Institute
ART	adjusted reference temperature
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	anticipated transient without scram
BTP	branch technical position
BVPS	Beaver Valley Power Station
BWR	boiling water reactor
CASS	cast austenitic stainless steel
CAT	chemical addition tank
CDF	core damage frequency
CE	electrical continuity
CF	chemistry factor
CFR	*Code of Federal Regulations*
CI	confirmatory item
CLB	current licensing basis
CMAA	Crane Manufacturers Association of America
CO_2	carbon dioxide
CR-15	Unit 1 fuel cask crane
CR-27	Unit 1 moveable platform and hoists crane
CRDM	control rod drive mechanism
CREVS	control room emergency ventilation system
CRN201	Unit 2 polar crane
CRN215	Unit 2 spent fuel cask trolley
CRN227	Unit 2 moveable platform with hoists
CUF	cumulative usage factor
C_VUSE	Charpy upper shelf energy
DBA	design basis accident
DBE	design basis event
DC	direct current
DF	direct flow

DLCo	Duquesne Light Company
ECCS	emergency core cooling system
EDG	emergency diesel generator
EFPY	effective full-power year
El	elevation
EN	enclosure or protection
EOL	end-of-license (current license life)
EOLE	end-of-license-extended (end of renewed license life)
EPRI	Electric Power Research Institute
EQ	environmental qualification
ER	applicant's environmental report
ERF	emergency response facility
ESF	engineered safety features
EXP	expansion or separation
FAC	flow-accelerated corrosion
FB	fire barrier
F_{en}	environmental fatigue life correction factor
FLB	flood barrier
FP	fire protection
FR	*Federal Register*
FSAR	final safety analysis report
ft-lb	foot-pound
FW	feedwater
GALL	Generic Aging Lessons Learned Report
GDC	general design criteria or general design criterion
GEIS	Generic Environmental Impact Statement
GL	generic letter
GSI	generic safety issue
HELB	high-energy line break
HHSI	high head safety injection
HLBS	HELB shielding
HS	heatsink
HVAC	heating, ventilation, and air conditioning
HX	heat exchanger
I&C	instrumentation and controls
IASCC	irradiation assisted stress corrosion cracking
IEB	inspection and enforcement bulletin
IEEE	Institute of Electrical and Electronics Engineers
IGA	intergranular attack
IGSCC	intergranular stress corrosion cracking
IN	information notice
INE	insulate (electrical)
INPO	Institute of Nuclear Power Operations
IPA	integrated plant assessment
ISG	interim staff guidance

ISI	inservice inspection
ksi	1000 pounds (kilo-pound) per square inch
kV	kilo-volt
LBB	leak-before-break
LER	licensee event report
LHSI	low head safety injection
LOCA	loss of coolant accident
LR	license renewal
LRA	license renewal application
LTOP	low-temperature overpressure protection
MB	missile barrier
MIC	microbiologically-influenced corrosion
MWe	megawatts-electric
MWt	megawatts-thermal
N_2	nitrogen
NA	not applicable
NaOH	sodium hydroxide
n/cm^2	neutrons per square centimeter
NDE	nondestructive examination
NDT	nil-ductility transition
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	US Nuclear Regulatory Commission
NSSS	nuclear steam supply system
ODSCC	outside-diameter stress corrosion cracking
OI	open item
OPPS	overpressure protection system
pH	potential hydrogen
PMF	probable maximum flood
ppm	parts per million
PR	pressure relief
P-T	pressure-temperature
PTS	pressurized thermal shock
PVC	polyvinyl chloride
PW	pipe whip restraint
PWR	pressurized water reactor
PWSCC	primary water stress corrosion cracking
QA	quality assurance
RAI	request for additional information
RCCA	rod cluster control assembly
RCPB	reactor coolant pressure boundary
RCS	reactor coolant system

RG	regulatory guide
RHR	residual heat removal
RIS	regulatory issue summary
RP	gaseous relief path
rpm	revolutions per minute
RPV	reactor pressure vessel
RT	reference temperature
RT_{NDT}	reference temperature for nil ductility transition
ΔRT_{NDT}	shift in reference temperature for nil ductility transition
RT_{PTS}	reference temperature for pressurized thermal shock
RVI	reactor vessel internals
RWST	refueling water storage tank
SBO	station blackout
SC	structure and component
SCC	stress-corrosion cracking
SCW	shutdown cooling water
SER	safety evaluation report
SG	steam generator
SHD	shielding
SIS	safety injection system
SNS	support for Criterion (a)(2) equipment
SPB	structural pressure barrier
SOC	statement of consideration
SRE	support for Criterion (a)(3) equipment
SRP	Standard Review Plan
SRP-LR	Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants
SSC	system, structure, and component
SSE	safe-shutdown earthquake
SSR	support for Criterion (a)(1) equipment
t/4	one fourth of the way through the vessel wall
TLAA	time-limited aging analysis
TS	technical specifications
U_{60}	sixty year cumulative usage factor
U_{env}	cumulative usage factor which includes environmental effects
UFSAR	Updated Final Safety Analysis Report
USE	upper-shelf energy
UT	ultrasonic testing
UV	ultraviolet
VAC	volts alternating current
WANO	World Association of Nuclear Operators
WASS	wrought austenitic stainless steel
WCAP	Westinghouse Commercial Atomic Power
Zn	zinc

SECTION 1

INTRODUCTION AND GENERAL DISCUSSION

1.1 Introduction

This document is a safety evaluation report (SER) on the license renewal application (LRA) for Beaver Valley Power Station (BVPS), Units 1 and 2, as filed by the FirstEnergy Nuclear Operating Company (FENOC or the applicant). By letter dated August 27, 2007, FENOC submitted its application to the U.S. Nuclear Regulatory Commission (NRC) for renewal of the BVPS operating licenses for an additional 20 years. The NRC staff (the staff) prepared this report to summarize the results of its safety review of the LRA for compliance with Title 10, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 54). The NRC project manager for the license renewal review is Kent Howard. Mr. Howard may be contacted by telephone at 301-415-2989 or by electronic mail at Kent.Howard@nrc.gov. Alternatively, written correspondence may be sent to the following address:

Division of License Renewal
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Kent Howard, Mail Stop O11-F1

In its August 27, 2007, submission letter, the applicant requested renewal of the operating licenses issued under Section 104b (Operating License No. DPR-66) and Section 103 (Operating License No. NPF-73) of the Atomic Energy Act of 1954, as amended, for Units 1 and 2 for a period of 20 years beyond the current expirations at midnight January 29, 2016, for Unit 1, and at midnight May 27, 2027, for Unit 2. BVPS is located approximately 17 miles west of McCandless, PA. The NRC issued the construction permits for Unit 1 on June 26, 1970, and on May 3, 1974, for Unit 2. The NRC issued the operating licenses for Unit 1 on July 2, 1976, and on August 14, 1987, for Unit 2. Units 1 and 2 are of a dry subatmospheric pressurized water reactor design. Westinghouse Electric supplied the nuclear steam supply system and Stone and Webster originally designed and constructed the balance of the plant. The licensed power output of each unit is 2900 megawatt thermal with a gross electrical output of approximately 972 megawatt electric. The updated final safety analysis report (UFSAR) shows details of the plant and the site.

BVPS Units 1 and 2 are constructed of similar materials with similar environments. Therefore, the mechanical system and component information presented in the LRA typically applies to both units, and no unit-specific identifier is listed. However, design differences exist between Units 1 and 2. Those design differences are identified by using a designator (i.e., Unit 1 only or Unit 2 only). Further, BVPS assigned a different designator (i.e., common) for those cases in where the system, structure, or component (SSC) is used and/or shared by both units.

The license renewal process consists of two concurrent reviews, a technical review of safety issues and an environmental review. The NRC regulations in 10 CFR Part 54 and 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," respectively, set forth requirements for these reviews. The safety review for the BVPS license renewal is based on the applicant's LRA and on its responses to the staff's

requests for additional information (RAIs). The applicant supplemented the LRA and provided clarifications through its responses to the staff's RAIs in audits, meetings, and docketed correspondence. Unless otherwise noted, the staff reviewed and considered information submitted through June 04, 2009. The staff reviewed information received after that date depending on the stage of the safety review and the volume and complexity of the information. The public may view the LRA and all pertinent information and materials, including the UFSAR, at the NRC Public Document Room, located on the first floor of One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738 (301-415-4737 / 800-397-4209), and at the Beaver Area Memorial Library, 100 College Avenue, Beaver, PA 15009-2704 or the Beaver County Library System, 1 Campus Drive, Monaca, PA 15061. In addition, the public may find the LRA, as well as materials related to the license renewal review, on the NRC Web site at http://www.nrc.gov.

This SER summarizes the results of the staff's safety review of the LRA and describes the technical details considered in evaluating the safety aspects of the units' proposed operation for an additional 20 years beyond the term of the current operating licenses. The staff reviewed the LRA in accordance with NRC regulations and the guidance in NUREG-1800, Revision 1, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated September 2005.

SER Sections 2 through 4 addresses the staff's evaluation of license renewal issues considered during the review of the application. SER Section 5 is reserved for the report of the Advisory Committee on Reactor Safeguards (ACRS). The conclusions of this SER are in Section 6.

SER Appendix A is a table showing the applicant's commitments for renewal of the operating licenses. SER Appendix B is a chronology of the principal correspondence between the staff and the applicant regarding the LRA review. SER Appendix C is a list of principal contributors to the SER and Appendix D is a bibliography of the references in support of the staff's review.

In accordance with 10 CFR Part 51, the staff prepared a draft plant-specific supplement to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)." This supplement discusses the environmental considerations for license renewals for Units 1 and 2. The staff issued draft, plant-specific GEIS Supplement 36, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Beaver Valley Power Station Units 1 and 2, Draft Report for Comment," on September 19, 2008. The staff issued plant-specific GEIS Supplement 36, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Beaver Valley Power Station Units 1 and 2," on May 14, 2009.

1.2 License Renewal Background

Pursuant to the Atomic Energy Act of 1954, as amended, and NRC regulations, operating licenses for commercial power reactors are issued for 40 years and can be renewed for up to 20 additional years. The original 40-year license term was selected based on economic and antitrust considerations rather than on technical limitations; however, some individual plant and equipment designs may have been engineered for an expected 40-year service life.

In 1982, the staff anticipated interest in license renewal and held a workshop on nuclear power plant aging. This workshop led the NRC to establish a comprehensive program plan for nuclear plant aging research. From the results of that research, a technical review group concluded that

many aging phenomena are readily manageable and pose no technical issues precluding life extension for nuclear power plants. In 1986, the staff published a request for comment on a policy statement that would address major policy, technical, and procedural issues related to license renewal for nuclear power plants.

In 1991, the staff published 10 CFR Part 54, the License Renewal Rule (Volume 56, page 64943, of the *Federal Register* (56 FR 64943), dated December 13, 1991). The staff participated in an industry-sponsored demonstration program to apply 10 CFR Part 54 to a pilot plant and to gain the experience necessary to develop implementation guidance. To establish a scope of review for license renewal, 10 CFR Part 54 defined age-related degradation unique to license renewal; however, during the demonstration program, the staff found that adverse aging effects on plant systems and components are managed during the period of initial license and that the scope of the review did not allow sufficient credit for management programs, particularly the implementation of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," which regulates management of plant-aging phenomena. As a result of this finding, the staff amended 10 CFR Part 54 in 1995. As published May 8, 1995, in 60 FR 22461, amended 10 CFR Part 54 establishes a regulatory process that is simpler, more stable, and more predictable than the previous 10 CFR Part 54. In particular, as amended, 10 CFR Part 54 focuses on the management of adverse aging effects rather than on the identification of age-related degradation unique to license renewal. The staff made these rule changes to ensure that important SSCs will continue to perform their intended functions during the period of extended operation. In addition, the amended 10 CFR Part 54 clarifies and simplifies the integrated plant assessment process to be consistent with the revised focus on passive, long-lived structures and components (SCs).

Concurrent with these initiatives, the staff pursued a separate rulemaking effort (61 FR 28467, June 5, 1996) and amended 10 CFR Part 51 to focus the scope of the review of environmental impacts of license renewal in order to fulfill NRC responsibilities under the National Environmental Policy Act of 1969.

1.2.1 Safety Review

License renewal requirements for power reactors are based on two key principles:

(1) The regulatory process is adequate to ensure that the licensing bases of all currently operating plants maintain an acceptable level of safety with the possible exceptions of the detrimental aging effects on the functions of certain SSCs, as well as a few other safety-related issues, during the period of extended operation.

(2) The plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as during the original licensing term.

In implementing these two principles, 10 CFR 54.4, "Scope," defines the scope of license renewal as including those SSCs that (1) are safety-related, (2) whose failure could affect safety-related functions, or (3) are relied on to demonstrate compliance with the NRC's regulations for fire protection, environmental qualification, pressurized thermal shock, anticipated transient without scram, and station blackout.

Pursuant to 10 CFR 54.21(a), a license renewal applicant must review all SSCs within the scope of 10 CFR Part 54 to identify SCs subject to an aging management review (AMR). Those

SCs subject to an AMR perform an intended function without moving parts or without change in configuration or properties and are not subject to replacement based on a qualified life or specified time period. Pursuant to 10 CFR 54.21(a), a license renewal applicant must demonstrate that the aging effects will be managed such that the intended function(s) of those SCs will be maintained consistent with the current licensing basis (CLB) for the period of extended operation. However, active equipment is considered to be adequately monitored and maintained by existing programs. In other words, detrimental aging effects that may affect active equipment can be readily identified and corrected through routine surveillance, performance monitoring, and maintenance. Surveillance and maintenance programs for active equipment, as well as other maintenance aspects of plant design and licensing basis, are required throughout the period of extended operation.

Pursuant to 10 CFR 54.21(d), the LRA is required to include a UFSAR supplement with a summary description of the applicant's programs and activities for managing aging effects and an evaluation of time-limited aging analyses (TLAAs) for the period of extended operation.

License renewal also requires TLAA identification and updating. During the plant design phase, certain assumptions about the length of time the plant can operate are incorporated into design calculations for several plant SSCs. In accordance with 10 CFR 54.21(c)(1), the applicant must either show that these calculations will remain valid for the period of extended operation, project the analyses to the end of the period of extended operation, or demonstrate that the aging effects on these SSCs will be adequately managed for the period of extended operation.

In 2005, the NRC revised Regulatory Guide (RG) 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses." This RG endorses Nuclear Energy Institute (NEI) 95-10, Revision 6, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," issued in June 2005. NEI 95-10 details an acceptable method of implementing 10 CFR Part 54. The staff also used the SRP-LR to review the LRA.

In the LRA, the applicant fully utilized the process defined in NUREG-1801, Revision 1, "Generic Aging Lessons Learned (GALL) Report," dated September 2005. The GALL Report summarizes staff-approved aging management programs (AMPs) for many SCs subject to an AMR. If an applicant commits to implementing these staff-approved AMPs, the time, effort, and resources for the LRA review can be greatly reduced, improving the efficiency and effectiveness of the license renewal review process. The GALL Report summarizes the aging management evaluations, programs, and activities credited for managing aging for most of the SCs used throughout the industry. The report is also a quick reference for both applicants and staff reviewers to AMPs and activities that can manage aging adequately during the period of extended operation.

1.2.2 Environmental Review

Part 51 of 10 CFR contains regulations on environmental protection regulations. In December 1996, the staff revised the environmental protection regulations to facilitate the environmental review for license renewal. The staff prepared the GEIS to document its evaluation of possible environmental impacts associated with nuclear power plant license renewals. For certain types of environmental impacts, the GEIS contains generic findings that apply to all nuclear power plants and are codified in Appendix B, "Environmental Effect of Renewing the Operating License of a Nuclear Power Plant," to Subpart A, "National

Environmental Policy Act - Regulations Implementing Section 102(2)," of 10 CFR Part 51. Pursuant to 10 CFR 51.53(c)(3)(i), a license renewal applicant may incorporate these generic findings in its environmental report. In accordance with 10 CFR 51.53(c)(3)(ii), an environmental report also must include analyses of environmental impacts that must be evaluated on a plant-specific basis (i.e., Category 2 issues).

In accordance with the National Environmental Policy Act of 1969, and 10 CFR Part 51, the staff reviewed the plant-specific environmental impacts of license renewal, including whether there was new and significant information not considered in the GEIS. As part of its scoping process, the staff held a public meeting on November 27, 2007, in Pittsburgh, Pennsylvania, to identify plant-specific environmental issues. The draft, plant-specific GEIS Supplement 36 documents the results of the environmental review and makes a preliminary recommendation as to the license renewal action. The staff held another public meeting on October 30, 2008, in Pittsburgh, Pennsylvania, to discuss draft, plant-specific GEIS Supplement 36. After considering comments on the draft, the staff published the final, plant-specific GEIS Supplement 36 separately from this report.

1.3 Principal Review Matters

Part 54 of 10 CFR describes the requirements for renewal of operating licenses for nuclear power plants. The staff's technical review of the LRA was in accordance with NRC guidance and 10 CFR Part 54 requirements. Section 54.29, "Standards for Issuance of a Renewed License," of 10 CFR sets forth the license renewal standards. This SER describes the results of the staff's safety review.

Pursuant to 10 CFR 54.19(a), the NRC requires a license renewal applicant to submit general information, which the applicant provided in LRA Section 1. The staff reviewed LRA Section 1 and finds that the applicant has submitted the required information.

Pursuant to 10 CFR 54.19(b), the NRC requires that the LRA include "conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." On this issue, the applicant stated in the LRA:

> The current Indemnity Agreement (No. B-73) for BVPS states in Article VII that the agreement shall terminate at the time of expiration of the license specified in Item 3 of the attachment to the agreement, which is the last to expire. Item 3 of the attachment to the indemnity agreement, as revised through Amendment No. 13 (effective December 16, 2005), lists BVPS Unit 1 and Unit 2 facility operating license numbers (DPR-66 and NPF-73, respectively). FirstEnergy Nuclear Operating Company has reviewed the original indemnity agreement and Amendments 1 through 13. Neither Article VII nor Item 3 of the attachment specify an expiration date for license numbers DPR-66 or NPF-73. Therefore, no changes to the indemnity agreement are deemed necessary as part of this application. Should the license numbers be changed by NRC upon issuance of the renewed licenses, FirstEnergy Nuclear Operating Company requests that NRC amend the indemnity agreement to include conforming changes to Item 3 of the attachment and other affected sections of the agreement.

The staff intends to maintain the original license numbers upon issuance of the renewed licenses, if approved. Therefore, conforming changes to the indemnity agreement need not be made and the 10 CFR 54.19(b) requirements have been met.

Pursuant to 10 CFR 54.21, "Contents of Application - Technical Information," the NRC requires that the LRA contain (a) an integrated plant assessment, (b) a description of any CLB changes during the staff's review of the LRA, (c) an evaluation of TLAAs, and (d) an FSAR supplement. LRA Sections 3 and 4 and Appendix B address the license renewal requirements of 10 CFR 54.21(a), (b), and (c). LRA Appendix A satisfies the license renewal requirements of 10 CFR 54.21(d).

Pursuant to 10 CFR 54.21(b), the NRC requires that, each year following submission of the LRA and at least three months before the scheduled completion of the staff's review, the applicant submit an LRA amendment identifying any CLB changes to the facility that affect the contents of the LRA, including the UFSAR supplement. By letter dated October 24, 2008, the applicant submitted an LRA update which summarize the CLB changes that have occurred during the staff's review of the LRA. This submission satisfies 10 CFR 54.21(b) requirements and is still under staff review.

Pursuant to 10 CFR 54.22, "Contents of Application - Technical Specifications," the NRC requires that the LRA include changes or additions to the technical specifications (TSs) that are necessary to manage aging effects during the period of extended operation. In LRA Appendix D, the applicant stated that it had not identified any TS changes necessary for issuance of the renewed BVPS operating licenses. This statement adequately addresses the 10 CFR 54.22 requirement.

The staff evaluated the technical information required by 10 CFR 54.21 and 10 CFR 54.22 in accordance with NRC regulations and SRP-LR guidance. SER Sections 2, 3, and 4 document the staff's evaluation of the LRA technical information.

As required by 10 CFR 54.25, "Report of the Advisory Committee on Reactor Safeguards," the ACRS will issue a report documenting its evaluation of the staff's LRA review and SER. SER Section 5 is reserved for the ACRS report when it is issued. SER Section 6 documents the findings required by 10 CFR 54.29.

1.4 Interim Staff Guidance

License renewal is a living program. The staff, industry, and other interested stakeholders gain experience and develop lessons learned with each renewed license. The lessons learned address the staff's performance goals of maintaining safety, improving effectiveness and efficiency, reducing regulatory burden, and increasing public confidence. Interim staff guidance (ISG) is documented for use by the staff, industry, and other interested stakeholders until incorporated into such license renewal guidance documents as the SRP-LR and GALL Report. Table 1.4-1 shows the current set of ISGs, as well as the SER sections in which the staff addresses them.

Table 1.4-1 Current Interim Staff Guidance

ISG Issue (Approved ISG Number)	Purpose	SER Section
Nickel-alloy components in the reactor coolant pressure boundary **(LR-ISG-19B)**	Cracking of nickel-alloy components in the reactor pressure boundary. ISG under development. NEI and EPRI-MRP will develop an augmented inspection program for GALL AMP XI.M11-B. This AMP will not be completed until the NRC approves an augmented inspection program for nickel-alloy base metal components and welds as proposed by EPRI-MRP.	**3.0.3.3.3**
Corrosion of drywell shell in Mark I containments **(LR-ISG-2006-01)**	To address concerns related to corrosion of drywell shell in Mark I containments.	**Not applicable to Beaver Valley Power Station, Units 1 and 2**

1.5 Summary of Open Items

As a result of its review of the LRA, including additional information submitted through June 04, 2009, the staff had identified the following open item (OI) in the draft SER with open item which was issued on January 9, 2009. An item is considered open if, in the staff's judgment, it does not meet all applicable regulatory requirements at the time of the issuance of the SER with open item. The staff had assigned a unique identifying number to each OI. As a result of the submittal of responses by the applicant for closure of the OI, the staff has reviewed those responses and found them to be acceptable for closure of the OI.

OI 3.0.3.1.11-1: (SER Section 3.0.3.1.11 – Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program)

In response to the staff RAI B.2.21-2, the applicant stated that plant-specific and industry operating experience will be used to identify areas for program improvement, including adjustment of the manhole inspection frequency. Therefore, plant inspection results and industry operating experience will be evaluated to determine if the manhole inspection frequency needs to be adjusted to ensure the cables are not exposed to significant moisture. The applicant further stated that as indicated by the corrective action to CR 04-03545, indication of water and cable submergence are visually evaluated by engineering using the corrective action program, and further action are taken based on the evaluation.

During the regional onsite inspection performed during the weeks of June 23, 2008 and July 14, 2008, the inspectors found water in the manholes that contain safety-related cables. The staff finds that these incidents demonstrated that the corrective actions described above, have not been properly implemented or were not adequate. In light of this operating experience, the staff is concerned that inaccessible medium-voltage cables that were submerged for a period of time may be degraded and may not perform their intended function during the period of extended

operation. The applicant has not used operating experience to adjust manhole inspection frequency and/or using automatic means if frequent inspection fails to keep the cables dry.

In a letter dated September 8, 2008, the applicant stated that LRA Section B.2.21 requires replacement of the entire section, because the program is being changed from a new program consistent with NUREG-1801 to a new plant-specific program. FENOC has confirmed that all inaccessible medium-voltage cables within the scope of the new plant-specific program are suitable for operation in a submerged water environment. NUREG-1801 does not require inspection and testing of cables qualified for submerged (i.e., submarine cables). Therefore, no aging effect requiring management was identified for the BVPS cables. However, FENOC concluded that periodic inspection and testing of submerged medium-voltage cables was conservative to confirm that the aging effects are not occurring, and revised the program to be plant-specific.

By letters dated March 24, May 14, and May 20, 2009, the applicant amended LRA (Amendment Nos. 35, 36, and 37) Section B.2.21 and associated sections to be consistent with GALL AMP XI.E3. In addition, the applicant would implement the following license renewal commitments prior to entering the period of extended operation: (1) Adopting an acceptable methodology that demonstrates that the in-scope, continuously submerged, inaccessible, medium-voltage cables will continue to perform their intended function during the period of extended operation or, (2) implementing measures to minimize long term inaccessible medium voltage cable submergence or, (3) replacing in-scope continuous submerged inaccessible medium voltage cable with cables designed for submerged service. The staff finds that if the applicant implements Commitment 1 or 3, the aging effect and mechanism due to significant moisture will not be significant for medium voltage cables that are designed for these conditions. If the applicant implements Commitment 2, it will minimize cable exposure to significant moisture and thus minimize the potential for insulation degradation consistent with GALL AMP XI.E3. Consistency with GALL AMP XI.E3 and the applicant's license renewal commitments will ensure that submerged inaccessible medium-voltage cables will perform their intended functions consistent with the CLB during the period of extended operation. The staff concerns with OI 3.0.3.1.11-1 are resolved.

1.6 Summary of Proposed License Conditions

Following the staff's review of the LRA, including subsequent information and clarifications from the applicant, the staff identified three proposed license conditions.

The first license condition requires the applicant to include the UFSAR supplement required by 10 CFR 54.21(d) in the UFSAR update in accordance with 10 CFR 50.71(e) following the issuance of the renewed licenses.

The second license condition requires future activities described in the UFSAR supplement to be completed prior to the period of extended operation with the exceptions as follows: For BVPS-1: UFSAR Supplement Commitments 20, 24, 29, and 31. For BVPS-2: UFSAR Supplement Commitments 22, 28, and 32.

The third license condition requires that all capsules in the reactor vessel that are removed and tested meet the requirements of American Society for Testing and Materials (ASTM) E 185-82 to the extent practicable for the configuration of the specimens in the capsule. Any changes to

the capsule withdrawal schedule, including spare capsules, must be approved by the staff prior to implementation.

SECTION 2

STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW

2.1 Scoping and Screening Methodology

2.1.1 Introduction

Title 10, Section 54.21 of the *Code of Federal Regulations* (10 CFR 54.21), "Contents of Application-Technical Information," requires that each application for license renewal contain an integrated plant assessment (IPA). Furthermore, the IPA must list and identify those structures and components (SCs) that are subject to an aging management review (AMR) from all of the systems, structures, and components (SSCs) that are within the scope of license renewal in accordance with 10 CFR 54.4.

In license renewal application (LRA) Section 2.1, "Scoping and Screening Methodology," the applicant described the methodology used to identify the SSCs at the Beaver Valley Power Station (BVPS) Units 1 and 2 that are within the scope of license renewal and the SCs subject to an AMR. The staff reviewed the FirstEnergy Nuclear Operating Company (FENOC or the applicant) scoping and screening methodology to determine whether it is consistent with the scoping requirements stated in 10 CFR 54.4 and the screening requirements stated in 10 CFR 54.21.

In developing the scoping and screening methodology for the LRA, the applicant considered the requirements of 10 CFR 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants" (the Rule), the statements of consideration related to the Rule, and the guidance provided in Nuclear Energy Institute (NEI) 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 6. Additionally, in developing this methodology, the applicant considered the correspondence between the U.S. Nuclear Regulatory Commission (NRC) and other applicants, and NEI.

2.1.2 Summary of Technical Information in the Application

In LRA Sections 2.0 and 3.0, the applicant provided the technical information required by 10 CFR 54.21(a). In LRA Section 2.1, the applicant described the process used to identify the SSCs that meet the license renewal scoping criteria pursuant to 10 CFR 54.4(a), and the process used to identify the SCs that are subject to an AMR, pursuant to 10 CFR 54.21(a)(1). The applicant provided the results of the process for identifying such SCs in the following LRA sections:

- Section 2.2, "Plant Level Scoping Results"
- Section 2.3, "Scoping and Screening Results: Mechanical Systems"
- Section 2.4, "Scoping and Screening Results: Structures"
- Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Controls"

In LRA Section 3.0, "Aging Management Review Results," the applicant provided aging management results in the following sections:

- Section 3.1, "Aging Management of Reactor Vessel, Internals, and Reactor Coolant Systems"
- Section 3.2, "Aging Management of Engineered Safety Features"
- Section 3.3, "Aging Management of Auxiliary Systems"
- Section 3.4, "Aging Management of Steam and Power Conversion Systems"
- Section 3.5, "Aging Management of Containment, Structures, and Component Supports"
- Section 3.6, "Aging Management of Electrical and Instrumentation and Controls"

In LRA Section 4.0, "Time-Limited Aging Analysis," the applicant provided an identification and evaluation of time-limited aging analyses.

2.1.3 Scoping and Screening Program Review

The staff evaluated the LRA scoping and screening methodology in accordance with the guidance contained in NUREG-1800, Revision 1, Section 2.1, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR). The following NRC regulations form the basis for the acceptance criteria for the scoping and screening methodology review:

- 10 CFR 54.4(a), as it relates to identification of SSCs within the scope of the Rule.
- 10 CFR 54.4(b), as it relates to identification of the intended functions of SSCs determined to be within the scope of the Rule.
- 10 CFR 54.21(a)(1) and (a)(2), as they relate to methods used by the applicant to identify SCs subject to an AMR.

As part of the review of the applicant's scoping and screening methodology, the staff reviewed the activities described in the following LRA sections using the guidance contained in the SRP-LR:

- Section 2.1 to ensure that the applicant described a process for identifying SSCs that are within the scope of license renewal, in accordance with the requirements of 10 CFR 54.4(a).
- Section 2.2 to ensure that the applicant described a process for determining the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1) and (a)(2).

In addition, the staff conducted a scoping and screening methodology audit at the BVPS facility, located in Shippingport, Pennsylvania, during the week of December 3-6, 2007. The audit focused on ensuring that the applicant had developed and implemented adequate guidance to conduct the scoping and screening of SSCs in accordance with the methodologies described in the LRA and the requirements of the Rule. The staff reviewed implementation of the project level guidelines and topical reports describing the applicant's scoping and screening

methodology. In addition, the staff conducted detailed discussions with the applicant on the implementation and control of the license renewal program and reviewed administrative control documentation and selected design documentation used by the applicant during the scoping and screening process. The staff also reviewed training for personnel that developed the LRA, and quality practices used by the applicant to develop the LRA. Additionally, the staff evaluated the quality attributes of the applicant's aging management program (AMP) activities described in LRA Appendix A, "Updated Final Safety Analysis Report Supplement" and Appendix B, "Aging Management Programs and Activities." The staff also reviewed the training and qualification of the LRA development team. In addition, the staff reviewed scoping and screening results reports for the main steam system (MSS), residual heat removal (RHR), the turbine building (TB), and the main intake structure to ensure that the applicant had appropriately implemented the methodology outlined in the administrative controls and that the results were consistent with the current licensing basis (CLB) documentation.

2.1.3.1 Implementation Procedures and Documentation Sources for Scoping and Screening

The staff reviewed the applicant's scoping and screening implementation procedures as documented in the Scoping and Screening Methodology Audit report, dated March 17, 2008, to verify that the process used to identify SCs subject to an AMR, was consistent with the LRA and SRP-LR. Additionally, the staff reviewed the scope of CLB documentation sources and the process used by the applicant to ensure that CLB commitments were appropriately considered and that the applicant had adequately implemented the procedural guidance during the scoping and screening process.

2.1.3.1.1 Summary of Technical Information in the Application

In LRA Section 2.1, the applicant stated that it reviewed the following information sources during the license renewal scoping and screening process:

- Updated Final Safety Analysis Report (UFSAR)
- BVPS Safety Evaluation Reports (SERs)
- BVPS docketed information sources
- Maintenance Rule Database and Maintenance Rule Basis Documents
- Design-Basis Document (DBD) Source Documents – DBDs were not cited as references, but were used to identify other controlled references
- Plant Engineering Drawings – site plan drawing, plant general arrangement drawings, valve operating number diagrams, piping and instrumentation diagrams (P&IDs), flow diagrams, controlled vendor drawings, isometric drawings, civil drawings
- Piping calculations
- Plant Operating Manuals and Procedures
- Emergency Operating Procedures and background documents

The applicant stated that it used this information to identify the functions performed by plant systems and structures. It then compared these functions to the scoping criteria in 10 CFR 54.4(a) to determine whether the associated plant system or structure performed a

license renewal intended function. The applicant also used these sources to develop the list of SCs subject to an AMR.

2.1.3.1.2 Staff Evaluation

Scoping and Screening Implementation Procedures. The staff reviewed the applicant's scoping and screening methodology implementation procedures, including license renewal guidelines, documents, reports, and AMR reports, as documented in the audit report, to ensure the guidance was consistent with the requirements of the rule, SRP-LR and NEI 95-10. The staff found the overall process used to implement the 10 CFR 54 requirements described in the implementing documents and AMRs was consistent with the rule and industry guidance. Guidance for determining plant SSCs within the scope of the Rule, and for determining which SCs, within the scope of license renewal, were subject to an AMR, were contained in the applicant's implementing documents.

During the review of the implementing documents, the staff focused on the consistency of the detailed procedural guidance with information in the LRA, including the implementation of staff guidance documented in SRP-LR, and the information in request for additional information (RAI) responses dated April 3, 2008.

After reviewing the LRA and supporting documentation, the staff found that the scoping and screening methodology instructions were consistent with LRA Section 2.1. The applicant's methodology contained sufficient detail to provide concise guidance on the scoping and screening implementation process followed during the LRA activities.

Sources of Current Licensing Basis Information. The staff reviewed the scope and depth of the applicant's CLB review to verify that the methodology was sufficiently comprehensive to identify SSCs within the scope of license renewal, as well as component types requiring an AMR. As defined in 10 CFR 54.3(a), the CLB is the set of staff requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with, and operation within, applicable NRC requirements and the plant-specific design bases that are docketed and in effect. The CLB includes certain NRC regulations, orders, license conditions, exemptions, Technical Specifications, design-basis information documented in the most recent UFSAR, and licensee commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in staff safety evaluations or licensee event reports.

During the audit, the staff reviewed pertinent information sources utilized by the applicant that included the UFSAR, license renewal boundary diagrams, and maintenance rule information. In addition, the applicant's license renewal process identified additional potential sources of plant information pertinent to the scoping and screening process, including, SERs, docketed information sources, DBD source documents, plant engineering drawings, piping calculations, plant operating manuals and procedures, emergency operating procedures, and background documents. The staff verified that the applicant's detailed license renewal program guidelines required use of the CLB source information in developing scoping evaluations.

The BVPS equipment database, the UFSAR and maintenance rule information were the applicant's primary repository for system identification and classification information. During the audit, the staff reviewed the applicant's administrative controls for the equipment database, maintenance rule information and other information sources used to verify system information.

These controls are described and implementation is governed by plant administrative procedures. Based on a review of the administrative controls, and a sample of the system identification and classification information contained in the applicable BVPS documentation, the staff concluded that the applicant had established adequate measures to control the integrity and reliability of system identification and classification data; and, therefore, that the information sources used by the applicant during the scoping and screening process provided a sufficiently controlled source of system and component data to support scoping and screening evaluations.

During the staff's review of the applicant's CLB evaluation process, the applicant provided the staff with a discussion regarding updates to the CLB and the process used to ensure those updates are adequately incorporated into the license renewal process. The staff determined that LRA Section 2.1 provided a description of the CLB and related documents used during the scoping and screening process that is consistent with the guidance contained in SRP-LR. In addition, the staff reviewed the implementing procedures and results reports used to support identification of SSCs relied upon to demonstrate compliance with the safety-related criteria, nonsafety-related criteria and regulated events criteria pursuant to 10 CFR 54.4(a). The applicant's license renewal program guidelines provided a comprehensive listing of documents used to support scoping and screening evaluations. The staff found these design documentation sources to be useful for ensuring that the initial scope of SSCs identified by the applicant was consistent with the plant's CLB.

2.1.3.1.3 Conclusion

Based on its review of information provided in LRA Section 2.1, a review of the applicant's detailed scoping and screening implementation procedures, and the results from the scoping and screening audit, the staff concludes that the applicant's scoping and screening methodology considered CLB information consistent with the guidance of the SRP-LR and the requirements of 10 CFR Part 54; and, therefore is acceptable.

2.1.3.2 Quality Assurance Controls Applied to LRA Development

2.1.3.2.1 Staff Evaluation

During the onsite scoping and screening methodology audit, the staff reviewed the quality controls used by the applicant to ensure that scoping and screening methodologies documented in the LRA were adequately implemented. The staff determined that the applicant applied the following quality assurance (QA) processes during the LRA development:

- The scoping and screening methodology was governed by written procedures, guidelines, and project checklist packages
- The LRA was examined and approved by the applicant's license renewal oversight board, license renewal assessment board, and plant review board
- The applicant implemented a four-step document development process to prepare, check, review, and approve each license renewal document
- The applicant's QA organization performed two self-assessments of the implementation of LRA

The staff reviewed implementing procedures, guidance documents, and selected portions of results reports and self assessment documentation and determined that the applicant had established and implemented a program to ensure adequate quality of the LRA.

2.1.3.2.2 Conclusion

Based on its review of reports and LRA development implementing procedures and guidance, and a discussion with the applicant's license renewal personnel, the staff concludes that the QA activities have met current regulatory requirements and have provided assurance that LRA development activities were performed consistent with the applicant's LRA program requirements.

2.1.3.3 Training

2.1.3.3.1 Staff Evaluation

During the scoping and screening methodology audit, the staff reviewed the applicant's training process to ensure the guidelines and methodology for the scoping and screening activities were applied in a consistent and appropriate manner. The applicant required training for all personnel participating in the LRA development, including both contract personnel and the applicant's staff, and used only trained personnel to prepare the scoping and screening implementing procedures. Prior to participating in the scoping and screening activities, the applicant required that its personnel complete a qualification program.

The training consisted of a combination of reading, computer-based training, attending training sessions, and a discussion with the project lead. These training requirements were documented on a qualification card. All license renewal personnel were required to review applicable license renewal and 10 CFR Part 50 regulations, NEI 95-10, Regulatory Guide (RG) 1.188, SRP-LR, and NUREG-1801, "Generic Aging Lessons Learned" (GALL) Report. In addition, all license renewal personnel were required to read license renewal project documents which included a project plan, project schedule, and business documents.

The audit team reviewed completed qualification and training records of several of the applicant's license renewal personnel responsible for the LRA development and determined that the records documented adequate training of the applicant's staff. Additionally, based on discussions with the applicant's license renewal personnel during the audit, the audit team determined that the personnel were knowledgeable on specific technical issues and the requirements associated with LRA development.

2.1.3.3.2 Conclusion

Based on discussions with the applicant's license renewal project personnel and review of selected documentation in support of the process, the staff concludes that the applicant's personnel were adequately trained to implement the scoping and screening methodology and LRA development as described in the applicant's implementing documents and the LRA.

2.1.3.4 Conclusion of Scoping and Screening Program Review

Based on a review of information provided in LRA Section 2.1, a review of the applicant's detailed scoping and screening implementation procedures, discussions with the applicant's

license renewal personnel, and the results from the scoping and screening audit, the staff concludes that the applicant's scoping and screening program is consistent with the guidance of the SRP-LR and with the requirements of 10 CFR Part 54; and, therefore is acceptable.

2.1.4 Plant Systems, Structures, and Components Scoping Methodology

In LRA Section 2.1.1, the applicant described the methodology used to scope SSCs pursuant to the requirements of the 10 CFR 54.4(a). The applicant described the scoping process for the plant in terms of systems and structures. Specifically, the scoping process consisted of developing a list of plant systems and structures, identifying their intended functions, and determining which functions meet one or more of the criteria of 10 CFR 54.4(a).

The systems list was developed using the equipment database and maintenance rule system information. Information on mechanical systems and structural intended functions was obtained from the UFSAR, maintenance rule information and additional CLB information. All electrical and instrument and control (I&C) systems, and electrical and I&C components in mechanical systems, were included within the scope of license renewal. The identified systems and structures and their associated functions were evaluated against the criteria of 10 CFR 54.4 as described in SER Sections 2.1.4.1 through 2.1.4.3.

2.1.4.1 Application of the Scoping Criteria in 10 CFR 54.4(a)(1)

2.1.4.1.1 Summary of Technical Information in the Application

In LRA Section 2.1.1.1, the applicant described the scoping methodology as it relates to the safety-related criterion pursuant to 10 CFR 54.4(a)(1). With respect to the safety-related criterion, the applicant stated that the safety-related systems and structures are initially identified based on a review of the BVPS equipment database. Systems and structures which contained a component which was classified as safety-related were included within the scope of license renewal. The LRA stated that all plant conditions, including conditions of normal operation, design-basis accidents (DBAs), external events, and natural phenomena for which the plant must be designed, were considered for license renewal scoping pursuant to 10 CFR 54.4(a)(1) criteria.

2.1.4.1.2 Staff Evaluation

Pursuant to 10 CFR 54.4(a)(1), the applicant must consider all safety-related SSCs relied upon to remain functional during and following a design-basis event (DBE) to ensure (a) the integrity of the reactor coolant pressure boundary, (b) the capability to shut down the reactor and maintain it in a safe-shutdown condition, or (c) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those pursuant to 10 CFR 50.34(a)(1), 50.67(b)(2), or 100.11.
With regard to identification of DBEs, SRP-LR Section 2.1.3 states:

> The set of DBEs as defined in the Rule is not limited to Chapter 15 (or equivalent) of the FSAR. Examples of DBEs that may not be described in this chapter include external events, such as floods, storms, earthquakes, tornadoes, or hurricanes, and internal events, such as a high energy line break. Information regarding DBEs as defined in 10 CFR 50.49(b)(1) may be found in any chapter of the facility FSAR, the Commission's regulations, NRC orders, exemptions, or

> license conditions within the CLB. These sources should also be reviewed to identify SSCs relied upon to remain functional during and following DBEs (as defined in 10 CFR 50.49(b)(1)) to ensure the functions described in 10 CFR 54.4(a)(1) are maintained.

During the audit, the applicant stated that it had evaluated the types of events listed in NEI 95-10 (i.e., anticipated operational occurrences, DBAs, external events and natural phenomena) applicable to BVPS and identified the documents that described those events. The UFSAR and system DBDs for Units 1 and 2, discusses events such as internal and external flooding tornados, and missiles. The applicant also reviewed licensing correspondence and design criteria.

The staff confirmed that all plant conditions, including conditions of normal operation, DBAs, external events, and natural phenomena for which the plant must be designed, were considered for license renewal scoping in accordance with 10 CFR 54.4(a)(1) criteria and concludes that the applicant's evaluation of DBEs was consistent with SRP-LR.

The applicant performed scoping of SSCs in accordance with 10 CFR 54.4(a)(1) criteria. The applicant's license renewal implementing documents provided guidance for the preparation, review, verification, and approval of the scoping evaluations to assure the adequacy of the results of the scoping process. The staff reviewed the implementing documents governing the applicant's evaluation of safety-related SSCs, and sampled the applicant's scoping results reports to ensure the methodology was implemented in accordance with those written instructions. In addition, the staff discussed the methodology and results with the applicant's personnel who were responsible for these evaluations.

During the audit, the staff noted that the applicant's definitions of safety-related used to identify SSCs within the scope of license renewal in the LRA, the license renewal scoping procedures, and the text of the plant classification document, agree with the definition pursuant to 10 CFR 54.4(a)(1)(iii). However, the form or procedure used to initially populate the equipment database, and subsequently relied upon to identify safety-related SSCs, referred only to 10 CFR Part 100. Units 1 and 2 have been approved by the staff for use of the alternate source term and; therefore, 10 CFR 50.67(b)(2) is applicable. The staff determined that additional information would be required to complete the review of the applicant's scoping methodology.

In RAI 2.1-1, dated March 5, 2008, the staff requested that the applicant provide a written evaluation that addresses the impact, if any, of the use of differing definitions of safety-related.

In its response to RAI 2.1-1, dated April 3, 2008, the applicant stated:

> There was no impact on license renewal scoping due to the worksheet error regarding the definition of "safety-related." FENOC explicitly considered those systems, structures, or components (SSCs) that are relied upon to ensure, "...the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines in 10 CFR 50.34(a)(1),10 CFR 50.67(b)(2), or 10 CFR 100.11 of this chapter, as applicable," consistent with the current licensing basis.

> The Quality Class Determination Worksheet reference to 10 CFR 100 alone, instead of including 10 CFR 50.67 and 10 CFR 50.34, was an error. This conclusion is based upon the fact that the Alternate Source Term (AST) methodology and inputs for determining post-design bases accident (DBA) radiological doses under 10 CFR 50.67 were incorporated into the BVPS licensing bases as a result of the BVPS Unit 1 and 2 License Amendments. The Unit 1 and 2 Waste Gas System Ruptures, however, are still assessed under the provisions of 10 CFR 100.11; thus, the Quality Class Determination Worksheets should refer to both dose criteria, as applicable. The Quality Class Determination Worksheet was revised to correct the error. The parent procedure that provides detailed steps for performing a safety classification using the Quality Class Determination Worksheet included the correct reference to,..." 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable."

Based on its review, the staff finds the applicant's response to RAI 2.1-1 acceptable because the applicant has provided a description of an adequate process used so that SSCs have been appropriately included within the scope of license renewal, pursuant to 10 CFR 54.4(a)(1) and that the definitions for safety-related used to classify SSCs, were consistent with the requirements of 10 CFR 54.4(a)(1). Therefore, the staff's concern described in RAI 2.1-1 is resolved.

During the audit, the staff noted that the applicant identified certain components for Units 1 and 2 that were classified as "Q" (a BVPS term used to identify safety-related components), and which are located within the nonsafety-related TB. However, the identified "Q" components were not included within the scope of license renewal as required by 10 CFR 54.4(a)(1). In addition, neither the TB nor the nonsafety-related SSCs in the vicinity of the "Q" components were included within the scope of license renewal as required by 10 CFR 54.4(a)(1) or (a)(2), as applicable.

In RAI 2.1-4, dated March 5, 2008, the staff requested that the applicant provide a written evaluation that addresses its review of this issue.

In the response to RAI 2.1-4, dated April 3, 2008, the applicant stated:

> Certain instrumentation located in the Unit 1 and 2 turbine buildings, and the Unit 2 component supports associated with the instrumentation, is conservatively assigned the classification of "Q" in the plant equipment database, but is not relied upon to remain functional during or following design basis events (the classification "Q" is assigned to all safety-related equipment at BVPS). All instrumentation in this category is within the scope of license renewal, but is screened out as active electrical components, and is not subject to aging management review. The LRA did not provide the level of detail to confirm that the specific component supports associated with the Unit 2 "Q" instrumentation piping are within the scope of license renewal. However, the Unit 2 Turbine Building civil AMR did not exclude or limit the scope of component supports. Therefore, all components in the Turbine Buildings with a "Q" designation in the plant equipment database are within the scope of license renewal.
>
> Circuit failure analyses were performed and concluded that any faults associated with instrumentation in the turbine buildings that is classified "Q" in the plant

equipment database would not result in a loss of any safety-related function. The faults considered were grounds, conductor shorts, open circuits, hot shorts with other cables in the same raceway or enclosure, and high impedance faults. Therefore, while these instruments and supports are assigned a quality classification "Q" in the plant equipment database, the classification is conservative, and these components do not perform a 10 CFR 54.4(a)(1) function, as documented within the BVPS CLB. Since the "Q" instruments can fail in any of the ways stated above without loss of safety function, and do not perform a 10 CFR 54.4(a)(1) function, failures of nearby nonsafety-related components cannot interact with these components in any way to result in a loss of a safety function. The evaluations also apply to the Unit 2 instrument supports, which are also classified "Q," since the failure of any supports would not result in any new failure modes for the instrumentation. Nonsafety-related components in the vicinity that interact with the instrumentation supports cannot result in loss of a safety-related function. Relative to the "Q" instrumentation and instrumentation supports in the turbine buildings, the license renewal scoping methodology used at BVPS did not preclude identification of safety-related SSCs which should have been included within the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.1-4 acceptable because the applicant has provided a description of an adequate process which determined that components located within the TB have been conservatively classified as "Q" (which the applicant used to designate safety-related SSCs), although they do not perform an intended function, which would require that they be included within the scope of license renewal pursuant to 10 CFR 54.4(a)(1). The applicant stated that it had determined that, based on information contained in the CLB for BVPS, the "Q" components located in the TB do not perform an intended function. The staff further finds that since the "Q" components located in the TB do not perform an intended function, the applicant is not required to evaluate other nonsafety-related components for interactions, in accordance with 10 CFR 54.4(a)(2). Therefore, the staff's concern described in RAI 2.1-4 is resolved.

The staff reviewed a sample of the license renewal scoping results for the MSS, RHR, TB, and main intake structure to provide additional assurance that the applicant adequately implemented their scoping methodology in accordance with 10 CFR 54.4(a)(1). The staff verified that the scoping results for each of the sampled systems were developed consistent with the methodology, the SSCs credited for performing intended functions were identified, and the basis for the results as well as the intended functions were adequately described. The staff verified that the applicant has identified and used pertinent engineering and licensing information to identify the SSCs required to be within the scope of license renewal as required by 10 CFR 54.4(a)(1).

2.1.4.1.3 Conclusion

Based on its review of sample systems, discussions with the applicant, review of the applicant's scoping process, and the applicant's responses to RAIs 2.1-1 and 2.1-4, the staff concludes that the applicant's methodology for identifying systems and structures is consistent with SRP-LR and 10 CFR 54.4(a)(1); and, therefore is acceptable.

2.1.4.2 Application of the Scoping Criteria in 10 CFR 54.4(a)(2)

2.1.4.2.1 Summary of Technical Information in the Application

In LRA Section 2.1.1.2, the applicant described the scoping methodology as it relates to the nonsafety-related criteria pursuant to 10 CFR 54.4(a)(2). Also, the applicant's 10 CFR 54.4(a)(2) scoping methodology was based on guidance provided in NEI 95-10, Revision 6, Appendix F. The applicant evaluated the impacts of nonsafety-related SSCs that met 10 CFR 54.4(a)(2) criteria by considering both functional and physical failures.

Functional Failure of Nonsafety-Related SSCs. In LRA Section 2.1.1.2.1, the applicant stated that SSCs required to perform a function in support of safety-related components are generally classified as safety-related and are included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). For the few exceptions where nonsafety-related systems and structures are required to remain functional to support a safety function, the systems and structures were included within the scope of license renewal pursuant to 10 CFR 54.4(a)(2).

Nonsafety-Related SSCs directly connected to Safety-Related SSCs. In LRA Section 2.1.1.2.2, the applicant stated that nonsafety-related piping and supports are within the scope of license renewal, up to and including the seismic anchor, as identified in the stress analysis and an equivalent anchor or one of the other bounding conditions, pursuant to the guidance found in NEI 95-10, Appendix F (*i.e.*, base mounted component, flexible connection, or to include the entire piping run). The LRA defined a seismic anchor or equivalent anchor as a seismic anchor or group of supports that provide lateral and torsional support in three orthogonal directions. The other methods used to define a scoping boundary include (a) the limits of a piping stress calculation, (b) the limits of evaluations described in Inspection and Enforcement Bulletin (IEB) 79-14, "Seismic Analyses for As-built Safety-Related Piping Systems," as shown on isometric or other controlled engineering drawings, and (c) approved design engineering evaluation and acceptance of an endpoint for scoping, documenting that piping beyond the scoping endpoint is not required for support of the safety-related piping components.

Nonsafety-Related SSCs With the Potential for Spatial Interaction With Safety-Related SSCs. In LRA 2.1.1.2.3, the applicant stated that nonsafety-related systems and nonsafety-related portions of safety-related systems are identified as within the scope of license renewal pursuant to 10 CFR 54.4(a)(2), if there is a potential for spatial interactions with safety-related equipment. Spatial failures are defined as failures of nonsafety-related SSCs located in the vicinity of safety-related SSCs that create the potential for interaction between the SSCs due to physical impact, pipe whip, jet impingement, a harsh environment resulting from a piping rupture, or damage due to leakage or spray and; thus, could impede or prevent the accomplishment of the safety-related functions of a safety-related SSC. Mitigative features, such as missile barriers, flood barriers, and spray shields, were included within the scope of license renewal pursuant to 10 CFR 54.4(a)(2). In addition, the preventive option described in NEI 95-10, Appendix F, was used to determine the scope of license renewal with respect to the protection of safety-related SSCs from spatial interactions not addressed in the CLB. This scoping process required an evaluation based on equipment location and the related SSCs and whether fluid-filled system components are located in the same space as safety-related equipment. For the purposes of the review, a "space" was defined as a structure containing safety-related SSCs.

2.1.4.2.2 Staff Evaluation

Pursuant to 10 CFR 54.4(a)(2), the applicant must consider all nonsafety-related SSCs, whose failure could prevent satisfactory accomplishment of safety-related function, for SSCs relied upon to remain functional during and following a DBE to ensure the following functions: (a) the integrity of the reactor coolant pressure boundary; (b) the capability to shut down the reactor and maintain it in a safe-shutdown condition; or (c) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those pursuant to 10 CFR 50.34(a)(1), 50.67(b)(2), or 100.11.

RG 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," Revision 1, provides staff endorsement on the use of NEI 95-10, Revision 6, Appendix F. RG 1.188 provides the staff position on 10 CFR 54.4(a)(2) scoping criteria; nonsafety-related SSCs typically identified in the CLB; consideration of missiles, cranes, flooding; high-energy line breaks (HELBs); nonsafety-related SSCs connected to safety-related SSCs, nonsafety-related SSCs in proximity of safety-related SSCs; and the mitigative and preventative options related to nonsafety-related and safety-related SSCs interactions.

In addition, the staff position states that applicants should not consider hypothetical failures, but rather, should base their evaluation on the plant's CLB, engineering judgment and analyses, and relevant operating experience. NEI 95-10 further describes operating experience as all documented plant-specific and industry-wide experience that can be used to determine the plausibility of a failure. Documentation would include NRC generic communications and event reports, plant-specific condition reports, industry reports such as safety operational event reports, and engineering evaluations.

The staff reviewed LRA Section 2.1.2.2, where the applicant described its scoping methodology pursuant to 10 CFR 54.4(a)(2) nonsafety-related criteria. In addition, the staff reviewed the applicant's results report which documented the guidance and corresponding results of the 10 CFR 54.4(a)(2) scoping review requirement, which the applicant had performed pursuant to the guidance in NEI 95-10, Revision 6, Appendix F.

Nonsafety-Related SSCs Required to Perform a Function that Supports a Safety-Related SSC. The staff determined that nonsafety-related SSCs required to remain functional to support a safety-related function were included as safety-related within the scope of license renewal in accordance with 10 CFR 54.4(a)(1) with several exceptions, which were included within the scope of license renewal pursuant to 10 CFR 54.4(a)(2). This evaluating criteria was discussed in the applicant's 10 CFR 54.4(a)(2) report. The staff found that the applicant had implemented an acceptable method for scoping of nonsafety-related systems that perform a function that supports a safety-related intended function.

Nonsafety-Related SSCs Directly Connected to Safety-Related SSCs. The applicant reviewed the safety-related to nonsafety-related interfaces for each mechanical system in order to identify the nonsafety-related components located between the interface and the license renewal structural boundary. The applicant had included within the scope of license renewal all nonsafety-related SSCs within the license renewal structural boundary in accordance with 10 CFR 54.4(a)(2).

The staff determined that in order to identify the nonsafety-related SSCs connected to safety-related SSCs and required to be structurally sound to maintain the integrity of the

safety-related SSCs, the applicant used a combination of the following to identify the portion of nonsafety-related piping systems to be included within the scope of license renewal:

- Seismic anchors
- Equivalent anchors
- Limits of the piping stress calculation
- Bounding conditions described in NEI 95-10, Appendix F (base mounted component, flexible connection, or to include the entire piping run)
- The limits of IEB 79-14, "Seismic Analyses for As-built Safety-Related Piping Systems," evaluations as shown on isometric or other controlled engineering drawings
- Approved design engineering evaluation and acceptance of an endpoint for scoping that provides documentation that piping beyond the scoping endpoint is not required for support of the safety-related piping components

During the audit, the staff noted that the applicant indicated that equivalent anchors had been used to identify portions of nonsafety-related pipe to be included within the scope of license renewal. However, the applicant stated that in certain cases, combinations of less than two restraints or supports in each of the three orthogonal directions had been used as equivalent anchors to determine the portions of nonsafety-related pipe, attached to safety-related SSCs, as included within the scope of license renewal. The staff determined that additional information was required to complete its review of the applicant's scoping methodology.

In RAI 2.1-2, dated March 5, 2008, the staff requested that the applicant provide a written evaluation that addresses its review of this issue.

In its response to RAI 2.1-2, dated April 3, 2008, the applicant stated:

> A review was conducted of the evaluations for nonsafety-related piping directly attached to safety-related piping for which groups of supports were used to define an endpoint for license renewal scoping. This review identified some additional nonsafety-related components that were added to scope to ensure that each such combination of supports included at least two supports in each of three orthogonal directions (or the scoping terminated at another alternative specifically identified by NEI 95-10, Appendix F, such as a base mounted component). Scoping for the boundaries of nonsafety-related piping components that are directly connected to safety-related components relied upon engineering evaluations of combinations of supports for a total of forty-eight safety to nonsafety transitions. Those engineering evaluations provided conclusions that the piping beyond the scoping boundary was not required to provide support to the attached safety-related components, but did not identify whether the evaluation specifically verified two supports in each of three orthogonal directions. The piping configuration for each of the forty-eight safety to nonsafety transitions that relied upon a group of supports was re-evaluated in response to this question. The existing evaluations for thirty-three transitions were confirmed to encompass at least two supports in each of three orthogonal directions. The remaining fifteen transitions required additions to the depictions of the scoping boundary shown on the applicable license renewal boundary drawings. In two

cases, the scoping boundary was expanded to include components that resulted in a clarifying change to an AMR, but the changes did not result in a new combination of component, material, environment, aging effect, so the AMR results did not change.

Based on its review, the staff finds the applicant's response to RAI 2.1-2 acceptable because the applicant has provided a description of an adequately modified process used to ensure that SSCs have been appropriately included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

The staff also finds that as a result of the modified process, the applicant has included additional SSCs within the scope of license renewal. Therefore, the staff's concern described in RAI 2.1-2 is resolved.

In LRA Section 2.1.1.2.2, the applicant stated that the limits of IEB 79-14, "Seismic Analyses for As-built Safety-Related Piping Systems," evaluations as shown on isometric or other controlled engineering drawings, were used to identify the portions of nonsafety-related piping, attached to safety-related SSCs, included within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2).

In RAI 2.1-3, dated March 5, 2008, the staff requested that the applicant provide a discussion to address how the information obtained in the walk-downs, previously performed in support of IEB 79-14, was used to identify either a seismic anchor or an equivalent anchor, as defined in NEI 95-10, Revision 6, Appendix F, to determine the portion of the nonsafety-related pipe included within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2).

In its response to RAI 2.1-3, dated April 3, 2008, the applicant stated the following:

> IEB 79-14 requested utilities to verify that their seismic analyses applied to the actual configuration of safety-related piping systems. The specific text of IEB 79-14 states, in part: "All power reactor facility licensees and construction permit holders are requested to verify, unless verified to an equivalent degree within the last 12 months, that the seismic analysis applies to the actual configuration of safety-related piping systems." The actions taken at Unit 2 to ensure the validity of seismic analysis were incorporated into the design and construction effort, and no notations related to IEB 79-14 appear on the Unit 2 piping or isometric drawings.
>
> License renewal scoping related to the use of IEB 79-14 notations on isometric piping drawings at BVPS is limited to Unit 1.
>
> As part of the response to IEB 79-14 for BVPS Unit 1, the architectural engineer generated detailed formal stress analyses for the safety-related piping systems. The calculations revised for IEB 79-14 remain, for the most part, the analytical basis for BVPS Unit 1 safety-related piping. Subsequent modifications to the piping have been qualified in revisions to these same calculations.
>
> As dictated by IEB 79-14, field walkdowns were performed on the piping required to complete the analyses. The site procedures that controlled the piping analyses and walkdowns specified inclusion of piping in the analyses and walkdowns up to

an equivalent translational anchor, or to branch piping that is significantly less stiff and less massive than the pipe being analyzed. The equivalent translational anchor is defined in the site procedures as a "hanger or combination of hangers which restrains the piping in 3 orthogonal directions." The site procedures also defined the stiffness and massiveness threshold for inclusion in analyses to be a moment of inertia ratio of pipe run to branch pipe less than or equal to 10. The limits of IEB 79-14 walkdowns, therefore, represent an anchor or a combination of supports that correspond to NEI 95-10; Appendix F, Paragraph 4.3, "equivalent anchor," which includes, "...a series of supports that have been evaluated as a part of a plant-specific piping design analysis to ensure that forces and moments are restrained in three orthogonal directions." In some cases, the limit of IEB 79-14 walkdowns may represent an analysis boundary corresponding to a branch line with a moment of inertia ratio of greater than 10, consistent with NEI 95-10, Appendix F, Section 4, "alternative f" (a smaller branch line, for which the moment of inertia ratio must be determined on a plant-specific basis).

The results of the IEB 79-14 field walkdowns, including any as-built dimensional changes and pipe support modifications made as a result of the re-analysis, were shown on revised isometric drawings. In addition, the boundaries of the IEB 79-14 field walkdowns were noted on the isometrics. Thus, the analytical boundaries of the current piping calculations are depicted by the IEB 79-14 walkdown boundaries as shown on the isometrics. These boundaries were used to determine the limits of scoping for nonsafety-related piping components that are directly connected to safety-related components.

Therefore, relative to the use of isometric drawing notes identifying the limits of IEB 79-14 walkdowns, the license renewal scoping methodology used at BVPS did not preclude identification of any nonsafety-related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1). No additional SSCs have been added to scope as a result of the response to this question.

Based on its review, the staff finds the applicant's response to RAI 2.1-3 acceptable because the applicant has provided a description of a process used to ensure that SSCs have been appropriately included within the scope of license renewal, pursuant to 10 CFR 54.4(a)(2). The staff further finds that the applicant's process was based on a stress analysis performed by the architectural engineer in response to IEB 79-14 and that the subsequent walkdowns, performed by BVPS personnel to identify seismic and equivalent anchors, was in accordance with the SRP-LR and the guidance found in NEI 95-10. Therefore, the staff's concern described in RAI 2.1-3 is resolved.

Nonsafety-Related SSCs with the Potential for Spatial Interaction with Safety-Related SSCs. The applicant considered physical impact (pipe whip, jet impingement), harsh environments, flooding, spray, and leakage when evaluating the potential for spatial interactions between nonsafety-related systems and safety-related SSCs. The applicant used a spaces approach to identify the portions of nonsafety-related systems with the potential for spatial interaction with safety-related SSCs. The spaces approach focused on the interaction between nonsafety-related and safety-related SSCs that are located in the same space, which was defined for the purposes of the review, as a structure containing safety-related SSCs.

Physical Impact or Flooding. The applicant considered nonsafety-related supports for non-seismic piping systems with potential for spatial interaction with safety-related SSCs for inclusion within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The applicant identified the nonsafety-related SSCs by performing a review of the engineering drawings (including operating manual figures, valve operating number diagrams, flow diagrams, piping and instrumentation drawings, and isometric drawings), equipment locations specified in the controlled operating manual valve lists, and system and component walk-downs, where needed. The applicant's review of earthquake experience identified no occurrence of welded steel pipe segments falling due to a strong motion earthquake. The applicant concluded that as long as the effects of aging on supports for piping systems are managed, falling of piping systems is not credible (except due to flow-accelerated corrosion as considered in the HELB analysis for high-energy systems) and; therefore, there is no requirement, due to a physical impact hazard, to include the piping sections within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2). The applicant evaluated the missiles that could be generated from internal or external events such as failure of rotating equipment. The nonsafety-related design features which protect safety-related SSCs from such missiles were included within the scope of license renewal.

Pipe Whip, Jet Impingement, and Harsh Environment. The applicant evaluated nonsafety-related portions of high-energy lines against criteria pursuant to 10 CFR 54.4(a)(2). The applicant's evaluation was based on a review of documents such as the UFSAR, design documents and relevant site documentation. The applicant's high-energy systems were evaluated to ensure identification of components that are part of nonsafety-related high-energy lines that can effect safety-related equipment, and applicable portions of high-energy piping systems and associated mitigative features were included within the scope of license renewal.

Spray and Leakage. The applicant evaluated moderate and low-energy systems which have the potential for spatial interactions due to spray or leakage. Nonsafety-related systems and nonsafety-related portions of safety-related systems, with the potential for spray or leakage that could prevent safety-related SSCs from performing their required safety function were considered within the scope of license renewal. The applicant used a spaces approach to identify the nonsafety-related SSCs which were located within the same space as safety-related SSCs. As described in the LRA, a space was defined for the purposes of the review, as a structure containing safety-related SSCs. Following identification of the applicable mechanical systems, the applicant reviewed the system functions to determine whether the system contained fluid, air or gas.

Plant Based and Industry Operating Experience. The applicant excluded the nonsafety-related SSCs containing air or gas from the scope of license renewal. The applicant then determined whether the system had any components located within a space containing safety-related SSCs. Those nonsafety-related SSCs determined by the applicant to contain fluid, and located within a space containing safety-related SSCs, were included within the scope license renewal, in accordance with 10 CFR 54.4(a)(2).

Protective Features. The applicant evaluated protective features such as whip restraints, spray shields, supports, missile and flood barriers installed to protect safety-related SSCs against spatial interaction with nonsafety-related SSCs due to fluid leakage, spray, or flooding. Nonsafety-related structural components could affect safety-related SSCs due to their spatial interaction with the SSCs (*i.e.*, their physical location could result in interaction upon failure of the nonsafety-related structure). Structural components that meet the criterion pursuant to

10 CFR 54.4(a)(2) included missile barriers, flood barriers, HELB protection, and nonsafety-related supports for non-seismic (including seismic II and I) piping systems, electrical conduit, and cable trays with potential for spatial interaction with safety-related equipment. Protective features credited in the plant design and all equipment supports in safety-related areas were included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

During the audit, the staff determined that the TBs had been included within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(3). However, although the BVPS Unit 1 TB had the potential to affect safety-related SSCs, the applicant failed to identify the Unit 1 TB as within the scope of license renewal in accordance with 10 CFR 54.4(a)(1) or (a)(2). Therefore, the staff required additional information to complete its review of the applicant's scoping methodology.

In RAI 2.1-5, dated March 5, 2008, the staff requested that the applicant provide a written evaluation to address the following:

(a) A safety-related portion of the Unit 1 river water pipe, which consists of a pipe and an elastic expansion joint, was included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). This portion of the river water pipe exits from the safety-related main steam cable vault pipe tunnel (included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1)) and enters the nonsafety-related TB. However, neither the TB, nor the nonsafety-related SSCs located in the TB and in the vicinity of the river water pipe, have been included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1) or (a)(2) as applicable. In addition, the river water pipe supports located in the TB, which provide structural support to the safety-related river water pipe, were not included within the scope of license renewal.

(b) The TB is contiguous with the main steam cable vault pipe tunnel with no wall or door providing separation between the interiors of the two structures. The main steam cable vault pipe tunnel is safety-related and contains safety-related SSCs, all of which are included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). However, neither the TB, nor the nonsafety-related SSCs located in the TB and in the vicinity of the opening to the main steam cable vault pipe tunnel, have been included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

(c) The TB is adjacent to the safety-related service building which was included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). However, the TB, although directly adjacent to a safety-related structure, has not been included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

In the response to RAI 2.1-5, dated April 3, 2008, the applicant stated, in part, the following:

(a) Interactions between nonsafety-related components and the mechanical piping components associated with the safety-related river water discharge line in the main steam cable vault pipe tunnel, and in the TB southwest

corner, were evaluated for license renewal scoping. The function of these safety-related river water piping components is to provide a discharge flow-path for river water that has already performed its function of removing heat from plant components. However, piping pressure boundary integrity is not required for this function, and a loss of integrity would not result in a loss of discharge flow and, as documented in the Unit 1 UFSAR, would not result in loss of any safety-related function. Therefore, failure of nonsafety-related components that could result in loss of piping integrity would not result in loss of any safety function. The applicant also stated that crushing of the line (e.g., by pipe whip) was not part of the HELB analysis criteria, and is, therefore, considered a hypothetical failure resulting from system interdependencies that is not part of the CLB, and that has not been previously experienced. NEI 95-10 states that consideration of this type of failure is not required for license renewal scoping pursuant to 10 CFR 54.4(a)(2). The scoping methodology used by the applicant did not preclude identification of safety-related SSCs which should have been included within the scope of license renewal. Also, the civil AMR reports have been updated to clarify that component supports and commodities associated with in-scope components in the TBs are within the scope of license renewal. The applicant further stated that no additional SSCs were added as in-scope in accordance with either 10 CFR 54.4(a)(1) or (a)(2), as a result of RAI 2.1-5(a).

(b) The safety-related components in the main steam cable vault pipe tunnel are the river water discharge piping components (addressed above, piping integrity not required) and the auxiliary steam system isolation valves HYV-1AS-101A and 101B. These valves, their actuators and power supplies are safety-related (and in-scope) for their intended function of isolating the supply of auxiliary steam to the main steam cable vault and auxiliary building upon detection of high-temperature in those areas and to mitigate a downstream auxiliary steam line break in those buildings. The isolation function is active, and pressure boundary integrity of the valves is not required to prevent a supply of steam to downstream components, so loss of integrity would not cause a loss of function. The valves fail closed on loss of power, so loss of power would not result in a loss of function. The direct current (DC) panel source of power to each valve is protected by breakers that are coordinated to ensure that a circuit fault downstream of a valve's individual power supply breaker, which would result in this breaker tripping and loss of power to the valve, will not result in loss of the DC panel power supply. The applicant also stated that the failure of nonsafety-related components that could result in loss of piping integrity, or in loss of power to the valves, would not result in loss of any safety function. Therefore, for components within the main steam cable vault pipe tunnel and the adjacent nonsafety-related SSCs both in the pipe tunnel and in the TB, the license renewal scoping methodology used by the applicant did not preclude identification of safety-related SSCs which should have been included within the scope of license renewal, and did not preclude the identification of any nonsafety-related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4 (a)(1). The applicant further stated that no

additional SSCs were added as in-scope in accordance with either 10 CFR 54.4(a)(1) or (a)(2), as a result of RAI 2.1-5(b).

(c) The potential for the nonsafety-related TBs (Units 1 and 2) to fail and interact with the adjacent safety-related structure(s) was not initially identified in the LRA for BVPS. The TBs are currently within the scope of license renewal, with functions associated with 10 CFR 54.4(a)(3) identified. A function has been added to the TB's lists of intended functions to address the potential for their failure to result in spatial interactions with adjacent safety-related structures, pursuant to 10 CFR 54.4(a)(2). The applicant further stated that no additional SSCs were added as in-scope in accordance with either 10 CFR 54.4(a)(1) or (a)(2), as a result of RAI 2.1-5(c).

Based on its review, that staff finds the applicants response to RAI 2.1-5 acceptable because the applicant has provided a description of an adequate process used to ensure that SSCs, applicable to the river water pipe and the auxiliary steam isolation valves, were appropriately considered for inclusion within the scope of license renewal pursuant to 10 CFR 54.4(a)(2). The staff notes that the applicants review was based on information contained in the CLB for Units 1 and 2. In addition, the staff further finds that the applicant has determined that certain AMR clarifications are required for component supports and that additional functions, pursuant to 10 CFR 54.4(a)(2), should be included for the TBs based on their proximity to safety-related structures. Therefore, the staff's concerns described in RAI 2.1-5 are resolved.

2.1.4.2.3 Conclusion

Based on its review of the applicant's scoping process and sample systems, discussions with the applicant, and review of the information provided in the response to RAI 2.1-2, 2.1-3, and 2.1-5 the staff concludes that the applicant's methodology for identifying and including nonsafety-related SSCs, which could affect the performance of a safety-related SSCs within the scope of license renewal, is consistent with the scoping criteria of 10 CFR 54.4(a)(2) and; therefore, is acceptable.

2.1.4.3 Application of the Scoping Criteria in 10 CFR 54.4(a)(3)

2.1.4.3.1 Summary of Technical Information in the Application

In LRA Section 2.1.1.3, the applicant described the methodology for identifying those systems and structures within the scope of license renewal in accordance with the staff's criteria for five regulated events: (1) 10 CFR 50.48, "Fire Protection;" (2) 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants;" (3) 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events;" (4) 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants;" and (5) 10 CFR 50.63, "Loss of All Alternating Current Power."

Fire Protection. In LRA Section 2.1.1.3.1, the applicant described the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the fire protection criterion. The applicant stated that the SSCs within the scope of license renewal for fire protection include those based on several different

functional requirements as defined in 10 CFR 50.48 and 10 CFR Part 50, Appendix R. SSCs credited with fire prevention, detection and mitigation in areas containing equipment important to safe operation of the plant are in-scope, as is equipment credited to achieve safe-shutdown in the event of a fire. To establish this scope, the applicant performed a review of the Units 1 and 2, CLBs for fire protection to determine those SSCs relied upon to demonstrate compliance with NRC regulations that govern fire protection. The following documents were used as part of the review:

- UFSAR
- Station Procedure for the Fire Protection Program
- Fire Protection Appendix R and/or Safe Shutdown Report
- SERs
- Docketed Information

The applicant stated that based on the review of the Units 1 and 2, CLBs for fire protection, SSCs and their corresponding intended functions required for compliance with 10 CFR 50.48 were determined and included within the scope of license renewal.

Environmental Qualification. In LRA Section 2.1.1.3.2, the applicant described the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function in compliance with the environmental qualification (EQ) criterion. The applicant stated that the Equipment Qualification Program for Units 1 and 2, contains documents that identify electrical equipment and components that are required to function during and subsequent to DBAs. The Unit 1 and 2 Electrical Equipment Qualification Master Lists document the CLBs for EQ of equipment at BVPS. Systems with equipment contained in these lists are included within the scope of license renewal. Based on the review of the CLBs for Units 1 and 2 for EQ, and the bounding scoping approach used for electrical equipment, systems and their corresponding intended functions that are required for compliance with 10 CFR 50.49, the applicant identified the SSCs included within the scope of license renewal.

Pressurized Thermal Shock. In LRA Section 2.1.1.3.3, the applicant described the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the pressurized thermal shock (PTS) criterion. The applicant's review of docketed information did not identify any Units 1 and 2 systems or structures that are credited for protection against PTS. Protection is afforded by engineering analysis and core design. The applicant stated that plant conditions, specific to the reactor vessel (RV), are managed to ensure that the reference temperature for nil-ductility transition remains within limits, and no equipment other than the RV is credited with mitigation of PTS.

Anticipated Transient Without Scram. In LRA Section 2.1.1.3.4, the applicant described the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the ATWS criterion. The applicant stated that the ATWS mitigation system actuation circuitry (AMSAC) was required to meet the requirements of 10 CFR 50.62 as described in the UFSAR. The AMSAC and other SSCs relied on in analyses or plant evaluations to sense, initiate, and perform these required functions have been included within the scope of license renewal for ATWS, in accordance with 10 CFR 54.4(a)(3).

Station Blackout. In LRA Section 2.1.1.3.5, the applicant described the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the station blackout (SBO) criterion. The applicant stated that the

Station Blackout Shutdown Capability Summaries for each unit, the UFSAR for Units 1 and 2 and docketed information, document the CLBs for SBO. Based on the review of the CLBs for SBO blackout, and the bounding scoping approach used for electrical equipment, the applicant identified the SSCs and their corresponding intended functions required for compliance with 10 CFR 50.63, and included those SSCs within the scope of license renewal.

2.1.4.3.2 Staff Evaluation

The staff reviewed the applicant's approach to identifying mechanical systems and structures relied upon to perform functions that meet the requirements of the fire protection, EQ, PTS, ATWS, and SBO regulations.

As part of this review the staff discussed the methodology with the applicant, reviewed the documentation developed to support the approach, and evaluated a sample of the mechanical systems and structures indicated as within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

The staff noted that the applicant's implementing procedures described the process for identifying systems and structures within the scope of license renewal. These procedures state that all systems and structures that perform functions pursuant to 10 CFR 54.4(a)(3) are to be included within the scope of license renewal and that the results are to be documented in scoping results reports. The results reports reference the information sources used for determining the systems and structures credited for compliance with the regulated events.

Fire Protection. The applicant's scoping results reports indicated that it considered CLB documents to identify in-scope systems and structures. These documents included the UFSARs, station procedures for the fire protection program, fire protection Appendix R – safe-shutdown report, SERs and other docketed information. The staff reviewed the scoping results reports in conjunction with the LRA and the CLB information to validate the methodology for including the appropriate SSCs within the scope of license renewal. The staff found that the scoping results reports indicated which of the SSCs are included within the scope of license renewal because they perform intended functions that meet 10 CFR 50.48 requirements. The staff determines that the applicant's scoping methodology was adequate for including SSCs credited in performing fire protection functions.

Environmental Qualification. The applicant used the EQ master list to identify SSCs that meet the requirements of 10 CFR 50.49. The EQ master list includes system information, component identification numbers and descriptions. The staff reviewed the LRA, implementing procedures, scoping results reports, and the EQ master list to verify that the applicant has identified SSCs within the scope of license renewal. The staff determines that the applicant's scoping methodology was adequate for identifying EQ SSCs within the scope of license renewal.

Pressurized Thermal Shock. The applicant addressed PTS requirements for these components in a plant analysis. The staff reviewed the scoping report and determines that the methodology is appropriate for identifying SSCs with functions credited for complying with the PTS regulation and within the scope of license renewal. For this requirement the applicant has identified the RV as within the scope of license renewal.

Anticipated Transient Without Scram. The applicant's scoping results report identified SSCs which were included within the scope of license renewal because they perform intended

functions that meet 10 CFR 50.62 requirements. The applicant determined the intended functions based on CLB information and identified most in-scope components as electrical equipment. The applicant also included mechanical systems with ATWS intended functions based on CLB information. The staff determines that this scoping methodology was adequate for identifying SSCs with functions credited for complying with the ATWS regulation and for including those SSCs within the scope of license renewal.

Station Blackout. The applicant's scoping results reports indicated the SSCs credited with performing intended functions to comply with the SBO requirement. In its scoping, the applicant considered the UFSAR and other docketed information as documented in a scoping report. The applicant included within the scope of license renewal electrical equipment, mechanical systems, and structures with intended functions meeting SBO requirements.

For scoping electrical equipment, the applicant's bounding methodology included within the scope of license renewal, all electrical and I&C systems by default. The staff determines that this scoping methodology was adequate for identifying SSCs with functions credited for complying with the SBO regulation. The staff's review and conclusion of the results of the implementation of the SBO scoping methodology is contained in Section 2.5.

2.1.4.3.3 Conclusion

Based on its review of the LRA, the staff concludes that the applicant's methodology for identifying systems and structures meets the scoping criteria pursuant to 10 CFR 54.4(a)(3) and; therefore, is acceptable. This conclusion is based on sample reviews, discussions with the applicant, and review of the applicant's scoping process.

2.1.4.4 Plant-Level Scoping of Systems and Structures

2.1.4.4.1 Summary of Technical Information in the Application

System and Structure Level Scoping. The applicant documented its methodology in the LRA for performing the scoping of SSCs in accordance with 10 CFR 54.4(a), guidance documents, and scoping and screening reports. The applicant's approach to system and structure scoping provided in the site guidance and implementing documents was consistent with the methodology described in LRA Section 2.1. Specifically, the guidance documents directed the personnel performing license renewal scoping to use CLB documents and to describe the system or structure, including a list of functions that the system or structure is required to accomplish. The applicant used sources of information included in the equipment database, UFSAR, SERs, maintenance rule, DBDs, plant engineering drawings, piping calculations, plant operating manuals and procedures, emergency operating procedures, and docketed correspondence. The applicant then compared identified system or structures function lists to the scoping criteria to determine whether the functions met the scoping criteria pursuant to 10 CFR 54.4(a). If any part of a system or structure met any of the license renewal scoping criteria, the system or structure was included within the scope of license renewal. The system and structure scoping results included an overall system and/or structure description, an evaluation of each of the scoping criteria pursuant to 10 CFR 54.4 and the basis for the applicant's conclusion. The applicant developed evaluation boundaries to document the system and structure level scoping determinations and to define the in-scope SSCs to support the subsequent screening and AMR processes. The applicant defined and documented the

boundaries for the in-scope systems and structures for each discipline in a manner that assured the in-scope SSCs were included in the screening process.

Component Level Scoping. After identifying the intended functions of systems or structures within the scope of license renewal, the applicant performed a review to determine which components and structures support the system's license renewal intended functions. The applicant considered the components that support intended functions within the scope of license renewal and screened to determine whether an AMR was required. During this stage of the scoping methodology, the applicant considered the following three groups of SCs: (1) mechanical, (2) structural, and (3) electrical.

Commodity Groups Scoping. In LRA Sections 2.1.2.2.1 and 2.1.2.3.1, the applicant discussed the application of commodity group scoping to structural and electrical SCs.

Insulation. In LRA Section 2.1.2.1.1, the applicant stated that thermal insulation was credited for various applications wherever in-scope piping or structures are located and was included within the scope of license renewal. Thermal insulation was evaluated as a bulk structural commodity.

Consumables. In LRA Section 2.1.2.4, the applicant discussed the considerations of consumables included within the scope of license renewal. The applicant used the guidance found in SRP-LR Table 2.1-3 to categorize and evaluate consumables, and for purposes of license renewal, divided them into the following groups: (a) packing, gaskets, component seals, and O-rings; (b) structural sealants; (c) oil, grease, and component filters; and (d) system filters, fire extinguishers, fire hoses, and air packs.

Group (a). Packing, gaskets, component mechanical seals, and O-rings are typically used to provide a leakproof seal when components are mechanically joined together. These items are commonly found in components such as valves, pumps, heat exchangers, ventilation units or ducts, and piping segments. Based on ANSI B31.1 standards and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section III, the subcomponents of these pressure retaining components are not pressure-retaining parts. Therefore, these subcomponents are not relied on to perform a pressure boundary intended function and were not subject to an AMR.

Group (b). Limited situations may exist where materials are important in maintaining the integrity of the components to which they are connected. These component types are subject to an AMR, and are included in the AMR of bulk commodities. Waterstops perform their functions without moving parts or change in configuration and are not typically replaced or accessible. They support a flood barrier intended function, since they form a tight seal against water intrusion under hydrostatic pressure in concrete construction joints. Structural sealants that provide pressure boundary, flood barrier, or fire barrier functions are also not typically replaced at a set schedule. These component types are subject to an AMR, and are included in the AMR bulk commodities.

Group (c). Oil, grease, and component filters have been treated as consumables because either (1) they are periodically replaced or (2) they are monitored and replaced based on condition, and are not subject to an AMR.

Group (d). Components such as system filters, fire hoses, fire extinguishers, and air packs are considered consumables and are routinely tested, inspected, and replaced when necessary.

Periodic inspection procedures specify the replacement criterion of these components that are routinely checked by tests or inspections. Therefore, while these consumables are within the scope of license renewal, they are not subject to an AMR.

2.1.4.4.2 Staff Evaluation

The staff reviewed the applicant's methodology for performing the scoping of plant systems and components to ensure it was consistent with the requirements of 10 CFR 54.4(a). The applicant's methodology used to determine the systems and components within the scope of license renewal was documented in implementing procedures and scoping results reports for mechanical systems. The scoping process defined the plant in terms of systems and structures. Specifically, the applicant's implementing procedures identified the systems and structures that are subject to 10 CFR 54.4 compliance review, described the processes for capturing the results of the review, and were used to determine whether the system or structure performed intended functions consistent with the criteria pursuant to 10 CFR 54.4(a). The applicant completed this process for all systems and structures to ensure that the entire plant was addressed.

The applicant documented the results of the plant-level scoping process in accordance with the guidance documents. Results were provided in the applicant's systems and structures documents and reports, which contained information including a description of the structure or system, a listing of functions performed by the system or structure, identification of intended functions, the 10 CFR 54.4(a) scoping requirements criteria met by the system or structure, references, and the basis for the classification of the system or structure intended functions. During the audit, the staff reviewed a sampling of the documents and reports and concludes that the applicant's scoping results contained an appropriate level of detail documenting the scoping process.

2.1.4.4.3 Conclusion

Based on its review of the LRA, scoping and screening implementation procedures, and a sampling of system scoping results during the audit, the staff concludes that the applicant's methodology identifies systems, structures, component types, and commodity groups within the scope of license renewal and their intended functions in accordance with the requirements of 10 CFR 54.4 and; therefore, is acceptable.

2.1.4.5 Mechanical Scoping

2.1.4.5.1 Summary of Technical Information in the Application

In addition to the information previously discussed in SER Section 2.1.4.4.1, in LRA Section 2.1.2.1, the applicant stated that for the mechanical scoping effort, summary-level boundary descriptions were developed, along with a set of license renewal mechanical boundary drawings. The applicant developed the mechanical boundary drawings from the Units 1 and 2 P&IDs, and identified mechanical components within the scope of license renewal in accordance 10 CFR 54.4(a)(1), (a)(2) and (a)(3) by highlighting and color-coding. The applicant clearly delineated end points for the portions within the scope of license renewal.

2.1.4.5.2 Staff Evaluation

The staff evaluated LRA Section 2.1.2.1 and the guidance in the applicant's implementing documents and reports to perform the review of mechanical scoping process. The project documents and reports provided instructions for identifying the evaluation boundaries. The staff required an understanding of system operations in support of intended functions in order to determine the mechanical system evaluation boundary.

This process was based on the review of information in the applicant's equipment data base, UFSAR, SERs, maintenance rule, DBDs, plant engineering drawings, piping calculations, plant operating manuals and procedures, emergency operating procedures, and docketed correspondence. The applicant documented evaluation boundaries for mechanical systems on license renewal boundary drawings that were created by highlighting and color-coding mechanical P&IDs to indicate the components within the scope of license renewal. The staff reviewed components within the evaluation boundary to determine whether they perform an intended function.

The applicant established intended functions based on whether a particular function of a component was necessary to support the system functions that met the scoping criteria.

The staff reviewed the implementation guidance and the CLB documents associated with mechanical system scoping, and found that the guidance and CLB source information noted above were acceptable in identifying mechanical components and support structures in mechanical systems that are within the scope of license renewal. The staff conducted detailed discussions with the applicant's license renewal project management personnel and reviewed documentation pertinent to the scoping process. The staff assessed whether the applicant had appropriately applied the scoping methodology outlined in the LRA and implementation procedures and whether the scoping results were consistent with CLB requirements.

The staff determined that the applicant's proceduralized methodology was consistent with the description provided in LRA Section 2.1 and the guidance contained in SRP-LR Section 2.1, and was adequately implemented.

The staff reviewed the applicant's methodology for identifying main steam and RHR mechanical component types that meet the scoping criteria as defined in the Rule. The staff also reviewed the applicant's scoping methodology implementation procedures and discussed the methodology and results with the applicant. The staff verified that the applicant has identified and used pertinent engineering and licensing information in order to determine the main steam and RHR mechanical component types required to be within the scope of license renewal. As part of the review process, the staff evaluated each system intended function that the applicant has identified for the main steam and RHRs, the basis for inclusion of the intended function, and the process used to identify each of the system component types. The staff verified that the applicant has identified, highlighted, and color-coded system P&IDs to develop the license renewal boundaries in accordance with the procedural guidance. The applicant was knowledgeable about the process and conventions for establishing boundaries as defined in the license renewal implementation procedures. Additionally, the staff verified that the applicant had independently verified the results in accordance with the governing procedures. Specifically, other license renewal personnel knowledgeable about the system had independently reviewed the marked-up drawings to ensure accurate identification of system intended functions. The

applicant performed additional cross-discipline verification and independent reviews of the resultant highlighted drawings, before final approval of the scoping effort.

2.1.4.5.3 Conclusion

Based on its review of the LRA, scoping implementation procedures, and the sample system review and discussions with the applicant, the staff concludes that the applicant's methodology for identifying mechanical systems within the scope of license renewal is in accordance with the requirements of 10 CFR 54.4 and; therefore, is acceptable.

2.1.4.6 Structural Scoping

2.1.4.6.1 Summary of Technical Information in the Application

In addition to the information previously discussed in LRA Section 2.1.4.4.1, in LRA Section 2.1.2.2, the applicant stated that for the structural scoping effort, the structures were determined to be within the scope of license renewal through a review of information in the UFSAR, SERs, maintenance rule, DBDs, plant engineering drawings, piping calculations, plant operating manuals and procedures, emergency operating procedures, and docketed correspondence. The applicant identified the structural SSCs intended functions and highlighted on layout drawings, those structures it determined to be within the scope of license renewal.

2.1.4.6.2 Staff Evaluation

The staff reviewed the applicant's approach for identifying structures relied upon to perform the functions pursuant to 10 CFR 54.4(a). As part of this review, the staff discussed the methodology with the applicant, reviewed the documentation developed to support the review, and evaluated the scoping results for several structures that the applicant has identified as within the scope of license renewal. The applicant identified and developed a list of plant structures and their intended functions through a review of information in the UFSAR, SERs, maintenance rule, DBDs, plant engineering drawings, piping calculations, plant operating manuals and procedures, emergency operating procedures, and docketed correspondence. Each structure was evaluated against the criteria pursuant to 10 CFR 54.4 (a)(1), (a)(2) and (a)(3).

The staff reviewed selected portions of the UFSAR, maintenance rule documents, design criteria, structural drawings, implementing procedures, and selected AMR reports to verify the adequacy of the applicant's methodology. In addition, the staff reviewed the scoping results, including information contained in the source documentation for the TB and the main intake structure to verify that application of the methodology would provide the results as documented in the LRA. The staff reviewed the applicant's methodology for identifying structures meeting the scoping criteria as defined in the Rule. The staff also reviewed the scoping methodology implementation procedures and discussed the methodology and results with the applicant. The staff verified that the applicant has identified and used pertinent engineering and licensing information in order to determine the TB and the main intake components required to be within the scope of license renewal. As part of the review process, the staff evaluated the intended functions identified for the TB and the main intake structure and the components, the basis for inclusion of the intended function, and the process the applicant used to identify each of the component types.

2.1.4.6.3 Conclusion

Based on its review of the LRA, scoping implementation procedures, and a sampling review of structural scoping results, the staff concludes that the applicant's methodology for identification of the structures within the scope of license renewal is in accordance with the requirements of 10 CFR 54.4 and; therefore, is acceptable.

2.1.4.7 Electrical Scoping

2.1.4.7.1 Summary of Technical Information in the Application

In LRA Section 2.1.2, the applicant stated that the scoping process for electrical and I&C systems differed from that applied to mechanical systems and structures. Plant systems with electrical and I&C components are within the scope of license renewal regardless of the intended function of the system, which is the result of an "encompassing" or "bounding" review for electrical components. Electrical and I&C components in mechanical systems were included in the evaluation of electrical components. In LRA Section 2.5, the applicant stated that the electrical and I&C IPA began by grouping the total population of components into commodity groups.

The commodity groups include similar electrical and I&C components with common characteristics. Component level intended functions of the commodity groups were identified. During the IPA screening, some commodity groups were removed from further review.

2.1.4.7.2 Staff Evaluation

The staff evaluated LRA Sections 2.1.2 and 2.5, and the applicants implementing procedures and AMR reports that governed the electrical scoping methodology. The applicant reviewed the electrical and I&C systems in accordance with the requirements of 10 CFR 54.4 and determined which systems should be included within the scope of license renewal. During the scoping process, the applicant used the UFSAR, SERs, maintenance rule information, DBDs, plant engineering drawings, plant operating manuals and procedures, emergency operating procedures, and docketed correspondence.

All electrical and I&C components contained in plant systems and electrical systems contained in mechanical or structural systems were included within the scope of license renewal.

The applicant reviewed fuse-holders using the plant fuse documentation and drawings. The applicant reviewed the application of tie-wraps to determine whether credit had been taken in the CLB for tie-wrap use or whether nonsafety-related tie-wraps could affect a safety-related function, but did not identify any tie-wraps that should be included within the scope of license renewal. The staff reviewed selected portions of the data sources and selected several examples of components for which the applicant demonstrated the process used to determine electrical components were within the scope of license renewal.

2.1.4.7.3 Conclusion

Based on its review of the LRA, scoping implementation procedures, and a sampling review of electrical scoping results, the staff concludes that the applicant's methodology for identification

of electrical components within the scope of license renewal is in accordance with the requirements of 10 CFR 54.4 and; therefore, is acceptable.

2.1.4.8 Scoping Methodology Conclusion

Based on its review of the LRA and the scoping implementation procedures, the staff determines that the applicant's scoping methodology was consistent with the guidance contained in the SRP-LR and identified those SSCs (a) that are safety-related, (b) whose failure could affect safety-related functions, and (c) that are necessary to demonstrate compliance with NRC regulations for fire protection, EQ, PTS ATWS, and SBO. The staff concludes that the applicant's methodology is consistent with the requirements of 10 CFR 54.4(a) and; therefore, is acceptable.

2.1.5 Screening Methodology

2.1.5.1 General Screening Methodology

After identifying systems and structures within the scope of license renewal, the applicant implemented a process for identifying SCs subject to an AMR, in accordance with 10 CFR 54.21.

2.1.5.1.1 Summary of Technical Information in the Application

In LRA Section 2.1.2, the applicant discussed the process for determining which components and structural elements require an AMR. Screening identifies SCs, within the scope of license renewal that perform an intended function as described in 10 CFR 54.4, without moving parts or without a change in configuration or properties, and that are not subject to replacement based on a qualified life or specified time period. The screening process is as follows:

(1) Determine the SCs subject to an AMR by determining the system evaluation boundaries, which define those portions of the mechanical system that are necessary to ensure that the intended functions of the system will be performed.

(2) Establish system scoping boundaries which are depicted on license renewal drawings by highlighting. Highlighted components perform functions that correspond to the functions specified in 10 CFR 54.4(a)(1), (a)(2) or (a)(3).

(3) Identify components that are passive and long-lived and subject to an AMR.

2.1.5.1.2 Staff Evaluation

Pursuant to 10 CFR 54.21, each LRA must contain an IPA that identifies SCs within the scope of license renewal and subject to an AMR. The IPA must identify components that perform an intended function without moving parts or a change in configuration or properties (passive), as well as components that are not subject to periodic replacement based on a qualified life or specified time period (long-lived). The IPA includes a description and justification of the methodology used to determine the passive and long-lived SCs, and a demonstration that the effects of aging on those SCs will be adequately managed so that the intended function(s) will

be maintained under all design conditions imposed by the plant-specific CLB, for the period of extended operation.

The staff reviewed the methodology used by the applicant to determine whether mechanical and structural component types and electrical commodity groups within the scope of license renewal should be subject to an AMR. The applicant implemented a process for determining which SCs were subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1). In LRA Section 2.1.2, the applicant discussed these screening activities as they relate to the component types and commodity groups within the scope of license renewal.

The screening process evaluated the component types and commodity groups included within the scope of license renewal, to determine which ones were passive and long-lived and therefore, subject to an AMR. The staff reviewed LRA Sections 2.3, 2.4 and 2.5 that provide the results of the process the applicant used to identify component types and commodity groups subject to an AMR. The staff also reviewed the applicant's screening results reports for main steam, the RHR, the TB and the main intake structure.

The applicant provided the staff with a detailed discussion of the processes used for each discipline and provided administrative documentation that described the screening methodology. Specific methodology for mechanical, electrical, and structural is discussed below.

2.1.5.1.3 Conclusion

Based on its review of the LRA, the screening implementation procedures and a sampling of screening results, the staff concludes that the applicant's screening methodology was consistent with the guidance contained in the SRP-LR and was capable of identifying passive, long-lived components within the scope of license renewal that are subject to an AMR. The staff determines that the applicant's process for identifying which component types and commodity groups are subject to an AMR is consistent with the requirements of 10 CFR 54.21 and; therefore, is acceptable.

2.1.5.2 Mechanical Component Screening

2.1.5.2.1 Summary of Technical Information in the Application

In LRA Section 2.1.2.1, the applicant discussed the screening methodology for identifying passive and long-lived mechanical components and their support structures that are subject to an AMR. The applicant prepared LRA drawings to indicate portions of systems that support system intended functions within the scope of license renewal. For mechanical systems, the applicant used a systematic process to identify the components that require an AMR that includes (a) identifying the in-scope SCs and associated component types using the license renewal mechanical boundary information and drawings created during the scoping process and (b) reviewing the components within the boundary to determine whether the passive, long-lived component's intended functions supported the system intended function. The components that contribute to the performance of a system intended function, perform their function without moving parts and without a change in configuration or properties, and are not subject to replacement based on a qualified life or specified time period, were subject to an AMR.

2.1.5.2.2 Staff Evaluation

The staff evaluated the mechanical screening methodology discussed and documented in LRA Section 2.1.2.1, the implementing guidance documents, the AMR reports, and the LRA drawings. The mechanical system screening process began with the results from the scoping process. The applicant reviewed each system evaluation boundary as illustrated on P&IDs to identify passive and long-lived components that perform or support an intended function and were determined to be subject to an AMR. The results of the review are documented in the AMR reports that contain information such as the information sources reviewed and the system intended functions.

The staff reviewed the results of the boundary evaluations and discussed the process with the applicant. The staff verified that mechanical system evaluation boundaries were established for each system within the scope of license renewal and that the boundaries were determined by mapping the system intended function boundary onto P&IDs. The applicant reviewed the components within the system intended function boundary to determine whether the component supported the system intended function. Those components that supported the system intended function were reviewed to determine whether the component was passive and long-lived and therefore, subject an AMR.

The staff reviewed selected portions of the equipment database, design criteria documents, the UFSAR, plant drawings, maintenance rule scoping documents, and selected AMR reports.

The staff conducted detailed discussions with the applicant's license renewal team and reviewed documentation pertinent to the screening process.

The staff assessed whether the mechanical screening methodology, outlined in the LRA and procedures, was appropriately implemented and whether the scoping results were consistent with CLB requirements. The staff also reviewed the mechanical screening results for the main steam and RHRs to verify proper implementation of the screening process. Based on these audit activities, the staff did not identify any discrepancies between the methodology documented and the implementation results.

2.1.5.2.3 Conclusion

Based on its review of the LRA, the screening implementation procedures, and a sample of the main steam and the RHR screening results, the staff concludes that the applicant's mechanical component screening methodology is consistent with SRP-LR guidance. The staff concludes that the applicant's methodology for identification of passive, long-lived mechanical components within the scope of license renewal and subject to an AMR is in accordance with the requirements of 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.1.5.3 Structural Component Screening

2.1.5.3.1 Summary of Technical Information in the Application

In LRA Section 2.1.2.2, the applicant stated that for each structure within the scope of license renewal, the structural components and commodities were evaluated to determine those subject to an AMR. This evaluation (screening process) for structural components and commodities involved a review of the UFSAR, DBDs, design drawings, general arrangement drawings, and

penetration drawings, to identify specific structural components and commodities that make up the structure. Since structures are inherently passive, and with few exceptions are long-lived, the screening of structural components and commodities was based primarily on whether they perform an intended function.

The applicant stated that structural components and commodities, unlike mechanical components, often have no unique identifiers. Therefore, grouping structural components and commodities based on materials of construction provided a practical means of categorizing them for AMRs. The applicant categorized structural components and commodities by groups based on materials of construction. Commodity groups were subdivided into discrete structural component types based on design, since component types may have different intended functions as defined pursuant to 10 CFR 54.4(a).

2.1.5.3.2 Staff Evaluation

The staff reviewed the applicant's methodology for identifying structural components that are subject to an AMR as required in 10 CFR 54.21(a)(1). As part of this review, the staff discussed the methodology with the applicant, reviewed the documentation developed to support the activity, and evaluated the screening results for several structures that the applicant has identified as within the scope of license renewal.

The staff reviewed the applicant's methodology used for structural screening described in LRA Section 2.1.2.2, and in the applicants implementing guidance and AMR reports. The applicant performed the screening review in accordance with the implementation guidance and captured pertinent structure design information, component, materials, environments, and aging effects.

The staff verified that the applicant had determined that structures are inherently passive and long-lived, such that the screening of structural components and commodities was based primarily on whether they perform an intended function. Structural components were grouped as commodities based on materials of construction. The primary task performed by the applicant during the screening process was to evaluate structural components to identify intended functions as they relate to license renewal. The applicant provided the staff with a detailed discussion that described the screening methodology, as well as the screening reports for a selected group of structures.

The staff reviewed selected portions of the UFSAR, DBDs, design drawings, general arrangement drawings, and penetration drawings, implementing procedures and selected AMR reports. The staff conducted detailed discussions with the applicant's license renewal team and reviewed documentation pertinent to the screening process. The staff assessed whether the screening methodology outlined in the LRA and procedures was appropriately implemented and whether the scoping results were consistent with CLB requirements. The staff also reviewed structural screening results for the TB and the main intake structure to verify proper implementation of the screening process. Based on these audit activities, the staff did not identify any discrepancies between the methodology documented and the implementation results.

2.1.5.3.3 Conclusion

Based on its review of information contained in the LRA, the applicant's detailed screening implementation procedures, and a sampling review of structural screening results, the staff

concludes that the applicant's methodology for identification of structural components within the scope of license renewal and subject to an AMR is in accordance with the requirements of 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.1.5.4 Electrical Component Screening

2.1.5.4.1 Summary of Technical Information in the Application

In LRA Section 2.1.2.3, the applicant stated that active components for Units 1 and 2 are not subject to an AMR, pursuant to 10 CFR 54.21(a)(1)(i). The ability of active components (*e.g.*, transformers, breakers, relays, or switches) to perform their intended functions is assured through condition and performance monitoring in accordance with the maintenance rule. Electrical cables and connections located inside active component enclosures are considered part of the active component, and are inspected and maintained along with the other subcomponents and piece-parts; therefore, these cables, connections, and other subcomponents are not subject to an AMR. The electrical commodity groups for Units 1 and 2 were identified and cross-referenced to the appropriate NEI 95-10 commodity, which identified the passive commodity groups.

Two passive electrical and I&C commodity groups that meet the 10 CFR 54.21(a)(1)(i) criterion (i.e., components that perform an intended function without moving parts or without a change in configuration) were identified:

- High-voltage insulators
- Cables and connections, bus, electrical portions of electrical and I&C penetration assemblies, fuse holders outside of cabinets of active electrical structures or components

2.1.5.4.2 Staff Evaluation

The staff reviewed the applicant's methodology used for electrical screening in LRA Sections 2.1.2.3 and the applicant's implementation procedures and AMR reports.

The applicant used the screening process described in these documents to identify the electrical commodity groups subject to AMR. The applicant used the information contained in NEI 95-10, plant documents and drawings and the EQ master list as data sources to identify the electrical and I&C components.

The applicant identified two commodity groups which were determined to meet the passive criteria in accordance with NEI 95-10. The applicant evaluated the identified, passive commodities to determine whether they were subject to replacement based on a qualified life or specified time period (short-lived), or not subject to replacement based on a qualified life or specified time period (long-lived). The remaining passive, long lived components were determined to be subject to an AMR. The staff reviewed the screening of selected components to verify the correct implementation of the methodology.

2.1.5.4.3 Conclusion

Based on its review of the LRA, procedures, electrical drawings, and a sample of the results of the screening methodology, the staff determines that the applicant's methodology was consistent with the description provided in LRA and the applicant's implementing procedures. Based on its review of information contained in the LRA, the applicant's screening implementation procedures, and a sampling review of electrical screening results, the staff concludes that the applicant's methodology for identification of electrical commodity groups within the scope of license renewal and subject to an AMR is in accordance with the requirements of 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.1.5.5 Conclusion for Screening Methodology

Based on its review of the LRA, the screening implementation procedures, discussions with the applicant's staff, and a sample review of screening results, the staff determines that the applicant's screening methodology was consistent with the guidance contained in the SRP-LR and identified those passive, long-lived components within the scope of license renewal that are subject to an AMR. The staff concludes that the applicant's methodology is consistent with the requirements of 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.1.6 Summary of Evaluation Findings

The staff review of the information presented in LRA Section 2.1, the supporting information in the scoping and screening implementation procedures and reports, the information presented during the scoping and screening methodology audit, and the applicant's responses to the staff's RAIs dated April 3, 2008, formed the basis of the staff's determination.

The staff verified that the applicant's scoping and screening methodology was consistent with the requirements of the Rule. From this review, the staff concludes that the applicant's methodology for identifying SSCs within the scope of license renewal and SCs requiring an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.2 Plant-Level Scoping Results

2.2.1 Introduction

In LRA Section 2.1, the applicant described its methodology for identifying systems, SSCs within the scope of license renewal and subject to an AMR. The applicant applied the scoping methodology to determine which systems and structures must be included within the scope of license renewal as required by 10 CFR 54.4(a). The applicant provided the results of its review in LRA Section 2.2.

The staff reviewed the applicant's plant-level scoping results to determine whether the applicant had properly identified SSCs belonging to the following groups: (1) safety-related SSCs which are relied upon to remain functional during and following DBEs, as required by 10 CFR 54.4(a)(1); (2) all nonsafety-related SSCs whose failure could prevent satisfactory

accomplishment of any of the functions pursuant to 10 CFR 54.4(a)(1) (i), (ii), or (iii), as required by 10 CFR 54.4(a)(2); and (3) all SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with other NRC regulations for fire protection, EQ, PTS, ATWS, and SBO, as required by 10 CFR 54.4(a)(3).

2.2.2 Summary of Technical Information in the Application

In LRA Tables 2.2-1, 2.2-3 and 2.2-4, the applicant listed plant mechanical systems, structures, and electrical and I&C systems within the scope of license renewal. In LRA Tables 2.2-2 and 2.2-5, the applicant listed the plant mechanical systems and structures, respectively that are not within the scope of license renewal. Systems and structures that only exist at one unit are marked in the tables, as appropriate. Based on the DBEs considered in the plant's CLB, other CLB information relating to nonsafety-related systems and structures, and certain regulated events, the applicant identified plant-level systems and structures within the scope of license renewal as defined by 10 CFR 54.4.

In LRA Section 2.1.1.2, the applicant described the license renewal scoping methodology used in identifying applicable systems and structures for spatial interactions. The applicant evaluated non-connected, nonsafety-related systems for their potential to adversely affect safety-related systems and structures. The applicant then included nonsafety-related systems with the potential to adversely affect safety-related systems and structures within the scope of license renewal to protect safety-related systems and structures from the consequences of failures of the nonsafety-related systems.

2.2.3 Staff Evaluation

In LRA Section 2.1, the applicant described its methodology for identifying systems and structures within the scope of license renewal and subject to an AMR. The staff reviewed the scoping and screening methodology and provides its evaluation in SER Section 2.1. To verify that the applicant properly implemented its methodology, the staff focused its review on the implementation results shown in LRA Tables 2.2-1, 2.2-2, 2.2-3, 2.2-4, and 2.2-5 to confirm that there were no omissions of plant-level systems and structures required to be included within the scope of license renewal in accordance with 10 CFR 54.4.

The staff determined whether the applicant properly identified the systems and structures within the scope of license renewal in accordance with 10 CFR 54.4. The staff reviewed selected systems and structures that the applicant did not identify as within the scope of license renewal to determine whether these excluded systems and structures perform any intended functions requiring their inclusion within the scope of license renewal. The staff's review of the applicant's implementation was conducted in accordance with the guidance in SRP-LR Section 2.2.

The staff reviewed LRA Section 2.1.1.2, Application of Criterion for Nonsafety-Related SSCs Whose Failure Could Prevent the Accomplishment of Safety Functions, and the FSAR using the evaluation methodology described in SER Section 2.1 and the guidance in SRP-LR Section 2.1. The staff reviewed sections of the FSAR, based on the systems and structures listed in LRA Tables 2.2-1, 2.2-2, 2.2-3, 2.2-4, and 2.2-5, to determine if there were any systems or structures that may have intended functions within the scope of license renewal, as defined by 10 CFR 54.4, but were omitted from the scope of license renewal.

During its review, the staff evaluated the system functions described in the LRA and FSAR to verify that the applicant did not omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant did not omit any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

During the review of LRA Section 2.2, the staff identified areas in which additional information was necessary to complete the review of the applicant's plant-level scoping results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.2-1, dated April 17, 2008, the staff noted that in LRA Table 2.2-2, the applicant identified the Unit 1 area ventilation systems - auxiliary building, as not within the scope of license renewal. However, the UFSAR for BVPS states that the Unit 1 area ventilation systems – auxiliary building, performs the following two functions. First, the Unit 1 area ventilation systems – auxiliary building, use automatic dampers contained in the system to divert the exhaust air stream to one of the supplementary leak collection and release system filter banks upon a high-high radiation alarm. Second, the charging pump cubicles' ventilation subsystem is relied upon to provide a level of fire protection equivalent to 10 CFR Part 50 Appendix R, Section III.G.2. The staff requested that the applicant explain why the Unit 1 area ventilation systems – auxiliary building are not within the scope of license renewal pursuant to criterion in 10 CFR 54.4(a)(1)(iii), for prevention or mitigation of the consequences of accidents that could result in potential offsite exposure in excess of limits. The staff also requested that the applicant explain why the portions of the system necessary for fire protection regulations identified in the other UFSAR function, were not included within the scope as required by 10 CFR 54.4(a)(3).

In its response to RAI 2.2-1, dated May 19, 2008, the applicant addressed both issues concerning the UFSAR functions of the BVPS Unit 1 area ventilation systems - auxiliary building. First, in regards to the automatic dampers the applicant stated:

> The diversion of the Beaver Valley Power Station (BVPS) Unit 1 Auxiliary Building ventilation exhaust to and its filtration by the Supplementary Leak Collection and Release System (SLCRS) upon high-high radiation, is described in, but is not credited by the Unit 1 Updated Final Safety Analysis Report (UFSAR), Section 9.13.2 as a safety-related function, and is not required to limit offsite doses to within limits.

The applicant cited other UFSAR references for Unit 1 that clarify that the diversion function is not required to limit offsite doses. The applicant stated that the supplementary leak collection and release system does not rely on the auxiliary building ventilation exhaust diversion function. Therefore, the diversion function of the area ventilation systems - auxiliary building, does not meet the requirements of 10 CFR 54.4(a)(1)(iii); however, the auxiliary building ventilation ductwork that is attached to the supplementary leak collection and release system ventilation ductwork is included within scope of license renewal for structural integrity pursuant to 10 CFR 54.4(a)(2). The ductwork is evaluated under the supplementary leak collection and release system for its function in accordance with 10 CFR 54.4(a)(2). Consequently, the applicant concluded that the Unit 1 area ventilation systems - auxiliary building, does not perform a diversion function requiring it to be within the scope of license renewal pursuant to 10 CFR 54.4(a)(1).

Secondly, in regards to the Unit 1 charging pump cubicle ventilation subsystem used to meet 10 CFR Part 50, Appendix R, Section III.G.2, the applicant explained that post-fire ventilation subsystem in the charging pump cubicles that is credited to achieve safe-shutdown is considered to be part of the supplementary leak collection and release system.

The charging pump cubicle ventilation provided by the supplementary leak collection and release system is listed in LRA Section 2.3.3.32 as within the scope of license renewal based upon its fire protection intended function, as required by 10 CFR 54.4(a)(3). The applicant pointed out that the charging pump cubicle ventilation is shown as in-scope on LR Drawing 1-16-1 (grids E-1 and F-1) and in LRA Section 2.3.3.32, and it includes the 10 CFR 54.4(a)(3) function for ventilation of the charging pump cubicles.

Based on its review, the staff finds the applicant's response to RAI 2.2-1 acceptable because the applicant has provided sufficient supporting documentation that clarified that the Unit 1 auxiliary building ventilation exhaust diversion through the supplementary leak collection and release system filter banks on high-high radiation is not credited to limit offsite exposure in accordance with 10 CFR 54.4(a)(1)(iii); therefore, it is not required to be included within the scope of license renewal. Further, the applicant clarified that the charging pump cubicles' ventilation subsystem is within scope and is evaluated within the supplementary leak collection and release system as described in LRA Section 2.3.3.32. Therefore, the staff's concern described in RAI 2.2-1 is resolved.

In RAI 2.2-2, dated April 17, 2008, the staff noted that in LRA Table 2.2-2, the applicant identified the emergency response facility (ERF) FPS as a mechanical system not within the scope of license renewal. The ERF FPS is located, in part, within the ERF diesel generator building structure. In LRA Sections 2.4.11 and 2.4.12, the applicant identifies the ERF diesel generator building structure and the ERF substation building structure as within the scope of license renewal pursuant to the criterion found in 10 CFR 54.4(a)(3), because they provide structural or functional support required to meet the NRC regulations for fire protection. The staff requested that the applicant explain why the ERF FPS was excluded as a mechanical plant system from the scope of license renewal.

In its response to RAI 2.2-2, dated May 19, 2008, the applicant stated:

> The Emergency Response Facility Substation (ERFS) System switchgear components in the ERFS building, and the Emergency Response Facility (ERF) diesel generator in the ERF Diesel Generator Building, support in-plant equipment used to establish safe shutdown during an in-plant fire by providing a non safety-related, independent source of power. The ERFS building and the ERF Diesel Generator Building contain fire detection and protection equipment that is not in the scope of license renewal because the ERFS System equipment has been evaluated in accordance with 10 CFR 50.48 and documented as not requiring fire protection. The basis for this conclusion is that a coincident ERFS fire and in-plant fire is not postulated. The ERFS is separated from the contiguous plant areas that could require its power to the extent that a fire in those plant areas could not spread to the ERFS and affect its ability to provide power to achieve or maintain safe-shutdown. Similarly, a fire in the ERFS resulting in loss of this non safety-related power source could not spread to in-plant areas where it could affect the ability to achieve and maintain safe-shutdown. Additionally, AMSAC equipment powered from the ERFS is

> credited for the mitigation of ATWS events; however, a coincident ERFS fire and an ATWS are not postulated. A fire in the ERFS would not affect the ability to achieve or maintain safe-shutdown and would not affect the ability to minimize and control a release of radioactivity. FirstEnergy Nuclear Operating Company (FENOC) has revised (change notices CN 08-059 and CN 08-060) the BVPS Unit 1 and Unit 2 UFSARs to include the ERFS and ERF Diesel Generator Buildings in Table 9.10-2 (Unit 1) and Table 9.5-12 (Unit 2), "Areas in which Fire Detection / Suppression is Outside the Scope of 50.48 Fire Protection." UFSAR changes are submitted to the NRC in accordance with 10 CFR 50.71(e).

Based on its review, the staff finds the applicant's response to RAI 2.2-2 acceptable, because the applicant has clarified that a coincident ERF substation and in-plant fire are not postulated because they are separated from each other and ERF substation system equipment is identified in the CLB as not requiring fire protection in accordance with 10 CFR 50.48. Therefore, the staff's concern described in RAI 2.2-2 is resolved.

In RAI 2.2-3, dated May 8, 2008, the staff noted that in LRA Table 2.2-5, the applicant identified the north pipe trench as a structure not within the scope of license renewal. On the LRA drawing showing plant structures, the applicant shows that the north pipe trench is adjacent to the valve pit structure, which is a structure that is within the scope of license renewal and is a safety-related, seismic Category I structure. The staff requested that the applicant verify that there are appropriate measures that prevent interaction between the north pipe trench and the valve pit structure, and that there is no piping between the north pipe trench and valve pit structure. In its response to RAI 2.2-3, dated June 9, 2008, the applicant stated:

> The North Pipe Trench has been added to the scope of License Renewal (see FirstEnergy Nuclear Operating Company (FENOC) Letter L-08-150 dated May 8, 2008, because the scoping endpoint of a non safety-related pipe directly attached to safety-related piping in the BVPS, Unit 2, valve pit, was determined to be located within the North Pipe Trench.
>
> (a) The safety-related BVPS Unit 2 Valve Pit is isolated from interaction with the nonsafety-related North Pipe Trench by a 4-inch shake space.
>
> (b) There is only one pipe that runs between the safety-related Unit 2 Valve Pit and the non safety-related North Pipe Trench, and the pipe is within scope for leakage boundary and structural integrity (attached) within the Valve Pit. The final support credited for the equivalent anchor associated with this pipe is located within the North Pipe Trench.

Based on its review, the staff finds the applicant's response to RAI 2.2-3 acceptable because the applicant has added the structure "north pipe trench" and applicable components to the scope of license renewal. Therefore, the staff's concern described in RAI 2.2-3 is resolved.

2.2.4 Conclusion

The staff review of LRA Section 2.2, the UFSAR, RAI responses, and applicable drawings found instances where the applicant omitted systems and structures that should have been included within the scope of license renewal. The applicant has satisfactorily resolved the issues as discussed in the preceding staff evaluation.

Based on its review, the staff concludes that the applicant has appropriately identified the systems and structures within the scope of license renewal as required by 10 CFR 54.4; therefore, it is acceptable.

2.3 Scoping and Screening Results: Mechanical Systems

This Section documents the staff's review of the applicant's scoping and screening results for mechanical systems. Specifically, this Section discusses:

- RV, RV internals, and reactor coolant system (RCS)
- engineered safety features (ESF)
- auxiliary systems
- steam and power conversion systems

In accordance with the requirement of 10 CFR 54.21(a)(1), the applicant must list passive, long-lived SCs within the scope of license renewal and subject to an AMR. To verify that the applicant properly implemented its methodology, the staff's review focused on the implementation results. This focus allowed the staff to confirm that there were no omissions of mechanical system components that meet the scoping criteria and are subject to an AMR.

The staff's evaluation of the information in the LRA for all mechanical systems used the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3. The objective was to determine whether the applicant has identified, in accordance with 10 CFR 54.4, components and supporting structures for mechanical systems that meet the license renewal scoping criteria. Similarly, the staff evaluated the applicant's screening results to verify that all passive, long-lived components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its scoping evaluation, the staff reviewed the applicable LRA sections and drawings, focusing on components that had not been identified as within the scope of license renewal. For each mechanical system, the staff reviewed relevant licensing basis documents (*e.g.*, UFSAR) to determine whether the applicant specified all intended functions and did not omit any components from the scope of license renewal with intended functions delineated pursuant to 10 CFR 54.4(a). The staff requested additional information to resolve any omissions or discrepancies identified. After its review of the scoping results, the staff evaluated the applicant's screening results. For those SCs with intended functions delineated pursuant to 10 CFR 54.4(a), the staff verified that the applicant properly screened out SCs that have functions performed with moving parts or a change in configuration or properties and SCs that are subject to replacement after a qualified life or specified time period, in accordance with 10 CFR 54.21(a)(1). For those meeting neither of these criteria, the staff confirmed that these remaining SCs received an AMR, as required by 10 CFR 54.21(a)(1). The staff requested additional information to resolve any omissions or discrepancies identified.

Two-Tier Scoping Review Process for BOP Systems

There are 48 mechanical systems within the scope of license renewal as documented in the LRA, among which, 34 are balance of plant (BOP) systems. These 34 systems include most of the auxiliary systems and all the steam and power conversion systems. The staff performed a two-tier scoping review for these BOP systems.

In the two-tier scoping review, the staff reviewed the LRA and UFSAR descriptions, focusing on the system intended function, to screen all the BOP systems into two groups: (1) a simplified review, Tier 1 and (2) a more detailed review, Tier 2. The staff selected systems for a detailed Tier 2 review based on systems having the following screening criteria:

- safety importance and/or risk significance
  - high safety significant systems
  - common cause failure of redundant trains
- operating experience indicating likely passive failures
- previous LRA review experience

Examples of the systems that typically have a high safety importance and/or risk significant are the emergency diesel generator (EDG) system, EDG support systems, and the emergency service water system (SWS). A drain system is an example of a system whose failure could result in common cause failure of redundant trains based upon providing flood protection. Main steam, feedwater, and SWSs are examples of systems with industry operating experience that would indicate likely passive failures. Examples of systems with omissions identified in previous LRA reviews include the spent fuel cooling system and makeup water sources to safety systems.

Tier 1 Review Results

The staff selected the following BOP systems for a simplified Tier 1 review, and determined no additional information was required to complete its review of the applicant's scoping and screening results:

- 2.3.3.10 domestic water system
- 2.3.3.20 gaseous waste disposal system
- 2.3.3.21 liquid waste disposal system
- 2.3.4.3 building services hot water heating system
- 2.3.4.4 condensate system (Unit 1 only)
- 2.3.4.5 glycol heating system (Unit 1 only)

For systems receiving a simplified Tier 1 review, the staff verified that the applicant included the intended function described in corresponding UFSAR sections in the applicable LRA section. Also, the staff verified that the applicant did not omit any component types that are typically found within the scope of license renewal.

The staff review of the LRA and the UFSAR for these systems did not find any omissions where the applicant failed to identify any SCs within the scope of license renewal as required by 10 CFR 54.4(a). In addition, the staff did not find any omissions where the applicant failed to identify any component types typically subject to an AMR.

Based on its review, the staff concludes for these Tier 1 BOP systems listed above, that the applicant has adequately identified the system components required to be included within the scope of license renewal in accordance with 10 CFR 54.4(a) and had identified those components subject to an AMR in accordance with 10 CFR 54.21(a)(1); therefore, are acceptable.

For the following system selected for a Tier 1 review, the staff required specific additional information in order to complete its review of the applicant's scoping and screening results:

- 2.3.3.21 liquid waste disposal system

The staff's evaluation and findings for this system is discussed in SER Section 2.3.3.

Tier 2 Review Results

For systems selected for a more detailed Tier 2 review, the staff reviewed the LRA, UFSAR, and detailed boundary drawings to determine whether the applicant failed to identify any components required to be included within the scope of license renewal and subject to an AMR. During its review, the staff used the system functions described in the LRA and UFSAR to review the detailed boundary drawings in order to verify that the applicant did not omit any components with intended functions pursuant to 10 CFR 54.4(a), from the scope of license renewal. The staff compared the components indentified as within scope of license renewal to the list of component types that the applicant indentified in the LRA section, in order to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with 10 CFR 54.21(a)(1).

A minimum of 50 percent of the BOP systems received a detailed Tier 2 review, as described below.

The staff performed a detailed Tier 2 review of the following BOP systems and required no specific additional information to complete its review of the applicant's scoping and screening results:

- 2.3.3.6 chilled water system
- 2.3.3.11 emergency diesel generators and air intake and exhaust system
- 2.3.3.13 emergency diesel generators - crankcase vacuum system
- 2.3.3.15 emergency diesel generators – lube oil system
- 2.3.3.24 post-design basis accident hydrogen control system
- 2.3.3.28 river water system (Unit 1 only)
- 2.3.4.2 auxiliary steam system
- 2.3.4.8 main turbine and condenser system
- 2.3.4.10 water treatment system

The staff reviewed the LRA, UFSAR, and the detailed boundary drawings for the systems described above to determine whether the applicant failed to identify any components that should have been included within the scope of license renewal and subject to an AMR. Based upon the system functions described in the LRA and UFSAR, the staff verified the applicant has not omitted from the scope of license renewal any components required to meet the intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed the components identified to be within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with 10 CFR 54.21.

For the systems identified above, the staff finds no omissions. Based on its review, the staff concludes that the applicant has adequately identified the system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1); therefore, they are acceptable.

The staff performed a detailed Tier 2 review of the following BOP systems and determined specific additional information was necessary to complete its review of the applicant's scoping and screening results:

- 2.3.3.4 building and yard drains system
- 2.3.3.7 compressed air system
- 2.3.3.12 emergency diesel generators - air start system
- 2.3.3.14 emergency diesel generators - fuel oil system
- 2.3.3.16 emergency diesel generators - water cooling system
- 2.3.3.17 emergency response facility substation system (common)
- 2.3.3.19 fuel pool cooling and purification system
- 2.3.3.22 post-accident sample system
- 2.3.3.25 radiation monitoring system
- 2.3.3.26 reactor plant sample system
- 2.3.3.27 reactor plant vents and drains
- 2.3.3.29 security diesel generator system (common)
- 2.3.3.30 service water system (Unit 2 only)
- 2.3.3.31 solid waste disposal system
- 2.3.3.32 supplementary leak collection and release system
- 2.3.4.1 auxiliary feedwater system
- 2.3.4.6 main feedwater system
- 2.3.4.7 main steam system
- 2.3.4.9 steam generator blowdown system

The staff's evaluation and findings for these systems are discussed in SER Sections 2.3.3 and 2.3.4.

2.3.1 Reactor Vessel, Internals, and Reactor Coolant System

In LRA Section 2.3.1, the applicant identified the RV, internals, and reactor coolant system SCs subject to an AMR for license renewal.

The applicant described the supporting SCs of the RV, internals, and reactor coolant system in the following LRA sections:

- 2.3.1.1 reactor vessel
- 2.3.1.2 reactor vessel internals
- 2.3.1.3 reactor coolant system

The staff's findings on review of LRA Sections 2.3.1.1 – 2.3.1.3 are in SER Sections 2.3.1.1 – 2.3.1.3, respectively.

2.3.1.1 Reactor Vessel

2.3.1.1.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.1, the applicant described the RV, a vertical, cylindrical pressure vessel with a welded hemispherical bottom head and a removable bolted, flanged, and gasketed

hemispherical upper closure head. The vessel contains the core, core support structures, control rods, and other vessel internals directly associated with the core.

Reactor coolant flows into and out of the RV through three inlet and three outlet nozzles spaced evenly around it. Pads on the bottoms of these six nozzles support the vessel. The RV closure head has penetrations for the control rod drive mechanisms and core instrumentation. The Unit 1 closure head was replaced during Refueling Outage 17 in the spring of 2006. The bottom head of the vessel has penetrations for the in-core instrumentation.

The RV internal surfaces in contact with primary coolant are clad with a weld overlay of stainless steel. The RV exterior is insulated with canned stainless steel reflective sheets (Units 1 and 2) and canned borated fiberglass (Unit 2 only).

The RV contains safety-related components relied upon to remain functional during and following DBEs. In addition, the RV performs functions that support PTS.

LRA Table 2.3.1-1 identifies RV component types within the scope of license renewal and subject to an AMR:

- bottom-mounted guide tube
- closure heat
- core support pad and core guide lug
- head penetration
- nozzle safe end and weld
- nozzle
- penetration
- refueling seal ledge ring
- vessel shell

The intended functions of the RV component types within the scope of license renewal include:

- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- support - structural, functional, or both - to maintain system functions

2.3.1.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.1 and UFSAR Section 4.2.2 for Unit 1 and UFSAR Section 5.3.3 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a).

The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.1.1.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the RV components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.1.2 Reactor Vessel Internals

2.3.1.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.2, the applicant described the RV internals, which consist of three major assemblies: (1) the lower core support structure (also known as the "lower internals"), (2) the upper core support structure (also known as the "upper internals"), and (3) the in-core instrumentation support structure (includes component parts of the "upper internals" or the "lower internals"). These assemblies support the core; align, guide, and limit movement of core components; direct coolant flow; and provide shielding.

The lower core support structure assembly consists of the core barrel, the core baffle, the lower core plate and support columns, the thermal shield or neutron shield pads, and the core support welded to the core barrel. A ledge in the RV supports the lower core support structure at its upper flange and a radial support system attached to the vessel wall restrains its lower end from transverse motion. Within the core barrel, an axial baffle and a lower core plate are attached to the core barrel wall and form the enclosure periphery of the assembled core. The lower core support structure and core barrel control and provide passageways for coolant flow. The lower core plate positioned at the bottom level of the core below the baffle plates supports and orients the fuel assemblies.

Unit 1 uses a one-piece thermal shield fixed to the core barrel at the top with rigid bolted connections. Rectangular specimen guides, welded to the outside of the thermal shield for insertion and irradiation of material samples during reactor operation, extend to the top of the thermal shield. Unit 2 uses a neutron shield pad assembly consisting of four pads bolted and pinned to the outside of the core barrel. Specimen guides, for insertion and irradiation of material surveillance samples during reactor operation, are attached to the outside of the pads.

The upper core support structure consists of the upper support assembly and the upper core plate, between which, are support columns and rod cluster control (RCC) guide tube assemblies. The support columns establishing the spacing between the upper support assembly and the upper core plate are fastened at the top and bottom to these plates. They transmit mechanical loadings between the upper support and upper core plate and serve as thermocouple passageways.

The RCC guide tube assemblies that shield and guide the control rod drive shafts and control rods assemblies are fastened to the upper support and oriented and supported by pins in the upper core plate. The upper guide tube attached to the upper support plate and guide tube also guides the control rod drive shafts.

The in-core instrumentation support structures consist of an upper system (components of which are parts of the "upper internals") to support and convey thermocouples penetrating the vessel through the head and a lower system (components of which are parts of the "lower internals") to support and convey flux thimbles penetrating through the bottom.

The upper system has instrumentation port columns, slip-connected to in-line columns fastened, in turn, to the upper support plate. The thermocouples, conveyed through these port columns and the upper support plate, are above their readout locations.

The lower in-core instrumentation support system uses RV bottom-mounted instrumentation columns (flux thimble guide tubes) which guide and protect the retractable, cold-worked stainless steel flux thimbles that are pushed upward into the reactor core. The thimbles, closed at the leading ends, are the pressure barrier between the reactor pressurized water and the containment atmosphere. All reactor vessel internals are removable for their inspection, and for inspection of the vessel internal surface .

The RV internals contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.3.1-2 identifies RV internals component types within the scope of license renewal and subject to an AMR:

- core baffle/former assembly
- core barrel assembly
- instrumentation support structure
- lower internals assembly
- rod cluster control guide tube assemblies
- upper internals assembly

The intended functions of the RV internals component types within the scope of license renewal include:

- control of flow distribution or direction
- shield to reduce neutron or gamma radiation fluence
- support - structural, functional, or both - to maintain system functions

2.3.1.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.2, UFSAR Section 3.2.2 for Unit 1, and UFSAR Section 3.9N.5 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that

the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.1.2.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

On the basis of its review, the staff concludes that the applicant has adequately identified the RV internals components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.1.3 Reactor Coolant System

2.3.1.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.3, the applicant described the RCS, which transfers heat from the reactor core to the steam generators, the steam from which, drives the turbine generator. The RCS consists of three similar heat-transfer loops connected in parallel to the RV. Each loop has an identical reactor coolant pump (RCP), inlet and outlet loop isolation valves, a steam generator, and piping to various auxiliary or safety systems. The system also has a pressurizer, connecting piping, pressurizer safety and relief valves, and pressurizer relief tank, all of which is necessary for operational pressure control.

Borated demineralized water circulates in the system as a neutron moderator and reflector, as a solvent for chemical shim control in the reactor core, and as a heat-transfer medium.

During normal operation, coolant exiting the core passes through tubes in the steam generator for heat removal by cooler secondary system water, which heats sufficiently to form a steam-water mixture. After leaving the steam generator, the reactor coolant flows into the RCP, discharges through a nozzle on the side of the pump, and enters the cold leg inlet nozzles of the RV to begin the thermal cycle again.

The pressurizer and pressure relief subsystem is connected to the RCS by a surge line on the loop "C" hot leg to accommodate reactor coolant volume changes due to temperature changes. The pressurizer and pressure relief subsystem maintains RCS pressure by electric heaters and prevents over-pressurization by water spray into the steam to condense it. RCS pressure also is maintained by actuation of power-operated relief valves and safety valves. The pressurizer has two spray lines, one from each of two separate cold leg sources, which sprays the pressurizer steam volume with reactor coolant to prevent pressure increases beyond the control setpoint.

Unit 1 also has a reactor coolant gas vent system (an RCS subsystem) designed to vent gases from the RV head or pressurizer steam space during post-accident situations, if large quantities of non-condensable gases collect in these high points. This system provides a vent path to the pressurizer relief tank or direct venting to containment atmosphere and also may be an alternate letdown path to support post-fire safe-shutdown. Unit 2 has a RV head vent system (an RCS

subsystem for license renewal evaluations) that removes noncondensable gases for additional RCS letdown capability.

The RCS system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the RCS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the RCS performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.1-3 identifies RCS component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose (Unit 2 only)
- heat exchanger (Unit 1 only)
- hydraulic isolator
- orifice
- piping
- pressurizer
- pressurizer relief tank
- reactor coolant pump
- steam generator
- thermal sleeve
- tubing
- valve body

The intended functions of the RCS component types within the scope of license renewal include:

- control of flow distribution or direction
- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- support - structural, functional, or both - to maintain system functions
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.1.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.3, UFSAR Section 4.2 for Unit 1, and UFSAR Section 5.1 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.1.3.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the RCS components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.2 Engineered Safety Features

LRA Section 2.3.2 identifies the ESFs SCs subject to an AMR for license renewal.

The applicant described the supporting SCs of the ESFs in the following LRA sections:

- 2.3.2.1 containment depressurization system
- 2.3.2.2 residual heat removal system
- 2.3.2.3 safety injection system

The staff's findings on review of LRA Sections 2.3.2.1 – 2.3.2.3 are in SER Sections 2.3.2.1 – 2.3.2.3, respectively.

2.3.2.1 Containment Depressurization System

2.3.2.1.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.1, the applicant described the containment depressurization system, which cools and depressurizes the containment and which can reduce and maintain containment pressure for an extended period of time after a DBA. The system also removes fission products from the containment environment following a primary system break.

The containment depressurization system consists of two subsystems; namely, the quench spray system and the recirculation spray system.

The quench spray system draws cold water from the refueling water storage tank (RWST), chemically treats the water, and sprays the containment. The system consists of two separate, parallel, 100-percent capacity trains, each with a quench spray pump discharging to spray headers located near the top of the reactor containment, piping, and valves. Sodium hydroxide solution added to the quench spray from the chemical addition tank improves removal of radioactive iodine from the containment atmosphere and controls containment sump pH.

The recirculation spray system for long-term cooling consists of four 50-percent capacity pumps which recirculate water from the containment sump through heat exchangers to spray containment after a containment isolation Phase B signal and low RWST level, which allows the containment sump to be filled by the quench spray system and primary plant leakage, makes adequate net positive suction head available for the pumps.

The water from the sump recirculates through recirculation spray heat exchangers for cooling by the river water (Unit 1) or service water (Unit 2) system. The cooled water then sprays the containment and the cycle repeats itself for an extended period.

The Unit 2 recirculation spray system also supplies water from the containment sump to the RCS and to the safety injection system (SIS) during the recirculation phase. The Unit 1 recirculation spray pumps can supply backup to the suction of the charging pumps in a failure of the low-head safety injection pumps. LRA Section 2.4.22 evaluates the containment sump as part of the reactor containment building.

The containment depressurization system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the containment depressurization system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the containment depressurization system performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.2-1 identifies containment depressurization system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- spray nozzle
- strainer body
- strainer element
- tank
- tubing
- valve body

The intended functions of the containment depressurization system component types within the scope of license renewal include:

- control of flow distribution or direction
- filtration
- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions

- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.2.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.1, UFSAR Section 6.4 for Unit 1, UFSAR Section 6.2.2 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a).
The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.2.1.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

On the basis of its review, the staff concludes that the applicant has adequately identified the containment depressurization system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.2.2 Residual Heat Removal System

2.3.2.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.2, the applicant described the RHR system, which transfers heat from the RCS to the primary plant component cooling water system (CWS), to reduce the reactor coolant temperature to the cold shutdown level, at a controlled rate during normal plant cooldown, and maintains this temperature until the plant starts up. The system also transfers refueling water from the refueling cavity and transfer canal to the RWST at the end of refueling operations.

The RHR system consists of two redundant subsystems, each with one pump and one heat exchanger, piping, and valves. During system operation, reactor coolant pumped from an RCS hot leg through the RHR heat exchangers (for cooling by primary plant component cooling water) returns to RCS cold leg connections via the SIS accumulator discharge piping.

The RHR system contains safety-related components relied upon to remain functional during and following DBEs.

The failure of nonsafety-related SSCs in the RHR system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the RHR system performs functions that support fire protection (Unit 2 only) and EQ.

LRA Table 2.3.2-2 identifies RHR system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- tubing
- valve body

The intended functions of the RHR system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.2.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.2, UFSAR Section 9.3 for Unit 1, and UFSAR Section 5.4.7 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.2.2.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In

addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the RHR system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.2.3 Safety Injection System

2.3.2.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.3, the applicant described the safety-related SIS, which provides emergency cooling to the reactor core and which consists primarily of pumps, tanks, valves, piping, and other components.
The SIS is described in two phases; namely, injection and recirculation. The injection phase provides emergency core cooling and additional negative reactivity immediately following actuation. The recirculation phase provides long-term post-accident cooling by recirculating water from the containment sump.

The principal components during the injection phase are accumulators, the charging/high-head safety injection pumps, and the low-head safety injection pumps. The accumulators are passive components consisting of tanks containing borated water with nitrogen gas overpressure. Each accumulator is connected to an RCS cold leg through check valves. During plant operation, RCS pressure is much higher than that in the accumulators, so the check valves remain closed. During an accident, the check valves open and the water in the accumulators flows into the RCS for rapid core flooding for large breaks. The charging/high-head safety injection pumps perform charging functions during normal plant operations. The safety injection function of these pumps is described here, but the pumps are evaluated for license renewal with the chemical and volume control system (CVCS). On a safety injection signal, these pumps provide high-pressure injection and add negative reactivity to the core. The safety injection signal diverts the suction of the high-head safety injection pumps from the volume control tank (VCT) to the RWST. The low-head safety injection pumps supply a high volume of water at low pressures. For large breaks, the system depressurizes the RCS and rapidly voids it of coolant. In this situation, the low-head safety injection pumps and the accumulators provide the high flow rate required to recover the exposed fuel quickly and limit possible core damage.

For Unit 1, when the transfer to recirculation signal is generated the low-head safety injection pump suction valves from the containment sump open. The suction of the charging/high head safety injection pumps shifts automatically from the RWST to the discharge header of the low-head safety injection pumps. The suctions of the low-head safety injection pumps and charging/high head safety injection pumps from the RWST close. This alignment recirculates water from the containment sump back to the RCS. If the low-head safety injection pumps fail during recirculation, the outside recirculation spray pumps can supply suction to the charging/high head safety injection pumps by manual valve alignment.

For Unit 2, upon transfer to recirculation mode, the recirculation spray pumps recycle the containment sump water back to the RCS, discharging through the low-head safety injection headers to the high-head safety injection pumps. The high-head safety injection pumps then pump water to the loops.

The SIS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the SIS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the SIS performs functions that support fire protection and EQ.

LRA Table 2.3.2-3 identifies SIS component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- tank
- tubing
- valve body

The intended functions of the SIS component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.2.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.3 and UFSAR Section 6.3 for Units 1 and 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.2.3.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components

subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the SIS components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3 Auxiliary Systems

In LRA Section 2.3.3, the applicant identified the auxiliary systems SCs subject to an AMR for license renewal. The applicant described the supporting SCs of the auxiliary systems in the following LRA sections:

- 2.3.3.1 Area Ventilation Systems – Control Areas
- 2.3.3.2 Area Ventilation Systems – Plant Areas
- 2.3.3.3 Boron Recovery and Primary Grade Water System
- 2.3.3.4 Building and Yards Drain System
- 2.3.3.5 Chemical and Volume Control System
- 2.3.3.6 Chilled Water System
- 2.3.3.7 Compressed Air System
- 2.3.3.8 Containment System
- 2.3.3.9 Containment Vacuum and Leak Monitoring System
- 2.3.3.10 Domestic Water System
- 2.3.3.11 Emergency Diesel Generators and Air Intake and Exhaust System
- 2.3.3.12 Emergency Diesel Generators - Air Start System
- 2.3.3.13 Emergency Diesel Generators – Crankcase Vacuum System
- 2.3.3.14 Emergency Diesel Generators – Fuel Oil System
- 2.3.3.15 Emergency Diesel Generators – Lube Oil System
- 2.3.3.16 Emergency Diesel Generators – Water Cooling System
- 2.3.3.17 Emergency Response Facility Substation System (common)
- 2.3.3.18 Fire Protection System
- 2.3.3.19 Fuel Pool Cooling and Purification System
- 2.3.3.20 Gaseous Waste Disposal System
- 2.3.3.21 Liquid Waste Disposal System
- 2.3.3.22 Post-Accident Sample System
- 2.3.3.23 Post-Design Basis Accident Hydrogen Control System
- 2.3.3.24 Primary Component and Neutron Shield Tank Cooling Water System
- 2.3.3.25 Radiation Monitoring System
- 2.3.3.26 Reactor Plant Sample System
- 2.3.3.27 Reactor Plant Vents and Drains System
- 2.3.3.28 River Water System (Unit 1 only)
- 2.3.3.29 Security Diesel System (common)
- 2.3.3.30 Service Water System (Unit 2 only)
- 2.3.3.31 Solid Waste Disposal System
- 2.3.3.32 Supplementary Leak Collection and Release System

The staff's evaluation of the following LRA Sections did not require additional information:

- 2.3.3.6 Chilled Water System
- 2.3.3.10 Domestic Water System
- 2.3.3.11 Emergency Diesel Generators and Air Intake and Exhaust System
- 2.3.3.13 Emergency Diesel Generators – Crankcase Vacuum System

- 2.3.3.15 Emergency Diesel Generators – Lube Oil System
- 2.3.3.20 Gaseous Waste Disposal System
- 2.3.3.24 Primary Component and Neutron Shield Tank Cooling Water System
- 2.3.3.28 River Water System (Unit 1 only)

The staff's findings of these above mentioned systems were discussed and dispositioned in SER Section 2.3. The remaining sections requiring additional information to complete the review of the applicant's scoping and screening results are discussed below.

2.3.3.1 Area Ventilation Systems - Control Areas

2.3.3.1.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.1, the applicant described the area ventilation systems - control areas, which cool, heat, ventilate, filter, pressurize, control humidity in, and remove smoke from the MCR area (common to Units 1 and 2) and other control building areas (Unit 2). Although the control boards are functionally and physically separate, Units 1 and 2 share a common control room. The control room areas of both units are open to each other and, therefore, within the same pressure boundary. The units share the emergency control room pressurization systems for use during accidents. Each unit has separate cooling and pressurization subsystems. The control area ventilation system has two separate control room cooling and ventilation systems at each unit with redundant air handling units, refrigeration condensing units, river water (Unit 1) or service water (Unit 2) cooling coils, temperature control air compressors and controls (Unit 1), fans, ductwork, and dampers.

In an accident, the control room emergency ventilation system pressurization system fans pressurize the control room with filtered air while the normal ventilation systems continue to operate in the 100-percent recirculation mode. Three control room emergency ventilation system subsystems serve the common control room. Any one of the three can pressurize the entire control room. Two are powered from Train A and Train B of Unit 2, respectively, the third is powered from either Train A or Train B of Unit 1.

The two control room emergency ventilation system subsystems powered from Unit 2 are fully automatic. Either of these subsystems can pressurize the control room with no operator actions. The subsystem powered from Unit 1 is not fully automatic. Its fan control switches are not maintained in the auto start position, and manual damper alignment is required. The Unit 1 subsystem is not credited by Unit 2.

Unit 2 has a separate control building air-conditioning subsystem that ventilates the control building external to the control room. The intake and exhaust fans and cooling coils for this subsystem are located in the equipment room of the auxiliary building. Self-contained breathing apparatus units and sufficient reserve air cylinders are available to support the minimum control room shift composition for at least five hours. Air cylinders from offsite locations may extend capacity beyond five hours. At Unit 2, miscellaneous backdraft dampers protect against over-pressurization following a carbon dioxide (CO_2) actuation from the FPS.

The area ventilation systems - control areas contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the area ventilation systems - control areas potentially could prevent the satisfactory accomplishment of

a safety-related function. In addition, the area ventilation systems - control areas performs functions that support fire protection and SBO.

LRA Table 2.3.3-1 identifies area ventilation systems - control areas component types within the scope of license renewal and subject to an AMR:

- air dryer
- bolting
- damper housing
- duct
- fan housing
- filter housing
- flexible connection
- heat exchanger
- heater housing
- isokinetic nozzle
- moisture separator
- piping
- tank
- tubing
- valve body

The intended functions of the area ventilation systems - control areas component types within the scope of license renewal include:

- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers).
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.1, UFSAR Section 9.13.4 for Unit 1, and UFSAR Section 9.4.1 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.1.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the area ventilation systems - control areas components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.2 Area Ventilation Systems - Plant Areas

2.3.3.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.2, the applicant described the area ventilation systems - plant areas, which ventilates and controls temperatures for plant areas other than the control room. Portions of some of these systems are safety-related. The systems primarily consist of air conditioning units, ducts, fans, filters, heat exchangers, piping, valves, dampers, controls, and instrumentation. Various systems ventilate areas or components as described in this section.

Each area serviced by this system typically has an air-handling unit which recirculates air to maintain the design condition temperature. The air-handling unit has cooling coils (and heating coils in some applications) that condition the air drawn through it. Chilled water (and hot water where applicable) systems supply the unit coils at Unit 1. Unit 2 systems use chilled water or service water as a cooling medium, with some units also using hot water heating coils. Some Unit 2 areas include condenser-type air conditioning units. The area ventilation systems-cooling subsystems cool the following areas:

- Unit 1 Main Steam Valve Area
- Unit 1 Safeguards Area
- Unit 1 Cable Vault Area
- Unit 1 Pipe Tunnel Area
- Unit 1 Fuel Building
- Unit 2 Main Steam Valve Area
- Unit 2 North Safeguards Area
- Unit 2 South Safeguards Area
- Unit 2 Cable Vault and Rod Control Area
- Unit 2 Pipe Tunnel Area
- Unit 2 Fuel Building
- Unit 2 Decontamination Building
- Unit 2 Motor Control Centers
- Unit 2 Alternate Shutdown Panel

Containment Air Recirculation Cooling. Bulk air cooling of the containment is accomplished by air recirculation cooling systems, with the recirculated air normally cooled by chilled water. Unit 1 can use river water and Unit 2 service water as a backup cooling medium. Cooled air discharges into common ductwork for the ventilated spaces.

Air leaving the ventilated spaces recirculates back to the supply fans via the annular space between the crane wall and containment outside wall.

Containment Iodine Filtration (called the containment atmosphere filtration at Unit 2). Use of the filtration system within the containment is at the discretion of the plant operator. The system is not credited for any safety-related function or regulated event.

Containment Purge Exhaust and Supply. During shutdown periods, containment purging ventilation is accomplished by an exhaust and supply system, which also functions as a heating and ventilation system during periods of maintenance. The purge system exhaust duct is aligned with the supplementary leak collection and release system. Ductwork for this function is evaluated in that system. Containment purge includes safety-related containment penetrations (Unit 2) but otherwise is not credited for any safety-related function or regulated event.

Control Rod Drive Mechanism Shroud Cooling. Cooling of the control rod drive mechanism shroud is by containment ambient air drawn through the shroud and ductwork to fans that discharge through component cooling water coil banks before returning the air to containment. Shroud cooling is not credited for any safety-related function or regulated event.

The Unit 1 auxiliary building ventilation system is not credited for any safety-related function or regulated event. The supplementary leak collection and release system performs the credited ventilation functions for the Unit 1 auxiliary building.

Unit 2 auxiliary building air handling units have preheat coils and reheat coils that use hot water as the heating medium, while cooling coils use chilled water as the cooling medium, and motor-driven fans. Ductwork supplies air supply to all levels. The system is designed on a once-through basis, except for some air recirculated from the auxiliary building equipment room. The emergency exhaust fan system, which consists of two axial flow exhaust fans, ductwork, and dampers, ventilates the charging pump cubicles and component cooling water pumps general area, if normal ventilation fails. The two filter exhaust fans of the supplementary leak collection and release system exhaust the air at a rate higher than the supply rate to maintain the buildings under a negative pressure.

Switchgear Ventilation. Air exhausted from switchgear areas by the switchgear exhaust fan passes in ducts through an air filter, then a bank of six chilled-water cooling coils, then to the suction side of the switchgear supply fan for distribution to the switchgear, rod control room, cable tray mezzanine, and battery rooms.

A closed chilled-water system cools the cooling coils. Chilled water pumps circulate the chilled water to the switchgear ventilation system chillers. The river water system supplies cooling water for the chillers.

Various Shops and Office Areas. Air-handling units supply a mixture of outdoor and recirculated conditioned air exhausted from the areas by return air fans. A portion of the exhaust goes to the atmosphere and the remainder returns to the air-handling units. Most areas are ventilated by roof, wall, or ducted fans that supply, exhaust, or combine these functions. Descriptions follow for some specific areas with unique system features.

Unit 1 Service Building. In addition to the switchgear cooling system, one of two redundant continuously-running emergency switchgear and battery room exhaust fans removes heated air

in emergency switchgear. In a loss of offsite power and loss of normal switchgear supply fan, one of two such redundant fans starts to supply outside air for heat removal from the emergency switchgear and battery rooms. These fans are safety-related.

Unit 2 Emergency Switchgear Area. The emergency switchgear area has two supply and two exhaust fans to remove heat. Both Train A fans and both Train B fans operate together. Either pair of fans handles all ventilation requirements, regulating temperature by modulating outdoor air, return air, and exhaust air dampers. These fans are safety-related.

Intake Structure. A Unit 1 fan supplies each pump cubicle. An additional fan is in the cubicle for the motor-driven fire pump. Each cubicle for a Unit 2 service water pump also has a Unit 2 fan. These fans supply a mixture of outdoor air and recirculated air to the cubicles. Outdoor air supplied to the four cubicles exhausts through vents in the upper Section of the cubicle to the building interior and to the atmosphere through exhaust roof hoods.

Unit 1 Diesel Generator Building. Each of the two diesel generator rooms has a ceiling-mounted propeller exhaust fan, which discharges room air outdoors to dissipate excess heat from equipment. Operation of either fan automatically opens its discharge damper and the outdoor air intake double damper in that diesel generator room. Starting of either diesel generator engine also opens its outdoor air intake double damper regardless of exhaust fan operation. At Unit 1, this outdoor air intake double damper supplies combustion air to and the diesel draws it from the room. The Unit 2 diesels, however, draw combustion air directly from outside.

The area ventilation systems - plant areas contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the area ventilation systems - plant areas potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the area ventilation systems - plant areas performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.3-2 identifies area ventilation systems - plant areas component types within the scope of license renewal and subject to an AMR:

- bolting
- damper housing
- drip pan
- duct
- fan housing
- filter housing
- flexible connection
- flexible hose
- heat exchanger (channel, plenum, shell, tube)
- isokinetic nozzle
- orifice
- piping
- piping (used as duct)
- valve body

The intended functions of the area ventilation systems - plant areas component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.2, UFSAR Sections 9.13.2, 9.13.5, and 9.13.6 for Unit 1 and UFSAR Sections 9.4.3 and 9.4.6 - 9.4.12 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.2, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, the staff issued RAIs concerning specific issues to determine whether the applicant has properly applied the scoping criteria pursuant to 10 CFR 54.4(a) and the screening criteria in accordance with 10 CFR 54.21(a) (1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In LRA drawing 1-44B-1, the staff noted that at coordinates C-6, the applicant identified valves VS-D-4-1 1A and VS-D-4-1 1B as receiving a containment isolation phase B signal.

This seems to indicate that these valves are used as an isolation barrier following a containment isolation phase B signal. The applicant has indicated on LR Drawing 1-44B-1 that these valves are within the scope of license renewal for fire protection only.

In RAI 2.3.3.2-01, dated March 3, 2008, the staff requested that the applicant explain why these valves and associated duct between the valves and from the valves to the penetration are not within the scope of license renewal as a pressure boundary or leakage barrier.

In response to RAI 2.3.3.2-01, dated March 31, 2008, that applicant stated that the notation "valves VS-D-4-1 1A and VS-D-4-1 1B are in-scope for fire protection only," was in error. Valves VS-D-4-1 1A and VS-D-4-1 1B are safety-related and provide an isolation function. However, some ductwork associated with these valves also should have been included in-scope.

The applicant updated the LRA to add the required ductwork associated with valves VS-D-4-1 1A and VS-D-4-1 1B as within the scope of license renewal for structural support of safety-related valves, pursuant to 10 CFR 54.4(a) (2).

Based on its review, the staff finds the applicant's response to RAI 2.3.3.3-01 acceptable because the applicant has verified that the notation on LR Drawing 1-44B-1 was in error and has updated the LRA to add the required ductwork associated with valves VS-D-4-1 1A and VS-D-4-1 1B as within the scope of license renewal for structural support of safety-related valves. Therefore, the staff's concern described in RAI 2.3.3.2-01 is resolved.

In LRA drawing 2-44B-3, the staff noted that at coordinates C-3, the applicant has identified a direct expansion cooling unit (2HVP-ACUS301) as having two pipe connections; namely, a capped line and a ¾-inch hose connection.

In RAI 2.3.3.2-02, dated March 3, 2008, the staff requested that the applicant explain whether there was a condensate drain for the cooling unit and if so, whether it is within the scope of license renewal for leakage pursuant to 10 CFR 54.4(a)(2).

In its response to RAI 2.3.3.2-02, dated March 31, 2008, the applicant stated that 2HVP-ACUS301 was locally verified to have a condensate drain line. The drain line corresponds to the ¾ - inch line with a hose connection shown on LR drawing 2-44B-3. There is no permanent drain piping beyond the hose connection. The air handling unit is classified as safety-related both on the ventilation (air) side and on the cooling (Freon) side; therefore, the condensate drain line has the same quality classification, and is highlighted in red (safety-related) on LR drawing 2-44B-3. Since the drain line is considered to be safety-related, it was not assigned a nonsafety-related function pursuant to 10 CFR 54.4(a) (2).

Based on its review, the staff finds the applicant's response to RAI 2.3.3.2-02 acceptable because the applicant has confirmed that the direct expansion cooling unit (2HVP-ACUS301) has a condensate drain which is within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.2-02 is resolved.

2.3.3.2.3 Conclusion

The staff reviewed the LRA, UFSAR, RAI responses, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the area ventilation systems - plant areas components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.3 Boron Recovery and Primary Grade Water System

2.3.3.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.3, the applicant described the boron recovery and primary grade water system, which supplies makeup water to the RCS and processes reactor coolant letdown and liquid collected in the primary drains transfer tanks. The primarily nonsafety-related system consists of pumps, tanks, heat exchangers, degasifiers, evaporators, piping, valves, and controls. Degasifiers reduce the concentrations of dissolved and entrained gases in the primary coolant. This recovered gas then discharges to the gaseous waste system for processing. Degasified liquid may be evaporated to extract the boric acid water and collect the condensed primary grade water for re-use. Primary grade water storage is located at Unit 1 in two tanks that supply both units for various uses in the reactor plant.

The boron recovery and primary grade water system contains safety-related components relied upon to remain functional during and following DBEs (Unit 2 only). The failure of nonsafety-related SSCs in the boron recovery and primary grade water system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the boron recovery and primary grade water system performs functions that support EQ (Unit 2 only).

LRA Table 2.3.3-3 identifies boron recovery and primary grade water system component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint (Unit 1 only)
- filter housing
- flexible hose
- heat exchanger (shell and channel)
- heat exchanger (tube/tubesheet) (Unit 2 only)
- orifice
- piping
- pump casing
- sight glass (Unit 1 only)
- strainer body
- tank
- tubing
- valve body

The intended functions of the boron recovery and primary grade water system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference (Unit 2 only)
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention (Unit 2 only)

- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.3, UFSAR Section 9.2 for Unit 1, UFSAR Sections 9.2.8 and 9.3.4.6 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.3.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the boron recovery and primary grade water system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.4 Building and Yard Drains System

2.3.3.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.4, the applicant described the nonsafety-related building and yard drains system, which drains normal nonradioactive leakage, leakage due to maintenance, precipitation, and sanitary drains. The system is not credited for any safety-related function or regulated event. The building and yard drains system has four similar subsystems at Units 1 and 2:

- Floor drains system, which collects and disposes of internal drainage from buildings
- Oily drains system, which collects drainage that may include equipment oil leakage. This subsystem has oil separators that remove oil from the drainage prior to discharge of the waste water
- Sanitary drains system, which handles sewage from plumbing fixtures and directs drainage to the sewage treatment systems
- Roof and yard drains system, which directs drainage to the storm sewers

Additionally, Unit 2 has a fifth subsystem; namely, the recirculation spray pump casing drains system. The drains in this system can be exposed to radioactive contamination. LRA Section 2.3.3.27 evaluates this subsystem in the reactor plant vents and drains system.

The failure of nonsafety-related SSCs in the building and yard drains system could potentially prevent the satisfactory accomplishment of a safety-related function. The building and yard drains system also performs functions that support fire protection (Unit 1 only).

LRA Table 2.3.3-4 identifies building and yard drains system component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- flow controller
- oil interceptor
- piping
- pump casing
- sight glass
- tank
- valve body

The intended functions of the building and yard drains system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.4 and UFSAR Sections 9.7.2 and 9.2.4, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.4, the staff identified areas in which additional information was necessary to complete its review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

On LRA drawing 1-41D-2, the staff noted that the applicant has highlighted piping and other components of the turbine and service building and yard drains system as being included within the scope of license renewal for spatial concerns, in accordance with 10 CFR 54.4(a)(2). However, the applicant did not highlight the vents and flanges associated with tank DA-TK-2, oil interceptor DA-SP-1, and flow controller. In RAI 2.3.3.4-1, dated April 17, 2008, the staff

requested that the applicant justify the exclusion of the above mentioned components from the scope of license renewal.

In its response to RAI 2.3.3.4-1, dated May 19, 2008, the applicant stated that the identified equipment vent lines contain ambient air only and do not have the potential for spatial interaction with safety-related components. Therefore, in accordance with the guidance found in NEI 95-10, Appendix F, Paragraph 5.2.2.1, the vents are not within the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.4-1 acceptable because the applicant has clarified that the vents contain air only and do not have any potential for spatial interaction with safety-related components. Therefore, the staff's concern described in RAI 2.3.3.4-1 is resolved.

2.3.3.4.3 Conclusion

The staff reviewed the LRA, RAI response, and the UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the concludes that the applicant has adequately identified the building and yard drains system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.5 Chemical and Volume Control System

2.3.3.5.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.5, the applicant described the safety-related CVCS, the primary support system for the RCS during all normal modes of plant operation. Charging and letdown flows maintain a programmed water level in the RCS pressurizer.

Reactor coolant letdown to the CVCS is from the RCS cold leg. The regenerative heat exchanger reduces letdown temperature. Restricting orifices then reduce letdown pressure. The nonregenerative heat exchanger further cools the letdown. A second pressure reduction occurs downstream from the nonregenerative heat exchanger. The letdown flow path then leads to demineralizers, a filter, and into the VCT. The charging pumps normally take suction from the VCT and return the purified reactor coolant to the RCS cold leg via the charging system.

The bulk of the charging flow returns to the RCS through the regenerative heat exchanger, which increases its temperature. A parallel charging flow path, with a control valve, extends from the regenerative heat exchanger outlet to the pressurizer spray line and supplies auxiliary spray to the vapor space of the pressurizer.

The system directs a portion of the charging flow to the RCP seals via a seal water injection filter and introduces high-pressure injection water to the RCPs through a connection on the thermal barrier flange. The injection water lubricates both the radial bearing and the seals. The

system also stores boric acid for reactivity control and makeup. Additionally, the centrifugal charging pumps serve as the high-head safety injection pumps in the emergency core cooling system.

The CVCS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the CVCS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the CVCS performs functions that support fire protection, SBO, and EQ.
LRA Table 2.3.3-5 identifies CVCS component types within the scope of license renewal and subject to an AMR:

- blender body
- bolting
- demineralizer
- filter housing
- flexible hose
- gear box
- heat exchanger
- orifice
- piping
- pump casing
- sight glass
- sparger body
- strainer body
- tank
- tubing
- valve body

The intended functions of the CVCS component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.5, UFSAR Sections 6.3.2 and 9.1 for Unit 1, and UFSAR Sections 6.3.2 and 9.3.4 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.5.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the CVCS components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.6 Chilled Water System

2.3.3.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.6, the applicant described the nonsafety-related chilled water system, which includes safety-related containment penetration piping and instrumentation, an auxiliary system that cools various plant components. The system consists of three chillers at each unit. Booster pumps supply river water (Unit 1) or service water (Unit 2) to the condensers. Chilled water circulation pumps circulate chilled water through the chillers and the various cooling loads. Each chiller has its own circulation pump. The system delivers water at 45° F to various station process and ventilation loads. If the chilled water system is unavailable, the system can supply river water (Unit 1) or service water (Unit 2) as backup cooling water to the containment air recirculation cooling coils.

The chilled water system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the chilled water system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the chilled water system performs functions that support EQ.

LRA Table 2.3.3-6 identifies chilled water system component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger
- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank
- tubing
- valve body

The intended functions of the chilled water system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.6.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For staff evaluation of this system, see Safety Evaluation Report (SER) Section 2.3.

2.3.3.6.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.7 Compressed Air System

2.3.3.7.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.7, the applicant described the nonsafety-related compressed air system (CAS), an auxiliary system that provides adequate compressed air capacity of suitable quality and pressure for normal station service and instrumentation, and which includes safety-related containment penetration piping and instrumentation and safety-related components in the intake structure used to inflate flood door seals,

The CAS consists of several subsystems:

- Station air system
- Instrument air system
- Containment instrument air system
- Condensate polishing air system (Unit 2)
- Intake structure and Unit 1 cooling tower pump house air systems

Two air compressors supply the station air system. Two station air receiver tanks and the necessary pipes and valves deliver air to numerous plant locations for maintenance personnel use. This system also supplies raw air to the instrument air system and can supply station air inside the containment through a pipe penetration.

The instrument air system has filters, air dryers, a receiver tank, and the necessary pipes and valves to deliver this air to numerous air loads. This system also has bypass filters for use during system upsets or dryer maintenance.

This system supplies clean, dry air to the station's air-operated components. At Unit 1, this system is the normal supply to the containment instrument air system. At Unit 2, the system backs up the supply to the containment instrument air system.

The station instrument air system supplies the Unit 1 containment instrument air system via an air-operated containment isolation trip valve. Rotary, water seal air compressors normally supply the Unit 2 containment instrument air system. A refrigerant-type air dryer dries the air. Two receiver tanks are in the system, one outside and the other inside the containment. This system supplies clean, dry air to the air-operated components in the containment.

The Unit 2 condensate polishing air system consists of an air compressor, a receiver tank, and the necessary pipes and valves. The condensate polishing air compressor is in use normally only when there is heavy air demand in the condensate polishing system. This system supplies raw compressed air to the condensate polishing system and backs up the air supply to the station air system.

In a loss of both station air compressors (and at Unit 2 the condensate polishing air compressor), a diesel-driven air compressor is available to supply air to the instrument air lines for operation of critical air-operated valves and controllers.

The intake structure and the Unit 1 cooling tower pump house both have an independent CAS to supply the loads in the respective building. Additionally, the intake structure has air tanks with sufficient capacity to inflate and maintain flood door seals at the required pressure for the duration of the probable maximum flood (PMF). These tanks, filled from compressed air or gas bottles, do not rely upon the system compressors.

Operation of the CAS for Unit 2 (*i.e.*, supplying compressed air) is credited for operation of some air-operated charging and letdown flow path valves, thermal barrier cooling, and RHR flow control during post-fire shutdown.

The supply of compressed air is not credited for any other license renewal intended function at Unit 2 nor is the supply of air from Unit 1 compressors credited, although Unit 1 credits the storage of compressed air or gas in accumulator tanks for operation of inflatable intake structure flood door seals. Additionally, both units have containment penetrations with a safety-related pressure boundary function.

The CAS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the CAS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the CAS performs functions that support fire protection, SBO (Unit 2 only), and EQ.

LRA Table 2.3.3-7 identifies CAS component types within the scope of license renewal and subject to an AMR:

- air dryer
- bolting
- chemical injector
- filter housing
- flexible hose
- heat exchanger

- moisture separator
- orifice
- piping
- pump casing
- sight glass
- silencer
- strainer body
- tank
- trap body
- tubing
- valve body

The intended functions of the CAS component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.7.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.7 and UFSAR Sections 9.8 and 9.3.1, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.7, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff noted that on LRA drawing 2-34-2, the applicant has highlighted piping from the standby instrument air train that supplies backup containment instrument air to the following branch lines:

- A 1-inch branch line to valve 614 in the cable vault building that supplies downstream components in the containment penetrations cubicle
- A 1-inch branch line and a ¾-inch branch line in the auxiliary building that supply unspecified downstream components

Since the branch lines continue onto another drawing that was not included in the application, the staff was unable to confirm which components were within the scope of license renewal and subject to an AMR downstream of these continuation lines. In RAI 2.3.3.7-1, dated April 17, 2008, the staff requested that the applicant describe the components that are connected by the ¾-inch and two 1-inch compressed air branch lines and their intended function or provide a copy of the continuation drawings for these branch lines identifying the components that require inclusion within the scope of license renewal, as appropriate.

In its response and supplemental response to RAI 2.3.3.7-1, dated May 19, 2008 and July 24, 2008, respectively, the applicant stated that these branch lines supply control air to the CVCS charging flow control valve 2CHS-FCV122, the CVCS letdown backpressure control valve 2CHS-PCV145, and the CVCS letdown isolation valve 2CHS-AOV204. The applicant stated that these valves are relied on to achieve safe-shutdown following a fire in each specific area within the containment. The piping and valves in the supply lines to these valves, as well as the branch lines up to the first isolation valve, are within the scope of license renewal and are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.7-1 acceptable because the applicant has identified the components downstream of the branch lines and the intended function of the instrument air to those components, and that the piping and valves are within scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.7-1 is resolved.

The staff noted that on LRA drawing 2-34-3, the applicant included part of a 3-inch containment instrument air loop header within the scope of license renewal, but indicated that other portions of the 3-inch containment instrument air loop header are not within the scope of license renewal. These out-of-scope piping segments contain downstream piping that is not isolable from the part of the loop header that is within the scope of license renewal. Should a loss of pressure occur from a break of this downstream 3-inch containment instrument air loop header, the entire 3-inch instrument air header, including the in-scope portion, would lose air pressure. The staff noted that in LRA Section 2.3.3.7, the applicant stated that the CAS provides compressed air to position air-operated valves that are required for post-fire safe-shutdown for fire protection in accordance with 10 CFR 54.4(a)(3).

In SRP-LR, page 2.1-8, the staff guidance for the review of scoping methodology to identify SSCs that are credited by regulated events, states in part, that "all SSCs that are relied upon in the plant's CLB (as defined in 10 CFR 54.3), plant-specific operating experience, industry-wide experience (as appropriate), and safety analyses or plant evaluations to perform a function that demonstrates compliance with NRC regulations identified under 10 CFR 54.4(a)(3), are required to be included within the scope of the rule."

On June 20, 2007, San Onofre Nuclear Generating Station Unit 2 experienced a loss of instrument air due to a failure of a joint in its 3-inch instrument air header, which resulted in a reactor trip. This event was reported in a letter regarding Docket No. 50-361, Licensee Event

Report Nos. 2007-001 and 2007-002, San Onofre Nuclear Generating Station, Unit 2, dated August 17, 2007. This event represents relevant industry operating experience of an instrument air header failure that would be applicable to the LRA for BVPS. In RAI 2.3.3.7-2, dated April 17, 2008, the staff requested that the applicant justify exclusion of the entire 3-inch containment instrument air loop header from within the scope of license renewal in accordance with 10 CFR 54.4(a)(3).

In its response to RAI 2.3.3.7-2, dated May 19, 2008, the applicant stated that they revised the LRA and associated LRA drawings to "include the remainder of the main air loop header and the branch air lines for the entire flowpath within the scope of license renewal up to and including the first isolation valve from the main flowpath."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.7-2 acceptable because the applicant has included the entire 3-inch main air loop header within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.7-2 is resolved.

In LRA drawings 2-34-1A and 2-34-2, the staff noted that the applicant did not highlight station service air compressors 2SAS-C21A and 2SAS-C21B, nor the station service air system piping, air receivers, and air dryer components that connect to the standby instrument air train header. The staff further noted that in LRA Section 2.3.3.7, the applicant stated that the Unit 2 CAS provides compressed air to position air-operated valves required for post-fire safe-shutdown in accordance with 10 CFR 54.4(a)(3). In UFSAR Section 9.5A.1.2.3.1.12 for Unit 2, the applicant stated that station air compressors (2SAS-C21A and 2SAS-C21B) direct air to the required components via a cross-connect to the containment instrument air header station to position several flow control, hand control, and air operated valves that are required for post-fire safe-shutdown.

In RAI 2.3.3.7-3, dated April 17, 2008, the staff requested that the applicant (a) provide an explanation of the apparent difference in the credited source of compressed air for post-fire safe-shutdown between the UFSAR and the application, and (b) justify the exclusion of the identified portions of station service air system piping and components on LRA drawings 2-34-2 and 2-34-1A from the scope of license renewal that are credited for post-fire safe-shutdown, in accordance with 10 CFR 54.4(a)(3).

In its response to RAI 2.3.3.7-3, dated May 19, 2008, the applicant stated that "FENOC no longer credits the station air compressors and associated equipment in achieving safe-shutdown at BVPS Unit 2." The applicant has identified that a change notice was approved to modify UFSAR Section 9.5A.1.2.3.1.12 to credit the diesel-driven standby instrument air compressor 21AS-C21 in lieu of the station air compressors.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.7-3 acceptable because the applicant has identified that a change notice modified the UFSAR to credit the diesel driven air compressor for safe-shutdown in lieu of the station service air compressors. Therefore, the staff's concern described in RAI 2.3.3.7-3 is resolved.

2.3.3.7.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff found instances where the applicant omitted systems and structures that should have been included

within the scope of license renewal. The applicant has satisfactorily resolved the issues as discussed in the preceeding staff evaluation. The staff finds no further omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no further omissions. Based on its review, the staff finds that the applicant has adequately identified the CAS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.8 Containment System

2.3.3.8.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.8, the applicant described the containment system, which maintains the containment pressure boundary. The system contains the mechanical components of the personnel airlock and the equipment hatch emergency airlock that includes piping, valves and instruments for airlock pressure instrumentation, equalization, or testing and actuators, pumps, tanks, piping components, and valves of the airlock door hydraulic operating mechanisms. The system has safety-related components. LRA Section 2.4.22, evaluates all other containment structure components as structural.

The containment system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the containment system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-8 identifies containment system component types within the scope of license renewal and subject to an AMR:

- actuator housing
- bolting
- flexible hose
- piping
- pump casing
- sight glass
- strainer body
- tank
- tubing
- valve body

The intended functions of the containment system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.8.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.8, UFSAR Section 5.2.4.8 for Unit 1, and UFSAR Section 3.8.1.1.3.2 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed LRA Section 2.3.3.8 and identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The following paragraphs describe the staff's RAIs and the applicant's related responses.

In LRA drawing 2-47-1, at coordinates C-8/9, the staff noted that the applicant did not highlight the lines from panel 2PHS-EALI associated with the connections labeled *CNMT. BLKD. SHAFT "A" SEAL TEST CONN.*, and *CNMT. BLKD. SHAFT "B" SEAL TEST CONN.*, as being within the scope of license renewal, while the applicant highlighted the lines from the connections labeled *CTMT. BLKD. DOOR SEAL TEST CONN.*, and ATMOS. *BLKD. SHAFT "A" SEAL TEST CONN.*, as being in-scope. Both sets of lines appear to enter the hatch airlock volume.

In RAI 2.3.3.8-01.a, dated March 3, 2008, the staff requested that the applicant explain the difference in the scoping.

In its response to RAI 2.3.3.8-01.a, dated March 31, 2008, the applicant stated that the highlighting for the emergency airlock shaft seal test lines was incorrectly omitted. The applicant revised LRA drawing 2-47-1 to correctly depict all emergency airlock test lines as highlighted in red (in-scope). The applicant further stated that this change does not affect any LRA text or AMR table results.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.8-01.a acceptable because the applicant has corrected LRA drawing 2-47-1 to depict all emergency airlock test lines as within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.8-01.a is resolved.

In LRA drawing 2-47-1, the staff also noted that the test panel connection labels *ATMOS. BLKD. SHAFT "A" SEAL TEST CONN, ATMOS. BLKD. DOOR SEAL TEST CONN.*, and *ATMOS. BLKD. SHAFT "B" SEAL TEST CONN.*, do not appear to match the lines whose test connections they are closest to. In RAI 2.3.3.8-10.b, dated March 3, 2008, the staff requested that the applicant clarify this labeling arrangement.

In its response to RAI 2.3.3.8-01.b, dated March 31, 2008, the applicant stated that the emergency airlock test connection labels shown on LRA drawing 2-47-1 were incorrect and are correctly shown on revised LRA drawing 2-47-1.

The applicant further stated that as shown on the revised drawing, the test panel connection labels align with the lines closest to the test connections.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.8-01.b acceptable because the applicant has corrected LRA drawing 2-47-1 to reflect the test panel connection labels in alignment with the lines closest to the test connections. Therefore, the staff's concern described in RAI 2.3.3.8-01.b is resolved.

2.3.3.8.3 Conclusion

The staff reviewed the LRA, UFSAR, RAI responses, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the containment system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.9 Containment Vacuum and Leak Monitoring System

2.3.3.9.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.9, the applicant described the containment vacuum and leak monitoring system, which maintains subatmospheric pressure in the containment during normal operation and determines the leakage rate into or out of containment by and periodic tests. Portions of the containment vacuum and leakage monitoring system are safety-related. The containment vacuum and leakage monitoring system consists of ejectors, vacuum pumps, piping, valves, and instrumentation. The containment vacuum ejector uses auxiliary steam to remove air from the containment structure to create, prior to plant operation, a subatmospheric pressure maintained by the vacuum pumps. The discharges of the containment vacuum pumps combine and pass through a flow indicator and integrator to the gaseous waste disposal (GWD) system. A tap on the suction line of each pump also connects to the post-DBA HCS.

The system also has instrument piping for containment pressure measurement and provides the sample and return flowpath for the containment air particulate and gaseous activity radiation monitor evaluated in the radiation monitoring system (RMS). The containment vacuum pumps alternately sample the containment air when the activity monitor pump is out of service.

The containment vacuum and leak monitoring system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the containment vacuum and leak monitoring system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the containment vacuum and leak monitoring system performs functions that support EQ.

LRA Table 2.3.3-9 identifies containment vacuum and leak monitoring system component types within the scope of license renewal and subject to an AMR:

- bolting
- ejector
- flexible hose
- heater body
- moisture separator
- orifice
- piping
- pump casing
- strainer body
- trap body
- tubing
- valve body

The intended functions of the containment vacuum and leak monitoring system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.9.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.9, UFSAR Section 5.4.2 for Unit 1, and UFSAR Sections 6.2.4.2 and 9.5.10 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.9.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the containment vacuum and leak monitoring system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.10 Domestic Water System

2.3.3.10.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.10, the applicant described the nonsafety-related domestic water system that supplies softened water as required to various plant areas for sanitation, emergency showers, and eye wash stations. Domestic water also fills drain traps and can be an alternate supply of cooling to the Unit 2 station air compressors. The system, not credited for any safety-related function or regulated event, has piping components, valves, pumps, water softener (not used), tanks, and water heaters. The domestic water system supply is provided by the Midland water system. Prior to the Midland connection, the site processed and stored all of its required domestic water without a supply from any municipal system. The Midland system supply-pressure is satisfactory for all site needs; therefore, system portions that previously processed, stored, and pressurized domestic water are no longer in service and are isolated in the field. However, no domestic water system equipment or components were retired, but are available for use if needed.

The failure of nonsafety-related SSCs in the domestic water system could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-10 identifies domestic water system component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger
- level gage
- piping
- pump casing
- strainer body
- tank
- valve body
- water hammer arrestor

The intended function of the domestic water system component types within the scope of license renewal is to provide nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions.

2.3.3.10.2 Staff Evaluation

The staff performed a simplified Tier 1 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.3.10.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.11 Emergency Diesel Generators and Air Intake and Exhaust System

2.3.3.11.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.11, the applicant described the emergency diesel generators and air intake and exhaust system. The EDG system for each unit consists of two safety-related engine-generator sets, each dedicated to an emergency train with all controls and support equipment required to start, run, sequence, and load the EDG, in the emergency mode, to meet the plant's operational requirements. Upon a loss of voltage to an emergency bus, the EDG starts automatically, energizes the bus, and then sequences on the emergency loads to the emergency bus. The EDG will carry the load up to its full load rating for up to seven days.

Each EDG also has controls to allow synchronization with the station's power supply and operation at full load to demonstrate operability. Each EDG has mechanical support equipment that can be grouped into six subsystems as described in the following sections. Each subsystem has safety-related subcomponents of the diesel generator.

(1) Emergency Diesel Generators and Air Intake and Exhaust System (System description follows this list)

(2) Emergency Diesel Generators—Air Start System (Section 2.3.3.12)

(3) Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)

(4) Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)

(5) Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)

(6) Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

The Unit 1 diesels draw combustion air from within the diesel generator building, while the Unit 2 diesels draw combustion air from outside the building such that it is separated from the exhaust to ensure that the air is not diluted or contaminated by exhaust products. A turbocharger supplies the volume of air needed for combustion and scavenging. The air from the blower increases in pressure and temperature. The air temperature decreases as it passes through aftercoolers, making cooled air of greater density, thus, increasing oxygen supply to the engine.

The diesels exhaust with silencers in protected enclosures located at the building roof level. Forced-air ventilation, with integral fans (blowers), cool the synchronous generators of the Unit 1 EDG engine-generator sets. Although the forced air from these fans/blowers is not combustion air, it is evaluated with the auxiliary system that supplies forced air to each EDG engine. Rotating blades attached internally to the generator rotors cool the synchronous generators of the Unit 2 EDG engine-generator sets. The blades draw air in through both end-cover screens, force air flow past the stator, and exhaust it through side vents. Although the forced air from these internal blades is not combustion air, it is evaluated with the auxiliary system that supplies forced air to each EDG engine.

The EDGs and air intake and exhaust system contains safety-related components relied upon to remain functional during and following DBEs. In addition, the emergency diesel generators and air intake and exhaust system performs functions that support fire protection and SBO.

LRA Table 2.3.3-11 identifies EDGs and air intake and exhaust system component types within the scope of license renewal and subject to an AMR:

- blower housing (Unit 1 only)
- bolting
- expansion joint
- filter housing
- flexible hose
- heat exchanger
- piping
- silencer
- tubing
- turbocharger housing
- valve body

The intended functions of the EDGs and air intake and exhaust system component types within the scope of license renewal include:

- heat transfer
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.11.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see Safety Evaluation Report (SER) Section 2.3.

2.3.3.11.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.12 Emergency Diesel Generators - Air Start System

2.3.3.12.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.12, the applicant described the EDGs - air start system. Each emergency diesel has an air start system sized for five generator starts without outside power. There are two independent air start systems for each EDG, either of which can start the engine. The diesel air start systems consist of air compressors, coolers, dryers, separators, tanks, air motors (including the Unit 2 air start distributors), and the necessary piping, valves, fittings, and I&C systems. The Unit 1 air start system rotates the engine using air motors; the Unit 2 system, by porting starting air to the cylinders via a start-air distributor. The applicant references the

distributor as a motor in this application. The Unit 2 air start system also has a skid-mounted air tank in the supply line to the servo fuel rack shutdown and fuel rack booster to ensure a source of air for positive fuel shutoff.

The EDGs - air start system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the EDGs - air start system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-12 identifies emergency diesel generators - air start system component types within the scope of license renewal and subject to an AMR:

- air dryer (Unit 2 only)
- bolting
- filter housing
- flexible hose
- heat exchanger
- injector
- moisture separator
- motor casing
- orifice
- piping
- strainer body
- tank
- trap body
- tubing
- valve body

The intended functions of the EDGs - air start system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.12.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.12 and UFSAR Sections 8.5.2.3 and 9.5.6 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with

intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.12, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In LRA drawing 1-36-1 for the EDGs - air start system, the staff noted that the applicant highlighted strainers and filters as being within the scope of license renewal. The staff also noted on LRA drawing 2-36-3 for the EDGs - air start system, that the applicant highlighted strainers and filters as being within the scope of license renewal. Additionally, in LRA Table 2.3.3-12, the applicant identified component types "strainer body" and "filter housing" as within the scope of license renewal, for purposes of a pressure boundary intended function, pursuant to 10 CFR 54.4(a)(1).

NEI 95-10, Revision 6, Table 4.1-1, "Typical Passive Structure and Component Intended Functions", identifies that filtration is an intended function for the component type "filter." However, in LRA Table 2.3.3-12, the applicant did not identify component type "filter" with the intended function of filtration. In RAI 2.3.3.12-1, dated April 17, 2008, the staff requested that applicant justify the exclusion from LRA Table 2.3.3-12, the intended function "filtration" for the above mentioned component types, strainers and filters, in the EDGs – air start system.

In its response to RAI 2.3.3.12-1, dated May 19, 2008, the applicant stated:

> All filter elements, as well as strainer elements that are not specifically credited with a filtration function, were screened out as short-lived. The filter elements are periodically replaced, and the strainer elements are periodically cleaned and inspected, or replaced. These internal filter/strainer elements are not long-lived, and are not subject to an AMR in accordance with 10 CFR 54.21(a)(1)(i).

Based on its review, the staff finds the applicant's response to RAI 2.3.3.12-1 acceptable because the applicant has clarified that the filter and strainer elements in this system are periodically replaced: therefore, they are not long-lived or subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.12-1 is resolved.

In UFSAR Section 3.6B.1.3.3.1 for Unit 2, the staff noted the applicant's statement that for all high-energy lines outside containment, each postulated break type and orientation is investigated to determine whether the unrestrained whipping of severed pipe could impact and damage any safety components. In UFSAR Section 3.6B.1.1.1, the applicant defined high-energy piping systems as fluid systems that are either in operation or maintained pressurized under conditions where either or both of the following are met: a maximum operating temperature exceeding 200°F or pressure exceeding 275 psig.

The Unit 2 EDG air start system operates at pressures greater than 425 psig and contains fluids; therefore, this system meets the definition of a high-energy piping system. The staff further noted that on LRA drawing 2-36-3, the applicant did not highlight parts of the EDG air start system, indicating it is not within the scope of license renewal.

In RAI 2.3.3.12-2, dated April 17, 2008, the staff requested that the applicant justify the exclusion of the non-highlighted EDG air start piping from the scope of license renewal.

In its response to RAI 2.3.3.12-2, dated May 19, 2008, the applicant stated:

> The non-highlighted portion of nonsafety-related diesel generator air start piping is not within the scope of license renewal, because its failure would not prevent satisfactory accomplishment of any safety-related functions. This conclusion is documented within the BVPS CLB in the response to NRC Interrogatory 430.77, dated September 19, 1983, and approved by NRC in the SER for the BVPS Unit 2 FSAR (operating license stage), dated October 1985, and was provided in Amendment 8 of the FSAR.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.12-2 acceptable because the applicant has clarified that the CLB justifies the reason for excluding the non-highlighted EDG air start piping from the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.12-2 is resolved.

2.3.3.12.3 Conclusion

The staff reviewed the LRA, UFSAR, RAI responses, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions. Based on its review, the staff finds that the applicant has adequately identified the EDG air start system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.13 Emergency Diesel Generators - Crankcase Vacuum System

2.3.3.13.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.13, the applicant described the emergency diesel generators - crankcase vacuum system. The EDGs at Units 1 and 2 have a crankcase vacuum system to remove oil vapors from the EDGs during operation, but the systems function differently at each unit.

Each Unit 1 EDG has a lube oil separator mounted on the turbocharger housing. An ejector assembly mounted on the lube oil separator cover connects by a flanged tube to an eductor tube in the exhaust stack. During engine operation, air pressure from the discharge of the turbocharger compressor passes through the ejector assembly, creating a suction which draws up engine oil vapors through an internal screen element. Oil collects on the screen element and drains back into the engine. The remaining gaseous vapor discharges to the exhaust stack and vents to the atmosphere. The oil separator, eductor assembly, air pressure from the turbocharger compressor, and exhaust stack suction together form a functional crankcase vacuum system. The Unit 1 crankcase vacuum system has no moving parts and is not essential to the safe, reliable operation of the diesel engine, except in maintaining a pressure boundary for proper operation of the air intake and exhaust system.

The Unit 2 crankcase vacuum system has a crankcase vacuum pump, moisture (oil) separator, piping, and fittings. The crankcase vacuum system removes oil vapors from the diesel engine crankcase. The crankcase vacuum system is not essential to the safe, reliable operation of the diesel engine, but has safety-related instrumentation with tubing and valves.

The EDGs - crankcase vacuum system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the EDGs - crankcase vacuum system potentially could prevent the satisfactory accomplishment of a safety-related function. LRA Table 2.3.3-13 identifies EDGs - crankcase vacuum system component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- flexible hose
- moisture separator
- piping
- tubing
- valve body

The intended functions of the EDGs - crankcase vacuum system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.13.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.3.13.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.14 Emergency Diesel Generators - Fuel Oil System

2.3.3.14.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.14, the applicant described the safety-related emergency diesel generators - fuel oil system, which stores fuel oil for the EDGs during normal operation and supplies fuel oil to the diesel generator fuel oil pumps. The fuel oil system consists of underground fuel oil storage tanks, transfer pumps, day tanks, engine-mounted fuel pumps and tanks, injectors, piping, and valves. The Unit 1 fuel oil inventory supports operation of one diesel

generator for seven days. The Unit 2 system can support operation of both diesels for seven days.

The EDGs - fuel oil system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the emergency diesel generators - fuel oil system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-14 identifies EDGs - fuel oil system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- flame arrestor
- flexible hose (Unit 2 only)
- orifice
- piping
- pump casing
- sight glass
- strainer body
- strainer element
- tank
- tubing
- valve body

The intended functions of the EDGs - fuel oil system component types within the scope of license renewal include:

- filtration
- restriction for flow rate limit or pressure difference
- prevention of fire spread by flame preclusion
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.14.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.14 and UFSAR Sections 8.5.2.3 (Unit 1), 9.14.4.1 (Unit 1) and 9.5.4 (Unit 2), using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.14, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In LRA renewal drawing 1-36-2 for the EDGs - fuel oil system, the staff noted that the applicant did not highlight the *diesel generator fuel oil holding tank, EE-TK-6*. In UFSAR Section 9.14.6 for Unit 1, the applicant described that the contents of the holding tank are sampled prior to transferring oil to the diesel generator storage tanks. In RAI 2.3.3.14-1, dated April 17, 2008, the staff requested that the applicant justify the exclusion of the diesel generator fuel oil holding tank from the scope of license renewal.

In its response to RAI 2.3.3.14-1, dated May 19, 2008, the applicant stated:

> The Unit 1 diesel generator fuel oil holding tank EE-TK-6 is not safety-related, and is not credited for any license renewal function. Unit 1 UFSAR, Sections 8.5.2.3 and 9.14.4.1, specify that the required fuel oil inventory is provided by the 20,000 gal storage tanks. EE-TK-1A and EE-TK-1B, the diesel fuel storage tanks, are safety-related, and are labeled on license renewal drawing 1-36-2 as "20000 gal." If the holding tank (EE-TK-6) were to fail, or were found to contain fuel oil of inadequate quality, there would be no affect on the ability of the diesel generators to perform their intended function.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.14-1 acceptable because the applicant has clarified that the diesel generator fuel oil holding tank is not safety-related and is not credited for any license renewal intended function, including the required fuel oil inventory. Therefore, the staff's concern described in RAI 2.3.3.14-1 is resolved.

2.3.3.14.3 Conclusion

The staff reviewed the LRA, UFSAR, RAI responses, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions. Based on its review, the staff finds that the applicant has adequately identified the EDG fuel oil system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.15 Emergency Diesel Generators - Lube Oil System

2.3.3.15.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.15, the applicant described the emergency diesel generators - lube oil system, which supplies essential lubrication to EDG components. The lube oil system for each engine has lube oil pumps, heat exchangers, piping components, and valves. Both units make provisions for keeping the lubricating oil warm during standby operation. When the Unit 1 engine shuts down, the lube oil cooler operates as a heater. Water heated by immersion heaters heats the oil in the lube oil cooler. The auxiliary oil system operates continuously and supplies warmed oil to the turbocharger and engine sump when the engine shuts down. The Unit 2 electric pumps operate continuously during standby to circulate oil through the electric keep-warm heater to other essential parts.

The EDGs - lube oil system contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.3.3-15 identifies EDGs - lube oil system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- flexible hose
- heat exchanger
- heater housing
- orifice
- piping
- pump casing
- sight glass
- strainer body
- strainer element
- tank
- tubing
- valve body

The intended functions of the emergency diesel generators - lube oil system component types within the scope of license renewal include:

- filtration
- restriction for flow rate limit or pressure difference
- heat transfer
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.15.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.3.15.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.16 Emergency Diesel Generators - Water Cooling System

2.3.3.16.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.16, the applicant described the emergency diesel generators - water cooling system, which supplies water to cool diesel engine components. The system consists of circulating pumps, water temperature regulating valves, water expansion tanks, electric heaters, heat exchangers, piping components, valves, and I&C. The river water system (Unit 1) or the SWS (Unit 2) cools the EDG CWS heat exchangers.

The EDGs - water cooling system contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.3.3-16 identifies EDGs - water cooling system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- heater housing
- orifice
- piping
- pump casing
- sight glass
- tank
- tubing
- valve body

The intended functions of the EDGs - water cooling system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.16.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.16 and UFSAR Sections 8.5.2.3 for Unit 1 and 9.5.5 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.16, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In LRA drawings 2-36-4A and 2-36-4B for EDG 2EGS-EG2-1 and EDG 2EGS-EG2-2, respectively, the staff noted that for the EDG - water cooling system, the applicant indicated that cooling water is supplied to the turbo chargers.

In LRA Tables 2.3.3-11 and 2.3.3-16, the staff noted that the applicant listed components subject to an AMR for the EDGs - air intake and exhaust system, and the EDGs - water cooling system, respectively. Also, in LRA Table 2.3.3-11, the applicant included the component type "turbo charger housing." However, in LRA Table 2.3.3-16, the applicant did not include "turbo charger housing" as a component type.

In LRA Tables 3.3.2-11 and 3.3.2-16, the staff noted that the applicant identified the summary of aging management evaluations for the EDGs - air intake and exhaust system and the EDGs - water cooling system, respectively. Also, In LRA Table 3.3.2-11, the applicant identified the component type "turbo charger housing" with air as the environment. However, the applicant did not identify an environment of closed cooling water for the component type "turbo charger housing." In LRA Table 3.3.2-16, the applicant did not identify a component type "turbo charger housing."

In RAI 2.3.3.16-1, dated April 17, 2008, the staff requested that the applicant justify the exclusion of the component type "turbo charger housing" from LRA Tables 2.3.3-16 and 3.3.2-16, and the exclusion of the associated environment "closed cooling water" from LRA Tables 3.3.2-11 and 3.3.2-16.

In its response, dated May 19, 2008, the applicant explained that LRA Table 2.3.3-16 did not specifically include the component type "turbocharger housing" because the turbocharger housing was already included as a subcomponent of the component type "heat exchanger."

Also, the applicant explained that in LRA Table 3.3.2-11, the component type "heat exchanger (header)" was intended to represent the component type "turbocharger housing" in the corresponding LRA Table 2.3.3-11. To improve clarity, the applicant added a new row "turbocharger housing (heat exchanger)" with an environment of closed cooling water into LRA Table 3.3.2-11 to clearly identify that there is an associated aging management evaluation for the component type "turbocharger housings."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.16-1 acceptable because the applicant has identified that in LRA Table 2.3.3-16, the component type "turbocharger housing" was already included as a subcomponent of the component type "heat exchanger," which has a cooling water environment in LRA Table 3.3.2-16. Also, the applicant added the component type "turbocharger housing (heat exchanger)" to LRA Table 3.3.2-11 to assure that an aging management evaluation is performed for the turbocharger housings exposed to closed cycle cooling water. Therefore, the staff's concern described in RAI 2.3.3.16-1 is resolved.

2.3.3.16.3 Conclusion

The staff reviewed the LRA, RAI response, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the EDG water cooling system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.17 Emergency Response Facility Substation System (Common)

2.3.3.17.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.17, the applicant described the ERF for the BVPS substation system (common), as common and used by both Units 1 and 2. The system receives standby power from a diesel generator, which supplies power to the ERF substation 4kV switchgear for selected equipment in the ERF substation, the ERF itself, and Units 1 and 2.

The ERF diesel generator has mechanical support equipment grouped into the following subsystems:

- Air Intake and Exhaust System
- Fuel Oil System
- Lube Oil System
- Water Cooling System

A turbocharger supplies combustion air and is mounted at the generator end of the engine. It consists of an exhaust-driven turbine unit and a centrifugal air compressor within a single housing and is mounted on a common shaft. An exhaust muffler/silencer is downstream of the turbocharger exhaust outlet.

The diesel generator fuel oil system consists of pumps, tanks, filters, strainers, fuel injectors, valves, piping, and instrumentation. This system does not incorporate any engine-mounted day tank.

The fuel oil transfer pumps, located in a below-grade enclosure, draw fuel oil from the underground fuel oil storage tank located northwest of the switchyard relay building and

transfers it to the fuel oil day tank in the ERF diesel generator building. The storage tank capacity can supply diesel operation for seven days. An engine-mounted fuel pump and a fuel-priming pump powered by DC supplies fuel oil from the day tank to the diesel fuel injectors.

The diesel engine lube oil system is a combination of four separate systems; namely, main lubricating, piston-cooling, auxiliary oil, and scavenging oil systems, each with its own oil pump. Auxiliary motor-driven pumps continuously operate to circulate oil from the lube oil sump to the lube oil cooler. These pumps circulate warm oil through the oil system to keep the engine in a state of readiness for immediate start and loading.

The water cooling system for the diesel consists of an expansion tank, centrifugal circulating pumps, standby immersion heater, thermostatic control valve, and radiator. The outside radiator removes heat from the cooling water. The diesel radiator located to the east of the ERF diesel generator building has two fans and circulating pumps that provide radiator flow. An electric immersion heater provides for standby heating of diesel engine cooling water and lube oil.

The emergency response facility substation system (common) performs functions that support fire protection and ATWS.

LRA Table 2.3.3-17 identifies emergency response facility substation system (common) component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- filter housing
- flexible hose
- heat exchanger
- heater housing
- orifice
- piping
- pump casing
- sight glass
- silencer
- strainer body
- strainer element
- tank
- tubing
- turbocharger housing
- valve body

The intended functions of the emergency response facility substation system (common) component types within the scope of license renewal include:

- filtration
- restriction for flow rate limit or pressure difference
- heat transfer
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product

barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.17.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.17 and UFSAR Section 8.4.5 for Unit 1 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.17, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In LRA drawing 1-58E-1, the staff noted that the applicant highlighted a component labeled "injector," as being included within the scope of license renewal pursuant to 10 CFR 54.4(a). However, in LRA Tables 2.3.3-17 and 3.3.2-17, the applicant did not list the injector as a component type with an intended function of pressure boundary. In RAI 2.3.3.17-1, dated April 17, 2008, the staff requested that the applicant clarify whether the component type "injector" should be included within the scope of license renewal in LRA Tables 2.3.3-17 and 3.3.2-17.

In its response to RAI 2.3.3-17, dated May 19, 2008, the applicant stated that the fuel injectors are in-scope, but are active subcomponents of the diesel engine and are not subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.17-1 acceptable because the applicant has clarified that the injectors are within the scope of license renewal, but are not subject to an AMR because they are active components. Therefore, the staff's concern described in RAI 2.3.3.17-1 is resolved.

In UFSAR Section 9.5A.1.2.3.1.12 for Unit 2, the staff noted the applicant's statement that the black diesel, located in Unit 1, supplies electric power to the station air compressors subsequent to the LOOP. However, in LRA Section 2.3.3-17, the applicant does not describe this function as a part of the system in accordance with 10 CFR 54.4(a)(3). In RAI 2.3.3.17-2, dated April 17, 2008, the staff requested that the applicant justify why the function of the black diesel, which supplies the station air compressors, should not be included as an intended function pursuant to 10 CFR 54.4(a)(3).

In its response, dated May 19, 2008, the applicant stated:

> FENOC no longer credits the station air compressors in achieving safe shutdown, and no longer credits the ERFS diesel generator (i.e., black diesel) with powering the station air compressors at BVPS Unit 2 in achieving post-fire safe shutdown. A change notice, CN 06-575; was approved by FENOC to

modify the text in several subsections of the Unit 2 UFSAR, Sections 9.2 and 9.5A.1, to reflect this change to the CLB.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.17-2 acceptable because the applicant has identified a change notice that no longer credits the black diesel for post-fire safe-shutdown as an intended function pursuant to 10 CFR 54.4(a)(3). Therefore, the staff's concern described in RAI 2.3.3.17-2 is resolved.

The staff noted that in the Fire Protection Safe Shutdown Report, Section 3.50.3 for Unit 2, the applicant stated that the black diesel is assumed lost following a fire in Unit 1. However, in LRA Section 2.3.3-17, the applicant stated that the black diesel supplies the dedicated nonsafety-related auxiliary feedwater (AFW) pump for Unit 1 with a highly reliable source of electrical power. In RAI 2.3.3.17-3, dated April 17, 2008, the staff requested that the applicant explain whether the black diesel is assumed lost in a Unit 1 fire, how the diesel can supply power to the dedicated non safety-related AFW pump for Unit 1, which is credited in a Unit 1 fire that causes the loss of the three safety-related AFW pumps.

In its response to RAI 2.3.3.17-3, dated May 19, 2008, the applicant stated that "the postulated BVPS Unit 1 fire affecting the ERF diesel generator (black diesel) is evaluated in the Unit 2 fire protection safe-shutdown report and is in a different building, separate and remote from the postulated fire that could affect all three Unit 1 safety-related AFW pumps evaluated in the Unit 1 fire protection Appendix R report."

The applicant also explained that only Unit 1 fire areas of the ERF system building and ERF diesel generator building are evaluated for Unit 2 safe-shutdown because the normal source of Unit 2 compressed air is powered from the ERF system. The ERF system building and the ERF diesel generator building are not evaluated as fire areas in the Unit 1 fire protection Appendix R report since they do not support equipment used for safe-shutdown of Unit 1.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.17-3 acceptable because the applicant has confirmed that the black diesel is in the ERF diesel generator building, which is separate and remote from the Unit 1 fire area (i.e., the Unit 1 main steam cable vault area) that causes the simultaneous loss of all three Unit 1 safety-related AFW pumps, and that simultaneous fires in the two fire areas are outside the CLB. Therefore, the staff's concern described in RAI 2.3.3.17-3 is resolved.

In UFSAR Section 8.4.5 for Unit 1, the staff noted the applicant's description of a buried 30,000 gallon fuel oil storage tank. However, in LRA Table 3.3.2-17, the applicant does not include an exterior environment of soil listed for component type "tank."

In RAI 2.3.3.17-AMR-1, dated April 17, 2008, the staff requested that the applicant clarify that the 30,000 gallon fuel storage tank is subject to an AMR or justify its exclusion.

In its response to RAI 2.3.3.17-AMR-1, dated May 19, 2008, the applicant stated that "the 30,000 gallon fuel storage tank discussed in the Unit 1 UFSAR Section 8.4.5 is identified as 1RGF-TK-1 and is within scope and subject to an AMR. The tank is a fiberglass tank that is located below grade in an enclosure backfilled with pea gravel." The applicant revised LRA Table 3.3.2-17, row 115 to reflect the external environment for this tank from "air-indoor uncontrolled" to "soil," to provide clarity.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.17-AMR-1 acceptable because the applicant has modified the external environment of the below grade fuel storage tank in order to more accurately portray its external environment and has clarified that the tank is subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.17-AMR-1 is resolved.

2.3.3.17.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the emergency response facility substation system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.18 Fire Protection Systems

2.3.3.18.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.18, the applicant described the fire protection system (FPS), which detects and suppresses fires in protected structures to ensure that no single fire causes an unacceptable risk to public health and safety, prevents any necessary safe-shutdown functions, or significantly increases the risk of radioactive release to the environment. The system consists of subsystems with detection, suppression, fire barrier, combustible oil collection, and shutdown functions.

Two fire pumps (one motor-driven and one diesel-driven) supply the water suppression subsystem. Both pumps, located in the intake structure, take suction from the Ohio River and discharge to the yard fire loop. The yard loop supplies fire hydrants, hose stations, and sprinkler systems throughout the plant. The water suppression system consists of pumps, piping, hydrants, hose stations, manual valves, deluge valves, and sprinkler heads. Hydrants protect the yard areas and hose stations located in buildings are for internal use.

The CO_2 suppression subsystem consists of refrigeration units for area and equipment enclosure protection and CO_2 discharge may be automatic or manual. Upon actuation of these systems, an alarm sounds to permit personnel to exit the affected area before the discharge.

Halon fire extinguishing subsystems provide suppression in areas with electronic computer parts or equipment. The systems may actuate either automatically or manually.

The fire detection subsystem consists of smoke-and heat-sensitive devices (and ultraviolet flame detectors at Unit 2) that monitor areas of the plant. When the devices sense smoke or heat, a fire alarm sounds and the area fire alarm displays in the control room.

The RCPs have a system for collecting lube oil leakage and draining it to containers that can hold the entire RCP lube oil inventory.

The fire barrier subsystems are construction elements rated in hours of fire resistance to prevent the spread of fires. LRA Section 2.4.36 addresses these fire barrier components as bulk structural commodities.

The FPS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the FPS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the FPS performs functions that support fire protection and EQ.

LRA Table 2.3.3-18 identifies FPS component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- flame arrestor
- flexible hose
- heat exchanger
- hose rack
- nozzle
- orifice
- piping
- pump casing
- sight glass
- silencer
- strainer body
- tank
- tubing
- valve body

The intended functions of the FPS component types within the scope of license renewal include:

- control of flow distribution or direction, spray shield, or curbs for flow direction
- restriction for flow rate limit or pressure difference
- prevention of fire spread by flame preclusion
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related SSCs caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.18.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.18, LRA drawings, UFSAR 9.10 for Unit 1, and UFSAR 9.5.1 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive or long-lived components subject to an AMR in accordance with 10 CFR 54.21(a)(1).

The staff also reviewed the following fire protection CLB documents for Units 1 and 2 listed in the Units 1 and 2 Operating License Conditions 2.C.5 and 2.F, respectively:

Fire Protection SERs – Unit 1

- Amendment No. 18, Beaver Valley Power Station Unit No. 1, Operating License DPR 66
- Updated Fire Protection Appendix R Review Report (Unit 1)

Fire Protection SERs – Unit 2

- NUREG-1057, October 1985 and Supplements 1 through 6 (Unit 2)

In addition, the staff reviewed the commitments to 10 CFR 50.48, "Fire protection" (*i.e.*, approved fire protection program) for Unit 1, using the applicant's commitment documents to Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." and contained within the applicant's fire protection CLB documents.

Further, the staff reviewed the commitments to 10 CFR 50.48 for Unit 2, using the applicant's commitment to the BTP Chemical and Mechanical Engineering Branch (CMEB) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," BTP APCSB 9.5-1, Appendix A, and 10 CFR Part 50, Appendix R. The applicant has committed the fire protection program for Unit 2 to these guidelines.

The staff reviewed LRA Section 2.3.3.18 and determined areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.3.3.18-1(a-e), dated April 17, 2008, the staff requested that the applicant verify whether each of the systems and components noted below are within the scope of license renewal, in accordance with 10 CFR 54.4(a), and subject to an AMR, in accordance with 10 CFR 54.21(a)(1), or justify their exclusion.

In LRA drawing 1-33-1, Revision 4, the staff noted that the applicant has shown the following FPS components as not within the scope of license renewal (*i.e.*, not colored in red), (RAI 2.3.3.18-1a):

- Fuel transfer pump and associated components
- 475 gallon hydro pneumatic tank FP-TK-1

In LRA drawing 1-33-3, Revision 4, the staff noted that the applicant has shown the following FPS components as not within the scope of license renewal (*i.e.*, not colored in red), (RAI 2.3.3.18-1b):

- Carbon dioxide (CO_2) refrigeration system
- CO_2 purge system

In LRA drawing 1-33-4, Revision 4, the staff noted that the applicant has shown the following FPS components as not within the scope of license renewal (*i.e.*, not colored in red), (RAI 2.3.3.18-1c):

- Electrical equipment room and diesel generator room CO_2 fire suppression system
- Halon 1301 fire suppression system

In LRA drawing 1-33-7, Revision 4, the staff noted that the applicant has shown the following FPS components as not within the scope of license renewal (*i.e.*, not colored in red), (RAI 2.3.3.18-1d):

- Northeast and southwest turbine building fire suppression system
- Relay building fire suppression system

In LRA drawing 2-33-1F, Revision 5, the staff noted that the applicant has shown the following FPS components as not within the scope of license renewal (*i.e.*, not colored in red), (RAI 2.3.3.18-1e):

- Deluge system for Transformers TR-2, TR-2A, TR-2B, TR-2C, and TR-2D
- Turbine building fire suppression systems
- Decontamination building fire suppression systems

In its response to RAI 2.3.3.18-1a, dated May 19, 2008, the applicant stated the following:

> The un-highlighted fire protection fuel transfer pump and associated components outside of the pump cubicle, which are associated with the diesel-driven fire pump, are not within the scope of license renewal. The fuel oil storage tank [FP-TK-2] shown on drawing LR 1-33-1, Revision 5, is sized to supply fuel oil for a period of 8 hours with pump operation at full capacity. The fuel transfer pump and associated piping are not classified as safety-related. No additional source of fuel is credited for operation of the pump for any 10 CFR 54.4(a) function. The fuel makeup pump and piping (outside the pump cubicle) are physically separated from all safety-related equipment, and their integrity is not required to avoid spatial interactions with safety-related components. The hydro pneumatic tank, FP-TK-1, is in scope for license renewal, but highlighting was inadvertently omitted on LRA drawing LR 1-33-1, Revision 4; drawing LR-1-33-1 was corrected (Revision 5) and submitted as errata on 12/21/2007.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-1a acceptable because the applicant has confirmed that the fuel transfer pump and associated components

are properly shown in LRA drawing 1-33-1, Revision 4 as out of scope for license renewal. The pump and associated components in question are not credited to meet the requirements of Appendix R for achieving safe-shutdown in the event of a fire.

The applicant inadvertently left as un-highlighted, the hydro pneumatic tank, FP-TK-1 on the LRA drawing, although it was identified as within the scope of license renewal and subject to an AMR. The applicant corrected the LRA drawing in its December 21, 2007 submission. Therefore, the staff's concern described in RAI 2.3.3.18-1a is resolved.

In its response to RAI 2.3.3.18-1b, dated May 19, 2008, the applicant stated the following:

> The carbon dioxide (CO_2) refrigeration components are not within the scope of license renewal. The refrigeration subsystem is not needed to maintain CO_2 tank operability. Operability requirements for the tank are based on CO_2 level and pressure. The CO_2 is stored in liquid form at saturation conditions. Excess heat that is not removed by the refrigeration components results in the temperature of the CO_2 rising. Since the CO_2 is at saturation conditions, the tank pressure rises slightly with temperature until the pressure equals that of the bleeder relief valves' set point. Both CO_2 storage tanks have bleeder relief valves and a large capacity safety valve that maintain system pressure. Under loss of refrigeration, the bleeder valve can maintain self refrigeration of the CO_2 unit and the CO_2 tank pressure will remain in the operable range. Tank levels are monitored by low level alarms and operator periodic checks. Additional CO_2 would be added as necessary to maintain levels within the operable range. The CO_2 purge system depicted on drawing LR 1-33-3, Grids F-6 through G-7, is not within the scope of license renewal. This subsystem provides for the purging of air or hydrogen from the main generator for maintenance. It is unrelated to 10 CFR 54.4(a)(3) fire protection functions or other 10 CFR 54.4(a) criteria, and is, therefore, not within the scope of license renewal. Unit I UFSAR, Table 9.10-2, "Areas in which Fire Detection/ Suppression is Outside the Scope of 50.48 Fire Protection," identifies the Main Generator CO_2 Purge System (used for purging H2 during shutdown and CO_2 during startup) as outside the scope of 10 CFR 50.48 Fire Protection."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-1b acceptable because the applicant has satisfactorily clarified the exclusion of the CO_2 refrigeration and purge system from the scope of license renewal and not subject to an AMR. The applicant stated that the CO_2 refrigeration and purge systems are not relied upon for compliance with 10 CFR 50.48 and do not have a license renewal intended function. The staff confirmed that, although the CO_2 system is addressed in the SER for Unit 2 (NUREG-1057) and in the UFSAR for Unit 1, it is not relied on for compliance with 10 CFR 50.48. Further, the CO_2 purge system for Unit 2, used for purging H_2 during shutdown and CO_2 during startup, is not credited for Appendix R for achieving safe-shutdown in the event of a fire. Therefore, the staff's concern described in RAI 2.3.3.18-1b is resolved.

In its response to RAI 2.3.3.18-1c, dated May 19, 2008, the applicant stated the following:

> The CO_2 and Halon subsystems depicted on drawing LR 1-33-4, Grids B-6 through G-10, are not within the scope of license renewal. These CO_2 and Halon subsystems provide fire suppression for equipment located in the Guard House (also known as the Security Building). Fire protection in this area is provided for

> commercial purposes only. A fire in this area would not affect the ability to achieve safe-shutdown. Unit 1 UFSAR, Table 9.10-2, identifies the Security Building as outside the scope of 10 CFR 50.48 Fire Protection.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-1c acceptable because the applicant has confirmed that the Guard House (also known as the Security Building) is not safety-related, cannot affect safety-related equipment by spatial interaction, nor required for safe-shutdown. The staff finds that the security building has no intended function pursuant to 10 CFR 54.4(a)(2) and as a result, the applicant has correctly excluded the CO_2 and Halon subsystems in the Guard House from the scope of license renewal and; thus, is not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-1c is resolved.

In its response to RAI 2.3.3.18-1d, dated May 19, 2008, the applicant stated the following:

> The fire protection equipment shown on LRA drawing 1-33-7 that is not highlighted is not within the scope of license renewal. This equipment supplies fire suppression water to outside transformers (Main transformer, and Station Service Transformers 1A, 1C and 1D) and to outside transformers in the switchyard. Fire protection for these areas is provided for commercial purposes only. A fire in these areas would not affect the ability to achieve safe-shutdown. Unit 1 UFSAR, Table 9.10-2, identifies the Relay Building (Switchyard) as outside the scope of 10 CFR 50.48 Fire Protection.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-1d acceptable because the applicant has confirmed that the main transformer and station service transformers 1A, 1C and 1D fire suppression water systems do not mitigate fires in areas containing equipment important to safe operation of the plant, nor are they credited with achieving safe-shutdown in the event of a fire. Since they are outdoors, away from safety-related equipment, the main transformer and station service transformers 1A, 1C and 1D cannot affect safety-related equipment by spatial interaction. Therefore, the staff finds that the main transformer and station service transformers 2A, 2B, 2C, and 2D fire suppression water systems were correctly excluded from the scope of license renewal and not subject to an AMR. Further, the applicant stated that the FPSs for these transformers are only provided due to insurance requirements. Therefore, the staff's concern described in RAI 2.3.3.18-1d is resolved.

In its response to RAI 2.3.3.18-1e, dated May 19, 2008, the applicant stated the following:

> The fire protection equipment shown on LRA drawing 2-33-1 F that is not highlighted is not within the scope of license renewal. This equipment supplies fire suppression water to outside transformers (Main transformer, and Station Service Transformers 2A, 2B, 2C, and 2D). Fire protection for these areas is provided for commercial purposes only. Unit 2 UFSAR, Section 9.5A.1.3.53.1, specifies that, "The isolation of the transformers from any safety-related equipment or areas precludes any possible effect on the ability to attain safe shutdown due to a transformer fire." A fire in these areas would not affect the ability to achieve or maintain safe shutdown and would not affect the ability to minimize and control a release of radioactivity. Unit 2 UFSAR, Table 9.5-12, "Areas in which Fire Detection / Suppression is Outside the Scope of 50.48 Fire Protection," includes the outside transformers, in the list of areas containing fire protection equipment that is outside the scope of 10 CFR 50.48 Fire Protection.

The Turbine Building and Decontamination Building fire suppression systems are not supplied by this piping. The references to Turbine and Decontamination Building at the left side of LR Drawing 2-33-1 F identify the locations of the fire water supplies for the transformer suppression, not the area being protected.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-1e acceptable because the applicant has confirmed that the main transformer and station service transformers 2A, 2B, 2C, and 2D fire suppression water systems do not mitigate fires in areas containing equipment important to safe operation of the plant, nor are they credited with achieving safe-shutdown in the event of a fire. Since they are outdoors and away from safety-related equipment, the main transformer and station service transformers 2A, 2B, 2C, and 2D cannot affect safety-related equipment by spatial interaction. Therefore, the staff finds that the main transformer and station service transformers 2A, 2B, 2C, and 2D fire suppression water systems were correctly excluded from the scope of license renewal and not subject to an AMR. Further, the applicant stated that the FPSs for these transformers are only provided due to insurance requirements. Therefore, the staff's concern described in RAI 2.3.3.18-1e is resolved.
Since the applicant has satisfactorily addressed all five parts of RAI 2.33.18-1, all staff concerns described in RAI 2.3.3.18-1(a-e) are resolved.

In UFSAR Section 9.10.2, Revision 22, Interim Issue 3, for Unit 1, the staff noted the applicant's discussions regarding various types of fire water suppression systems provided in the plant areas for fire suppression activities. These fire suppression systems are located in the following areas:

- Turbine room under floors
- Turbine building auxiliary bay
- Turbine oil room
- Chemistry laboratory
- Auxiliary feedwater pump area
- Residual heat removal pump area
- Redundant cable penetrations area
- Reactor plant component cooling water pump area

In RAI 2.3.3.18-2, dated April 17, 2008, the staff requested that the applicant verify whether the fire water suppression systems installed in the various areas of the plant noted above are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if excluded, provide justification for the exclusion.

In its response to RAI 2.3.3.18-2, dated May 19, 2008, the applicant stated the following for the areas in question (note that, by identifying the appropriate LRA drawings for the various items, the applicant has provided the proper indication that the item is included within the scope of license renewal):

Turbine room under floors - the flowpaths to the sprinkler systems for the turbine room under floors in the Turbine room basement and mezzanine are shown on LRA drawing LR 1-33-1, within the Turbine Building area defined by Grids D-4 to G-9, at Grids D-5 and E-5, and on drawing 1-33-7, the flow path continues to the Turbine room basement and mezzanine through alarm check (AC) valves AC-1 FP-1 and AC-1 FP-2, respectively, in Grids A-9 through C-10.

Based on its review, the staff finds the applicant's response acceptable because the applicant has identified and adequately discussed the fire water sprinkler system under floors of the turbine room as within the scope of license renewal and subject to an AMR. The staff confirms that the fire water sprinkler system under the floors of the turbine room is correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the turbine room under floors is resolved.

> Turbine Building auxiliary bay - there are two (2) sources of fire suppression for the auxiliary bay; hoses and sprinklers, shown on LRA drawing LR 1-33-1 at Grids F-3 for the hoses, and G-4 for the sprinkler supply to valve AC-FP-4, shown on drawing 1-33-7 at Grid E-5. Valve AC-FP-4 supplies the sprinklers to the auxiliary bay and cold chemistry laboratory, which are adjacent to one another and share the sprinkler source.

Based on its review, the staff finds the applicant's response acceptable because the applicant has clarified that the TB auxiliary bay has two sources of fire suppression; namely, hoses and sprinklers, and that the TB auxiliary bay system suppression system lies within the scope of license renewal and subject to an AMR. The staff confirms that the TB auxiliary bay system suppression system is correctly included within the scope of license renewal and is subject to an AMR. Therefore, the staff's concern with the turbine building auxiliary tray is resolved.

> Turbine oil room - sprinkler supply to the turbine oil room is shown on LRA drawing 1-33-1 at grid D-8, and drawing 1-33-7 at Grid D-5, through valve AC-FP-3 to the sprinklers.

Based on its review, the staff finds the applicant's response acceptable because the applicant appropriately has identified the turbine oil room sprinkler system and its components (piping and valves) as within the scope of license renewal and subject to an AMR.

The staff confirms that the turbine oil room sprinkler system and its components (piping and valves) are correctly within the scope of license renewal and subject to an AMR. Therefore, the staff concern with the turbine oil room is resolved.

> Chemistry laboratory - the sprinkler supply to the chemistry laboratory is shown on LRA drawing 1-33-2 at Grid B-3, to drawing 1-33-8, through valve AC-FP-7 to the sprinklers shown at Grid B-1.

Based on its review, the staff finds the applicant's response acceptable because the applicant appropriately has identified the chemistry laboratory sprinkler system as within the scope of license renewal and subject to an AMR. The staff confirms that the chemistry laboratory sprinkler system and its associated components are correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the chemistry laboratory is resolved.

> Auxiliary feedwater pump area - the flowpath for fire protection water supply to the auxiliary feedwater pump area is shown on LRA drawing 1-33-2 at Grid C-3, then to drawing 1-33-7 through deluge valve (DV) DV-FP-12 at Grid A-3.

Based on its review, the staff finds the applicant's response acceptable because the applicant has adequately clarified the flowpath for the auxiliary feedwater pumps area sprinkler system. The staff confirms that the auxiliary feedwater pumps area sprinkler system and its associated components are correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the auxiliary feedwater pumps area is resolved.

> Residual heat removal pump area - the flowpath for the RHR area fire protection water is shown on LRA drawing 1-33-2 at Grid C-3 as the supply to valve DV-FP-13, then to drawing 1-33-7 to valve DV-FP-13 at Grid C-3.

Based on its review, the staff finds the applicant's response acceptable because the applicant has identified and adequately discussed the flowpath for the RHR pump area sprinkler system. The staff confirms that the applicant correctly identified the RHR pump area sprinkler system and its components as within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the RHR pump area is resolved.

> Redundant cable penetrations area - there are three (3) deluge valves that supply fire protection water to the redundant cable penetration area. LRA drawing 1-33-2 at Grid C-2 shows the supply to valve DV-FP-14 (main supply valve in series with the other two deluge valves) with the flowpath continuing to grid D-5 for the supply to valves DV-FP-20 and DV-FP-19. Deluge valve DV-FP-14 is shown on drawing 1-33-7 at grid D-3, and drawing 1-33-8 shows the other two deluge valves at Grids E-9 through G-10, with valve DV-FP-19 supplying the east cable penetration sprinkler risers and valve DV-FP-20 supplying the west cable penetration sprinkler risers.

Based on its review, the staff finds the applicant's response acceptable because the applicant has adequately explained that the cable penetrations area fire suppression system is within the scope of license renewal and subject to an AMR. The applicant also adequately discussed details of redundant cable penetrations area fire suppression system.
The staff confirms that the applicant properly identified the flowpath of the redundant cable penetrations area fire suppression system and its components as within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the redundant cable penetrations area is resolved.

> Reactor plant component cooling water pump area - the flowpath for the fire protection water deluge supply to the component cooling water pump area is shown on LRA drawing 1-33-2 at Grid D-9 and then on drawing 1-33-8 at Grid C-9 for valve DV-FP-17.

Based on its review, the staff finds the applicant's response acceptable because the applicant has adequately explained that the reactor plant component cooling water pump area fire water sprinkler system is within the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff confirms that the applicant properly identified the reactor plant component cooling water pump area fire water sprinkler system as within the scope of license renewal and subject to an AMR. Therefore, the staff's concern with the reactor plant component cooling water pump area is resolved.

Since all items in RAI 2.3.3.18-2 have been satisfactorily addressed by the applicant, the staff's concerns described in RAI 2.3.3.18-2 are resolved.

In UFSAR Section 9.10.2, Revision 22, Interim Issue 3 for Unit 1, the staff noted the applicant's discussion regarding CO_2 systems provided in the plant areas for fire suppression activities. The CO_2 systems are located in the following areas:

- Cable vault areas
- Cable tray mezzanine area
- Diesel generator rooms

In RAI 2.3.3.18-3, dated April 17, 2008, the staff requested that the applicant verify whether the above CO_2 systems installed in various areas of the plant are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if excluded, provide justification for the exclusion.

In its response to RAI 2.3.3.18-3, dated May 19, 2008, the applicant stated that the Unit 1 CO_2 suppression systems for each of the bulleted areas are within the scope of license renewal and are subject to AMR. The following list identifies the LRA drawings that depict those subsystems in scope (highlighted in red):

- Cable vault areas - LRA drawing 1-33-3, Grid G-3, depicts storage unit FP-C-2, supplying the east and west cable vault areas in Grids C-1 through D-5.
- Cable tray mezzanine area - LRA drawing 1-33-3, Grid G-3, depicts storage unit FP-C-2, supplying the cable tray mezzanine in grids A-1 through B-5.
- Diesel generator rooms - LRA drawing 1-33-3, Grid G-3, depicts storage unit FP-C-2, supplying the diesel generator rooms in, Grids E-5 through G-5.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-3 acceptable because the applicant has adequately explained that the Unit 1 CO_2 suppression systems and components in question are within the scope of license and subject to an AMR, by referencing the appropriate LRA drawing 1-33-3.

The staff is assured that the Unit 1 cable vault areas, cable tray mezzanine area, and diesel generator rooms CO_2 fire suppression systems will be considered appropriately during the aging management activities. The staff concludes that the Unit 1 CO_2 suppression systems and components were correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-3 is resolved.

In UFSAR Section 9.10.2, Revision 22, Interim Issue 3 for Unit 1, the staff noted the applicant's discussion of Halon fire suppression systems for the primary process rack area and cable tunnel. The staff noted that the Halon 1301 systems do not appear in LRA Section 2.3.3.18 as being within the scope of the license renewal and subject to an AMR.

In RAI 2.3.3.18-4, dated April 17, 2008, the staff requested that the applicant verify whether the above Halon 1301 systems are within the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response dated May 19, 2008, the applicant stated the following:

> The Halon fire suppression systems for the Unit 1 primary process rack area and cable tunnel are within the scope of license renewal and are subject to AMR. The process rack area Halon systems are shown in scope (highlighted in red) on LRA drawing 1-33-4, Grids E-1 through G-4, and the cable tunnel Halon system is shown on the same drawing, Grids A-1 through B-4. These subsystems are described in LRA Section 2.3.3.18 (LRA Page 2.3-87) -- "Halon fire extinguishing subsystems are utilized for suppression in areas where electronic computer parts or equipment is used. The systems may be actuated either automatically or manually." The Halon subsystems are responsible for the LRA Section 2.3.3.18 System Intended Function under 10 CFR 54.4(a)(3) (LRA page 2.3-88) -- "Provides automatic or manual Halon fire suppression system capability."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-4 acceptable because the applicant correctly identified the Halon fire suppression systems for the Unit 1 primary process rack area and cable tunnel and its associated components as within the scope of license renewal and subject to an AMR. The staff concludes that the Unit 1 primary process rack area and cable tunnel Halon system and associated components are correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-4 is resolved.

The staff reviewed NUREG-1057, "Safety Evaluation Report Related to the Operation of Beaver Valley Power Station Unit 2," Section 9.5.1.5, dated October 1985, and noted that the jockey pump maintains the fire water system pressure, indicating that this pump has a fire protection function and implying that it should be included within the scope of license renewal. The staff also noted that the jockey pump and associated components do not appear in LRA Section 2.3.3.18 as being within the scope of the license renewal and subject to an AMR.

In RAI 2.3.3.18-5, dated April 17, 2008, the staff requested that the applicant verify whether the jockey pump and components are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-5, dated May 19, 2008, the applicant stated:

> The fire protection jockey pump FP-P-3 and associated piping and hydro pneumatic tank are in scope for license renewal and subject to AMR. The jockey pump, hydro pneumatic tank, and associated components are presented in LRA Table 2.3.3-18 as "Pump casing," "Piping," "Valve body" and "Tank" components types, and are shown in scope (highlighted in red) on LRA drawing 1-33-1, Grids A-1 through B-2.
>
> FENOC currently uses the filtered water system instead of the jockey pump and hydro pneumatic tank as the normal pressure maintenance source for the fire protection system, but the filtered water system is not credited with any intended function for license renewal, and the portion of the system that supplies makeup to the fire protection system is not within the scope of license renewal. Failure of the filtered water system to maintain pressure in the fire protection system would

not affect the ability of the fire protection water suppression system to perform any intended function. A rupture or leak in the filtered water system can be isolated from the fire protection system at the in-scope system interface valve FP-1 052, shown on LR Drawing 1-33-1, Grid E-9. The fire pumps are capable of running on recirculation to maintain system pressure, and are continuously available to provide suppression flow. Restoration of filtered water supply to the fire protection system for normal pressure maintenance would be an item of maintenance convenience, not one of fire protection operability.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-5 acceptable because the applicant has identified the jockey pump and hydro-pneumatic tank and their associated components as within the scope of license renewal and subject to an AMR. The applicant stated that the jockey pump and hydropneumatic tank are included in the component type "Pump Casing," "Piping," "Valve body" and "Tank" listed in LRA Table 2.3.3-18. The staff has confirmed that the applicant has correctly identified the jockey pump and hydro pneumatic tank and associated components within the scope of license renewal and subject to an AMR. Therefore, the staff concern described in RAI 2.3.3.18-5 is resolved.

The staff reviewed SER (NUREG-1057) Section 9.5.1.5 and UFSAR Section 9.5.1.7.3, Revision 2, Interim Issue 2 for Unit 2, where the applicant discussed various types of fire water suppression systems that are provided in the plant areas for fire suppression activities. The fire suppression systems are as follows:

- water spray system for condensate polishing building charcoal filter
- water spray system for fuel and decontamination building charcoal filter
- water spray system for auxiliary building general area
- deluge water spray systems for reactor containment areas (charcoal filter banks, RHR pumps, and orange purple cable penetrations area)
- automatic water deluge spray system for south safeguards area AFW pump room
- wet pipe sprinkler system for turbine building (under operating and mezzanine floors)
- automatic water spray deluge water curtain at the entrance to the condensate polishing pipe tunnel
- deluge system for turbine oil reservoir and coolers
- automatic water spray deluge system for hydrogen seal oil unit
- sprinkler system for auxiliary boiler area
- dry pipe sprinkler system for South Office Shops Building (SOSB) railway bay

In RAI 2.3.3.18-6, dated April 17, 2008, the staff requested that the applicant verify whether the above fire water suppression systems installed in various areas of the plant are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-8, dated May 19, 2008, the applicant stated:

> Each of the bulleted fire water suppression systems, with the exception of those for the auxiliary boiler area and SOSB railway bay, are within the scope of license renewal and are subject to AMR.
>
> Fire protection systems for the auxiliary boiler area and SOSB railway bay are not within the scope of license renewal because a fire in these areas would not affect the ability of the BVPS Unit 2 to achieve safe-shutdown. Unit 2 UFSAR, Table 9.5-12, includes the Auxiliary Boiler Room and SOSB in the list of areas containing fire protection equipment that is outside the scope of 10 CFR 50.48 Fire Protection.
>
> The following list identifies the LRA drawings that depict the subsystems in scope (highlighted in red):
>
> - water spray system for condensate polishing building charcoal filter LRA drawing 2-33-1 F, Grid E-8
> - water spray system for fuel and decontamination building charcoal filter LRA drawing 2-33-1 B, Grid E-9 (the "fuel and decontamination building charcoal filter" refers to a single filter, associated with the fuel and decontamination building)
> - water spray system for auxiliary building general area - LRA drawing 2- 33-1A, left side, and drawing 2-33-1 C, Grids D-6 through F-7
> - deluge water spray systems for reactor containment areas (charcoal filter banks, RHR pumps, and orange purple cable penetrations area) - LRA drawing 2-33-1D (all)
> - automatic water deluge spray system for south safeguards area auxiliary feedwater pump room - LRA drawing 2-33-1 B, Grids C-1 through G-3
> - wet pipe sprinkler system for turbine building (under operating and mezzanine floors) - LRA drawing 2-33-1 E, Grids D-1 through G-4
> - automatic water spray deluge water curtain at the entrance to the condensate polishing pipe tunnel - LRA drawing 2-33-1 F, Grids F-8 through E-1 0
> - deluge system for turbine oil reservoir and coolers - LRA drawing 2-33-1 E, Grids E-8 through E-10
> - automatic water spray deluge systems for hydrogen seal oil unit – LRA drawing 2-33-1 E, Grids D-5 through D-7
> - sprinkler system for auxiliary boiler area - none; auxiliary boiler area fire protection is not in scope for license renewal
> - dry pipe sprinkler system for SOSB railway bay - none; SOSB railway bay fire protection is not in scope for license renewal

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-6 acceptable because the applicant has confirmed that the various types of Unit 2 fire water suppression systems are identified as within the scope of license renewal and subject to an AMR. The applicant stated that the sprinkler system for the auxiliary boiler room and dry pipe sprinkler

system for the SOSB railway are not credited for 10 CFR 50.48, and therefore, not within the scope of the license renewal. Further, these two FPSs do not support Unit 2 post-fire safe-shutdown requirements. The staff concludes that the applicant has correctly identified the fire suppression systems installed in various areas of the plant that are within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-6 is resolved.

The staff reviewed SER (NUREG-1057) Section 9.5.1.5 and UFSAR Revision 2, Interim Issue 2, for Unit 2, where the applicant discussed the total flooding Halon 1301 suppression systems for the computer and west communications room. The staff noted that the total flooding Halon 1301 suppression systems do not appear in LRA Section 2.3.3.18 as being within the scope of the license renewal and subject to an AMR.

In RAI 2.3.3.18-7, dated April 17, 2008, the staff requested that the applicant verify whether the total flooding Halon 1301 suppression systems and its components are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-7, dated May 19, 2008, the applicant stated:

> The Halon suppression systems for the Unit 2 computer and west communications room are within the scope of license renewal and are subject to AMR. LRA drawing-2-33-3 (entire drawing) shows these systems in scope (highlighted in red). LRA drawing 2-33-3, however, does not include the term "west" in the title of the "communications room." These subsystems are described in LRA Section 2.3.3.18 (LRA page 2.3-87) -- "Halon fire extinguishing subsystems are utilized for suppression in areas where electronic computer parts or equipment is used. The systems may be actuated either automatically or manually." The Halon subsystems are responsible for the LRA Section 2.3.3.18 System Intended Function under 10 CFR 54.4(a)(3) (LRA page 2.3-88) -- "Provides automatic or manual Halon fire suppression system capability."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-7 acceptable because the applicant has confirmed that the Unit 2 total flooding Halon 1301 suppression systems for the computer and west communications room are within the scope of license renewal and subject to an AMR. Further, the applicant clarified that the LRA drawing 2-33-3 does not include the term "west" in the title of the "communications room." These subsystems are described in LRA Section 2.3.3.18 (LRA page 2.3-87), "Halon fire extinguishing subsystems are utilized for suppression in areas where electronic computer parts or equipment is used." The staff concludes that the total flooding Halon fire suppression systems and the associated components are correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-7 is resolved.

The staff reviewed SER (NUREG-1057) Section 9.5.1.5 and UFSAR, Revision 2, Interim Issue 2, for Unit 2 where the applicant discussed the total flooding CO_2 systems provided in the plant areas for fire suppression activities. The CO_2 systems are located in the following areas:

- control building instrument and relay room
- cable spreading room
- cable tunnel

- cable vault/rod control building (El 735'-6" and El 755'-6")
- orange diesel generator room, purple diesel generator room
- cable vault relay room
- service building cable tray area
- turbine generator

In RAI 2.3.3.18-8, dated April 17, 2008, the staff requested that the applicant verify whether the CO_2 systems installed in the above areas of the plant are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-8, dated May 19, 2008, the applicant stated:

> The Unit 2 CO_2 suppression systems for each of the bulleted areas are within the scope of license renewal and are subject to AMR. The following list identifies the LRA drawings that depict those subsystems in scope (highlighted in red):
>
> - Control building instrument and relay room - LRA drawing 2-33-2A, Grids C-10 and D-10.
> - Cable spreading room - LRA drawing 2-33-2A, Grid B-10.
> - Cable tunnel - LRA drawing 2-33-2A, Grid B-8.
> - Cable vault/rod control building (El. 735'-6" and El. 755'-6") - LRA drawing 2-33-2A, Grids C-5 to E-9.
> - Orange diesel generator room, purple diesel generator room - LRA drawing 2-33-2A, Grids G-4 and G-5.
> - Cable vault relay room - LRA drawing 2-33-2A, Grids F-9 to G-10.
> - Service building cable tray area - LRA drawing 2-33-2A, Grid F-8 and G-8.
> - Turbine generator- LRA drawing 2-33-2B (all).

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-8 acceptable because the applicant has correctly identified the total flooding CO_2 fire suppression systems for various areas for Unit 2 as within the scope of license renewal and subject to an AMR. The staff concludes that the total flooding CO_2 fire suppression systems for Unit 2 provided in the following locations: (a) control building instrument and relay room, (b) cable spreading room, (c) cable tunnel, (d) cable vault/rod control building (El 735'-6" and El 755'-6"), (e) orange diesel generator room, (f) purple diesel generator room, (g) cable vault relay room, (h) service building cable tray area, and (i) turbine generator and associated components, were correctly included within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.18-8 is resolved.

The staff reviewed SER (NUREG-1057) Section 9.5.1.5 and UFSAR Section 9.5.1.8.5, Revision 2, Interim Issue 2 for Unit 2 where the applicant discussed standpipe hose stations for emergency switchgear rooms. The staff noted that the standpipe hose stations for switchgear rooms do not appear in LRA Section 2.3.3.18 as being within the scope of the license renewal and subject to an AMR.

In RAI 2.3.3.18-9, dated April 17, 2008, the staff requested that the applicant verify whether the standpipe hose stations for switchgear rooms are within the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1) and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-9, dated May 19, 2008, the applicant stated:

> The water suppression for the emergency switchgear rooms is provided by manual fire standpipe hose stations (hose racks) located in the stairwells adjacent to the switchgear rooms. These hose racks are within the scope of license renewal and are subject to AMR, and are listed as component type "hose rack" in LRA Table 2.3.3-18. They are shown in-scope (highlighted in red) on LRA drawing 2-33-1 B, Grids C-4 and C-5 (Service Building hose racks). Specifically, hose stations 219 and 220 are located outside of the emergency switchgear rooms.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-9 acceptable because the applicant has correctly identified the standpipe hose stations for the emergency switchgear rooms for Unit 2 as within the scope of license renewal and subject to an AMR. The applicant has evaluated standpipe hose stations as component type "hose racks" in LRA Table 2.3.3-18, which is within the scope for license renewal and subject to an AMR. The staff is assured that the standpipe hose stations used for fire suppression will be appropriately considered during plant aging management activities. Therefore, the staff's concern described in RAI 2.3.3.18-19 is resolved.

The staff reviewed LRA Tables 2.3.3-18 and 3.3.2-18 and noted that the applicant has excluded several types of fire protection components that appear on the LRA drawings as within the scope of license renewal (i.e., highlighted in red). These components are listed below:

- hose connections
- interior fire hose stations
- pipe supports
- couplings
- threaded connections
- restricting orifices
- interface flanges
- chamber housings
- heat-actuated devices
- thermowells
- water motor alarms
- filter housing
- gear box housing
- turbocharger housing
- latch door pull box
- pneumatic actuators
- actuator housing
- dikes for oil spill confinement
- buried underground fuel oil tanks for emergency diesel generators
- fire water main loop valves
- post-indicator valves

- jacket cooling water keepwarm pump and heater
- lubricating oil cooler
- rocker lubricating oil pump
- floor drains and curbs for fire-fighting water
- backflow prevention devices
- flame retardant coating for cables
- fire retardant coating for structural steel supporting walls and ceilings

In RAI 2.3.3.18-10, dated April 17, 2008, the staff requested that the applicant verify whether the components listed above should be included in LRA Tables 2.3.3-18 and 3.3.2-18 and if not, provide justification for the exclusion.

In its response to RAI 2.3.3.18-10, dated May 19, 2008, the applicant stated:

> The components within the scope of License Renewal and within the fire protection system are grouped within the component type names listed in LRA Table 2.3.3-18. LRA Section 3.0.1.2 provides brief descriptions of the component type names used. Some components in the bulleted list for this question, perform functions associated with fire protection or safe-shutdown, but are contained within a system other than the fire protection system. For example, some of the bulleted component types questioned are associated with emergency diesel generators. While emergency diesel generators perform functions credited for fire protection, they are not evaluated within the fire protection system, but within the diesel generator systems (LRA Sections 2.3.3.11 through 2.3.3.17, and 2.3.3.29). Some components such as dikes, curbs and fire retardant coatings for structural steel are evaluated within the LRA as bulk structural commodities in LRA Section 2.4.36.
>
> Specifics for each bulleted component type are provided, including identification of those component types that are not in-scope or not subject to AMR:
>
> - Hose connections - outdoor fire protection hose connections exist on fire hydrants. Hydrants were evaluated as valves; they appear in Table 2.3.3-18 as "Valve body," and are listed in Table 3.3.2-18 as "Valve body (hydrant)." Interior hose connections are located at hose racks, and are labeled "Hose rack" in Table 2.3.3-18, and "Hose rack (CO_2)," or "Hose rack (water)" in LRA Table 3.3.2-18.
> - Interior fire hose stations - labeled "Hose racks" in Table 2.3.3-18, and "Hose rack (CO_2)," or "Hose rack (water)" in LRA Table 3.3.2-18
> - Pipe supports - "Pipe supports" were evaluated as structural commodities in LRA Tables 2.4-36 and 3.5.2-36
> - Couplings - fire protection couplings were evaluated as piping components, and appear in LRA Table 2.3.3-18 as "Piping," and in LRA Table 3.3.2-18 as "Piping," "Piping (buried)," "Piping (CO_2 fittings)," "Piping (CO_2)," "Piping (drained/vented)," "Piping (halon fittings)," "Piping (halon)," and "Piping (RCP oil collection)"
> - Threaded connections - fire protection threaded connections were evaluated as piping components, and appear in LRA Table 2.3.3-18 as "Piping," and in LRA Table 3.3.2-18 as "Piping," "Piping (buried)," "Piping (CO_2 fittings)," "Piping (CO_2)"

"Piping (drained/vented)," "Piping (halon fittings)," "Piping (halon)," and "Piping (RCP oil Collection)"

- Restricting orifices - orifices are listed in LRA Tables 2.3.3-18 and 3.3.2-18 as "Orifice"
- Interface flanges - fire protection flanges were evaluated as piping components, and appear in Table 2.3.3-18 as "Piping," and in LRA Table 3.3.2-18 as "Piping," "Piping (buried)," "Piping (CO_2 fittings)," "Piping (CO_2)," "Piping (drained/vented)," "Piping (halon fittings)," "Piping (halon)," and "Piping (RCP oil collection)"
- Chamber housings - retarding chambers used in water suppression alarm circuits appear in LRA Table 2.3.3-18 as "Tank," and are listed in LRA Table 3.3.2-18 as "Tank (retarding chamber)"
- Heat-actuated devices - heat actuated devices are electrical fire detection devices that correspond to Nuclear Energy Institute NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Appendix B, "Typical Structure, Component and Commodity Groupings and Active/Passive Determinations for the Integrated Plant Assessment," Item 73, "Alarm Unit." These devices are active electrical components and are not subject to AMR per 10 CFR 54.21(a)(1)(i)
- Thermowells - thermowells are integral piping or tank components, and appear in the LRA Tables as "Piping," or as "Tank" component type
- Water motor alarms - water motor alarms, labeled "water gongs," provide local audible indication of fire protection deluge or alarm check valve actuation. Water gongs are independent of control room alarms, are not credited with performance of any function under 10 CFR 54.4(a), and are not within the scope of license renewal
- Filter housing - there are no filter housings that are within the boundaries of the fire protection system and subject to AMR. Numerous fire protection strainer bodies are in scope, and are listed as "Strainer body" in LRA Tables 2.3.3-18 and 3.3.2-18
- Gear box housing - all portions of gear boxes in the fire protection system are active components not subject to AMR. The diesel engine driven fire pump includes a gear box which is an integral subcomponent of the diesel driven fire pump drive train, corresponding to NEI 95-10, Appendix B, and item 55, "Fire Pump Diesel Engines". The gear box and housing is part of the active assembly, and is not subject to AMR per 10 CFR 54.21(a)(1)(i). Some manual valve or damper operators have gear boxes corresponding to NEI 95-10, Appendix B, item 108, "Manual Valves," 110, "Motor-Operated Valves," or 116, "Dampers, louvers, and gravity dampers." Only the bodies (or housings) of the actuated valves or dampers are passive and subject to AMR. The valve or damper actuators, including gear boxes, are active components not subject to AMR per 10 CFR 54.21(a)(1)(i). Gearbox housings in other systems that are associated with a separate lube oil subsystem (with a circulating pump and heat exchanger) are subject to AMR. For example, the Chemical and Volume Control System includes gear boxes within the charging pump lube oil system that are subject to AMR in LRA Tables 2.3.3-5 and 3.3.2-5

- Turbocharger housing - turbocharger housings are identified and evaluated for diesel generators in LRA Sections 2.3.3.11, 2.3.3.17, and 2.3.3.29. While the diesel driven fire pump engine has a turbocharger, the engine is a small (380 HP) unit, and the turbocharger is considered an integral part of the active engine assembly corresponding to NEI 95-10, Appendix B, item 55, "Fire Pump Diesel Engines," and is not subject to AMR per 10 CFR 54.21(a)(1)(i)
- Latch door pull box - pull boxes are active electrical switch assemblies corresponding to NEI 95-10, Appendix B, item 102, "Switches," that are not subject to AMR per 10 CFR 54.21(a)(1)(i)
- Pneumatic actuators - pneumatic actuators in the fire protection system are active components corresponding to NEI 95-10, Appendix B, item 111, "Air-Operated Valves," and are not subject to AMR per 10 CFR 54.21(a)(1)(i)
- Actuator housing - actuator housings in the fire protection system are considered integral parts of active components corresponding to NEI 95-10, Appendix B, item 111, "Air-Operated Valves," and are not subject to AMR per 10 CFR 54.21(a)(1)(i)
- Dikes for oil spill confinement - "Flood curbs" are evaluated as structural commodities in LRA Tables 2.4-36 and 3.5.2-36
- Buried underground fuel oil tanks for emergency diesel generators - fuel tanks associated with diesel generators are not evaluated with the fire protection system, but with the associated diesel generator systems. Buried emergency diesel fuel tanks are listed as "Tank" in LRA Tables 2.3.3-14 and 2.3.3-29, and are evaluated as "Tank" in "Soil" in LRA Tables 3.3.2-14 and 3.3.2-29
- Fire water main loop valves - fire protection valves are labeled "Valve body" in LRA Table 2.3.3-18. Some valves include a parenthetical clarification of type; many main loop valves are buried, and are labeled "Valve body (buried)" in LRA Table 3.3.2-18. Fire water main loop valves within the Intake Structure are labeled "Valve body (water system)" in LRA Table 3.3.2-18
- Post-indicator valves - valves are labeled "Valve body" in LRA Table 2.3.3-18. Some valves include a parenthetical clarification of type; post-indicator valves are buried, and are labeled "Valve body (buried)" in LRA Table 3.3.2-18
- Jacket cooling water keepwarm pump and heater - the diesel driven fire pump engine has an electric jacket water heater, but the engine is a small (380 HP) unit, and the heater is considered an integral part of the active engine assembly, corresponding to NEI 95-10, Appendix B, item 55, "Fire Pump Diesel Engines," and is not subject to an AMR per 10 CFR 54.21(a)(1)(i) separate from that of the engine assembly itself. AMR evaluations for the emergency diesel generators include these components, which are labeled "Pump casing" and "Heater housing" in LRA Tables 2.3.3-16 and 3.3.2-16
- Lubricating oil cooler - LRA Table 2.3.3-18 includes evaluation of the lubricating oil cooler (labeled "Heat exchanger") for the diesel driven fire pump, which is labeled "Heat exchanger (oil cooler - housing)" and "Heat exchanger (oil cooler - tube)" in LRA Table 3.3.2-18

- Rocker lubricating oil pump - lubricating pumps for the emergency diesel generators and the security diesel generator are labeled "Pump casing" in LRA Tables 2.3.3-15, 3.3.2-15, 2.3.3-29, and 3.3.2-29
- Floor drains and curbs for fire-fighting water - floor drains are evaluated as "Piping" in LRA Tables 2.3.3-4 (Building and Yard Drains) and 2.3.3-27 (Reactor Plant Vent and Drains). "Flood curbs" are evaluated as structural commodities in LRA Tables 2.4-36 and 3.5.2-36
- Backflow prevention devices - no special name is given to piping configurations such as loop seals that prevent backflow in drain systems. The piping is labeled "Piping." Check valves are labeled "Valve body" in LRA Table 2.3.3-18, and "Valve body (CO_2/halon)" or "Valve body (water system)" in LRA Table 3.3.2-18
- Flame retardant coating for cables - Electrical cables are addressed in LRA Section 2.5. Coatings applied by manufacturers are not considered a separate component, but are evaluated and managed with the cables themselves. "Fire wraps" are used for some cable/cable tray locations and are evaluated as a structural commodity in LRA Tables 2.4-36 and 3.5.2-36
- Fire retardant coating for structural steel supporting walls and ceilings – "Fireproofing" and "Fire wraps" are evaluated as structural commodities in LRA Tables 2.4-36 and 3.5.2-36

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-10 acceptable. Although the applicant states that they consider these components to be included in other line items, the descriptions of the line items in the LRA do not specifically list all these components. The applicant properly identified the following components to be included in the other line items within the scope of license renewal and subject to an AMR: (a) hose connections; (b) interior fire hose stations; (c) pipe supports; (d) couplings; (e) threaded connections; (f) restricting orifices; (g) interface flanges; (h) chamber housing;(i) thermowells; (j) dikes for oil spill confinement; (k) buried underground fuel oil tanks; (l) fire water main loop valves; (m) post-indicator valves; (n) lubricating oil cooler; (o) rocker lubricating oil pump; (p) floor drains and curbs for fire-fighting water; (q) backflow prevention devices; (r) fire wraps; and (s) fire retardant coating for structural steel supporting walls and ceilings. The staff is assured that these components will be appropriately considered during the plant aging management activities.

For each of the following components, the staff found that they were not included in the line item descriptions in the LRA: (a) heat-actuated devices; (b) water motor alarms; (c) gear box housing; (d) latch door pull box; (e) pneumatic actuators; (f) and actuator housing. Further, the applicant has considered the turbocharger housing and jacket cooling water keepwarm pump and heater as an integral part of the active diesel driven fire pump engine assembly. Filter housings are not part of the FPS boundaries, however, fire protection strainers are identified as within the scope of license renewal and subject to an AMR. The staff recognizes the applicant's interpretation of these components as active (short-lived components), which will result in more vigorous oversight of the condition and performance of the component. Because the applicant has interpreted that these components are active, the staff concludes that the components were correctly excluded from the scope of license renewal and are not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.8-10 is resolved.

The staff reviewed LRA Section 2.3.3.18 in which the applicant discussed the requirements for the fire water supply system but did not mention trash racks and traveling screens for the fire

pump suction water supply. Trash racks and traveling screens are located upstream of the fire pump suction to remove any major debris from the fresh or raw water supply. Trash racks and traveling screens are necessary to remove debris from and prevent clogging of the fire protection water supply system. Trash racks and traveling screens are typically considered to be passive, long-lived components. Both trash racks and traveling screens are located in a fresh or raw water or air environment and are typically constructed of carbon steel. Carbon steel in a fresh or raw water environment or water or air environment is subject to loss of material, pitting, crevice formation, and microbiologically influenced corrosion, and fouling.

In RAI 2.3.3.18-11, dated April 17, 2008, the staff requested that the applicant explain the apparent exclusion of the trash racks and traveling screens located upstream of the fire pump suction from the scope of license renewal pursuant to 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response to RAI 2.3.3.18-11, dated May 19, 2008, the applicant stated:

> The trash racks and traveling screens are within the scope of license renewal and are subject to AMR, but are not evaluated within the fire protection system. FENOC evaluated Intake Structure trash racks and traveling screens as structural components associated with the Intake Structures. While the common Intake Structure houses the fire pumps, the Alternate Intake Structure also has trash racks and traveling water screens. These components appear in LRA Tables 2.4-1, 2.4-17, 3.5.2-1 and 3.5.2-17 as "Screen guides," "Trash racks," and "Traveling screen casing and associated framing." The active components of the traveling screens are not subject to AMR per 10 CFR 54.21(a)(1)(i).

Based on its review, the staff finds the applicant's response to RAI 2.3.3.18-11 acceptable because the applicant has evaluated trash racks and traveling screens as components associated with the intake structures in LRA Section 2.4.1. Because the applicant has committed to interpret trash racks and traveling screens as included in the intake structure system components, which is within the scope for license renewal and subject to an AMR, the staff is assured that the racks and traveling screens used for fire suppression will be appropriately considered during plant aging management activities. Also the staff has confirmed that the trash racks and traveling screens are included in LRA Tables 2.4-1, 2.4-17, 3.5.2-1, and 3.5.2-17 as "Screen guides," "Trash racks," and "Traveling screen casing and associated framing." Further, the applicant has indicated that the active components of the traveling screens are not subject to AMR. Therefore, the staff's concern described in RAI 2.3.3.18-11 is resolved.

2.3.3.18.3 Conclusion

The staff reviewed the LRA, UFSAR, RAI responses, and all available drawings as provided by the applicant to determine whether the applicant has failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff sought to determine whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the fire protection Halon 1301, and RCP oil collection systems' components within the scope of license

renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.19 Fuel Pool Cooling and Purification System

2.3.3.19.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.19, the applicant described the safety-related fuel pool cooling and purification system, which removes heat generated by the stored spent fuel assemblies, maintains clarity of the water in the spent fuel storage pool and the refueling cavity, and makes access to the working area in and around the spent fuel storage pool possible.

The fuel pool cooling and purification system consists of two subsystems, the fuel pool cooling and the fuel pool purification subsystems. The fuel pool cooling subsystem consists of two circulating pumps, two heat exchangers, and the necessary piping and valves. The subsystem configuration can allow either pump to circulate flow through either heat exchanger to control fuel pool temperature and level.

The fuel pool purification subsystem consists of two circulating pumps, two filters, one demineralizer, and the necessary piping and valves. The subsystem configuration can allow either pump to circulate flow through either filter to:

- control the clarity and purity of the fuel pool
- support operation of the refueling cavity during refueling
- clean up the RWST
- supply emergency makeup water to the RWST

Diverse makeup sources for the spent fuel pool are available from the boron recovery system (*i.e.*, primary grade water), the SWS (Unit 2), the containment depressurization system (*i.e.*, the RWST), and the FPS (*i.e.*, via hose racks).

The fuel pool cooling and purification system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the fuel pool cooling and purification system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the fuel pool cooling and purification system performs functions that support EQ (Unit 2 only).

LRA Table 2.3.3-19 identifies fuel pool cooling and purification system component types within the scope of license renewal and subject to an AMR:

- bolting
- demineralizer
- expansion joint
- filter
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- strainer body

- tank
- tubing
- valve body

The intended functions of the fuel pool cooling and purification system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.19.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.19 and UFSAR Sections 9.5 and 9.1.3 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1). During its review of LRA Section 2.3.3.19, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA Table 2.4-14 for the Unit 1 fuel building and LRA Table 2.4-22 for the Unit 1 reactor containment building, where the applicant has identified the spent fuel pool liner and the refueling cavity liner as subject to an AMR with the intended function of structural pressure boundary. On LRA drawing 1-20-1 for the Unit 1 fuel pool cooling and purification system, the applicant did not highlight the component spent fuel pool skimmer, 1FC-SK-1, and associated piping and refueling cavity skimmer 1FC-SK-2. Skimmers 1FC-SK-1 and 1FC-SK-2 appear to be structurally attached to the spent fuel pool liner and refueling cavity liner, respectively.

In RAI 2.3.3.19-1, dated April 17, 2008, the staff requested that the applicant justify why skimmers 1FC-SK-1 and 1FC-SK-2, and their associated piping, do not have as intended function, structural pressure boundary.

In its response to RAI 2.3.3.19-1, dated May 19, 2008, the applicant stated:

> The non safety-related fuel pool cooling and purification system spent fuel pool and refueling cavity skimmers and their flexible hoses do not have an intended function of structural pressure boundary (or leakage boundary (spatial)) because they cannot leak onto or spray nearby safety-related components, and do not provide mechanical or structural support to the pool or cavity liner. The skimmers float on the water surface and use flexible hoses to connect to non safety-related piping connections that penetrate the pool liner. The flexible hoses do not provide mechanical or structural support to the pool or cavity liner or piping.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.19-1 acceptable, because the applicant has clarified that the skimmers and attached flexible hoses do not provide a function of structural pressure boundary and are not within the scope of license renewal. The staff confirms that the skimmers and attached flexible hoses do not provide a function of structural pressure boundary and; thus, are not within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.19-1 is resolved.

2.3.3.19.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions. Based on its review, the staff finds that the applicant has adequately identified the fuel pool cooling and purification system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.20 Gaseous Waste Disposal System

2.3.3.20.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.20, the applicant described the nonsafety-related GWD system, which controls, collects, processes, handles, stores, recycles, and disposes of all gaseous radioactive waste generated by plant operation. The GWD system processes and via the RMS (LRA Section 2.3.3.25), monitors all waste gas streams prior to their discharge to the atmosphere. The system allows decay-time for the degasifier gaseous effluent and for the condenser air-ejector offgas stream as necessary and recycles the hydrogen in the degasifier overheads back to the VCT. All gaseous waste effluent not recycled goes to the GWD system for disposal. The system also stores gases generated from either unit going to cold shutdown.

The failure of nonsafety-related SSCs in the GWD system could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-20 identifies GWD system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing

- heat exchanger
- piping
- sight glass
- strainer body
- tank
- trap body
- tubing
- valve body

The intended functions of the GWD system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.20.2 Staff Evaluation

The staff performed a simplified Tier 1 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.3.20.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.21 Liquid Waste Disposal System

2.3.3.21.1 Summary of Technical Information in the Application

The staff performed a simplified Tier 1 review of this Balance of Plant System. In LRA Section 2.3.3.21, the applicant described the nonsafety-related liquid waste disposal system (WDS), which processes liquid waste to comply with 10 CFR Part 20. The system collects, processes, and disposes of liquid radioactive waste generated by normal plant operation, including normal operational transitions. The liquid WDS consists of tanks, filters, pumps, heat exchangers, evaporators, demineralizers, piping, valves, and instrumentation necessary for operation and control. Liquid effluents in the reactor plant enter the reactor plant vent and drain system, while aerated wastes are routed to the liquid WDS. The system can process waste from either unit.

Liquid waste from building sumps must be processed with dilution, for suitability, prior to discharge into the river. The system can process liquid waste with an evaporator. However, it is not in use; thus, the system uses demineralizers.

The failure of nonsafety-related SSCs in the liquid WDS could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-21 identifies liquid WDS component types within the scope of license renewal and subject to an AMR:

- bolting
- demineralizer
- filter housing
- flexible hose
- heat exchanger
- heater housing
- orifice
- piping
- pump casing
- strainer body
- tank
- tubing
- valve body

The intended function of the liquid WDS component types within the scope of license renewal is to provide nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related SSCs caused by spatial interactions.

2.3.3.21.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.21 and UFSAR Sections 11.2.4 for Unit 1 and 11.2 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.21, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA Table 2.3.3-21, noting that the applicant listed all of the components within the scope of license renewal having an intended function of "leakage boundary (spatial)." However, on LRA drawings, 2-17-1 and 1-17-1, the applicant did not highlight several tank vents. Additionally, on LRA drawing 1-17-3, the applicant did not highlight a piping line with valve 1LW-486. These components are in the same room or building as other components in this system, which are identified as within the scope of license renewal. In RAI 2.3.3.21-1, dated April 17, 2008, the staff requested that the applicant justify the exclusion of these components from the scope of license renewal for leakage boundary.

In its response to RAI 2.3.3.21-1, dated May 19, 2008, the applicant stated that "the tank vents are not fluid-filled components, contain ambient air, and do not have the potential for spatial interaction with safety-related components. Therefore, the tank vents are not within the scope of

license renewal in accordance with NEI 95-10, Appendix F, paragraph 5.2.2.1." The applicant, in its response, revised the LRA drawing 1-17-3 to include the piping line, previously not shown, as within the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.21-1 acceptable because the applicant has adequately clarified that the tank vents are not within the scope of license renewal. The applicant revised the LRA drawing to include the previously not shown piping line as within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.21-1 is resolved.

The staff reviewed LRA drawing 1-17-2, noting that the applicant has highlighted expansion joint MEJ-LW-1 as within the scope of license renewal. However, in LRA Tables 2.3.3-21 and 3.3.2-21, the applicant did not list this component type "expansion joint;" whereas, other LRA tables include component type "expansion joint" in other systems. In RAI 2.3.3.21-2, dated April 17, 2008, the staff requested that the applicant justify the exclusion of component type "expansion joint" from the scope of license renewal in LRA Tables 2.3.3-21 and 3.3.2-21.

In its response to RAI 2.3.3.21-2, dated May 19, 2008, the applicant revised LRA Table 2.3.3-21 to include component type "expansion joint" and LRA Table 3.3.2-21 to include the aging evaluations for this expansion joint.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.21-2 acceptable because the applicant has appropriately revised the LRA to include an AMR for the expansion joint and revised the LRA tables accordingly. Therefore, the staff's concern described in RAI 2.3.3.21-2 is resolved.

2.3.3.21.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the liquid waste disposal system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with 10 CFR 54.21(a)(1).

2.3.3.22 Post-Accident Sample System

2.3.3.22.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.22, the applicant described the post-accident sample system, which the CLB no longer credits for its sampling function. The post-accident sample system was designed to draw reactor coolant, containment atmosphere, and containment sump samples after a design-basis accident. The system is no longer credited for this function, but the equipment remains in place along with the sample piping and valves. The post-accident sample system for Unit 2 has a containment penetration that no longer supports the system sampling function.

The post-accident sample system contains safety-related components relied upon to remain functional during and following DBEs (Unit 2 only). The failure of nonsafety-related SSCs in the post-accident sample system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the post-accident sample system performs functions that support EQ.

LRA Table 2.3.3-22 identifies post-accident sample system component types within the scope of license renewal and subject to an AMR:

- bolting
- drip pan
- heat exchanger
- piping
- pump casing
- sample capsule
- sample panel
- strainer body
- tank
- tubing
- valve body

The intended functions of the post-accident sample system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.22.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.22, UFSAR Section 12.2.1.3.3 for Unit 2, and UFSAR Table 6.2-60 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.22, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA Section 2.3.3.22, noting the applicant's statement that the PASS for Unit 1 contains components with a non safety-related function pursuant to 10 CFR 54.4(a)(2) and contains components relied upon to demonstrate compliance with the EQ regulation in accordance with 10 CFR 54.4(a)(3). However, the staff noted that on LRA drawing 1-14C-1, the applicant highlighted components of the post-accident sampling system (PASS) as being within the scope of license renewal. In this LRA section, the applicant stated that the PASS is no longer credited by the CLB for its sampling function. In contrast, in UFSAR Sections 11.3.3.3.27, 11.3.3.3.28, and 11.3.3.3.29 for Unit 1, the applicant described the operation and functions of PASS, which include the sampling function. In RAI 2.3.3.22-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the PASS sampling function from the Unit 1 CLB and from the scope of license renewal.

In its response to RAI 2.3.3.22-1, dated June 9, 2008, the applicant stated that the PASS was excluded because "BVPS Unit 1 License Amendment 245 and Unit 2 Amendment 123 eliminated the requirement to have and maintain the PASS." The applicant added that "the system is no longer credited with sampling functions," although the system components have not been physically removed. The applicant clarified that the UFSAR Subsections 11.3.3.3 for Unit 1 describe the RMS rather than the PASS. The radiation monitors in UFSAR Sections 11.3.3.3.27, 11.3.3.3.28, and 11.3.3.3.29 for Unit 1 are associated with the PASS, and according to the applicant, their descriptions have not been changed in the UFSAR because the system has not been physically removed from the plant.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.22-1 acceptable because the applicant has clarified that PASS is no longer part of the CLB for Unit 1 and is not within the scope of license renewal because the requirements to have and maintain the PASS were eliminated. The staff confirms that the PASS is no longer part of the CLB for Unit 1 and is not within the scope of license renewal and; thus, not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.22-1 is resolved.

2.3.3.22.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the PASS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.23 Post-Design Basis Accident Hydrogen Control System

2.3.3.23.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.23, the applicant described the post-DBA hydrogen control system (HCS). The 2003 revision of 10 CFR 50.44 eliminated the requirement for hydrogen recombiners and hydrogen purge systems. The recombiners are retired but some components remain, including containment penetrations and purge components. The system has redundant hydrogen analyzers with piping and valves and obtains containment samples through independent sample lines for each analyzer.

The post-DBA HCS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the post-DBA HCS potentially could prevent the satisfactory accomplishment of a safety-related function.
In addition, the post-DBA HCS performs functions that support EQ.

LRA Table 2.3.3-23 identifies post-DBA HCS component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- fan housing
- filter housing
- flexible hose
- orifice
- piping
- pump casing
- rupture disc
- tubing
- valve body

The intended functions of the post-DBA HCS component types within the scope of license renewal include:

- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.23.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.23, UFSAR Section 6.5 for Unit 1, and UFSAR Section 6.2.5 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with

intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.23.3 Conclusion

The staff reviewed the LRA, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the post-DBA HCS components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.24 Primary Component and Neutron Shield Tank Cooling Water System

2.3.3.24.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.24, the applicant described the safety-related primary component and neutron shield tank CWS, which supplies cooling water to remove heat from reactor components during normal operations and from the RHR system heat exchangers during plant cooldown. The system also supplies normal makeup to the neutron shield expansion tank. The primary component and neutron shield tank CWS consists of three circulating pumps arranged in parallel, three heat exchangers in parallel, and the necessary piping and valves to supply cooling water to various parallel loads. Neutron shield tank cooling is performed by a natural circulation closed-loop subsystem supplied with cooling water from the main system.

The primary component and neutron shield tank CWS contains safety-related components relied upon to remain functional during and following DBEs.

The failure of nonsafety-related SSCs in the primary component and neutron shield tank CWS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the primary component and neutron shield tank CWS performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.3-24 identifies primary component and neutron shield tank CWS component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank

- tubing
- valve body

The intended functions of the primary component and neutron shield tank CWS component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.24.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For Staff Evaluation of this system, see Safety Evaluation Report (SER) Section 2.3

2.3.3.24.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.25 Radiation Monitoring System

2.3.3.25.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.25, the applicant described the safety-related RMS, which monitors process, effluent, and area radiation; and, it detects, computes, indicates, annunciates, and records, radioactivity levels. The RMS for Unit 1 has process and effluent monitors that give early warning of plant malfunctions and record and limit the discharge of radioactive fluids and gases to the environment. Area radiation monitors at fixed plant locations warn personnel of increasing radiation levels.

The RMS for Unit 2 has process, effluent, and area radiation monitors that transmit data to the digital RMS central processors in the main control room (MCR). The system initiates alarm messages when the monitored parameters exceed pre-determined reference values. Area radiation monitors at fixed plant locations warn personnel of increasing radiation levels.

The RMS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the RMS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the RMS performs functions that support fire protection and EQ.

LRA Table 2.3.3-25 identifies RMS component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- heat exchanger
- isokinetic nozzle
- piping
- pump casing
- radiation monitor
- tubing
- valve body

The intended functions of the RMS component types within the scope of license renewal include:

- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.25.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.25 and UFSAR Sections 11.3 for Unit 1 and 11.5, for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.25, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 2-43-18, noting that the applicant showed the following detectors within shielded enclosures: 2HVS-RQ-109B, 2HVS-RQI-109C, 2HVS-RQ-101A, and 2HVS-RQ-101B. In UFSAR Section 11.5.2.3.2 for Unit 2, the applicant stated that an adequate amount of shielding is provided around each detector to reduce the background radiation to a level that will not interfere with detector sensitivity. The staff noted that the applicant only highlighted the shielding for detector 2HVS-RQ-101A, indicating that it is within the scope of license renewal and subject to an AMR.

In LRA Table 2.0-1, the applicant identified that the intended function of radiation shielding is to reduce neutron or gamma radiation fluence. In LRA Table 2.3.3-25, "Radiation Monitoring System Components Subject to Aging Management Review (AMR)," the applicant only identified the component type "radiation monitor" with intended functions of leakage boundary (spatial) and pressure boundary. In RAI 2.3.3.25-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the shielded enclosures for radiation detectors 2HVS-RQ-109B, 2HVS-RQ-109C, and 2HVS-RQ-101B from the scope of license renewal with an intended function of radiation shielding.

In its response to RAI 2.3.3.25-1, dated June 9, 2008, the applicant stated that "Where radiation monitor shielding performs a function that supports the accurate detection and indication/alarm of radiation, it is considered to be an integral part of the active detector assembly." Therefore, the radiation monitor shielding is not subject to an AMR.

The applicant explained that since "degradation of shielding would result in immediate changes in radiation monitor indication; the influence of shielding upon the function of the monitor is equivalent to that of the active electronic portion of the instrument."

The applicant further stated that the radiation monitor flowpath for 2HVS-RQ101A, a particulate detector, has an intended function of pressure boundary, and the shielding is active and not subject to AMR. The monitor housing for 2HVS-RQ101A is highlighted as the pressure boundary. The other monitors referenced are gas monitors, which have the shielded enclosure depicted separately on the drawing.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.25-1 acceptable because the applicant has clarified that 2HVS-RQ101A was only highlighted to show the radiation monitor housing, and not the shielding, with an intended function of pressure boundary that is subject to AMR. The staff confirms that the shielded enclosures for all of the monitors were correctly excluded from the scope of license renewal because they are considered an active component; hence, they are not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.25-1 is resolved.

2.3.3.25.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the RMS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.26 Reactor Plant Sample System

2.3.3.26.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.26, the applicant described the safety-related reactor plant sample system, which transfers liquid and gaseous samples from contaminated and potentially contaminated

systems, to the primary sample panel for monitoring and/or collection of grab samples or pressurized vessel samples for laboratory analysis. As part of the reactor plant sample system, the steam generator blowdown (SGB) sample system, continuously and automatically samples and monitors radiation of SGB.

The reactor plant sample system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the reactor plant sample system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the reactor plant sample system performs functions that support ATWS and EQ.

LRA Table 2.3.3-26 identifies reactor plant sample system component types within the scope of license renewal and subject to an AMR:

- bolting
- demineralizer
- flexible hose
- heat exchanger
- piping
- pump casing
- sample sink
- sight glass
- tank
- tubing
- valve body

The intended functions of the reactor plant sample system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.26.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.26 and UFSAR Sections 9.6 for Unit 1 and 9.3.2 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has

not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.26, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below

The staff reviewed LRA drawing 1-14A-1 for the sampling system, noting that the applicant highlighted radiation monitor RM ISS-100 as being within the scope of license renewal for spatial concerns (*e.g.*, leakage, spray, pipe whip), pursuant to 10 CFR 54.4(a)(2). The staff noted that in LRA Table 2.3.3-26, the applicant has identified the component types subject to an AMR for the reactor plant sample system. However, the staff noted that the applicant does not identify "radiation monitor" as a component type. Radiation monitors should be included within the scope of license renewal and subject to an AMR for spatial concerns pursuant to 10 CFR 54.4(a)(2) because they have an intended function of leakage boundary (spatial). In RAI 2.3.3.26-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the radiation monitor from LRA Tables 2.3.3-26 and 3.3.2-26 as a component type requiring an AMR with an intended function of leakage boundary (spatial).

In its response to RAI 2.3.3.26-1, dated June 9, 2008, the applicant stated that the radiation monitor RM-1SS-100 "should have been shown with system boundaries to place the monitor within the scope of license renewal in the radiation monitoring system." The drawing depiction of RM-1SS-100 and several others have been revised to include all radiation monitors within the RMS as within the scope of license renewal and subject to an AMR.

The applicant included radiation monitor 2CCP-RQ100, which was also revised to show the demineralized water flush line boundary to system 32 (Water Treatment); radiation monitor 2CNA-RQ100 and its sample cooler, which was also revised to show the demineralized water flush line boundary to system 32; and radiation monitor 2SSR-RQ100. The applicant noted that all radiation monitors included within the scope of license renewal are evaluated with the RMS in LRA Section 2.3.3.25, with AMR results tabulated.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.26-1 acceptable because the applicant has revised the LRA drawings that depict the specified radiation monitors, to show that all radiation monitors in the RMS are within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.26-1 is resolved.

2.3.3.26.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions.

In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the reactor plant sample system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.27 Reactor Plant Vents and Drains System

2.3.3.27.1 Summary of Technical Information in the Application

IN LRA Section 2.3.3.27, the applicant described the safety-related reactor plant vents and drains system, which collects potentially radioactive fluids and gases from various systems and discharges them to the gaseous waste system, the liquid WDS, or the boron recovery system. The reactor plant vents and drains system consists of four subsystems; namely, two for liquids and two for gases.

The system separates liquids (drains) into those which contain air (aerated drains) and those which contain hydrogenated reactor coolant fluid (nonaerated). Nonaerated drains go to the boron recovery system for processing and reuse, while aerated drains go to the liquid WDS for disposal. The system separates gases (vents) into those which contain air (aerated vents) and those which contain hydrogen and radioactive gases (nonaerated vents). Aerated vents go to the gaseous waste dilution air subsystem. Nonaerated vents, in which hydrogen and radioactive gases predominate, go to the gaseous waste holdup subsystem. The Unit 1 system disposes of gases from both units.

The reactor plant vents and drains system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the reactor plant vents and drains system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the reactor plant vents and drains system performs functions that support fire protection and EQ.

LRA Table 2.3.3-27 identifies reactor plant vents and drains system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- piping
- pump casing
- strainer body
- tank
- trap body
- tubing
- valve body

The intended functions of the reactor plant vents and drains system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product

- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.27.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.27 and UFSAR Sections 9.7 for Unit 1 and 9.3.3 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.27, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 2-09-3, noting that the applicant does not highlight ten tanks (shown as sumps) that house the sump pumps. The sump pumps listed by the applicant include those in the following areas: (a) north safeguards area, (b) fuel building, (c) northeast auxiliary building, (d) southeast auxiliary building, (e) west auxiliary building, (f) northwest auxiliary building, (g) tunnel, (h) decontamination building, (i) south safeguards area, and (j) gaseous waste storage vault. The staff noted that in LRA Table 2.3.3-27, the applicant has identified the component type "tank" as subject to an AMR with an intended function of leakage boundary (spatial). In RAI 2.3.3.27-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the above tanks (sumps) from the scope of license renewal.

In its response to RAI 2.3.3.27-1, dated June 9, 2008, the applicant stated that "the tanks listed in the question are building sumps and are all within the scope of license renewal. However, because sumps are evaluated as structural components, they are not highlighted on mechanical scope drawings." The applicant listed the LRA tables where the specific sumps in the question are addressed. Also, the applicant added that stainless steel sumps were evaluated as a single bulk commodity for all sumps. The applicant added an additional row to LRA Table 3.5.2-36 in order to address exposure to a "raw water" environment for sump liners, because the table addressed the "protected from the weather" environment only for sump liners.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.27-1 acceptable because the applicant has clarified that the tanks listed are building sumps and are included in LRA Section 3.5 tables as structural components within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.27-1 is resolved.

2.3.3.27.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal.

The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the reactor plant vents and drains system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.28 River Water System (Unit 1 Only)

2.3.3.28.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.28, the applicant described the river water system (Unit 1), which includes the reactor plant river water system, auxiliary river water system, and the turbine plant river water system. The river water system supplies cooling water to remove heat from the power plant auxiliary systems during all modes of operation.

The reactor plant river water system consists of three safety-related river water pumps that take suction from individually screened bays within the intake structure, piping, valves, controls, electrical components, and instrumentation. Each pump is 100-percent capacity; thus, the system can have one pump out of service and still maintain two independent trains.

The nonsafety-related auxiliary river water system accommodates unit shutdown from 100-percent reactor power and subsequent RCS cooldown to cold shutdown conditions, when the intake structure is disabled.

The system has two pumps which take suction from individually screened bays within the alternate intake structure. Either pump can deliver cooling water through a common header which connects to the river water system headers downstream of the intake structure. Design and installation of the auxiliary river water system are nonsafety-related but credited with mitigation of a DBE.

The nonsafety-related turbine plant river water subsystem, which supplies cooling water from the Ohio River to secondary systems, has two pumps which take suction from individually screened bays within the intake structure. The pumps deliver cooling water to the turbine plant loads through a common header.

The river water system (Unit 1 only) contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the river water system (Unit 1 only) potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the river water system (Unit 1 only) performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.3-28 identifies river water system (Unit 1 only) component types within the scope of license renewal and subject to an AMR:

- bolting
- condenser

- expansion joint
- orifice
- piping
- pump casing
- sight glass
- strainer body
- strainer element
- tank
- tubing
- valve body

The intended functions of the river water system (Unit 1 only) component types within the scope of license renewal include:

- filtration
- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.28.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.3.28.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.3.29 Security Diesel Generator System (Common)

2.3.3.29.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.29, the applicant described the nonsafety-related security diesel generator system (common), common to and used by both Units 1 and 2, and which supplies power to exterior lighting credited by regulated events. The security diesel generator supports area ingress and egress by site personnel and consists of a diesel generator, an underground fuel oil storage tank, a day tank, a fuel transfer pump, piping, and auxiliaries. Generator power is provided by a diesel engine in the guardhouse.

The fuel oil storage tank is located underground between the guardhouse and the TB for Unit 1. All other support equipment is within the guardhouse.

The security diesel generator system (common) performs functions that support fire protection and SBO.

LRA Table 2.3.3-29 identifies security diesel generator system (common) component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- flexible hose
- heat exchanger
- heater housing
- orifice
- piping
- pump casing
- tank
- turbocharger housing
- valve body

The intended functions of the security diesel generator system (common) component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

2.3.3.29.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.29 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.29, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA Section 2.3.3.29, noting that the applicant has stated that the security diesel generator system's intended function is to provide power to exterior lighting used for outdoor access/egress paths for Unit 1 and Unit 2. The staff further noted that on LRA drawing 1-45F-1 for the security diesel generator system, the applicant highlights the security diesel

generator fuel oil tank, NHS-TK-1, and the security diesel generator fuel oil day tank, NHS-TK-2, as being within the scope of license renewal for performing an intended function pursuant to 10 CFR 54.4(a)(3). However, the applicant does not highlight the fuel oil tank fill line, vent line and flame arrestor; and the day tank vent line. The vent lines and the flame arrestor support proper functioning of the fuel oil tanks and operation of the security diesel generator. Operation of the security diesel generator is necessary in order to meet its intended function for SBO and fire protection. In RAI 2.3.3.29-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the above mentioned components from the scope of license renewal.

In its response to RAI 2.3.3.29-1, dated June 9, 2008, the applicant stated that the "security diesel generator system fuel oil tank fill line is not in scope because its failure would not result in leakage of fuel or loss of any function." The applicant added that with regard to the tank vents, originally, these were not in-scope "because the vent lines are not expected to contain fluid, and piping integrity is not required to provide a vent." However, to ensure consistency with the presentation for other fuel oil tanks, the applicant added the security diesel generator system vent piping and flame arrestor as within the scope of license renewal.

Additionally, the applicant added the vent piping and flame arrestors for the ERF diesel generator as within the scope of license renewal, for consistency. The applicant revised the LRA and LRA boundary drawings accordingly.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.29-1 acceptable because the applicant has clarified that the fuel oil tanks fill line is not within scope because its failure would not result in fuel leakage or loss of any function. The applicant has added to the scope of license renewal, vent piping and flame arrestors, for consistency and has revised the corresponding LRA drawings and tables. Therefore, the staff's concern described in RAI 2.3.3.29-1 is resolved.

2.3.3.29.3 Conclusion

The staff reviewed the LRA, RAI responses and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the security diesel system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.30 Service Water System (Unit 2 Only)

2.3.3.30.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.30, the applicant described the safety-related SWS (Unit 2 only), which includes the standby SWS and which supplies cooling water to remove heat from the power plant auxiliary systems during all modes of operation.

The SWS consists of three safety-related pumps, piping, valves, controls, electrical components, and instrumentation. Two pumps are necessary for normal plant operation, while

only one service water pump is required for safe-shutdown. The three pumps share the intake structure with the river water and turbine plant raw water pumps for Unit 1. Each service water pump is located in a separate bay of the intake structure and supplies Ohio River water to one of two supply headers.

The standby SWS accommodates unit shutdown from 100-percent reactor power and subsequent RCS cooldown to cold shutdown conditions, after the postulated loss of the intake structure. The standby SWS consists of two pumps which take suction from individually screened bays within the alternate intake structure, discharging to a common 30-inch line and connecting to the redundant 30-inch seismic Category I service water supply lines, via motor-operated valves in the seismic Category I valve pit. The standby SWS is classified as nonsafety-related, but is credited with mitigation of a DBE.

The SWS (Unit 2 only) contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the SWS (Unit 2 only) potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the SWS (Unit 2 only) performs functions that support fire protection, SBO, and EQ.

LRA Table 2.3.3-30 identifies SWS (Unit 2 only) component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- flexible hose
- orifice
- piping
- pump casing
- sight glass
- strainer body
- strainer element
- tank
- tubing
- valve body

The intended functions of the SWS (Unit 2 only) component types within the scope of license renewal include:

- filtration
- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.30.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.30 and UFSAR Sections 9.2.1.1 and 9.2.1.2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.30, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawings 2-30-1 for the service water pumps (2SWS-P21A, P21B, and P21C) and 2-30-1A for the standby service water pumps (2SWE-P21A and P21B), noting that the applicant has highlighted the motors, the pumps, a ¾-inch line to a pump seal, and a 1-inch pipe entering and leaving the motors. Also, the applicant has highlighted the components for performing an intended function pursuant to 10 CFR 54.4(a)(1), (a)(2), or (a)(3). The staff noted that in LRA Table 2.3.3-30, the applicant has included the component type "pump casing" and "piping" as subject to an AMR. However, in LRA Table 2.3.3-30, the applicant does not include any of the component types: "motor housing," "heat exchanger," or "pump seal cooler." The staff notes that these components are part of the cooling water supply to the service water pump motors/seals and should be within the scope of license renewal, with an intended function of "leakage boundary (spatial)." In RAI 2.3.3.30-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion from LRA Table 2.3.3-30 as subject to an AMR, "motor housing" and other applicable component types serviced by this cooling water.

In its response to RAI 2.3.3.30-1, dated June 9, 2008, the applicant stated:

> The Unit 2 service water and standby service water pump motor housings are highlighted to indicate that they contain fluid-retaining components needed to support intended functions. However, the internal motor components that provide the fluid pressure boundary and heat transfer functions are not long-lived and not subject to aging management review per 10 CFR 54.21 (a)(1)(ii).

Additionally, there are no heat exchangers or other passive internal components associated with seal/bearing water supply. Each pump motor has an oil cooler supplied with service water. The coolers are replaced periodically on a 10- or 15-year frequency, as determined by site maintenance planning program. The applicant concluded that the service water lines to the motor oil coolers are within the scope of license renewal; but, the heat exchangers are not subject to an AMR, because they are not long-lived.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.30-1 acceptable because the service water pump motor oil coolers are not long-lived and are periodically replaced; hence, they are not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.30-1 is resolved.

2.3.3.30.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the SWS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.31 Solid Waste Disposal System

2.3.3.31.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.31, the applicant described the solid WDS, which primarily collects and prepares radioactive waste materials for shipment to processing and disposal facilities. Portions of the system for Unit 2 form a safety-related piping pressure boundary for the CVCS, but the solid WDS is not credited with any other safety-related or regulated event function.

The system prepares waste streams for shipment by filtration, dewatering, solidification, segregation, compaction, packaging, storage, or a combination of methods. Materials handled as radioactive solid waste include depleted resins from process ion exchangers, concentrated waste solutions from evaporator bottoms hold tanks, spent filter cartridges, and miscellaneous contaminated or irradiated solid materials (other than fuel). Packaging, storage, and shipment of radioactive solid wastes comply with NRC and US Department of Transportation regulations.

The solid WDS immobilizes radioactive wastes in a cement mixture inside 55-gallon closed-head steel drums, a method that produces a low probability of accidental release of radioactive material to the environment during transport and storage. The waste solidification system consists of a cement storage bin and cement feeder, resin waste hold tank, evaporator bottoms hold tank, caustic buffering equipment, drumming station and drum processing enclosure, pumps, piping, valves, instrumentation, electronics, and hardware necessary for the system to function.

The system also disposes of compressible solid waste that is generated during station operation and maintenance. Compressible solid waste items are rags, anti-contamination clothing, and plastic bags. The solid waste baler is a hydraulically-operated ram that compresses the material into 55-gallon drums for eventual shipment offsite.
The solid WDS contains safety-related components relied upon to remain functional during and following DBEs (Unit 2 only). The failure of nonsafety-related SSCs in the solid WDS potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-31 identifies solid WDS component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing

- flexible hose
- piping
- pump casing
- sight glass
- tank
- tubing
- valve body

The intended functions of the solid WDS component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.31.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.31 and UFSAR Sections 11.2.5 for Unit 1 and 11.4 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.31, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 1-18-1, noting that the applicant has included the note "functional locations tagged as boundary per Technical Evaluation Report (TER) 13287." In RAI 2.3.3.31-1, dated May 8, 2008, the staff requested that the applicant describe and summarize TER 13287 with respect to its relationship to license renewal boundary drawings and license renewal scoping pursuant to 10 CFR 54.4.

In its response to RAI 2.3.3.31-1, dated June 9, 2008, the applicant stated that "TER 13287 documents the formal retirement of selected equipment within the solid waste system." The applicant further explained that the non-highlighted equipment tagged in reference to TER 13287 has been formally retired, "the equipment has been isolated and drained, and the boundary valves are administratively controlled to maintain isolation." The applicant stated that the tagged equipment performs no function credited by the CLB, and does not represent a

potential source of fluid or energy interaction with any safety-related components; thus, the tagged equipment is not within scope.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.31-1 acceptable because the equipment tagged in reference to TER 13287 has been formally retired, isolated, drained, and controlled such that it neither interacts with safety-related components nor performs any function credited by the CLB. Therefore, the staff's concern described in RAI 2.3.3.31-1 is resolved.

2.3.3.31.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the solid WDS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.3.32 Supplementary Leak Collection and Release System

2.3.3.32.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.32, the applicant described the safety-related supplementary leak collection and release system, which collects and filters for iodine removal, radioactive leakage from the primary containment following a DBA, prior to discharge to the atmosphere at the system vent on top of the containment building dome (elevated release). Filtering of radioactive material from the ventilation stream still occurs but is no longer credited in accident analyses. The system also controls temperature by the removal of heat from areas with safety-related equipment.
Following a loss of offsite power, the supplementary leak collection and release system fans can be powered from the emergency buses, to prevent components in these areas from exceeding design temperatures.

The supplementary leak collection and release system consists of fans, ductwork, dampers, high-efficiency particulate activity filters, charcoal filters, and I&Cs. The system fans exhaust plant areas during normal operations. The system automatically transfers ventilation flow through the filter bank on a containment isolation signal or a high-high radiation signal from monitors in the ventilation exhaust. The capacity of each exhaust fan exceeds the estimated air in-leakage to the containment contiguous area and other areas served. The excess capacity of the fan ensures a negative pressure in the exhausted areas.

The supplementary leak collection and release system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the supplementary leak collection and release system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the supplementary leak collection and release system performs functions that support fire protection and EQ.

LRA Table 2.3.3-32 identifies supplementary leak collection and release system component types within the scope of license renewal and subject to an AMR:

- bolting
- damper housing
- duct
- fan housing
- filter housing
- flexible connection
- flow straightener
- heater housing
- isokinetic nozzle
- moisture separator
- piping
- tank
- valve body

The intended functions of the supplementary leak collection and release system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.3.32.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.32 and UFSAR Sections 6.6 for Unit 1 and 6.5.3.2 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.3.32, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 2-16-2, noting that the applicant has highlighted the following flow elements: (a) 2HVS-FE-22, (b) 2HVS-FE-27, (c) 2HVS-FE-26, (d) 2HVS-FE-25, and (e) 2HVS-FE-24. However, the staff noted that in LRA Table 2.3.3-32, the applicant did not list

component types such as "orifice," which would include flow elements that are subject to an AMR. In RAI 2.3.3.32-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the component type "orifice" in LRA Table 2.3.3-32, from the scope of license renewal and subject to an AMR.

In its response to RAI 2.3.3.32-1, dated June 9, 2008, the applicant stated:

> The flow elements in the SLCRS are not orifice-type components. Ventilation flow elements in the SLCRS do not function by causing a flow restriction that produces a differential pressure between the upstream and downstream flow. Rather, these components are essentially a Section of ductwork that supports instrument piping connections for two sensing lines, one of which is exposed to total (impact) pressure by aligning the open end into the flow stream, and the other is exposed to static pressure by aligning the open end parallel to the ventilation flow stream. As such, according to the applicant, the flow element is evaluated for license renewal as component type "duct," not "orifice," with a pressure boundary function.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.32-1 acceptable because the flow elements are not orifice-type components; they are to be evaluated as ducts. Therefore, the staff's concern described in RAI 2.3.3.32-1 is resolved.

2.3.3.32.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal.

The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the supplementary leak collection and release system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.4 Steam and Power Conversion Systems

In LRA Section 2.3.4, the applicant identified the steam and power conversion systems SCs subject to an AMR for license renewal. The applicant described the supporting SCs of the steam and power conversion systems in the following LRA sections:

- 2.3.4.1 Auxiliary Feedwater System
- 2.3.4.2 Auxiliary Steam System
- 2.3.4.3 Building Services Hot Water Heating System
- 2.3.4.4 Condensate System (Unit 1 only)
- 2.3.4.5 Glycol Heating System (Unit 1 only)
- 2.3.4.6 Main Feedwater System
- 2.3.4.7 Main Steam System
- 2.3.4.8 Main Turbine and Condenser System

- 2.3.4.9 Steam Generator Blowdown System
- 2.3.4.10 Water Treatment System

The staff's findings of LRA Sections 2.3.4.2, 2.3.4.3, 2.3.4.4, 2.3.4.5 and 2.3.4.10 were discussed and dispositioned in SER Section 2.3. The remaining sections requiring additional information to complete the review of the applicant's scoping and screening results are discussed below.

2.3.4.1 Auxiliary Feedwater System

2.3.4.1.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.1, the applicant described the safety-related AFW system, an emergency source of feedwater to the steam generators. The system must ensure safe-shutdown in a main turbine trip with complete loss of normal electric power to the station, and starts automatically on a safety injection signal. Also, the AFW system (Unit 1) has a nonsafety-related dedicated AFW pump.

The AFW system at each unit consists of two motor-driven auxiliary feed pumps, a turbine-driven auxiliary feed pump, piping, valves, controls, electrical components, and instrumentation. The auxiliary feed pumps normally take suction from the primary plant demineralized water storage tank. The AFW system supply also can be provided by water from the river water system (Unit 1) or the SWS (Unit 2).

The motor-driven AFW pumps receive power from redundant 4,160 VAC emergency switchgear. The turbine-driven auxiliary feed pump steam supply is obtained from the main steam lines upstream of the steam line isolation valves.

There is a significant difference between the AFW systems for Units 1 and 2. The Unit 1 motor-driven AFW pumps and the turbine-driven pump are all located in the same area. Presumably all three pumps could be damaged by a postulated fire in this area. For this reason, a remotely-located, nonsafety-related, dedicated motor-driven AFW pump at Unit 1 can accomplish shutdown capability in the event of a fire in the AFW pump area. This additional pump can take suction from either of two tanks evaluated in the condensate system. Power for the dedicated AFW pump motor is powered from the ERF substation, which can be powered by its diesel generator. Unit 2 has no corresponding pump because the AFW pumps for this unit are not all housed in a common fire area.

The AFW system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the AFW system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the AFW system performs functions that support fire protection, ATWS, SBO, and EQ.

LRA Table 2.3.4-1 identifies AFW system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger

- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank
- tubing
- valve body

The intended functions of the AFW system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- heat transfer
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.1 and UFSAR Sections 10.3.5.1.2, 10.3.5.2.2, 10.3.5.2.3 for Unit 1, and 10.4.9 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.4.1, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 1-24-2, noting that the applicant did not highlight the following components as within the scope of license renewal and subject to an AMR: (a) piping and valve body up to valve 351 for PI 1FW-155; (b) piping and valve body up to valve 364 for PI 1FW-156B; and (c) piping and valve body up to valve 628. These components are in the same flow paths as other components, that are highlighted as within scope and perform a similar function to those listed in LRA Table 2.3.4-1 (i.e., bolting, piping, tubing, and valve body), subject to an AMR with an intended function of pressure boundary. In RAI 2.3.4.1-1, dated

May 8, 2008, the staff requested that the applicant justify the exclusion of these components from the scope of license renewal with an intended function of pressure boundary.

In its response its response to RAI 2.3.4.1-1, dated June 9, 2008, the applicant stated that "highlighting for these components was inadvertently omitted from the original drawing." The applicant revised the drawings to include highlighting of the piping and valve bodies noted in the RAI. The applicant noted that "additional highlighting on the LRA drawing did not affect any AMR results, and did not result in any changes to the LRA."

Based on its review, the staff finds the applicant's response to RAI 2.3.4.1-1 acceptable because the applicant has confirmed that it inadvertently omitted highlighting for the components from the original drawing. The applicant has revised the drawings in the LRA to include highlighting of the piping and valve bodies that are within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.4.1-1 is resolved.

In LRA Section 2.3.4.1, the applicant stated that a separate dedicated AFW pump (FW-P-4) provides an alternate shutdown subsystem to the normal AFW system, in the event of a fire in the AFW pump area. The staff noted that on LRA drawing 1-24-3, the applicant has highlighted the flow path from turbine plant demineralized water tank WT-TK-11 to where the 4-inch dedicated AFW pump line ties into the 26-inch MFW line at location D-9, as within the scope of license renewal. The staff also noted that on drawing 1-24-3, the applicant did not highlight components upstream on the main feedwater (MFW) header, where the alternate AFW piping connection ties into the header, at location D-9 (*e.g.*, MFW piping, feedwater pump check valves, and first point feedwater heaters).

In order for the dedicated AFW system for Unit 1 to meet its intended fire protection function of providing water to the steam generators in the event of a fire pursuant to 10 CFR 54.4(a)(3), that disables the primary AFW system pumps, the flow path must be capable of delivering the water to the steam generators. If there is a rupture of MFW piping between the MFW check valves (FW-001 and FW-002) and the piping junction of the four-inch dedicated AFW pump line, flow cannot be delivered to the steam generators. Additionally, on Figure 4-4 of the Unit 1, Appendix R Report, the applicant showed the feedwater system Appendix R safe-shutdown flow path. On Figure 4-4, the MFW pump check valves (FW-001 and FW-002) are shown as providing isolation for the dedicated AFW pump flow path to the steam generators. In RAI 2.3.4.1-2, dated May 8, 2008, the staff requested that the applicant justify the exclusion of the MFW piping and components between the dedicated AFW pump pipe line to MFW line connection up to and including the MFW pump check valves (FW-001 and FW-002), from the scope of license renewal.

In its response to RAI 2.3.4.1-2, dated June 9, 2008, the applicant stated that originally, only the direct flowpath required for compliance with 10 CFR 54.4(a)(3) functions associated with the dedicated AFW pump was scoped in. The applicant revised the LRA and expanded the scope for this (a)(3) function to include branch lines of up to and including the first isolation valve from the flowpath, and upstream from the MFW header to the MFW pump discharge check valves. The applicant revised LRA drawings 1-22-1, 1-24-1, 1-24-3, and 1-32-7 to highlight these branch lines in red to indicate that they are included within the scope of license renewal, pursuant to 10 CFR 54.4(a)(3). Additionally, the applicant stated that the scope expansion resulted in the addition of the first point feedwater heaters into scope "Heat exchanger (tube)," "heat exchanger (channel)," and "heat exchanger (tubesheet)" component types were added as

within scope for the MFW system as pressure boundary components. The applicant has revised LRA Tables 2.3.4-6 and 3.4.2-6 to include new rows for these heat exchanger components.

Based on its review, the staff finds the applicant's response to RAI 2.3.4.1-2 acceptable because the applicant revised the LRA to include the MFW piping and components between the dedicated AFW pump pipe line to MFW line connection up to and including the MFW pump check valves. Therefore, the staff's concern described in RAI 2.3.4.1-2 is resolved.

2.3.4.1.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff found instances where the applicant omitted structures that should have been included within the scope of license renewal. The applicant has satisfactorily resolved the issues as discussed in the preceding staff evaluation. The staff finds no further omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no further omissions.

Based on its review, the staff finds that the applicant has adequately identified the AFW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.4.2 Auxiliary Steam System

2.3.4.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.2, the applicant described the auxiliary steam system, which supplies heating and process steam for nonsafety-related use in various balance-of-plant and primary plant support systems and recovers the condensed steam from the equipment supplied. The system can supply steam during normal operation, plant start-up, and plant shutdown.

The auxiliary steam system receives its steam supply from the MSS (when the reactor plant is in operation), from the opposite unit's auxiliary steam system (when the supplied unit shuts down), or from the Unit 2 auxiliary boilers. Unit 1 has no auxiliary boilers. A condensate receiver and condensate pumps collect condensate from the components served.

The collected condensate may return to either unit. The system continuously monitors auxiliary steam condensate for radioactivity, to detect leakage from radioactive systems into the auxiliary steam system. The only safety-related auxiliary steam system components are the safety-related auxiliary steam system isolation valves, which automatically isolate on a HELB in selected areas. The auxiliary steam system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the auxiliary steam system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the auxiliary steam system performs functions that support EQ.

LRA Table 2.3.4-2 identifies auxiliary steam system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- heat exchanger
- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank
- trap body
- tubing
- valve body

The intended functions of the auxiliary steam system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.2.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.2.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.4.3 Building Services Hot Water Heating System

2.3.4.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.3, the applicant described the nonsafety-related building services hot water heating system, which supplies chemically-treated hot water to various unit heaters and heating coils in air-handling units and ductwork. In addition, at Unit 1, the system supplies the glycol heating system heat exchangers.

Not credited for any safety-related function or regulated event, the building services hot water heating system consists of pumps, heat exchangers, piping, tanks, valves, controls, electrical

components, and instrumentation. The hot water heating piping system consists of several branches, some of which supply areas with safety-related equipment.

The failure of nonsafety-related SSCs in the building services hot water heating system could potentially prevent the satisfactory accomplishment of a safety-related function. LRA Table 2.3.4-3 identifies building services hot water heating system component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger
- heating coil
- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank
- trap body
- tubing
- valve body

The intended function of the building services hot water heating system component types within the scope of license renewal is to provide nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions.

2.3.4.3.2 Staff Evaluation

The staff performed a simplified Tier 1 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.3.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.4.4 Condensate System (Unit 1 Only)

2.3.4.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.4, the applicant described the nonsafety-related condensate system (Unit 1 only), which removes condensate from the main condenser hotwell and supplies preheated water to the suction of the MFW pumps. The system cools the SGB heat exchanger, condenser air ejectors, and gland steam condensers. From the gland steam condensers, condensate flows through two parallel feedwater heater trains, each consisting of one heater drain cooler and five low-pressure feedwater heaters. The flow from the last low-pressure feedwater heater combines with that from the other train to the common suction line of the MFW pumps.

The condensate system is within the scope of license renewal only for its support of the nonsafety-related dedicated AFW pump, to which the system supplies water from plant

demineralized water storage tanks. The Unit 1 motor-driven AFW pumps and turbine-driven pump are located in the same area. Presumably all three pumps could be damaged by a postulated fire in this area. For this reason, a remotely-located, dedicated motor-driven auxiliary feed pump at Unit 1 can accomplish shutdown capability in a postulated fire in the AFW pump area. Unit 2 has no corresponding pump because the Unit 2 AFW pumps are not all housed in a common fire area. The condensate system (Unit 1 only) performs functions that support fire protection.

LRA Table 2.3.4-4 identifies condensate system (Unit 1 only) component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- tank
- valve body

The intended function of the condensate system (Unit 1 only) component types within the scope of license renewal is to provide pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention.

2.3.4.4.2 Staff Evaluation

The staff performed a simplified Tier 1 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.4.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.4.5 Glycol Heating System (Unit 1 Only)

2.3.4.5.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.5, the applicant described the nonsafety-related, building services glycol heating system (Unit 1), which supplies heating solution to ventilation and air conditioning units utilizing outside air. This closed, forced system consists of heat exchangers, circulating pumps, piping, valves, and heating coils. An aqueous solution of ethylene glycol circulates through preheat coils and heating coils to prevent coil freeze-up in heating and ventilating and air conditioning units utilizing outside air. The glycol solution piping consists of two piping loops; namely, one supplying selected heating coils in the auxiliary building and the other, selected heating coils in the service building.

The failure of nonsafety-related SSCs in the glycol heating system (Unit 1 only) could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.4-5 identifies glycol heating system (Unit 1 only) component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger
- heating coil
- orifice
- piping
- pump casing
- sight glass
- strainer body
- tank
- tubing
- valve body

The intended function of the glycol heating system (Unit 1 only) component types within the scope of license renewal is to provide nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions.

2.3.4.5.2 Staff Evaluation

The staff performed a simplified Tier 1 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.5.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.4.6 Main Feedwater System

2.3.4.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.6, the applicant described the MFW system, which supplies feedwater to the three steam generators using two half-size, motor-driven MFW pumps for the necessary flow and pressure. Unit 2 also has a motor-driven start-up feedwater pump that minimizes operation of the MFW pumps at low flow during start-up and low load operation. The start-up feedwater pump can operate in parallel with one MFW pump if the other is out of service.

The MFW pumps discharge through two half-size, high-pressure feedwater heaters arranged in parallel to a common discharge header for distribution to the steam generators. Feedwater flows to each steam generator through individual feedwater flow control valves, each positioned by a three-element feedwater control system. When feedwater flow requirements are low, a bypass valve around each feedwater control valve, controls steam generator level and feedwater flow. The feedwater isolation valves, control valves, and control valve bypass valves automatically close on a feedwater isolation signal, to isolate MFW flow to the steam generators.

The MFW system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the MFW system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the MFW system performs functions that support fire protection, ATWS, SBO, and EQ.

LRA Table 2.3.4-6 identifies MFW system component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- orifice
- piping
- tubing
- valve body

The intended functions of the MFW system component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.6.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.6 and UFSAR Sections 10.3.5 for Unit 1 and 10.4.7 for Unit 2, using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

During its review of LRA Section 2.3.4.6, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 2-24-2A, noting that the applicant has shown the MFW regulating valves and bypass valves for Unit 2 as highlighted in blue, indicating that these valves are within the scope of license renewal pursuant to 10 CFR 54.4(a)(2). In LRA Section 2.3.4.6, the applicant stated that feedwater isolation valves, control valves, and control valve bypass valves will automatically close on receipt of a feedwater isolation signal, to isolate MFW flow to the steam generators. In UFSAR Section 15, the applicant also stated that the MFW control and bypass valves are required to close, following a main steam line break. In LRA

Section 2.0, the applicant further stated, "The BVPS license renewal review methods are consistent with the approach recommended in Nuclear Energy Institute document NEI 95-10, Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule, Revision 6." The staff noted that in accordance with NEI 95-10, these valves provide an isolation function and perform a safety-related function; therefore, they should be included within the scope of license renewal pursuant to 10 CFR 54.4(a)(1). In RAI 2.3.4.6-1, dated May 8, 2008, the staff requested that the applicant include the main and bypass feedwater regulating valves within the scope of license renewal in accordance with 10 CFR 54.4(a)(1) or justify their exclusion. The staff also requested that the applicant evaluate the attached piping and supports, along with surrounding components, for inclusion within the scope of license renewal pursuant to 10 CFR 54.4(a)(2).

In its response to RAI 2.3.4.6-1, dated June 9, 2008, the applicant stated that "the Unit 2 main and bypass FRVs are classified as safety-related in the plant equipment database and should be included within scope for license renewal in accordance with 10 CFR 54.4(a)(1)." The applicant will revise LRA drawing 2-24-2A to highlight the valves in red to show they are within the scope of license renewal pursuant to 10 CFR 54.4(a)(1). Additionally, the applicant clarified that "piping on either side of the valves is not safety-related, but the piping located in the service building is included within scope for 10 CFR 54.4(a)(2) only."

The applicant replied that, in UFSAR Section 10.4.7.3 for Unit 2, the feedwater regulating valves (also referred to as control valves) along with the redundant feedwater isolation valves are credited for the feedwater isolation function. Further, the applicant confirmed that the feedwater regulating valves, the feedwater regulating valve bypasses, and the feedwater isolation valves receive redundant ESF signals from diverse trains upon a feedwater isolation signal. The applicant stated that the feedwater isolation valves are located in the safety-related main steam valve area with seismic category I supports. The feedwater regulating valves and feedwater regulating valve bypass valves are located in the service building, attached to non nuclear safety class piping and supports that are seismically-supported. All of the attached piping and supports within the service building are within the scope of license renewal under 10 CFR 54.4(a)(2).

The applicant stated that the feedwater regulating valves and bypass feedwater regulating valves do not perform any other safety-related function. A failure of these feedwater lines will not prevent the feedwater isolation function; therefore, failure of directly connected piping or nonseismic supports in the TB will not prevent satisfactory accomplishment of any safety-related function. Hence, no directly-connected piping in the TB, related to the feedwater regulating valves, was added as within the scope of license renewal, pursuant to 10 CFR 54.4(a)(2).

In its response, the applicant restated that its applied scoping method included liquid and steam retaining components in safety-related structures within the scope of license renewal. The service building for Unit 2 is a safety-related structure, and all liquid and steam retaining components in the building are within scope. No additional components in the service building were added to scope pursuant to 10 CFR 54.4(a)(2), due to the evaluation that the feedwater regulating valves are safety-related components.

Based on its review, the staff finds the applicant's response to RAI 2.3.4.6-1 acceptable because the applicant described that the Unit 2 feedwater regulating valves and bypass feedwater regulating valves are safety-related and are within the scope of license renewal in accordance with 10 CFR 54.4(a)(1), and the attached piping and supports, and/or surrounding

components are not safety-related but within scope pursuant to 10 CFR 54.4(a)(2). Therefore, the staff's concern described in RAI 2.3.4.6-1 is resolved.

The staff reviewed LRA drawing 1-24-1, noting that the applicant has shown feedwater regulating valves and bypass feedwater regulating valves for Unit 1 as highlighted in red, which corresponds to components that are credited by the CLB for performing an intended function in accordance with 10 CFR 54.4(a)(1), (a)(2), or (a)(3). This flow path is coincidental with an (a)(3) flow path. In RAI 2.3.4.6-2, dated May 8, 2008, the staff requested that the applicant verify that these valves are within the scope of license renewal for 10 CFR 54.4(a)(1).

In its response, dated June 9, 2008, the applicant stated:

> The Unit 1 main and bypass feedwater regulating valves are classified as safety-related in the plant equipment database, and are in scope for license renewal in accordance with 10 CFR 54.4(a)(1). The piping on either side of the valves, however, is not safety-related, and is in scope for regulated event flowpath only. LR Drawing 1-24-1 has been revised to clearly depict the safety-related boundaries at these valves, and to show the (a)(2) directly-connected scoping boundaries (equivalent anchor locations) associated with the safety / nonsafety transitions. The equivalent anchor evaluation did not result in additional piping being added to scope beyond the piping that is credited with a pressure boundary function.

Based on its review, the staff finds the applicant's response to RAI 2.3.4.6-2 acceptable because the applicant clarified that the Unit 1 feedwater regulating valves and feedwater regulating valve bypasses are within the scope of license renewal in accordance with 10 CFR 54.4(a)(1) and their equivalent anchor evaluation did not require any additional piping to be brought into scope. Therefore, the staff's concern described in RAI 2.3.4.6-2 is resolved.

2.3.4.6.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff found instances where the applicant omitted systems and structures that should have been included within the scope of license renewal. The applicant has satisfactorily resolved the issues as discussed in the preceding staff evaluation. The staff finds no further omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no further omissions.

Based on its review, the staff finds that the applicant has adequately identified the MFW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.4.7 Main Steam System

2.3.4.7.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.7, the applicant described the MSS, which supplies dry saturated steam to the main turbine, the turbine steam bypass system, the gland sealing system, the auxiliary

steam system, the moisture separator reheaters, and the turbine-driven AFW pump. Safety-related portions of the MSS remove reactor decay heat for reactor plant cooldown.

The system routes steam from each of the three steam generators through the containment wall to the main steam valve area, which houses the steam generator safety valves, main steam trip and non-return valves (Unit 1) or main steam isolation valves (Unit 2), atmospheric steam dump valves, and a single common residual heat release valve. Each main steam line in the main steam valve area also supplies the turbine-driven AFW pump. The three main steam lines join a main steam header in the TB just below the mezzanine level.

Bypass valves around each main steam trip valve (Unit 1) or main steam isolation valve (Unit 2), normally are closed during power operation. During plant heat-up the valves assist in warming up and pressurizing the downstream main steam piping. The main steam header distributes steam to systems in the TB. Four lines route to the high-pressure turbine throttle valves, two lines route to the turbine steam bypass (steam dump) system, and individual lines supply the gland sealing and auxiliary steam systems. Two reheater steam supply lines tap off of the two steam dump lines.
The atmospheric steam dump valves, one on each of the three main steam lines upstream of each main steam trip and non-return valve (Unit 1) or main steam isolation valve (Unit 2), are used for: (a) plant cooldown when the main condenser is unavailable, (b) relief of excess pressure in the steam generators, and (c) prevention of unwanted lifting of the safety valves.

The residual heat release valve can remove all sensible and core decay heat one-half hour after a reactor trip, when the main condenser is not available. The steam flow is from the valve through the residual heat release header to atmosphere. This one valve, mounted on the common residual heat release header, serves all three steam generators through connections on each main steam line upstream of the main steam trip valves (Unit 1) or main steam isolation valves (Unit 2). A check valve in each residual heat release line ensures steam flow to the header but prevents reverse flow if a line breaks between a steam generator and a main steam trip valve (Unit 1) or main steam isolation valve (Unit 2).

The condenser steam dump system consists of 18 valves capable of dumping steam to the condenser as necessary and is configured so nine valves dump to each condenser half. Upon loss of load to the main turbine generator, the steam dump system automatically bypasses excess steam from the steam generators directly to the main condenser, and controls the amount of flow through the steam dumps based on reactor coolant average temperature. The steam dump system also maintains constant steam pressure in the main steam header during plant startup, testing, and shutdown.

A flow restrictor in each steam generator exit nozzle limits steam flow in a steam line break downstream of the flow restrictor, limiting the RCS cooldown rate and reactivity addition to the reactor core.

The MSS contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the MSS potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the MSS performs functions that support fire protection, ATWS, SBO, and EQ.

LRA Table 2.3.4-7 identifies MSS component types within the scope of license renewal and subject to an AMR:

- bolting
- flexible hose
- orifice
- piping
- trap body
- tubing
- turbine casing
- valve body

The intended functions of the MSS component types within the scope of license renewal include:

- restriction for flow rate limit or pressure difference
- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.7.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.7 and UFSAR Sections 10.3.1.2 for Unit 1 and 10.3.2 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1). During its review of LRA Section 2.3.4.7, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA drawing 1-21-1, noting that the applicant has highlighted the 32-inch main steam headers in the service building up to an equivalent anchor location that appears to be short of the service building/TB boundary. In LRA Section 2.4.26, the applicant has stated that the Unit 1 service building is included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). In LRA Section 2.1.1.2.3, the applicant has also stated that fluid-retaining (*i.e.*, water, steam, oil or hydraulic liquids) nonsafety-related systems and components that are located inside safety-related structures, are included within the scope of license renewal for potential spatial interaction pursuant to 10 CFR 54.4(a)(2). The staff noted

that since the Unit 1 service building is safety-related, the whole length of the 32-inch main steam headers in the service building should be within the scope of license renewal and subject to an AMR for potential spatial interaction, in accordance with 10 CFR 54.4(a)(2). In RAI 2.3.4.7-1, dated May 8, 2008, the staff requested that the applicant verify that the whole 32-inch main steam piping is highlighted in the service building as included within the scope of license renewal, or justify its exclusion from the scope of license renewal and subject to an AMR.

In its response to RAI 2.3.4.7-1, dated June 9, 2008, the applicant stated that "the entire length of main steam piping within the service building is within the scope of license renewal." The applicant revised the relevant LRA drawing to "more clearly depict the scoping endpoint at the service building boundary."

Based on its review, the staff finds the applicant's response to RAI 2.3.4.7-1 acceptable because the applicant has clarified that the whole 32-inch main steam piping is within the scope of license renewal and has revised the LRA drawings accordingly. Therefore, the staff's concern described in RAI 2.3.4.7-1 is resolved.

2.3.4.7.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff finds that the applicant has adequately identified the MSS components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.4.8 Main Turbine and Condenser System

2.3.4.8.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.8, the applicant described the main turbine and condenser system and auxiliaries, which utilize steam from the nuclear steam supply system as the motive force for the main unit generator of electrical power on the system grid. The main turbine portion of the system consists of an 1,800-rpm, tandem, compound main turbine unit with one double-flow, high-pressure turbine and two double-flow low-pressure turbine sections, four high-pressure inlet throttle valves, four high-pressure inlet governing valves, four moisture separator reheaters, four low-pressure reheat stop valves, four low-pressure interceptor valves, an electro-hydraulic control system, provisions for extracting steam for feedwater heating, a gland steam sealing system, a turbine lube oil system, and an auto-stop oil system. Other portions of the main turbine and condenser system include the main condenser and air ejectors and the miscellaneous vents and drain system.

The system admits steam from the MSS through four steam lines, each with a throttle valve, then supplies the steam through individually-controlled, hydraulically-operated governor valves to the high-pressure turbine. Steam passes from the high-pressure turbine casing into the moisture separator reheaters. High pressure steam from the main steam header is the heating steam in the moisture separator reheaters.

Dry superheated steam (at full load) exits the moisture separator reheaters through reheat stop valves and intercept valves, enters the two low-pressure turbines, and passes from them to the condenser.

To prevent the leakage of air into or steam out of the turbine casing along the shaft, each turbine Section has labyrinth-type steam gland seals supplied with steam from the gland sealing steam system.

Journal bearings, two for each turbine, support the turbine shaft. A thrust bearing, mounted between the two low-pressure turbines, accomplishes axial positioning of the shaft.
Oil is supplied to the turbine bearings from the turbine lubricating oil system, the oil output of which cools and lubricates the turbine bearings, acts as a control medium in the turbine protection (auto-stop oil) system to effect various turbine trips, and backs up the generator seal oil system upon failure of both air side seal oil pumps.

The hydraulic auto-stop oil system initiates a turbine trip when required. The auto-stop oil system trip signal causes a loss of electro-hydraulic fluid system pressure and closure of all turbine throttle, governor, interceptor, and reheat stop valves.

The system diverts the Unit 1 air ejector exhaust from the gaseous waste system to the reactor containment upon a signal from an in-line radiation monitor. This line has a containment isolation function (Unit 1).

The main turbine and condenser system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the main turbine and condenser system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the main turbine and condenser system performs functions that support ATWS and EQ.

LRA Table 2.3.4-8 identifies main turbine and condenser system component types within the scope of license renewal and subject to an AMR:

- bolting
- moisture separator
- piping
- trap body
- valve bodies

The intended functions of the main turbine and condenser system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention

- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.8.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.8.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.3.4.9 Steam Generator Blowdown System

2.3.4.9.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.9, the applicant described the SGB system, which primarily removes contaminants and process blowdown water from the steam generators to maintain steam generator water chemistry within specified limits. Continuous blowdown of the steam generators is necessary during operation because the boiling action concentrates the chemicals and impurities introduced into the steam generators from the feedwater. Portions of the system are safety-related. The SGB system consists of containment isolation valves, a blowdown flash tank, tanks, pumps, piping, heat exchangers, filters, demineralizers, resin traps, valves, and instrumentation.

Blowdown flow rate regulation is accomplished by adjusting hand control valves. The system normally directs steam in the blowdown flash tank to feedwater heaters. Blowdown flash tank level control is accomplished by a level control valve. The blowdown water flows through heat exchangers, filters, and demineralizers prior to returning to the main condenser. Radiation monitors continuously sample the flow path to indicate any potential steam generator tube leak.

Safety-related containment isolation valves perform a containment isolation function of isolating SGB flow in a HELB outside containment or actuation of the AFW pumps. Additionally, high steam generator sample radiation or high blowdown tank level will isolate blowdown flow (Unit 2).

The SGB system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the SGB system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the SGB system performs functions that support ATWS and EQ.

LRA Table 2.3.4-9 identifies SGB system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- flexible hose
- heat exchanger
- orifice

- piping
- pump casing
- tank
- tubing
- valve body

The intended functions of the SGB system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.9.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.9 and UFSAR Sections 10.3.8 for Unit 1 and 10.4.8 for Unit 2 using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

During its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR, in accordance with 10 CFR 54.21(a)(1). During its review of LRA Section 2.3.4.9, the staff identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff reviewed LRA Section 2.3.4.9, noting that the applicant has stated that an intended function of the SGB system is that it contains components relied upon in the safety analyses or plant evaluations to demonstrate compliance with EQ regulations. In UFSAR Section 10.3.8.3 for Unit 1, the applicant identified the following feature, "Reducing orifices (RO-BD-109A, B, and C) limit the energy release in those areas without ambient monitors so the environmental qualification envelope in those areas with vital equipment is maintained."

In LRA Table 2.3.4-9, the applicant identified the component type "orifice" as being subject to an AMR with an intended function of leakage boundary (spatial). However, the staff noted that on LRA drawing 1-25-1, at locations A-6 and B-6, the applicant did not highlight these orifices as within the scope of license renewal pursuant to 10 CFR 54.4(a)(3), which includes the above identified function. In RAI 2.3.4.9-1, dated May 8, 2008, the staff requested that the applicant justify the exclusion of these orifices from the scope of license renewal.

In its response to RAI 2.3.4.9-1, dated June 9, 2008, the applicant stated:

> The LRA did not originally include restricting orifices RO-BD-109A, -109B, and -109C within the scope of license renewal. Since Unit 1 UFSAR Section 10.3.8.3 identifies these orifices as performing a function associated with EQ, these orifices were added to scope for 10 CFR 50.54(a)(3) with a component intended function of "Flow restriction." The applicant revised the relevant drawing to show RO-BD-109A, -109B, and -109C highlighted in red. The component function "Flow restriction" was added to the orifice component in the relevant LRA table. The applicant explained that these components are located on the roof of the service building (outside), and five new rows were added to the relevant AMR table to account for these components. Additionally, the "Air-outdoor" environment was added to the list of environments for the SGB system in LRA Section 3.4.2.1.9.

Based on its review, the staff finds the applicant's response to RAI 2.3.4-9-1 acceptable because the applicant has clarified that the orifices perform a function associated with EQ and; thus, are within the scope of license renewal. Additionally, the applicant has revised the LRA drawing and table, accordingly. Therefore, the staff's concern described in RAI 2.3.4-9-1 is resolved.

2.3.4.9.3 Conclusion

The staff reviewed the LRA, RAI responses, UFSAR, and drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff found instances where the applicant omitted systems and structures that should have been included within the scope of license renewal. The applicant has satisfactorily resolved the issues as discussed in the preceding staff evaluation. The staff finds no further omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no further omissions.

Based on its review, the staff finds that the applicant has adequately identified the SGB system components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.3.4.10 Water Treatment System

2.3.4.10.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.10, the applicant described the nonsafety-related water treatment system, which performs the following:

- Clarifies and filters Ohio River water
- Demineralizes a portion of the filtered water
- Produces reactor-grade demineralized water
- Stores sufficient filtered and demineralized water
- Neutralizes wastes to generate an effluent with a pH of 6.0 to 9.0 before discharge to the cooling tower blowdown stream

The main water treatment processing facility is located at Unit 1, where the system clarifies, filters, and demineralizes river water. Normal production of demineralized water is accomplished by pumping filtered water through a vendor-supplied demineralizer skid. The water treatment area has, but normally does not use, installed demineralizers and regeneration equipment.

The system then distributes filtered and demineralized water from the Unit 1 processing facility to Units 1 and 2.
The most significant recipient of demineralized water is the primary plant demineralized water storage tank, which supplies the AFW pumps. The water treating systems at both units have the tanks, pumps, piping, valves, controls, and instrumentation to store, distribute, and chemically adjust demineralized and filtered water as required for primary and secondary plant make-up, cooling water make-up, and general plant use. Operation of the water supply and treatment system is not necessary for safety and there is no redundancy of equipment.

The failure of nonsafety-related SSCs in the water treatment system could potentially prevent the satisfactory accomplishment of a safety-related function. The water treatment system also performs functions that support fire protection (Unit 2 only).

LRA Table 2.3.4-10 identifies water treatment system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- sight glass
- tank
- tubing
- valve body

The intended functions of the water treatment system component types within the scope of license renewal include:

- nonsafety-related maintenance of mechanical and structural integrity to prevent failure of safety-related structures, systems, and components caused by spatial interactions
- pressure-retaining boundary for delivery of sufficient flow at adequate pressure (and barrier to fire spread for components like ductwork and fire dampers), fission product barrier for containment pressure boundary, or containment isolation for fission product retention
- nonsafety-related maintenance of mechanical and structural integrity for support of attached safety-related piping and components

2.3.4.10.2 Staff Evaluation

The staff performed a detailed Tier 2 review of this Balance of Plant System and required no specific additional information to complete its review of the applicant's scoping and screening results. For the staff evaluation of this system, see SER Section 2.3.

2.3.4.10.3 Conclusion

For staff conclusion for this system, see SER Section 2.3.

2.4 Scoping and Screening Results: Structures

This Section documents the staff's review of the applicant's scoping and screening results for structures. Specifically, this Section discusses:

- alternate intake structure (common)
- auxiliary building
- boric acid tank building (Unit 1 only)
- cable tunnel
- chemical addition building (Unit 1 only)
- condensate polishing building (Unit 2 only)
- control building (Unit 2 only)
- decontamination building
- diesel generator building
- emergency outfall structure (Unit 2 only)
- emergency response facility diesel generator building (common)
- emergency response facility substation building (common)
- equipment hatch platform
- fuel building
- gaseous waste storage vault
- guard house (common)
- intake structure (common)
- main steam and cable vault
- pipe tunnel
- primary demineralized water storage tank pad and enclosure
- primary water storage building (Unit 1 only)
- reactor containment building
- refueling water storage tank and chemical addition tank pad and surroundings
- relay building (common)
- safeguards building
- service building
- solid waste building (Unit 1 only)
- south office and shops building (common)
- steam generator drain tank structure (Unit 1 only)
- switchyard (common)
- turbine building
- valve pit
- waste handling building (Unit 2 only)
- water treatment building (Unit 1 only)
- yard structures
- bulk structural commodities

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant must identify and list passive, long-lived SCs within the scope of license renewal and subject to an AMR. To verify

that the applicant properly implemented its methodology, the staff's review focused on the applicant's implementation results. This approach allowed the staff to confirm that there were no omissions of SCs that meet the scoping criteria and are subject to an AMR.

The staff's evaluation of the information in the LRA was performed in the same manner for all structures. The objective was to determine whether the applicant has identified, in accordance with 10 CFR 54.4, components and supporting structures for those structures that appear to meet the license renewal scoping criteria. Similarly, the staff evaluated the applicant's screening results to verify that all passive, long-lived SCs were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its scoping evaluation, the staff reviewed the applicable LRA sections, focusing on components that have not been identified as within the scope of license renewal. The staff reviewed the UFSAR, for each structure to determine whether the applicant has omitted from the scope of license renewal, components with intended functions pursuant to 10 CFR 54.4(a). The staff also reviewed the UFSAR to determine whether the LRA specified all intended functions in accordance with 10 CFR 54.4(a). The staff requested additional information to resolve any identified omissions or discrepancies.

After its review of the scoping results, the staff evaluated the applicant's screening results. For those SCs with intended functions, the staff sought to determine whether (1) the functions are performed with moving parts or a change in configuration or properties or (2) the SCs are subject to replacement after a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those SCs meeting neither of these criteria, the staff sought to confirm whether they were subject to an AMR, as required by 10 CFR 54.21(a)(1). The staff requested additional information to resolve any omissions or discrepancies identified.

2.4.1 Alternate Intake Structure (Common)

2.4.1.1 Summary of Technical Information in the Application

In LRA Section 2.4.1, the applicant described its non-QA Category I alternate intake structure. This structure is common to both Units 1 and 2; and, is seismically designed and classified as augmented quality. Located east of the plant and east of the Shippingport Bridge, this approximately 60 by 42 by 62 feet high structure houses the Unit 1 auxiliary river water and the Unit 2 standby SWSs, which provide heat sink requirements after a postulated loss of the seismic Category I intake structure.

The periphery of the alternate intake structure is a cofferdam formed by sheet piling driven to refusal on bedrock. Sheet piling driven on the north-south centerline of the periphery forms two separate cells which are the river water bays from which the standby service water and auxiliary river water pumps take suction. Above the reinforced concrete operating floor, the structure is steel framed and enclosed with insulated metal siding and roof decking. Extending away from the sheet piling on the south side of the structure is a reinforced concrete pipe chamber. Embedded within the lower concrete floor and supporting the pipe chamber are steel H-piles driven to refusal.

The failure of nonsafety-related SSCs in the alternate intake structure (common) could potentially prevent the satisfactory accomplishment of required safety-related functions.

LRA Table 2.4-1 identifies alternate intake structure (common) component types within the scope of license renewal and subject to an AMR.

2.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.1 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.1, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the alternate intake structure.

Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.1, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.XX-1, dated June 4, 2008, the staff requested that the applicant confirm that the component identified as "Structural Steel: beams, columns, plates and trusses" in various tables in LRA Section 2.4 includes the connection components (gusset plates, welds, bolts, etc.).

In its response to RAI 2.4.XX-1, dated July 24, 2008, the applicant confirmed that its Structural Monitoring Program requires inspection of all aspects of structural framing load path and the connection components (e.g., gusset plates, welds, bolts, girder and seat stiffeners) for license renewal SSCs are within the scope of license renewal and subject to an AMR.

On the basis of its review, the staff finds the applicant's response to RAI 2.4.XX-1 acceptable because the applicant has confirmed that all connection components are within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.4.XX-1 is resolved.

In RAI 2.4-1, dated June 4, 2008, the staff requested that the applicant confirm the consistency between the in-scope structures identified in LRA Section 2.4 and the LRA drawing "LR-STRUCTURES."

In its response to RAI 2.4-1, dated July 24, 2008, the applicant revised LRA drawing "LR-STRUCTURES" to label the in-scope structures consistent with those structures identified in LRA Section 2.4.

On the basis of its review, the staff finds the applicant's response to RAI 2.4-1 acceptable because the applicant has revised LRA drawing "LR-STRUCTURES" to conform to LRA Section 2.4. Therefore, the staff's concern described in RAI 2.4-1 is resolved.

The staff noted in LRA Table 2.4-1 that the applicant selected "EN" (enclosure or protection) for the metal siding. However, the applicant did not include "EN" as an intended function for the exterior wall and roof decking.

In RAI 2.4.1-1, dated June 4, 2008, the staff requested that the applicant clarify the intended function for the exterior walls above grade and the roof decking.

In its response to RAI 2.4.1-1, dated July 24, 2008, the applicant confirmed that for the alternate intake structure metal siding, the intended function "EN" was erroneously selected in LRA Table 2.4-1. The applicant stated that the definition of the intended function "EN" is shelter or protection of safety-related equipment and there is no safety-related equipment located in the alternate intake structure. The applicant revised LRA Table 2.4-1 to delete "EN" from the list of intended functions for the metal siding.

Based on its review, the staff finds the applicant's response to RAI 2.4.1-1 acceptable, because the applicant has acknowledged that it erroneously selected "EN" as an intended function and as a result, revised LRA Table 2.4-1 to delete "EN" from the list of intended functions for metal siding. Therefore, the staff's concern described in RAI 2.4.1-1 is resolved.

2.4.1.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the alternate intake structure (common) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.2 Auxiliary Building

2.4.2.1 Summary of Technical Information in the Application

In LRA Section 2.4.2, the applicant described the auxiliary buildings. The Unit 1 auxiliary building is a safety-related, seismic Category I structure approximately 120 by 104 by 69 feet high, consisting of a basement and three upper stories located adjacent to and south of the Unit 1 service building. It houses various safety- and nonsafety-related primary systems.

A reinforced concrete foundation mat supports the auxiliary building and the uppermost floor supports a seismically-designed steel superstructure. Design of the reinforced concrete floors and walls below and for certain components above this elevation is for tornado protection for safety-related equipment and piping and for biological shielding, where required. The uppermost, heavily reinforced concrete slabs can accommodate a collapse of the steel framed structure above them without detriment to the integrity of the Class I portions below. This structure also includes the Category I pipe trench beneath its lower level to the RCB and the pipe trench beneath it to the fuel building.

The auxiliary building basement portion housing safety-related equipment is protected against flooding to El. 730'-0" (*i.e.*, PMF elevation). The charging pumps, located below the PMF and within watertight cubicles with water stops at construction joints below the PMF elevation, are the only equipment required to maintain plant shutdown during the PMF. The remainder of the basement is allowed to flood to eliminate hydraulic uplift. The pipe trenches from the auxiliary building to the containment and the fuel building also are allowed to flood.

Steel framing above the uppermost floor slab supports the auxiliary building roof, which consists of a built-up membrane on steel decking. Exterior walls are concrete or protected, insulated

metal fluted siding, designed to blow off under tornado loading to reduce wind loads on the superstructure. Some of the interior walls are concrete block.

The Unit 2 auxiliary building is a safety-related, seismic Category I structure approximately 120 by 145 by 63 feet high, consisting of a basement and three upper stories supported on a reinforced concrete foundation mat. The roof and walls of the top story are predominantly steel-framed with metal siding and metal roof decking, except for the ventilation core area, component cooling surge tank cubicle, and the air-conditioning room. These locations are reinforced concrete as is the remainder of the structure. Concrete walls and floors protect safety-related equipment and piping from tornados and provide biological shielding where required. The top story steel framing design is not for tornado protection.

The concrete exterior walls and foundation mat protect against external flood up to El. 730'-0". Construction joints in the exterior walls and mats below El. 730'-0" have water stops. Above El. 773'-6", the concrete ventilation core area, component cooling surge tank cubicle, and air conditioning room are tornado-protected, although the seismic Category I steel frame top story structure is not tornado protected. The metal siding around the top story is designed to blow off under tornado loading to reduce wind loads on the superstructure.

The auxiliary building contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the auxiliary building potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the auxiliary building performs functions that support fire protection and SBO.

LRA Table 2.4-2 identifies auxiliary building component types within the scope of license renewal and subject to an AMR.

2.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.2 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA 2.4.2, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.2.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the auxiliary building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.3 Boric Acid Tank Building (Unit 1 Only)

2.4.3.1 Summary of Technical Information in the Application

In LRA Section 2.4.3, the applicant described the boric acid tank building (Unit 1 only), a nonsafety-related, seismic Category II structure located adjacent to the southeast corner of the auxiliary building and housing the boric acid hold tank and its equipment, none of which is within the scope of license renewal. At approximately 20 feet by 23 feet by 43 feet high, the boric acid tank building consists of a reinforced concrete structure and foundation mat, a concrete roof deck supported by a steel beam, and no interior walls or floors. The building, as designed, will not collapse onto nearby structures.

The failure of nonsafety-related SSCs in the boric acid tank building (Unit 1 only) potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.4-3 identifies boric acid tank building (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.3.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.3, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the boric acid tank building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.3, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.3, the applicant identified the intended function of Unit 1 Boric Acid Tank Building as support for compliance with 10 CFR 54.4(a)(2). Based on UFSAR Table 9.2-2 for Unit 1, the boric acid hold tank is protected from tornado by concrete walls.

In RAI 2.4.3-1, dated June 4, 2008, the staff requested that the applicant clarify the intended function of the boric acid tank building exterior walls and roof slab relative to tornado protection.

In its response to RAI 2.4.3-1, dated July 24, 2008, the applicant confirmed that although the boric acid tank building was designed not to collapse due to tornado wind pressure loading and earthquake, the exterior walls and the roof of this building were not designed as barriers for tornado generated missiles. Therefore, the 10 CFR 54.4(a)(2) intended function currently identified in LRA Section 2.4.3 is accurate and sufficient.

Based on its review, the staff finds the applicant's response to RAI 2.4.3-1 acceptable because the applicant has confirmed that the design of the Unit 1 exterior walls and the roof is for tornado wind pressure only and that the boric acid tank building is classified as a nonsafety-related seismic category II structure designed not to collapse due to tornado wind load and earthquake. Therefore, the staff's concern described in RAI 2.4.3-1 is resolved.

2.4.3.3 Conclusion

The staff reviewed the LRA and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal.
The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the boric acid tank building (Unit 1 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.4 Cable Tunnel

2.4.4.1 Summary of Technical Information in the Application

In LRA Section 2.4.4, the applicant described the cable tunnels. The Unit 1 cable tunnel is a safety-related, seismic Category I reinforced concrete subsurface structure housing safety-related electrical equipment. The cable tunnel is the service building area for transfer of cable from the cable vault structure to the building's cable tray area and is situated northeast of the cable vault. One part of the cable tunnel runs vertically from El. 725'-6" to El. 754'-6" and another runs horizontally from the cable vault area northward into the service building. The vertical and horizontal parts divide into two compartments by a north-south concrete wall. There are no equipment or floor drains in the cable tunnel but water stops are placed within construction joints all around the cable tunnel.

The Unit 2 cable tunnel is a safety-related, seismic Category I subsurface structure of reinforced concrete foundation mat, walls, and roof extending approximately 82 feet from the auxiliary building to the control building. The concrete structure of the cable tunnel protects safety-related electrical systems from tornados. The bottom of the cable tunnel's foundation is at El. 709'-6" and is designed for external flood protection up to El. 730'.

The cable tunnel contains safety-related components relied upon to remain functional during and following DBEs. In addition, the cable tunnel performs functions that support fire protection.

LRA Table 2.4-4 identifies cable tunnel component types within the scope of license renewal and subject to an AMR.

2.4.4.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.4, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.4.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal.
The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the cable tunnel SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.5 Chemical Addition Building (Unit 1 Only)

In LRA Section 2.4.5, the applicant described the chemical addition building (Unit 1 only), a safety-related, seismic Category I structure approximately 19 by 31 by 11 feet high and located adjacent to the refueling water storage tank. Supported on a reinforced concrete foundation mat, this building has metal siding and a metal roof deck and houses the caustic tank pumps of the containment depressurization system. The top of the foundation for the chemical addition building is at El. 735'-0", the site grade elevation. The roof, supported by steel framing, consists of a built-up membrane on steel decking.

The chemical addition building (Unit 1 only) contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.4-5 identifies chemical addition building (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.5.1 Staff Evaluation

The staff reviewed LRA Section 2.4.5 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.5, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.5.2 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the chemical addition building (Unit 1) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.6 Condensate Polishing Building (Unit 2 Only)

2.4.6.1 Summary of Technical Information in the Application

In LRA Section 2.4.6, the applicant described the condensate polishing building (Unit 2 only), a nonsafety-related, seismic Category II (designed not to collapse in a safe-shutdown earthquake) structure with no safety-related equipment. Located adjacent to and west of the waste handling building and consisting of a basement and three upper stories, the L-shaped condensate polishing building has a main portion of approximately 44 by 141 feet and a maximum height of 93 feet.

The foundation mat supporting the structure and the roof, walls, and floor slabs are reinforced concrete. The steel framing, supporting the metal decking beneath the reinforced concrete roof slab, is designed such that it is not a secondary missile under earthquake, tornado, or probable maximum precipitation conditions.

The failure of nonsafety-related SSCs in the condensate polishing building (Unit 2 only) could potentially prevent the satisfactory accomplishment of a safety-related function. The condensate polishing building (Unit 2 only) also performs functions that support fire protection.

2.4.6.2 Staff Evaluation

The staff reviewed LRA Section 2.4.6 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.6, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.6.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the condensate polishing building (Unit 2 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.7 Control Building (Unit 2 Only)

2.4.7.1 Summary of Technical Information in the Application

In LRA Section 2.4.7, the applicant described the control building (Unit 2 only), a safety-related, seismic Category I structure consisting of three stories adjacent to the Unit 1 service building. The top story contains the Unit 2 portion of the MCR, the computer room, and the heating,

ventilation, and air-conditioning equipment room. The lower two stories house switchgear, cable spreading areas, and other equipment. As noted in LRA Section 2.4.26, the MCR is common to Unit 1 and 2 but split between the Unit 2 control building and the Unit 1 service building.

The Unit 2 Control Building, approximately 69 by 89 by 45 feet high, has a foundation mat, roof, and walls constructed of reinforced concrete designed for tornado protection. The exterior and some interior concrete walls have missile barrier functions, while the main entrance incorporates light structural steel framing, siding, and roof decking. Construction joints in the exterior walls and mats below El. 730'-0" have water stops.

Positive pressure in the control room envelope minimizes, during emergency operation, in-leakage through doors, ducts, pipes, and cable penetrations from wind effects and pressure variations. Special construction features, including compression seals for access doors and equipment removal hatches, penetration seals for pipes, ducts, and electrical penetrations, and water trap seals for sanitary piping, maintain the leak-tightness of the common control room boundary. Shielding by the MCR walls and the separation of the MCR from the containment structure, ensure operator ability to remain in the MCR for 30 days after an accident and not receive an integrated radiation dose in excess of 5 rem.

The control building (Unit 2 only) contains safety-related components relied upon to remain functional during and following DBEs. In addition, the control building (Unit 2 only) performs functions that support fire protection and SBO.

2.4.7.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.7, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.7.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the control building (Unit 2 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.8 Decontamination Building

2.4.8.1 Summary of Technical Information in the Application

In LRA Section 2.4.8, the applicant described the decontamination buildings. The Unit 1 decontamination building is a nonsafety-related, seismic Category II steel frame and siding building abutting the west end of the fuel building's south wall. The building is used to decontaminate plant equipment.

The structure houses no safety-related equipment and by design, its steel framing will not collapse and endanger systems or structures requiring protection.

In the 77-foot tall single-story building, equipment can be decontaminated without uncontrolled release of activity into the environment. A 125-ton trolley runs through the high-bay portion of the decontamination building into the west end of the fuel building to the north and on a high-level runway out over the road to the south. Stainless steel walls, eight feet high, separate the central area and stainless steel covers the floor to form an area for washing down fuel casks and other equipment. A stainless steel pad protects the floor under heavy objects.

The Unit 2 decontamination building is a safety-related, seismic Category I structure housing equipment for washing fuel casks. Although classified as safety-related, the building houses no safety-related equipment. The decontamination building is integral to the fuel building. UFSAR Section 3.8.4.1.4 for Unit 2 describes the two buildings as one structure, but for license renewal purposes, their evaluations are separate. Situated north of the fuel building's east end, the decontamination building is approximately 33 by 33 feet. A concrete wall and a set of doors separate the two buildings, and a continuous reinforced concrete foundation mat supports the decontamination building.

The building's roof and walls are concrete with external flood protection and water stops are provided at all construction joints up to El. 730'-0" (the PMF elevation). The decontamination building is also a tornado-protected structure. Steel framing supports the metal decking beneath the reinforced concrete roof slab. The steel framing is designed such that it is not a secondary missile under earthquake, tornado, or probable maximum precipitation conditions. A 125-ton trolley runs from the fuel building to the decontamination area (building) to the yard area. The top of the crane girder is at El. 797'-10".

LRA Table 2.4-8 identifies decontamination building component types within the scope of license renewal and subject to an AMR.

2.4.8.2 Staff Evaluation

The staff reviewed LRA Section 2.4.8 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.8, the staff identified areas in which additional information was necessary to complete its evaluation of the applicant's scoping and screening results for the decontamination buildings. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

The following discussion describes the staff's RAIs related to LRA Section 2.4.8, the corresponding applicant responses, and the staff evaluation.

Based on the applicant's description of the decontamination building in LRA Section 2.4.8 and UFSAR Table 3.2-2 for Unit 2, the staff issued RAI 2.4.8-1, dated June 4, 2008, requesting that the applicant clarify the intended function of this building relative to flood barrier.

In its response to RAI 2.4.8-1, dated July 24, 2008, the applicant confirmed that (1) all exterior walls are located above the flood elevation; (2) there are no safety-related SSC in the decontamination building that would require flood protection; (3) there is an interior sump in the foundation base mat with the bottom elevation of 18 inches above the flood elevation; and (4) the top of the foundation base mat is 5'-6" above flood elevation. Therefore, the applicant stated that the intended function of flood barrier was not assigned to any of the in-scope components identified in LRA Table 2.4-8.

Based on its review, the staff finds the applicant's response to RAI 2.4.8-1 acceptable because the applicant has properly clarified the intended function of the decontamination building relative to flood barrier. Therefore, the staff's concern described in RAI 2.4.8-1 is resolved.

In LRA Section 2.4.8, the applicant indicated in its description of the decontamination building that the stainless steel lined floor and walls are provided for equipment wash-down. The staff noted that LRA Table 2.4-8 did not include stainless steel liner nor did LRA Table 3.5.2-8 identify the stainless steel liner material subject to an AMR.

In RAI 2.4.8-2, dated June 4, 2008, the staff requested that the applicant confirm that the stainless steel liner is within the scope of license renewal and subject to an AMR or provide justification for the exclusion.

In its response to RAI 2.4.8-2, dated July 24, 2008, the applicant confirmed that the intent of the stainless steel liner is to provide a suitable surface for decontamination purposes only and it does not perform any intended functions pursuant to 10 CFR 54.4 (a)(1), (a)(2), or (a)(3) and as a result, was excluded from the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.4.8-2 acceptable because the applicant has provided adequate justification for excluding the stainless steel liner from the scope of license renewal pursuant to 10 CFR 54.4 (a)(1), (a)(2), or (a)(3). Therefore, the staff's concern described in RAI 2.4.8-2 is resolved.

2.4.8.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the decontamination building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.9 Diesel Generator Building

2.4.9.1 Summary of Technical Information in the Application

In LRA Section 2.4.9, the applicant described the diesel generator buildings. The Unit 1 diesel generator building is a safety-related, seismic Category I structure located adjacent to and south of the Unit 1 fuel building. The diesel generator building is a single-story, reinforced concrete structure approximately 57 by 61 by 32 feet high (including two penthouses, one each for gas and air exhaust) supported on a reinforced concrete foundation mat.

The building houses the EDGs. Its walls and roof are constructed of reinforced concrete and designed to provide tornado protection. A pipe trench, which passes under the 12- inch thick wall between the two diesel generator compartments, has fuel oil cross connections that run between the two diesel fuel oil pump suction and discharge pipelines.

The diesel generator building is above the PMF elevation. The two fuel oil storage tanks for the diesel generators and the fuel oil piping outside the diesel generator building are buried and covered with a two feet thick concrete slab for missile protection. In addition, a concrete partition separates the lines from each tank from one another.

The Unit 2 diesel generator building is a safety-related, seismic Category I structure housing the EDGs. The two-story building is approximately 78 by 88 by 57 feet high and is supported on a reinforced concrete foundation mat above the PMF elevation. Reinforced concrete roof and walls protect the building from tornados and missiles. Underground concrete, enveloping the EDG fuel oil tanks below the diesel generator building, is part of the building structure.

The diesel generator building has two separate areas, each housing one EDG and its auxiliary systems and electrical and/or control equipment. The concrete wall separating the two areas is designed to withstand a safe-shutdown earthquake, fire, or missiles. Each of the redundant fuel oil systems is in a separate room within the diesel generator building.

The south exterior wall of the building adjacent to the system station service transformer has a three-hour fire rating as has the exterior door to the diesel generator in this area. Material that seals penetrations of exterior and interior walls that form the fire barriers has a rating equivalent to the barrier rating, except for the intake and exhaust openings that are separated by sufficient distance to preclude fire propagation.

The diesel generator building contains safety-related components relied upon to remain functional during and following DBEs. In addition, the diesel generator building performs functions that support fire protection and SBO.

LRA Table 2.4-9 identifies diesel generator building component types within the scope of license renewal and subject to an AMR.

2.4.9.2 Staff Evaluation

The staff reviewed LRA Section 2.4.9 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.9, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for

the diesel generator buildings. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.9, the corresponding applicant responses, and the staff evaluation.

Based on the applicant's description of the diesel generator building in LRA Section 2.4.9 and UFSAR Section 8.5.2.4 for Unit 1, the staff issued RAI 2.4.9-1, dated June 4, 2008, requesting that the applicant clarify the intended function of the interior walls relative to missile barrier.

In its response to RAI 2.4.9-1, dated July 24, 2008, the applicant confirmed that the interior wall, separating the Unit 1 diesel generator sets, performs a missile barrier function by protecting each set of diesel generators from internally generated missiles. The applicant revised LRA Section 2.4, Tables 2.4-9 and 3.5.2-9 to correct this oversight.

Based on its review, the staff finds the applicant's response to RAI 2.4.9-1 acceptable because the applicant adequately clarified the intended function of the interior walls relative to missile barrier and revised LRA Section 2.4, Tables 2.4-9 and 3.5.2-9 to include missile barrier intended function for the interior walls. Therefore, the staff's concern described in RAI 2.4.9-1 is resolved.

The applicant discussed the diesel generator building in UFSAR Section 3.8.4.1.6 for Unit 2. The UFSAR references included in LRA Section 2.4.9 do not include UFSAR Section 3.8.4.1.6. Therefore, the staff issued RAI 2.4.9-2, dated June 4, 2008, requesting that the applicant clarify LRA Section 2.4.9.

In its response to RAI 2.4.9-2, dated July 24, 2008, the applicant revised LRA Section 2.4.9 to include as a reference, UFSAR Section 3.8.4.1.6 for Unit 2.

Based on its review, the staff finds the applicant's response to RAI 2.4.9-2 acceptable because the applicant has revised LRA Section 2.4.9 to add a reference to UFSAR Section 3.8.4.1.6 for Unit 2. Therefore, the staff's concern described in RAI 2.4.9-2 is resolved.

2.4.9.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the diesel generator building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.10 Emergency Outfall Structure (Unit 2 Only)

2.4.10.1 Summary of Technical Information in the Application

In LRA Section 2.4.10, the applicant describes the safety-related, seismic Category I emergency outfall structure (Unit 2), a dual-chambered overflow weir approximately 21 by 35 by 24 feet high and situated about 1,900 feet west of the center of the RCB for Unit 2. It protects the ends of the service water lines from missile impact and maintains proper hydraulic head within the

SWS. If normal service water flow via the circulating water system to the cooling tower is blocked, service water discharge is re-routed to the emergency outfall structure and on to the Ohio River.

The emergency outfall structure is constructed of reinforced concrete. The bottom of the emergency outfall structure is at El. 710'-0" and the top at approximately El. 737'-5" and is designed to remain functional under postulated tornado and tornado-generated missile loadings.

The emergency outfall structure (Unit 2 only) contains safety-related components relied upon to remain functional during and following DBEs. In addition, the emergency outfall structure (Unit 2 only) performs functions that support SBO.

LRA Table 2.4-10 identifies emergency outfall structure (Unit 2 only) component types within the scope of license renewal and subject to an AMR.

2.4.10.2 Staff Evaluation

The staff reviewed LRA Section 2.4.10 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.10, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.10.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the emergency outfall structure (Unit 2 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.11 Emergency Response Facility Diesel Generator Building (Common)

2.4.11.1 Summary of Technical Information in the Application

In LRA Section 2.4.11, the applicant described its emergency response facility (ERF) diesel generator building (common), also known as the reserve generator building. The ERF diesel generator building is a nonsafety-related, nonseismic structure approximately 41 by 23 by 16 feet high and is located south of the plant and north of the ERF substation building. The ERF diesel generator building houses the nonsafety-related ERF diesel generator (also known as the reserve generator or the black diesel) that powers via the ERF substation switchgear the Unit 1 dedicated AFW pump, the Unit 1 ATWS mitigation system actuation circuitry panel and Unit 2 diesel-driven station air compressor equipment. The applicant's evaluation of the ERF diesel

generator building included nearby concrete foundations for the ERF diesel generator cooler (water-to-air heat exchanger) and cooler fans.

The building is a pre-engineered, steel-framed, single-story structure with insulated metal siding, a metal roof, and a concrete mat foundation. The top of the foundation slab is at El. 735'-6". A 30,000-gallon fuel oil storage tank buried near the ERF diesel generator building can supply the ERF diesel for seven days. The bottom of the tank, at approximately El. 732'-6" (*i.e.*, above the PMF elevation of El. 730'-0"), rests on undisturbed soil. A concrete roof slab and concrete walls partially cover the tank and form a vault for its piping and equipment. Pea gravel fills the space between the sheet piling and the tank and vault.

The ERF diesel generator building (common) performs functions that support fire protection. LRA Table 2.4-11 identifies ERF diesel generator building (common) component types within the scope of license renewal and subject to an AMR.

2.4.11.2 Staff Evaluation

The staff reviewed LRA Section 2.4.11 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.11, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the ERF diesel generator building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.11, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.11, the applicant stated that pea gravel was used to fill the space between the sheet piling, the tank and vault.

In RAI 2.4.11-1, dated June 4, 2008, the staff requested that the applicant provide justification for excluding the sheet piling from the scope of license renewal.

In its response to RAI 2.4.11-1, dated July 24, 2008, the applicant confirmed that the sheet piling was installed for excavation purposes during the original building construction. The applicant stated that since the sheet piling serves no structural purpose or license renewal intended function subsequent to construction of the original building, it was excluded from the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.4.11-1 acceptable because the applicant has confirmed that the sheet piling was installed as a construction aid and serves no intended function for license renewal. Therefore, the staff's concern described in RAI 2.4.11-1 is resolved.

2.4.11.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the ERF diesel generator building (common) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.12 Emergency Response Facility Substation Building (Common)

2.4.12.1 Summary of Technical Information in the Application

In LRA Section 2.4.12, the applicant described the ERF substation building (common), a nonsafety-related, nonseismic structure approximately 60 by 30 by 32 feet high and located south of the plant. The ERF substation building houses two 4kV buses and 480 VAC, 120 VAC, and 125 VDC equipment, all of which is necessary to supply components in Units 1 and 2.

The building consists of two stories, the first floor at El. 735'-6" and the second at El. 751'-6". Grade on the north and west sides of the building is at El. 735'-0" and varies between El. 735'-0" and El. 744'-0" on the south and east sides. A concrete retaining wall and sheet piling are on the west side of the building at its south end and the building's foundation is concrete. The ERF substation building (common) primarily is a steel-framed structure with metal siding, with some exterior walls constructed of concrete with metal siding. The roof consists of insulated metal decking with a built-up membrane.

The ERF substation building (common) provides structural or functional support for fire protection and ATWS.

LRA Table 2.4-12 identifies ERF substation building (common) component types within the scope of license renewal and subject to an AMR.

2.4.12.2 Staff Evaluation

The staff reviewed LRA Section 2.4.12 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.12, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the ERF substation building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.12, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.12, the applicant stated that a concrete retaining wall and sheet piling are located on the west side of the building. LRA Table 2.4-12 does not include the concrete retaining wall and the sheet piling.

In RAI 2.4.12-1, dated June 4, 2008, the staff requested that the applicant provide justification for excluding these components from the scope of license renewal.

In its response to RAI 2.4.12-1, dated July 24, 2008, the applicant confirmed that neither the concrete retaining wall nor the sheet piling is part of the ERF substation building foundation system. The applicant stated that the retaining wall has a nominal connection with the ERF

substation building. In a follow-up letter dated August 22, 2008, the applicant further confirmed that a potential adverse interaction between the retaining wall and the ERF substation building is not identified in the BVPS CLB and the plant or industry experience does not indicate such interaction could exist. Therefore, the applicant stated that the nonsafety-related retaining wall and the sheet piling do not provide license renewal intended functions and have been excluded from the scope of license renewal.

Based on its review, the staff finds the applicant's response to RAI 2.4.12-1 acceptable because the applicant has confirmed that the nonsafety-related retaining wall and sheet piling are not part of the building's foundation and that interaction between the retaining wall and the building is not part of the BVPS CLB. Therefore, the staff's concern described in RAI 2.4.12-1 is resolved.

2.4.12.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the ERF substation building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.13 Equipment Hatch Platform

2.4.13.1 Summary of Technical Information in the Application

In LRA Section 2.4.13, the applicant described the equipment hatch platforms. The Unit 1 equipment hatch platform is a safety-related, seismic Category I structure adjacent to and southwest of the containment. At approximately 27 feet by 27 feet by 46 feet high, the platform protects the equipment hatch. Supported on a reinforced concrete foundation mat, the platform has reinforced concrete walls and slabs designed to protect the containment equipment hatch from tornado-generated missile. The platform has a removable missile shield enclosure consisting of various wall assemblies and roof sections. The bottom of the equipment hatch platform foundation is at El. 732'-0", which is above the PMF elevation of El. 730 feet.

The Unit 2 equipment hatch platform is a safety-related, seismic Category I structure adjacent and northeast of the RCB. At approximately 29 feet by 31 feet by 49 feet high, the platform protects the equipment hatch.

Supported on a reinforced concrete foundation mat, the platform walls and slabs are reinforced concrete designed to protect the containment equipment hatch from tornado-generated missiles. The walls and slabs are removable. The equipment hatch platform is protected from external flooding up to El. 730 feet.

The equipment hatch platform contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.4-13 identifies equipment hatch platform component types within the scope of license renewal and subject to an AMR.

2.4.13.2 Staff Evaluation

The staff reviewed LRA Section 2.4.13 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.13, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the equipment hatch platforms. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.13, the corresponding applicant responses, and the staff evaluation.

In UFSAR Section 3.8.4.1.12 for Unit 2, the applicant discussed equipment hatch platform. However, the UFSAR references included in LRA Section 2.4.13 did not include UFSAR Section 3.8.4.1.12. In RAI 2.4.13-1, dated June 4, 2008, the staff requested that the applicant clarify LRA Section 2.4.13.

In its response to RAI 2.4.13-1, dated July 24, 2008, the applicant revised LRA Section 2.4.13 to include as a reference, UFSAR Section 3.8.4.1.12 for Unit 2.

Based on its review, the staff finds the applicant's response to RAI 2.4.13-1 acceptable because the applicant revised LRA Section 2.4.13 to include a reference to UFSAR Section 3.8.4.1.12 for Unit 2. Therefore, the staff's concern described in RAI 2.4.13-1 is resolved.

The staff noted in LRA Section 2.4.13, that both Units 1 and 2 equipment hatch platforms have reinforced concrete walls and slabs. In LRA Table 2.4-13 for Unit 1 equipment hatch platform, the applicant identified floor slabs as an in-scope component.

In RAI 2.4.13-2, dated June 4, 2008, the staff requested that the applicant clarify the scoping difference between the Units 1 and 2 equipment hatch platforms.

In its response to RAI 2.4.13-2, dated July 24, 2008, the applicant confirmed that due to design differences in the Units 1 and 2 equipment hatch platforms, the in-scope components identified in LRA Table 2.4-13 are different. The applicant stated that the listed in-scope components are consistent with the equipment hatch platform structural configuration and are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.13-2 acceptable because the applicant confirmed that (1) design differences between the Unit 1 and 2 equipment hatch platforms produce different in-scope components, (2) there are no omissions in LRA Table 2.4.13, and (3) the identified components are consistent with the structural configuration of Unit 1 and 2 equipment hatch platforms. Therefore, the staff's concern described in RAI 2.4.13-2 is resolved.

2.4.13.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the equipment hatch platform SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.14 Fuel Building

2.4.14.1 Summary of Technical Information in the Application

In LRA Section 2.4.14, the applicant described the fuel buildings. The Unit 1 fuel building is a safety-related, seismic Category I structure approximately 41 by 107 by 60 feet high and is located adjacent to and south of the Unit 1 auxiliary building. The fuel building houses the new and spent fuel and fuel handling facilities, including the reinforced concrete fuel pool, and is supported on a continuous reinforced concrete foundation mat. The fuel building superstructure steel framing is designed not to collapse and endanger SSCs required for safe-shutdown. The metal siding, cladding the superstructure, is designed to blow off under tornado loading to reduce wind loads on the superstructure. The fuel building elevation is higher than the PMF elevation.

The fuel building houses racks for both new and used fuel. New fuel assemblies are stored dry in a steel and concrete structure within the fuel building. The new fuel storage racks are stainless steel fuel guide assemblies bolted into stainless steel support structures. In a separate pool area, spent fuel is stored underwater in stainless steel racks. Neutron-absorbing material (Boral®) installed in spent fuel racks assure spent fuel subcriticality. The sides of the spent fuel pool are constructed of concrete six feet thick. The pool is filled with borated water and fully lined with stainless steel to prevent leakage.

The Unit 2 fuel building is a safety-related, seismic Category I structure approximately 44 by 110 feet housing the new and spent fuel and fuel handling facilities, including the reinforced concrete fuel pool. The building has roof and walls of reinforced concrete supported on a continuous reinforced concrete foundation mat.

Safety-related equipment and the spent fuel have protection against tornadoes and tornado-generated missiles. Steel framing supporting the metal decking under the reinforced concrete roof slab is designed not to be a secondary missile under earthquake, tornado, or probable maximum precipitation conditions. There is external flood protection up to El. 730'-0".
New fuel assembly is stored dry in a steel and concrete structure within the fuel building. The new fuel storage racks are stainless steel fuel guide assemblies bolted into stainless steel support structures. The spent fuel storage racks, housed within the spent fuel pool, are of stainless steel with Boraflex (boron carbide in nonmetallic binders), a neutron-absorbing material. The spent fuel rack criticality analysis takes no credit for any of this neutron-absorbing material but credits soluble boron to maintain spent fuel subcriticality. The concrete sides of the spent fuel pool, three of which also form parts of the fuel building exterior walls, are six feet thick. The pool is lined with stainless steel and filled with borated demineralized water.

The fuel building contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the fuel building potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the fuel building performs functions that support fire protection.

LRA Table 2.4-14 identifies fuel building component types within the scope of license renewal and subject to an AMR.

2.4.14.2 Staff Evaluation

The staff reviewed LRA Section 2.4.14 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.14, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the fuel buildings. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.14, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.14-1, dated June 4, 2008, the staff requested that the applicant confirm that the leak chase system for the spent fuel pool liner has been screened-in as components subject to an AMR or provide justification for the exclusion.

In its response to RAI 2.4.14-1, dated July 24, 2008, the applicant confirmed that the leak chase system for the spent fuel pool liner is within the scope of license renewal, included in LRA Table 2.4-14 as "spent fuel pool liner," and subject to an AMR. Also, the piping associated with the spent fuel pool leak chase system is considered within the scope of license renewal and evaluated as a mechanical component in LRA Section 2.3.3.

Based on its review, the staff finds the applicant's response to RAI 2.4.14-1 acceptable because the applicant confirmed that the leak chase system for the spent fuel pool liner is within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.4.14-1 is resolved.

In RAI 2.4.14-2, dated June 4, 2008, the staff requested that the applicant confirm that the Unit 2 spent fuel rack neutron absorbers are within the scope of license renewal and subject to an AMR, or provide justification for the exclusion.

In its response to RAI 2.4.14-2, dated July 24, 2008, the applicant confirmed that the Unit 2 spent fuel rack criticality analysis only credits the soluble boron and that the Boraflex® neutron absorber is not credited to maintain subcriticality of stored fuel. The Boraflex® neutron absorber has been excluded from the scope of license renewal since it performs no license renewal intended function.

Based on its review, the staff finds the applicant's response to RAI 2.4.14-2 acceptable because the applicant has confirmed that Boraflex® neutron absorber is not credited to maintain subcriticality of stored fuel and it performs no license renewal intended function. Therefore, the staff's concern described in RAI 2.4.14-2 is resolved.

In LRA Table 2.4-14, the staff noted that the applicant did not identify floor slabs as an in-scope component. In RAI 2.4.14-3, dated June 4, 2008, the staff requested that the applicant confirm that floor slabs are within the scope of license renewal and subject to an AMR, or provide justification for excluding them from the scope of license renewal.

In its response to RAI 2.4.14-3, dated July 24, 2008, the applicant confirmed that the floor slabs of both Units 1 and 2 are within the scope of license renewal and subject to an AMR, and revised LRA Tables 2.4-14 and 3.5.2-14 to include floor slabs.

Based on its review, the staff finds that the applicant's response to RAI 2.4.14-3 is acceptable because the applicant has confirmed that the Units 1 and 2 floor slabs are within the scope of license renewal and subject to an AMR. Further, the applicant revised LRA Tables 2.4-14 and 3.5.2-14 to include floor slabs. Therefore, the staff's concern described in RAI 2.4.14-3 is resolved.

2.4.14.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the fuel building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.15 Gaseous Waste Storage Vault

2.4.15.1 Summary of Technical Information in the Application

In LRA Section 2.4.15, the applicant described the gaseous waste storage vaults. The Unit 1 gaseous waste storage vault (also referred to in the UFSAR for Unit 1 as the waste gas storage area) is a safety-related, seismic Category I structure at approximately 37 by 23 by 43 feet and located directly east of the fuel building housing nonsafety-related gaseous waste decay tanks. The gaseous waste storage vault is a reinforced concrete structure, constructed mostly underground for tornado protection. There are no water sources that could cause flooding above or connected to the gaseous waste storage vault. The vault is structurally protected against ingress of water from the PMF.

The Unit 2 gaseous waste storage vault (Enclosure), a nonsafety-related, seismic Category II structure located north of the fuel building, is an in-ground, one-story structure 37 by 52 by 15 feet high with an at-grade entrance 11 by 18.25 by 10 feet high. The structure houses the nonsafety-related gaseous waste storage tanks and is supported on a reinforced concrete foundation mat with walls, roof, and interior structures also constructed of reinforced concrete. Steel framing, which supports the internal stairs, is designed not to be a secondary missile under earthquake, tornado, or probable maximum precipitation conditions.

The gaseous waste storage vault contains safety-related components relied upon to remain functional during and following DBEs Unit 1 only). The failure of nonsafety-related SSCs in the

gaseous waste storage vault potentially could prevent the satisfactory accomplishment of a safety-related function (Unit 2 only). In addition, the gaseous waste storage vault performs functions that support fire protection (Unit 2 only).

LRA Table 2.4-15 identifies gaseous waste storage vault component types within the scope of license renewal and subject to an AMR.

2.4.15.2 Staff Evaluation

The staff reviewed LRA Section 2.4.15 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.15, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the gaseous waste storage vault. Therefore, the staff issued an RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.15, the corresponding applicant responses, and the staff evaluation.

In UFSAR Section 3.8.4.1.18 for Unit 2, the applicant stated that the gaseous waste storage enclosure provides biological shielding where required.

In RAI 2.4.15-1, dated June 4, 2008, the staff requested that the applicant clarify the intended function of the Unit 2 gaseous waste storage vault (Enclosure) relative to biological shielding.

In its responses to RAI 2.4.15-1, dated July 24, 2008 and August 22, 2008, the applicant confirmed that no plant personnel are required to access the gaseous waste storage vault for plant safe-shutdown or accident mitigation actions; and, this structure is not credited with providing radiological shielding to plant personnel during or after an accident or for providing shielding in support of any 10 CFR 54.4(a)(1), (a)(2) or (a)(3) functions. Therefore, the applicant stated that radiological shielding is not an intended function for the gaseous waste storage vault.

Based on its review, the staff finds the applicant's response to RAI 2.4.15-1 acceptable because the applicant has adequately clarified the function of the Unit 2 gaseous waste storage vault and confirmed that radiological shielding is not an intended function. Therefore, the staff's concern described in RAI 2.4.15-1 is resolved.

2.4.15.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the gaseous waste storage vault SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.16 Guard House (Common)

2.4.16.1 Summary of Technical Information in the Application

In LRA Section 2.4.16, the applicant described the guard house (common), a nonsafety-related, nonseismic structure housing a diesel generator. A day tank within the diesel generator room supplies fuel for the diesel generator. The guard house was originally a single-story structure. Two stories and a penthouse were added onto the original structure and onto its west end. Foundations for the original guard house and additions are slabs on grade with perimeter footings. Steel framing supports the second floor and roof over the original guard house. Pre-cast concrete floor and roof panels support the second floor and roof of the addition.

The guard house provides structural or functional support for fire protection.

LRA Table 2.4-16 identifies guard house (common) component types within the scope of license renewal and subject to an AMR.

2.4.16.2 Staff Evaluation

The staff reviewed LRA Section 2.4.16 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.16, the staff evaluated the structural component functions described in the LRA to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal, to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.16.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the guard house SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.17 Intake Structure (Common)

2.4.17.1 Summary of Technical Information in the Application

In LRA Section 2.4.17, the applicant described the intake structure, a safety-related, seismic Category I structure common to both Units 1 and 2 and approximately 85 by 112 by 122 feet high. The seismic Category I portion of the intake structure houses the Unit 1 river water pumps, the Unit 2 service water pumps, the motor-driven fire pump, and the engine-driven fire pump. The structure protects these pumps and related equipment from tornados and tornado-generated missiles as well as flooding. The reinforced concrete slabs in this structure

can accommodate the collapse of the light steel-framed structures above them. The seismic Category I duct lines and manholes that protect the electrical supply to the river water and service water pumps are included as part of the intake structure.

The intake structure is founded on a reinforced concrete mat at El. 637'-0" placed on compacted select granular fill, overlying dense in-situ granular soil extending to bedrock. The intake structure is constructed of reinforced concrete to the operating floor at El. 705'-0". Above this elevation, a steel superstructure with steel siding encloses four contiguous missile-protected, reinforced concrete pump rooms or cubicles. The cubicles have a common concrete roof two feet thick at El. 730'-0"; the north end of the roof is open across its width for ventilation purposes. Its exhaust vents and covers have gaskets for flood protection. The pump cubicle roof also supports several chemical addition (*e.g.*, clamicide) tanks. Water stops in construction joints in the concrete exterior walls protect the pump rooms or cubicles from flooding. The roof, at an approximate elevation of 760 feet, is steel decking supported on the steel framing. An overhead bridge crane, the screenwell crane, services the traveling screen areas, the raw water pumps, the Unit 1 river water pumps, and the Unit 2 service water pumps.

The intake structure contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the intake structure potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the intake structure performs functions that support fire protection and SBO.

LRA Table 2.4-17 identifies intake structure component types within the scope of license renewal and subject to an AMR.

2.4.17.2 Staff Evaluation

The staff reviewed LRA Section 2.4.17 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.17, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a).
The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.17.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the intake structure (common) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.18 Main Steam and Cable Vault

2.4.18.1 Summary of Technical Information in the Application

In LRA Section 2.4.18, the applicant described the main steam and cable vaults. The Unit 1 main steam and cable vault is a safety-related, seismic Category I structure with the following seismic Category I areas: cable vault, main steam valve area, pump room below the main steam valve area (housing AFW and quench spray pumps), and the main steam valve area ventilation room. Situated directly north and east of the RCB, the structure has a pipe chase or tunnel at the west end of the cable vault area connecting with the TB.

The main steam and cable vault is a reinforced concrete structure. The bottom of the foundation is at El. 712'-0". Floor slabs at several elevations correspond to four floors, with some floor elevations slightly different within different areas. The pipe chase or tunnel is at El. 722'-6". The roof slab elevations vary, with the lower slabs at El. 762'-0" and 767'-10" and the upper slabs at El. 783'-8" and 791'-2". Exterior walls are of concrete construction; however, the main steam and cable vault shares the RCB wall. No additional wall separates the main steam and cable vault from the reactor containment. Some of the interior walls within the cable vault are of concrete block construction. Steel platforms and their framing comprise the main steam valve area enclosed by concrete walls above El. 751'-0" and extending to the underside of the upper roof slab at El. 788'-6". Removable roof slabs are above the main steam valve area.

The lowest elevation of the cable vault and main steam valve areas is subject to flooding because the pipe tunnel that connects to the TB floods during the PMF. The pump room below the main steam valve area and its ventilation rooms is higher than the PMF elevation and not subject to flooding. Equipment in the main steam and cable vault, needed to maintain plant shutdown during the PMF, is located above El. 730 feet. Water stops are placed at the main steam and cable vault below-grade construction joints and around the pipe tunnel. Manually-operated louvers in the main steam valve area are designed to open and relieve any pressure build-up caused by a HELB jeopardizing building integrity.

The Unit 2 main steam and cable vault is a safety-related, seismic Category I, multi-level structure approximately 94 (at its widest part) by 138 by 77 feet high. The bottom of the main steam and cable vault foundation is at El. 712'-6". The cable vault (and rod control area) houses safety-related valves and piping which penetrate the containment building and run between other safety-related areas. The main steam valve area has safety-related components required for steam and feedwater isolation. A reinforced concrete foundation mat supports the multilevel structure, the remainder of which is also reinforced concrete. Water stops are placed at construction joints up to El. 731 feet, above the PMF elevation. The structure protects safety-related systems, including the MSIVs, from tornados. One Section of the roof is steel-framed with metal roof decking. That Section is nonseismic Category I and not designed for seismic or tornado loads.

Safety-related valves and electrical and control equipment in the main steam and cable vault are above the highest internal flood elevation. High-energy lines are on El. 718'-6" of the cable vault (and rod control area). No significant internal flood levels would ensue from postulated high-energy breaks because the steam release to the main steam valve area increases the pressure and a major portion of the released mass vents through openings in the main steam valve area to reduce pressure. Vent panels are in the walls near the main steam valve area roof. The main steam and cable vault is a target for turbine missiles. Reinforced concrete walls,

roofs, and floors are for missile protection. Reinforced concrete walls, labyrinths, or steel missile barriers protect ventilation or penetration openings in the various buildings housing essential shutdown equipment. There are shields for postulated missiles ejected through inlet air flex connections for two axial fans in the cable vault area.

The main steam and cable vault contains safety-related components relied upon to remain functional during and following DBEs. In addition, the main steam and cable vault performs functions that support fire protection and SBO.

LRA Table 2.4-18 identifies main steam and cable vault component types within the scope of license renewal and subject to an AMR.

2.4.18.2 Staff Evaluation

The staff reviewed LRA Section 2.4.18 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.18, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.18.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the main steam and cable vault SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.19 Pipe Tunnel

2.4.19.1 Summary of Technical Information in the Application

In LRA Section 2.4.19, the applicant described the pipe tunnels. The Unit 1 pipe tunnel is a safety-related, seismic Category I structure with safety-related piping between the RWST and the cable vault area, including the trench that runs approximately 60 feet southwest and then 38'-6" south to the west side of the safeguards building. The tunnel is approximately 20' by 12'-8" by about 9'-6" high. Water stops are placed at construction joints all around the tunnel and a shake space separates the tunnel from adjacent structures. All essential piping from the RWST goes through missile-protected pipe trenches before entering the safeguards building by way of the cable vault structure or directly by way of the trench.

There are three Unit 2 pipe tunnels that are within the scope of license renewal. Two are safety-related, seismic Category I structures while the third is a nonsafety-related structure. One

safety-related tunnel connects the service building, main steam and cable vault, and safeguards building and is approximately 10 feet wide by 42 feet long by 13 feet deep. The second safety-related tunnel, connecting the auxiliary building with the fuel building, is 7 feet wide by 6 feet deep with one portion 14 feet wide by 8 feet deep. The reinforced concrete safety-related pipe tunnels are protected against external flooding up to El. 730 feet. These safety-related tunnels provide protection against tornados except for approximately 103 feet of length adjacent to the fuel and decontamination buildings. This unprotected length of tunnel has no safety-related piping, components, or equipment. The nonsafety-related pipe tunnel (north pipe trench) connects the Unit 1 TB to the Unit 2 safety-related pipe tunnel that connects the auxiliary building to the fuel building north of the Unit 2 cable tunnel. The nonsafety-related tunnel is approximately 9 feet wide by 6 feet deep, and runs north from the Unit 2 safety-related pipe tunnel and then west to the Unit 1 TB. The nonsafety-related pipe tunnel is a reinforced concrete subsurface structure, and the top of the tunnel-covers are approximately level with grade.

The safety-related pipe tunnels contain safety-related components relied upon to remain functional during and following DBEs. In addition, the Unit 1 pipe tunnel performs functions that support fire protection. The Unit 2 nonsafety-related pipe tunnel (north pipe trench) includes an in-scope pipe support that is credited in the evaluation of nonsafety-related piping directly attached to safety-related piping.

LRA Table 2.4-19 identifies pipe tunnel component types within the scope of license renewal and subject to an AMR.

2.4.19.2 Staff Evaluation

The staff reviewed LRA Section 2.4.19 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.19, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.19.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the pipe tunnel SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.20 Primary Demineralized Water Storage Tank Pad and Enclosure

2.4.20.1 Summary of Technical Information in the Application

In LRA Section 2.4.20, the applicant described the primary demineralized water storage tank pads and enclosures. The Unit 1 primary demineralized water storage tank pad and enclosure is a safety-related, seismic Category I structure approximately 38 feet by 41 feet by 45 feet high and is located in the yard west of the RCB. The enclosed tank supplies the AFW pumps. Also included with this structure are the nonsafety-related, nonseismic turbine plant demineralized water storage tank pad and the auxiliary demineralized water storage tank pad, which, similar to the primary demineralized water storage tank pad and enclosure, support tanks that supply the nonsafety-related dedicated AFW pump and that are within the scope of license renewal for fire protection concerns.

A reinforced concrete foundation pad three feet thick supports the primary demineralized water storage tank enclosure and the tank. The pad is above the PMF elevation. The walls of the enclosure are constructed of reinforced concrete two feet thick. The roof slab is the standard site tornado missile design for concrete depth and reinforcement but with permanent steel decking, supported by steel beams, for erection of the tank prior to installation of the roof. The walls and roof of the primary demineralized water storage tank pad enclosure are designed for design-basis tornado wind pressure and missile.

The turbine plant and auxiliary demineralized water storage tank pads are reinforced concrete foundations located higher than the standard project flood (El. 705 feet) but not the PMF, and the design of the two tanks is not for PMF flood conditions. Steel piles driven to the top of bedrock support the pad for the auxiliary demineralized water storage tank.

The Unit 2 primary demineralized water storage tank pad and enclosure is a safety-related, seismic Category I structure approximately 38 by 40 by 46 feet high located east of the safeguards building and south of the RWST.

The enclosed tank supplies the AFW pumps. Included with this structure is the nonsafety-related, nonseismic demineralized water storage tank pad that supports the nonsafety-related demineralized water storage tank that supplies additional water volume for the AFW system to support safe-shutdown.

The Unit 2 primary demineralized water storage tank and its enclosure are supported on a reinforced concrete foundation mat. The walls and roof of the enclosure are reinforced concrete. The roof slab is the standard site tornado missile design for concrete depth and reinforcement but with permanent steel decking, supported by steel beams, for erection of the tank prior to installation of the roof. The enclosure design is for tornado protection. A shake space separates the square pad for the primary demineralized water storage tank from the RWST. The pad is above the PMF elevation. The demineralized water storage tank pad is a reinforced concrete foundation similar in shape to a regular octagon but with only seven sides because two extend to form a square corner. The pad is above the PMF elevation and not adjacent to other structures.

The primary demineralized water storage tank pad and enclosure contains safety-related components relied upon to remain functional during and following DBEs. In addition, the primary

demineralized water storage tank pad and enclosure performs functions that support fire protection.

LRA Table 2.4-20 identifies primary demineralized water storage tank pad and enclosure component types within the scope of license renewal and subject to an AMR.

2.4.20.2 Staff Evaluation

The staff reviewed LRA Section 2.4.20 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.20, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the primary demineralized water storage tank pads and enclosures. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.20, the corresponding applicant responses, and the staff evaluation.

In UFSAR Section 3.8.4.1.10 for Unit 2, the applicant discussed the primary demineralized water tank enclosure. However, the applicant's UFSAR references included in LRA Section 2.4.20 did not include UFSAR Section 3.8.4.1.10.

In RAI 2.4.20-1, dated June 4, 2008, the staff requested that the applicant clarify LRA Section 2.4.20.

In its response to RAI 2.4.20-1, dated July 24, 2008, the applicant revised LRA Section 2.4.20 to include as a reference, UFSAR Section 3.8.4.1.10 for Unit 2.

Based on its review, the staff finds the applicant's response to RAI 2.4.20-1 acceptable because the applicant has revised LRA Section 2.4.20 to include as a reference, UFSAR Section 3.8.4.1 for Unit 2. Therefore, the staff's concern described in RAI 2.4.20-1 is resolved.

In RAI 2.4.20-2, dated June 4, 2008, the staff requested that the applicant clarify the intended functions (missile barrier, fire barrier and flood barrier) for the components listed in LRA Table 2.4-20.

In its response to RAI 2.4.20-2, dated July 24, 2008, the applicant confirmed that (1) the missile barrier intended function for the roof slab of the Unit 1 primary demineralized water tank enclosure is missing from LRA Table 2.4-20 and revised LRA Tables 2.4-20 and 3.5.2-20 to correct this omission, (2) the Unit 2 primary demineralized water tank enclosure is not credited with a fire barrier intended function since there are no combustible materials located in proximity of the Unit 2 tank enclosure, and (3) the structural components of Unit 1 and 2 primary demineralized water tank enclosures do not have flood protection intended functions since the physical location of both tank enclosures is above the PMF level.

Based on its review, the staff finds the applicant's response to RAI 2.4.20-2 acceptable because the applicant has corrected LRA Tables 2.4-20 and 3.5.2-20 to include the missile barrier intended function for the roof slab of the Unit 1 primary demineralized water tank enclosure, and

clarified the fire protection and flood barrier intended functions for the Unit 1 and 2 tank enclosures. Therefore, the staff's concern described in RAI 2.4.20-2 is resolved.

2.4.20.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the primary demineralized water storage tank pad and enclosure SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.21 Primary Water Storage Building (Unit 1 Only)

2.4.21.1 Summary of Technical Information in the Application

In LRA Section 2.4.21, the applicant described the primary water storage building (Unit 1 only), a safety-related, seismic Category I structure approximately 64 by 50 by 13 feet high that is located east of the diesel generator building. There is no safety-related equipment in the building. The primary water storage building is a reinforced concrete structure designed for tornado protection. Carbon dioxide storage is located on the second (ground) floor of the building, just above grade.

The primary water storage building (Unit 1 only) performs functions that support fire protection.

LRA Table 2.4-21 identifies primary water storage building (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.21.2 Staff Evaluation

The staff reviewed LRA Section 2.4.21 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.21, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the primary water storage building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.21, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.21, the applicant stated that there is no safety-related equipment in the primary water storage building (also known as primary grade water pump room). Also, the applicant stated that the building is classified as safety-related and provides tornado protection.

In RAI 2.4.21-1, dated June 4, 2008, the staff requested that the applicant clarify the safety classification and intended functions of this building, and the classification of the equipment inside the building.

In its response to RAI 2.4.21-1, dated July 24, 2008, the applicant confirmed that the Unit 1 primary water storage building was originally designed as a safety-related structure because it contained safety-related equipment. The safety-related equipment has since been removed but the safety classification of the building was never downgraded.

Based on its review, the staff finds the applicant's response to RAI 2.4.21-1 acceptable because the applicant has clarified the classification of the Unit 1 primary water storage building and the equipment located inside this building. Therefore, the staff's concern described in RAI 2.4.21-1 is resolved.

2.4.21.3 Conclusion

The staff reviewed the LRA and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the primary water storage building (Unit 1 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.22 Reactor Containment Building

2.4.22.1 Summary of Technical Information in the Application

In LRA Section 2.4.22, the applicant described the RCBs. The Unit 1 RCB is a safety-related, seismic Category I structure entirely designated as QA Class I. It is a heavily reinforced concrete, steel-lined vessel with a flat base mat, cylindrical walls, and a hemispherical dome. The base mat is a soil-bearing concrete slab 10 feet thick without projections below its lower surface. A layer of porous concrete at least four inches thick underlying the mat consists of coarse aggregate bound with a water-cement paste. The inside diameter of the containment cylinder is 126 feet and the cylinder wall is 4'-6" inches thick. The distance from the top of the mat to the inside of the dome crown is approximately 185 feet. The dome has a thickness of 2'-6" inches and an inside radius of 63 feet. The inside faces of the containment wall, dome, and mat are lined with steel plates to make the RCB gas-tight.

The liner plate is anchored to the concrete containment. The steel liner is not credited for structural integrity of the containment shell. The containment internal structures consist of heavily reinforced concrete walls and slabs.

The containment exterior (shell) and the containment interior, consisting of the primary shield wall and crane wall connected by floors and radial walls and interior structural steel, are independent of one another and have different loading criteria. The exterior below-grade surface of the concrete shell and foundation mat has a continuous waterproofing membrane to protect the containment structure against water seepage during flood stages of the standard project flood elevation and the PMF elevation. As supplementary features, water relief systems are at two instrument pits outside the cylindrical containment wall. Concrete shafts extend from grade to the instrument pits in the top of the containment concrete foundation mat. The pits extend downward through the foundation mat into the porous concrete layer beneath it to indicate the

presence of flood water penetrating the containment waterproof membrane. Accumulated water sets off an alarm in the control room. A spring 2006 steam generator replacement project removed an approximately 17 by 21-foot area on the south face of the RCB at El. 767'-0" to provide an access opening.

The Unit 2 RCB is a safety-related, seismic Category I reinforced concrete structure consisting of a cylindrical wall with a flat base and hemispherical dome completely lined with steel for support and strength against internal pressure and for vapor tightness. The distance between the top of the mat to the inside of the dome crown is approximately 185 feet. The 4'-6" inch thick cylindrical wall is about 122 feet high, and the 2'-6" thick dome has an inside radius of about 63 feet. The base mat is a soil-bearing concrete slab 10 feet thick. A layer of porous concrete at least four inches thick underlies the mat.

The containment exterior (shell and mat) structure and the containment internal structure of concrete and steel components are independent of one another and have different loading criteria. The containment is not integral to any of the surrounding structures. A shake space between the containment and the adjacent structures accommodates relative structural movement. The exterior below-grade surface of the concrete shell and foundation mat has a continuous waterproofing membrane to protect the containment structure against water seepage. As a supplementary feature, a water relief system of two open instrument pits in the floor of the safeguards area extend down to the porous concrete layer beneath the containment mat to indicate the presence of flood water penetrating the containment waterproof membrane. Accumulated water sets off an alarm in the control room. The containment internal structures consist of heavily reinforced concrete walls and slabs supporting the principal nuclear steam supply equipment.

The interior concrete also shields equipment and operating personnel from radiation, protects against missiles from component failure, provides restraint for various piping systems, and acts as a jet impingement barrier during postulated pipe breaks. Radial reinforced concrete walls extending between the primary shield wall and the crane wall (which supports the polar crane) separate the internals into cubicles which house three steam generators, RCPs, and the pressurizer. The containment floor, shell, dome, and interior concrete are passive heat sinks.

The RCB contains safety-related components relied upon to remain functional during and following DBEs. In addition, the RCB performs functions that support fire protection.

LRA Table 2.4-22 identifies RCB component types within the scope of license renewal and subject to an AMR.

2.4.22.2 Staff Evaluation

The staff reviewed LRA Section 2.4.22 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.22, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the RCB. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to the LRA Section 2.4.22, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.22, the applicant stated that the floor liner plate is installed on top of the foundation slab and is then covered with concrete.

In RAI 2.4.22-1, dated June 4, 2008, the staff requested that the applicant confirm that the inaccessible floor liner plate of the base mat, including the leak chase system and the concrete fill slab above this liner, are included in the components listed in LRA Table 2.4-22 and are subject to an AMR.

In its response to RAI 2.4.22-1, dated July 24, 2008, the applicant confirmed that the inaccessible floor liner plate of the base mat including the leak chase system and the concrete fill slab above this liner are included within the scope of license renewal and are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.22-1 acceptable because the applicant has confirmed that the components in question are considered within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.4.22-1 is resolved.

In LRA Table 2.4.22, the applicant listed the equipment hatch, emergency air lock and personnel airlocks as containment components subject to an AMR.

In RAI 2.4.22-2, dated June 4, 2008, the staff requested that the applicant confirm that the hatch locks, hinges and closure mechanisms that help prevent loss of sealing and/or leak-tightness for these listed hatches are included within the scope of license renewal and subject to an AMR.

In its response to RAI 2.4.22-2, dated July 24, 2008, the applicant confirmed that all components (including fasteners, attachment devices, mechanical closure and locking mechanisms, hydraulic systems, valves, tubing and piping, and O-rings) of the equipment hatch, emergency air lock and personnel airlocks required to maintain structural integrity and to provide pressure boundary integrity are within the scope of license renewal for Unit 1 and 2 and are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.22-2 acceptable because the applicant has confirmed that the components in question are considered within the scope of license renewal and are subject to an AMR. Therefore, the staff's concern described in RAI 2.4.22-2 is resolved.

In LRA Table 2.4-22 for the Unit 1 RCB, the staff noted that the applicant did not include blowout panels as a component subject to an AMR. The blowout panels are included in LRA Table 2.4-22 for the Unit 2 RCB.

In RAI 2.4.22-3, dated June 4, 2008, the staff requested that the applicant clarify the scoping difference between the Unit 1 and 2 RCBs relative to blowout panels.

In its responses to RAI 2.4.22-3, dated July 24, 2008 and August 22, 2008, the applicant confirmed that unlike the containment design for Unit 2, the Unit 1 containment design does not credit blowout panels, located in the incore instrument tunnel roof, for pressure relief. Therefore, blowout panels are not identified in LRA Table 2.4-22 for Unit 1 as an in-scope component subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.22-3 acceptable because the applicant has clarified that the Unit 1 containment design does not credit blowout panels for pressure relief and thus are not within the scope of license renewal nor subject to an AMR. Therefore, the staff's concern described in RAI 2.4.22-3 is resolved.

In LRA Table 2.4-22 for the Unit 2 RCB, the staff noted that the applicant did not include the vortex baffles and refueling cavity cofferdam as components subject to an AMR. The vortex baffles and refueling cavity cofferdam are included in LRA Table 2.4-22 for the Unit 1 RCB.

In RAI 2.4.22-4, dated June 4, 2008, the staff requested that the applicant clarify the scoping difference between the RCB for Unit 1 and 2 relative to these items.

In its responses to RAI 2.4.22-4, dated July 24, 2008 and August 22, 2008, the applicant confirmed that (1) Unit 2 does not have refueling cavity cofferdam, (2) the cofferdam function is no longer needed at either Unit 1 or 2 since the removable cavity seals have been replaced with a permanent one piece welded in-place seal, (3) vortex baffles have been removed from the Unit 1 containment sump, and vortex devices have been added to the Unit 2 containment sump as a result of recent modifications associated with Generic Safety Issue -191, "Assessment of Debris Accumulation on PWR Sump Performance," and Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors." In addition, the applicant revised LRA Tables 2.4-22 and 3.5.2-22 to reflect the changes in Unit 1 and 2 containment sumps.

Based on its review, the staff finds the applicant's responses to RAI 2.4.22-4 acceptable because the applicant has clarified the scoping relative to the Unit 2 refueling cavity cofferdam and corrected LRA Tables 2.4-22 and 3.5.2-22 to reflect the containment sump configuration. Therefore, the staff's concern described in RAI 2.4.22-4 is resolved.

In LRA Table 2.4-22, the staff could not determine whether the following components of the containment structure have been screened-in and subject to an AMR.

In RAI 2.4.22-5, dated June 4, 2008, the staff requested that the applicant clarify the inclusion of the following components in the scope of license renewal:

- Interior concrete floors
- Primary shield walls
- Grouted area between the neutron shield tank and primary shield wall
- Leak chase channels/angles that have been used at the containment liner welded joints (including those at penetrations)
- Leak chase system (if any) for the refueling cavity liner
- Floor and/or wall embedded plates and/or anchorages for RCS primary equipment (e.g., RV, pressurizer, steam generators, RCP)
- Reactor vessel support (foot) assembly (Unit 1 UFSAR Figure 5.2-2 and Unit 2 UFSAR Figure 5.4-10)
- Missile shields (Unit 1)

- Radiation shield panels (Unit 2)
- Penetration bellows (Unit 2)
- Neutron shields (Unit 2)
- Sheet piling and concrete wales shown in UFSAR Figure 5.1-5 (Unit 1) and Figure 3.8-6 (Unit 2)
- In reference to the Information Notice 98-26, the 4 inch (minimum) porous concrete sub-base under the containment base mat providing drainage for the emergency seepage removal system as described in UFSAR Sections 5.2.1 and 3.8.1.1.1 for Unit 1 and 2, respectively.
- Emergency seepage removal system, including concrete shafts extending from grade to the instrument pits located in the top of the containment foundation mat.

In its responses to RAI 2.4.22-5, dated July 24, 2008 and August 22, 2008, the applicant confirmed that:

- The containment interior concrete floors at both units are in-scope and subject to an AMR, and are evaluated under the component type "concrete framing" in LRA Table 2.4-22,
- The primary shield walls are in-scope and evaluated under the component type "interior walls" in LRA Table 2.4-22,
- The grouted area between the neutron shield tank and the primary shield wall is in-scope and evaluated under the component type "interior walls" in LRA Table 2.4-22,
- The leak chase channels/angles that have been used at the containment liner welded joints (including those at penetrations) are in-scope and evaluated under the component type "containment liner" in LRA Table 2.4-22,
- The leak chase channels for the refueling cavity liner are in-scope and evaluated under the component type "reactor cavity liner" in LRA Table 2.4-22. The associated piping for the reactor cavity liner leak chase system is in-scope and evaluated under the component type "piping" in LRA Section 2.3.3.19,
- The floor and/or wall embedded plates/anchorages for RCS primary equipment (e.g., RV, pressurizer, steam generators, RCP) are in-scope and evaluated under component types "anchorage / embedments" and "component and piping supports (ASME Code Class 1, 2 and 3)" in LRA Table 2.4-36,
- The RV support assemblies are in-scope and evaluated under component type "Component and Piping Supports (ASME Code Class 1, 2 and 3)," as bulk commodities, in LRA Table 2.4-36. The RV supports also include Lubrite® pads, which are listed in LRA Table 2-4-22 as "slide bearing plates,"
- The component "missile shields" is listed for Unit 2 in LRA Table 2.4-22 because stainless steel missile shields were installed for three fans in the Unit 2 containment, and because there is a concrete missile shield above the control rod drive housings. In Unit 1, there are no "missile shields" equivalent to the fan missile shields in Unit 2. Also, in Unit 1, the "missile shields" structure provided over the control rod drive mechanisms is a carbon steel plate, integral to the "control rod drive shield,"

- The component "radiation shield panels" is listed for Unit 1 in LRA Table 2.4-22 because shield panels were installed in an opening in the Unit 1 crane wall, across from the personnel hatch. There are no equivalent radiation shield panels in Unit 2,
- No penetration bellows are associated with the Unit 2 containment piping penetrations. The penetration bellows listed for Unit 1 are associated only with the recirculation spray heat exchangers river water outlet piping. No other piping penetrations include bellows,
- The Unit 2 neutron shields are in-scope and listed in LRA Table 2.4-22 under component type "neutron shield (supplementary),"
- The sheet piling and wales were used for initial construction. They had no function once construction was completed and therefore, are not subject to aging management review,
- Alumina cement was not used in the Unit 1 porous concrete mix design. Calcium aluminate (high alumina) cement was specified for the Unit 2 porous concrete mix design. However, the containment structures at both Unit 1 and 2 are founded well above the site's normal groundwater level. The Unit 2 containment instrument pit sumps' access shafts are located inside the safeguards building, and those sumps have remained dry. The porous concrete sub-bases under the containment base mats are water relief systems. The porous concrete sub-bases were evaluated as part of the containment foundation. Considering that the sub-base is above the groundwater table, a de-watering system is not used, and settlement has been found acceptable. In addition, the applicant stated that the erosion of cement from the porous concrete layer (i.e., loss of material) is not an aging effect requiring management.
- The systems in the porous concrete sub-foundation under the containment base mat described in Unit 1 UFSAR, Section 5.2.1, and Unit 2 UFSAR, Section 3.8.1.1.1, are water relief systems, as stated in the referenced UFSAR sections. The water relief system components are in-scope and are included as "instrument pits" in LRA Table 2.4-22.

In a follow-up September 3, 2008 teleconference with the applicant regarding Unit 2 containment with high alumina cement in porous concrete mix design, the staff requested that the applicant provide further information relative to the potential for rain water intrusion to cause erosion of porous concrete, and confirm that the electrical and mechanical components of the dewatering system are evaluated in other sections of the LRA. In its response, dated October 3, 2008, the applicant provided the following information:

- The Unit 1 and Unit 2 water relief systems each consist of open standpipes that extend into a nominal 4 inch thick porous concrete layer that exists beneath each unit's containment structure (included as part of the foundation for structural monitoring). The standpipes are considered "instrument pits" for the relief systems, since each contains level alarms to alert to the control rooms if water is filling the standpipes. Since the normal water table is approximately 10 feet or more below the containment mat's founding elevation (680'-11"), an alarm would be produced in the event of a flood and unexpected leakage through the waterproof membrane that encloses the containment structure to elevation 730'-0" (Probable Maximum Flood level). Both containment structures rest on a rubber membrane that is continuous and glued to the slab's perimeter and to the exterior containment wall surface up to an elevation of 730'-0". The waterproof membranes are in-scope for license renewal, but have no aging effects since

ultraviolet light, ionizing radiation, ozone, or extreme thermal conditions do not exist for the waterproof membranes at either unit.

- The Updated Final Safety Analysis Report (UFSAR) for each unit states that the water relief system acts "as a supplementary safety factor" to prevent build-up of water pressure behind the steel containment liner during a flood if the membrane fails. This is a condition that is unlikely to occur, since the porous layer is separated from the liner by the ten (10) feet thick concrete foundation mat. The mat contains multiple (7) keyways in each of its vertical joints. The standpipe/pit openings are outside of the containment wall, and separated from the liner by 54 inches of wall concrete. Seepage through the poured in-place concrete wall-mat joint during the relatively short duration of a flood is improbable. Furthermore, the level alarms being lower in the standpipes, would result in the identification of any water rising in the standpipes before it reached the wall base at the top of the mat (690'-11"). Pumps would then be used to remove the water.
- At Unit 1, water has entered the instrument pits after prolonged or heavy rains, which causes the level alarm to activate in the control room. Operators then have the water removed using portable submersible pumps. It was concluded at the time of water accumulation that rain entered the shaft cover directly or through soil and then the shaft containment interface joint, and accumulated in the pit at the shaft's bottom. An accumulation causes the alarm to activate. No slurry has been reported during water removal. Unit 2 has not experienced water intrusion.
- The instrumentation (level alarms) in the emergency water relief pits is active equipment and not subject to aging management. The cables associated with the instruments are in-scope and are to be managed by the LRA Section B.2.11, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," program. There is no mechanical equipment associated with the subject instrument pits since accumulated water is removed using portable submersible pumps.

Based on its review, the staff finds the applicant's responses to RAI 2.4.22-5 and follow-up questions relative to Units 1 and 2 containment porous concrete sub-foundation and water relief system acceptable because: (1) the applicant has confirmed the inclusion of all components (with the exception of the sheet piling and wales that were used for construction aid and have no intended functions for license renewal) listed in RAI 2.4.22-5 as within the scope of license renewal; (2) normal ground water table is approximately 10 feet or more below the bottom of the containment mat's founding elevation and an active dewatering system is not used; (3) the settlement for containment structures is within acceptable limit; (4) at the Unit 2 containment, where high alumina cement was used in porous concrete mix design, the instrument pit sumps' access shafts are located inside the safeguards building, and has not experienced water intrusion; (5) both containment structures rest on a rubber membrane that is continuous and glued to the slab's perimeter and to the exterior containment wall surface up to an elevation of 730'-0"; (6) in the event of rising water in the standpipes, an alarm will sound in the control room. The water will then be removed by a sump pump; (7) conventional Portland cement (not calcium aluminate cement) was used in Unit 1 porous concrete mix design; therefore, the erosion of cement and degradation of porous concrete sub-foundation as described in Information Notices 97-11 and 98-26 is not applicable; (8) the level instrumentation associated with the water relief system are active components and not subject to an AMR; and (9) all other components associated with the water relief system (concrete shaft and electrical cables) are appropriately included in the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.4.22-5 is resolved.

2.4.22.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the RCB SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.23 Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings

2.4.23.1 Summary of Technical Information in the Application

LRA Section 2.4.23 describes the RWST and chemical addition tank pad and surroundings. The Unit 1 RWST and chemical addition tank pad is a safety-related, seismic Category I structure located west of the RCB. The pad and its shield wall are approximately 42 by 42 by 25 feet high. The two-foot thick pad and the shield wall are constructed of reinforced concrete. The concrete shielding around the RWST is one foot thick for adequate protection against damage from failure of the only rotating equipment in this area, the chemical addition tank pump and the chemical injection pumps. The concrete shielding, metal covering, and insulation protect the tank from fire. The distance from RWST to nonseismic structures in its vicinity and the concrete shielding provide adequate protection for the RWST. The elevation of the refueling water tank enclosure is higher than the PMF elevation.

The pad and shield walls surrounding the Unit 2 RWST and chemical addition tank are safety-related, seismic Category I structures approximately 56 by 57 by 16 feet high. The tanks are east of the Unit 2 safeguards building. The foundation mat supporting the tanks and the wall are constructed of reinforced concrete. The RWST foundation is five feet thick, and the 16-foot high concrete radiation protection shield surrounding the tank has a minimum thickness of one foot. The elevation of the tank foundation is above the PMF elevation.

The RWST and chemical addition tank pad and surroundings contain safety-related components relied upon to remain functional during and following DBEs. In addition, the RWST and chemical addition tank pad and surroundings performs functions that support fire protection.

LRA Table 2.4-23 identifies RWST and chemical addition tank pad and surroundings component types within the scope of license renewal and subject to an AMR.

2.4.23.2 Staff Evaluation

The staff reviewed LRA Section 2.4.23 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.23, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the RWST and chemical addition tank pad and surroundings. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a)

and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.23, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.23-1, dated June 4, 2008, the staff requested that the applicant confirm that missile barrier, fire barrier and flood barrier are intended functions for the components in LRA Table 2.4-23.

In its response to RAI 2.4.23-1, dated July 24, 2008, the applicant confirmed that the missile barrier function was inadvertently omitted from the list of functions in LRA Section 2.4.23 for the Unit 1 RWST shield wall and revised LRA Section 2.4.23 and LRA Tables 2.4-23 and 3.5.2-23 to correct this omission. The applicant further confirmed that the Unit 1 RWST "shield wall" provides a fire barrier function due to its proximity to the 1B System Station Service Transformer. The applicant stated that the transformer is a source of combustible materials and is located less than 50 feet from the enclosure; therefore, a fire barrier is required. The applicant also confirmed that there are no combustibles within the proximity of the Unit 2 RWST, and that the Unit 2 shield wall is not credited with a fire barrier intended function. Lastly, the applicant confirmed that although a flood protection function was assigned to the RWST and chemical addition tank pad, no structural components were assigned a flood barrier function, since the physical location of the structures are above the PMF level.
Based on its review, the staff finds the applicant's response to RAI 2.4.23-1 acceptable because the applicant has adequately clarified whether the missile barrier, fire barrier and flood barrier are intended functions for the components in LRA Table 2.4-23 and revised the applicable sections of the LRA. Therefore, the staff's concern described in RAI 2.4.23-1 is resolved.

2.4.23.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the RWST and chemical addition tank pad and surroundings SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.24 Relay Building (Common)

2.4.24.1 Summary of Technical Information in the Application

LRA Section 2.4.24 describes the Unit 1 and 2 relay building (common), a nonsafety-related, nonseismic structure which is part of the switchyard. This building houses the control circuits for the switchyard breakers within the scope of license renewal for offsite power recovery following SBO. The relay building is a single-story structure with an addition built onto the east end of the original building, circa 1980.

The foundations for the relay building and its addition are slabs on grade with perimeter footings. The top of the foundation/floor slab is at El. 751'-6". A 4mm polyethylene vapor barrier underlies the foundation slab for the original relay building and a pre-molded membrane vapor barrier underlies the floor slab for the addition. An electrical conduit and/or duct bank, encased

in concrete, runs beneath a portion of the building addition's floor slab. A concrete-lined catch basin is at the northwest corner of the addition. Both the original building and the addition have exterior walls constructed of concrete block masonry with brick veneer. The roof for the original building is constructed of pre-cast concrete roof panels.

The roof for the addition consists of a lightweight concrete slab supported by metal decking and beams. A roof membrane covers both the original building and building addition roof slabs. The building addition's roof beams are encased with gypsum perlite plaster as fireproofing. Fire protection piping, in addition to domestic water and sanitary piping, penetrates the original relay building within a subsurface concrete compartment at its northwest corner. Equipment within the relay building is outside the 10 CFR 50.48 scope of required fire protection. The relay building provides structural or functional support for SBO.

LRA Table 2.4-24 identifies relay building (common) component types within the scope of license renewal and subject to an AMR.

2.4.24.2 Staff Evaluation

The staff reviewed LRA Section 2.4.24 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.24, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the relay building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.24, the corresponding applicant responses, and the staff evaluation.

In LRA Section 2.4.24, the staff noted that the original building and the addition to the building have masonry block exterior walls. This description is not consistent with LRA Table 3.5.2-24 which lists the material for the exterior walls of the relay building as concrete.

In RAI 2.4.24-1, dated June 4, 2008, the staff requested that the applicant clarify this inconsistency.

In its response to RAI 2.4.24-1, dated July 24, 2008, the applicant confirmed that the exterior walls are masonry blocks (not poured concrete) and revised LRA Table 3.5.2-24 to correct this inconsistency.

Based on its review, the staff finds the applicant's response to RAI 2.4.24-1 acceptable because the applicant has confirmed that the exterior walls are masonry blocks and has corrected the inconsistency in LRA Table 3.5.2-4. Therefore, the staff's concern described in RAI 2.4.24-1 is resolved.

2.4.24.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the relay building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.25 Safeguards Building

2.4.25.1 Summary of Technical Information in the Application

In LRA Section 2.4.25, the applicant described the safeguards buildings. The Unit 1 safeguards building is a safety-related, seismic Category I, two-story structure adjacent to and west of the Unit 1 RCB. The building has a deep valve pit and houses engineered safeguard systems (*e.g.*, the AFW system). A reinforced concrete foundation mat supports the safeguards building and baffles divide the floor of the safeguards area into two sections.

Piping connects the safeguards building to the RCB. A shake space accommodates movement relative to the containment. The safeguards valve pit attaches directly to the reactor containment mat. The valve pit connects to the upper part of the safeguards building by pump casements and a shaft. The pump casings and the access shaft are included within the butyl waterproof membrane surrounding the reactor containment for flood protection up to El. 730'. The elevation of the safeguards building is higher than the PMF elevation and not subject to flooding. A sump collects liquid from the floor drains. The sealed concrete surrounding the safeguards building prevents both entry of ground water and leakage of recirculation water from the safeguards area into the earth backfill between the cofferdam and the containment.

The Unit 2 safeguards building is a safety-related, seismic Category I structure approximately 60 by 106 and 59 feet high that protects the engineered safety feature pumps, valves, and piping penetrations from tornados. At El. 718'-6", the safeguards building separates into two areas, north and south. All redundant components and equipment are physically separate in the two individual cubicles.

The Unit 2 safeguards building design precludes seismic, tornado, and missile damage. The building is a reinforced concrete structure supported on a reinforced concrete foundation mat. External flood protection is up to El. 730'. The Unit 2 safeguards building has a separate valve pit located below the main part of the building and joined by pump casements and two shafts. The same waterproof membrane that protects the containment building protects the pit from external flooding.

The safeguards buildings contain safety-related components relied upon to remain functional during and following DBEs. In addition, the safeguards buildings perform functions that support fire protection and SBO.

LRA Table 2.4-25 identifies safeguards building component types within the scope of license renewal and subject to an AMR.

2.4.25.2 Staff Evaluation

The staff reviewed LRA Section 2.4.25 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.25, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the safeguards buildings. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to LRA Section 2.4.25, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.25-1, dated June 4, 2008, the staff requested that the applicant to clarify whether the Unit 2 recirculation spray coolers and associated shielding and supports are considered within the scope of license renewal or provide justification for their exclusion from the scope of license renewal.

In its response to RAI 2.4.25-1, dated July 24, 2008, the applicant clarified that the Unit 1 recirculation spray coolers are protected from a postulated pressurizer surge line break by a shield because they are located in the containment building. The Unit 2 recirculation spray coolers are located in the safeguards building, and do not require shielding. Consequently, no shield exists for the Unit 2 recirculation spray coolers. The recirculation spray coolers and associated supports are evaluated in LRA Sections 2.3.2.1 and 2.4.36, respectively.

Based on its review, the staff finds the applicant's response to RAI 2.4.25-1 acceptable because the applicant has confirmed that the recirculation spray coolers and associated supports are in scope and subject to an AMR and the Unit 2 recirculation spray coolers do not require shielding due to their location in the safeguard building. Therefore, the staff's concern described RAI 2.4.25-1 is resolved.

2.4.25.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the safeguards building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.26 Service Building

2.4.26.1 Summary of Technical Information in the Application

In LRA Section 2.4.26, the applicant described the service buildings. The Unit 1 service building is a safety-related, seismic Category I structure which protects safety-related systems and components. Seismic Category I portions include part of the MCR, emergency switchgear and relay room, battery rooms, cable tray area, process room, and air conditioning equipment room for the MCR. The Unit 1 service building is a four-story structure with mezzanine levels, approximately 135 by 275 by 88 feet high, located adjacent to and south of the Unit 1 TB.

The Unit 1 service building foundation consists of a reinforced concrete mat founded on undisturbed gravel or compacted granular fill. Construction of the upper levels are of conventional steel framing, and the areas below the steel superstructure are of reinforced

concrete designed for seismic and tornado loads. Roofing consists of a built-up membrane over steel decking supported by steel framing. Concrete floor slabs supported by steel or concrete framing can accommodate a collapse of the steel superstructure. The west end of the roof supports housing for a large structural steel and sheet metal air intake and radiator cooler. The service building exterior is either concrete or protected metal-fluted siding.

The service building is waterproofed and unaffected by floods to the PMF elevation. Equipment below the PMF elevation and essential for maintaining safe-shutdown is in watertight and missile-proof concrete structures.

The Unit 1 portion of the MCR is on the ground floor at the east end of the building. The Unit 2 portion of the MCR is in the Unit 2 control building (SER Section 2.4.7). A concrete wall two feet thick separates the MCR from other ground floor areas.

The control room is within a missile-proof concrete structure independently air-conditioned and protected against airborne radioactive contaminants. Structural steel beams below the cable tray area (cable spreading room), coated with a fireproof material, achieve a 1.5-hour fire-rated barrier. A vertical pipe chase extending from El. 698'-6" to the roof at El. 775'-6" in the northwest corner of the building contains main steam and feedwater piping.

The Unit 2 service building is a safety-related, seismic Category I, four-story structure which houses safety-related equipment and is approximately 54 by 186 by 70 feet high. The roof and portions of the walls of the top story are steel-framed with metal decking and siding. The remainder of the structure is reinforced concrete with a reinforced concrete foundation mat. The concrete walls and slabs protect against tornado and tornado-generated missiles. The steel framing is non-Category I and not designed for seismic or tornado loads. External flood protection is up to the PMF. Except for the seismic Category I battery room ductwork, all equipment at El. 760'-6" is nonseismic. If nonseismic Category I portions of the service building fail, no adverse effects on adjacent seismic Category I structures or components will occur.

The service buildings contain safety-related components relied upon to remain functional during and following DBEs. In addition, the service buildings perform functions that support fire protection and SBO.

LRA Table 2.4-26 identifies service building component types within the scope of license renewal and subject to an AMR.

2.4.26.2 Staff Evaluation

The staff reviewed LRA Section 2.4.26 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.26, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the service building. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAs related to LRA Section 2.4.26, the corresponding applicant responses, and the staff evaluation.

In LRA Table 2.4-26 for the Unit 2 service building, the staff noted that the applicant did not include exterior walls below grade; thus, indicating that this building is a surface founded structure. Considering the pipe tunnel elevation and information in UFSAR Table 3.7B-2 for Unit 2, the staff issued RAI 2.4.26-1, dated June 4, 2008, requesting that the applicant provide justification for the exclusion of exterior walls below grade from the scope of license renewal.

In its response to RAI 2.4.26-1, dated July 24, 2008, the applicant confirmed that the Unit 2 service building is mainly surface founded and does not have an exterior wall below grade and in contact with soil.

Based on its review, the staff finds the applicant's response to RAI 2.4.26-1 acceptable because the applicant has confirmed that the Unit 2 service building has no exterior walls below grade; thus, there is no omission in LRA Table 2.4-26. Therefore, the staff's concern described in RAI 2.4.26-1 is resolved.

The staff reviewed UFSAR Figures 3.8-45 and 3.8-46 for Unit 2 and noted a sump pit in the Unit 2 service building.

In RAI 2.4.26-2, dated June 4, 2008, the staff requested that the applicant provide justification for the exclusion of Unit 2 service building sump pit(s) from the scope of license renewal.

In its response to RAI 2.4.26-2, dated July 24, 2008, the applicant confirmed that there is a sump pit in the foundation mat at the bottom of a pipe chase in the southeast corner of the Unit 2 service building. The applicant stated that the sump pit is considered within the scope of license renewal and is subject to an AMR. The applicant revised LRA Tables 2.4-26 and 3.5.2-26 to include the sump pit for Unit 2.

Based on its review, the staff finds the applicant's response to RAI 2.4.26-2 acceptable because the applicant has clarified that the Unit 2 sump pit is an in-scope component subject to an AMR and revised LRA Tables 2.4-26 and 3.5.2-26 to include this component. Therefore, the staff's concern described in RAI 2.4.26-2 is resolved.

2.4.26.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the service building SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.27 Solid Waste Building (Unit 1 Only)

2.4.27.1 Summary of Technical Information in the Application

In LRA Section 2.4.27, the applicant described the solid waste building (Unit 1 only), a safety-related, seismic Category I structure 40 by 120 by 47 feet high which is located directly east of the Unit 1 auxiliary building. This building houses the coolant recovery tanks and solid

waste processing equipment. The solid waste building has reinforced concrete walls. The two coolant recovery tanks are at the north and south ends of the building. The foundation (*i.e.*, the main floor slab) is four feet thick. The foundation extends downward to enclose pipe and duct penetrations, near the center of the building. Structural steel framing supports the steel roof decking and the roof slab is 12 inches thick. There is a sump in the solid waste building but no equipment or floor drains. The building elevation is higher than the PMF elevation.

The solid waste building (Unit 1 only) contains safety-related components relied upon to remain functional during and following DBEs.

LRA Table 2.4-27 identifies solid waste building (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.27.2 Staff Evaluation

The staff reviewed LRA Section 2.4.27 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.27, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the solid waste building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.27, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.27-1, dated June 4, 2008, the staff requested that the applicant clarify the intended functions of the Unit 1 solid waste building for missile barrier to ensure compliance with 10 CFR 54.4(a)(1) and to maintain consistency with the intended functions listed in LRA Table 2.4-27.

In its response to RAI 2.4.27-1, dated July 24, 2008, the applicant confirmed that the Unit 1 solid waste building provides tornado missile protection for the coolant recovery tanks. LRA Section 2.4.27 was revised to add a missile barrier intended function.

Based on its review, the staff finds the applicant's response to RAI 2.4.27-1 acceptable because the applicant has verified that the Unit 1 solid waste building provides tornado missile protection for the coolant recovery tanks and corrected LRA Section 2.4.27 to maintain consistency with the intended functions listed in LRA Table 2.4-27. Therefore, the staff's concern described in RAI 2.4.27-1 is resolved.

2.4.27.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the solid waste building (Unit 1 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.28 South Office and Shops Building (Common)

2.4.28.1 Summary of Technical Information in the Application

In LRA Section 2.4.28, the applicant described the south office and shops building (common), a seven-story, nonsafety-related, seismic Category II steel frame structure adjacent to the southeast corner of the Unit 2 TB. This building houses offices and shops for engineering and maintenance groups that support both plant units. The Unit 2 auxiliary boiler room is in the south office and shops building but contains no components within the scope of license renewal. The south office and shops building, by design, will not collapse onto the TB under tornado or seismic loads (the TB otherwise could collapse onto safety-related structures). Therefore, only the major structural building systems (column and floor steel, bracing, roof deck and slab, fasteners, and anchorage) required for overall structural integrity are subject to an AMR.

The failure of nonsafety-related SSCs in the south office and shops building (common) could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.4-28 identifies south office and shops building (common) component types within the scope of license renewal and subject to an AMR.

2.4.28.2 Staff Evaluation

The staff reviewed LRA Section 2.4.28 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.28, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the south office and shops building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.28, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.28-1, dated June 4, 2008, the staff requested that the applicant provide justification for exclusion of floor slabs from the scope of license renewal.

In its responses to RAI 2.4.28-1, dated July 24, 2008 and August 22, 2008, the applicant confirmed that concrete floor slabs for the south office and shops building (common) at all elevations are within scope of license renewal and, and revised LRA Section 2.4.28 and Tables 2.4-28 and 3.5.2-28 to include floor slabs as an in-scope component subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.28-1 acceptable because the applicant has verified that the concrete floor slabs for the south office and shops building (common) are in-scope and revised the applicable LRA sections to correct the omission of concrete floor slabs. Therefore, the staff's concern described in RAI 2.4.28-1 is resolved.

2.4.28.3 Conclusion

The staff reviewed the LRA and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In

addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the south office and shops building (common) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.29 Steam Generator Drain Tank Structure (Unit 1 Only)

2.4.29.1 Summary of Technical Information in the Application

In LRA Section 2.4.29, the applicant described the steam generator drain tank structure (Unit 1 only), a nonsafety-related, nonseismic, triangular-shaped, reinforced concrete building, partitioned internally to form two separate stainless steel-lined tanks totally enclosed by an integral, reinforced concrete roof with a perimeter handrail and several access hatches. The structure is in a wedge-shaped area between the reactor containment and decontamination buildings. The tank structure, a late addition to the plant, was built primarily on an existing drum storage pad concrete slab but extends into the foundation slab of the decontamination building. The tanks hold water for treatment as liquid waste, during certain plant evolutions, prior to discharge. Piping for fill, drain, and level indications penetrates the wall facing the RCB. The structure is within the scope of license renewal because of its proximity to the reactor containment, fuel pool, and decontamination buildings.

The failure of nonsafety-related SSCs in the steam generator drain tank structure (Unit 1 only) could potentially prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.4-29 identifies steam generator drain tank structure (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.29.2 Staff Evaluation

The staff reviewed LRA Section 2.4.29 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.29, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.29.3 Conclusion

The staff reviewed the LRA and UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the steam generator drain tank structure (Unit 1 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.30 Switchyard (Common)

2.4.30.1 Summary of Technical Information in the Application

In LRA Section 2.4.30, the applicant described the switchyard (common), a nonsafety-related, nonseismic structure located south of the plant. The switchyard (including 138kV and 345kV switchyards) houses Duquesne Light Company (DLCo) system circuit breakers and relays connecting to the DLCo grid and forms a transmission switching point for the DLCo system. The two 138kV lines from the switchyard to the plant are on separate towers.

The Units 1 and 2 main transformers connect to the switchyard via transmission lines supported by towers. Switchyard structural components include towers and poles located outside the switchyard but supporting electrical transmission lines and connected to switchyard equipment via such lines. FirstEnergy Nuclear Generation Corp. owns some switchyard components and DLCo, a former owner, operator, and licensee, owns other switchyard components. The switchyard (common) provides structural or functional support for SBO.

LRA Table 2.4-30 identifies switchyard (common) component types within the scope of license renewal and subject to an AMR.

2.4.30.2 Staff Evaluation

The staff reviewed LRA Section 2.4.30 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.30, the staff evaluated the structural component functions described in the LRA to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.30.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the switchyard (common) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.31 Turbine Building

2.4.31.1 Summary of Technical Information in the Application

In LRA Section 2.4.31, the applicant described the TBs. The Unit 1 TB is a nonsafety-related, nonseismic structure adjacent to and north of the Unit 1 service building and adjacent to and east of the Unit 1 water treatment building. By design the TB superstructure will not collapse and endanger protected structures and systems.

The building houses secondary plant and fire protection equipment. The foundation or basement floor slab is below grade. Steel framing supports the mezzanine and operating floor slabs and roof decking. The TB has a built-up roof membrane on steel decking and is clad with insulated metal-fluted siding.

The Unit 2 TB is a nonsafety-related, nonseismic structure approximately 135 by 275 by 115 feet high enclosed with insulated metal siding and roof deck adjacent to and south of the auxiliary and service buildings. The TB houses secondary plant and fire protection equipment. The ground floor is a reinforced concrete slab. Reinforced concrete spread footings and foundation mats support the building and major equipment, including the turbine generator. The steel-framed TB has a built-up roof membrane on steel decking and is clad with insulated metal fluted siding designed to blow off under tornado loading to reduce wind loads on the superstructure. The ground floor slab is slightly above the PMF elevation. The mezzanine floor slab is at El. 752'-6" and the operating floor slab at El. 774'-6". In the event of internal flooding from a rupture of any circulating water system piping expansion joints in the TB, the building side panels release and discharge the water into the yard area before the water level reaches El. 735'-6" and affects other buildings or equipment.

The TB provides structural or functional support for fire protection.

LRA Table 2.4-31 identifies TB component types within the scope of license renewal and subject to an AMR.

2.4.31.2 Staff Evaluation

The staff reviewed LRA Section 2.4.31 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.31, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the TB. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to LRA Section 2.4.31, the corresponding applicant responses, and the staff evaluation.

In RAI 2.4.31-1, dated June 4, 2008, the staff requested that the applicant confirm that the intended function of the TB includes compliance with 10 CFR 54.4(a)(2), since this building is adjacent to safety-related structures and it is designed not to collapse.

In its response to RAI 2.4.31-1, dated July 24, 2008, the applicant verified that the intended function of the TB complies with 10 CFR 54.4(a)(2) and revised LRA Tables 2.4-31 and 3.5.2-31 to include 10 CFR 54.4(a)(2) intended function.

Based on its review, the staff finds the applicant's response to RAI 2.4.31-1 acceptable because the applicant has confirmed the intended function of the TB and corrected the LRA Tables 2.4.31 and 3.5.2-31. Therefore, the staff's concern described in RAI 2.4.31-1 is resolved.

In LRA Table 2.4-31 for Unit 2 TB, the staff noted that the applicant did not include exterior walls below grade.

In RAI 2.4.31-2, dated June 4, 2008, the staff requested that the applicant discuss Unit 2 TB exterior wall embedment below grade, considering the TB foundation elevation (715.3 feet) shown in LRA Figure 2.5.4-41 and final plant grade elevation of 735 feet shown in UFSAR Figure 2.5.4-8 for BVPS Unit 2; and, provide justification for the exclusion of exterior walls below grade from the scope of license renewal.

In its responses to RAI 2.4.31-2, dated July 24, 2008 and August 22, 2008, the applicant confirmed that Unit 2 TB does not have any exterior wall below grade, since this building is mainly at grade and has a perimeter grade beam which spans between reinforced concrete piers supporting steel columns. The applicant stated that the grade beam is evaluated as part of TB foundation and included in the LRA as an in-scope component and subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.31-2 acceptable because the applicant has clarified the TB elevation and foundation configuration and confirmed that the Unit 2 TB does not have any exterior wall below grade. Therefore, the staff's concern described in RAI 2.4.31-2 is resolved.

2.4.31.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the TB SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.32 Valve Pit

2.4.32.1 Summary of Technical Information in the Application

In LRA Section 2.4.32, the applicant described the valve pits. The Unit 1 valve pit is a safety-related, seismic Category I, reinforced concrete, subsurface structure approximately 13 by 19.5 by 14 feet high, which houses safety-related equipment. The valve pit is divided into two separate compartments, each with its own manhole for access and a sump pit at its bottom.

The two Unit 2 service water valve pits are safety-related, seismic Category I, subsurface structures. One valve pit is approximately 14 by 20 by 15 feet high and located adjacent to the

Unit 2 safeguards building. The other is approximately 24 by 36 by 18 feet high and located northwest of the fuel and decontamination buildings. The valve pits house safety-related valves for service water piping that runs outside the major buildings. Reinforced concrete foundation mats support reinforced concrete walls and roofs. The valve pits protect their contents from tornados and have external flood protection up to the PMF elevation. The valve pit northwest of the fuel and decontamination buildings has two separate compartments, each with a sump pit.

Access is by two doors (one per compartment) to an above-ground concrete enclosure over the valve pit with two sealed plugs to provide access for equipment removal. Access to the valve pit adjacent to and north of the safeguards building is via removable sealed slabs.

The valve pits contain safety-related components relied upon to remain functional during and following DBEs. In addition, the Unit 2 valve pit provides structural or functional support for fire protection.

LRA Table 2.4-32 identifies valve pit component types within the scope of license renewal and subject to an AMR.

2.4.32.2 Staff Evaluation

The staff reviewed LRA Section 2.4.32 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.32, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the valve pit. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.32, the corresponding applicant responses, and the staff evaluation.

The staff reviewed LRA Section 2.4.32 and noted that a sump pit is located at the bottom of each compartment.

In RAI 2.4.32-1, dated June 4, 2008, the staff requested that the applicant confirm that the sump pit(s) are within the scope of license renewal and subject to an AMR or provide justification for the exclusion.

In its response to RAI 2.4.32-1, dated July 24, 2008, the applicant confirmed that the Unit 1 valve pit sump pit is within the scope of license renewal and subject to an AMR. The Unit 1 sump pit was not included in LRA Tables 2.4-32 and 3.5.2-32. The applicant revised LRA Tables 2.4-32 and 3.5.2-32 to include the Unit 1 sump pit as an in-scope component subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.4.32-1 acceptable because the applicant has confirmed that the Unit 1 sump pit is within the scope of license renewal and subject to an AMR, and revised LRA Tables 2.4-32 and 3.5.2-32 to reflect this change. Therefore, the staff's concern described in RAI 2.4.32-1 is resolved.

2.4.32.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the valve pit SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.33 Waste Handling Building (Unit 2 Only)

2.4.33.1 Summary of Technical Information in the Application

In LRA Section 2.4.33, the applicant described the waste handling building (Unit 2 only), a nonsafety-related, seismic Category II, four-story plus basement structure. The waste handling building is approximately 40 by 112 by 77 feet high and is located adjacent to and west of the TB. This building contains no safety-related equipment. The foundation is a reinforced concrete mat, with the top two stories consisting of structural steel framing with metal siding and roof deck. The remainder of the structure is reinforced concrete. The failure of nonsafety-related SSCs in the waste handling building (Unit 2 only) could potentially prevent the satisfactory accomplishment of a safety-related function. The waste handling building (Unit 2 only) also provides structural or functional support for fire protection.

LRA Table 2.4-33 identifies waste handling building (Unit 2 only) component types within the scope of license renewal and subject to an AMR.

2.4.33.2 Staff Evaluation

The staff reviewed LRA Section 2.4.33 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.33, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the waste handling building. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.33, the corresponding applicant responses, and the staff evaluation.

The staff reviewed UFSAR Section 3.8.4.1.16 for Unit 2 and noted that the waste handling building is designed to provide biological shielding where required. However, LRA Table 2.4-33 does not include shielding as an intended function of components identified in this table.

In RAI 2.4.33-1, dated June 4, 2008, the staff requested that the applicant clarify the intended function of this building relative to biological shielding.

In its responses to RAI 2.4.33-1, dated July 24, 2008 and August 22, 2008, the applicant confirmed that (1) no plant personnel have a need to access the waste handling building for plant safe-shutdown or accident mitigation actions and (2) this structure is not credited with

providing radiological shielding to plant personnel during or after an accident or for providing shielding in support of any 10 CFR 54.4(a)(1), (a)(2) or (a)(3) functions. Therefore, radiological shielding is not an intended function for the waste handling building.

Based on its review, the staff finds the applicant's response to RAI 2.4.33-1 acceptable because the applicant has confirmed that the Unit 2 waste handling building provides no license renewal intended function relative to biological shielding. Therefore, the staff's concern described in RAI 2.4.33-1 is resolved.

2.4.33.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the waste handling building (Unit 2 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.34 Water Treatment Building (Unit 1 Only)

2.4.34.1 Summary of Technical Information in the Application

In LRA Section 2.4.34, the applicant described the water treatment building (Unit 1 only), a nonsafety-related, nonseismic, two-story structure located adjacent to and west of the TB. The top floor is open to the TB. It houses equipment for filtering, demineralizing, and chemically treating river water. Water treatment is not required for safe-shutdown of the reactor. The top of the building's foundation, the ground floor slab, is at El. 707'-6" and rests on compacted sand and gravel. Structural steel framing supports the upper floor slab at El. 735'-6" and the roof at approximately El. 753'. Roofing consists of an insulated built-up membrane on steel decking. The building is clad in insulated metal-fluted siding. The water treatment building (Unit 1 only) provides structural or functional support for fire protection.

LRA Table 2.4-34 identifies water treatment building (Unit 1 only) component types within the scope of license renewal and subject to an AMR.

2.4.34.2 Staff Evaluation

The staff reviewed LRA Section 2.4.34 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.34, the staff evaluated the structural component functions described in the LRA to verify that the applicant has not omitted from the scope of license renewal any SCs with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those SCs that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived SCs subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.34.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.
Based on its review, the staff concludes that the applicant has adequately identified the water treatment building (Unit 1 only) SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.35 Yard Structures

2.4.35.1 Summary of Technical Information in the Application

In LRA Section 2.4.35, the applicant described the yard structures. The Unit 1, Unit 2, and common yard structures include slag pits and concrete (fire) walls for the Units 1 and 2 offsite power supply transformers, electrical equipment within the scope of license renewal, and their supports and foundations, respectively. Outside transformers are not within the scope of license renewal for the fire protection requirements of 10 CFR 50.48, but the concrete (fire) walls are within the scope of license renewal. The applicant credits outdoor lighting (with backup power from the security diesel generator) for ingress/egress in accordance with 10 CFR Part 50 Appendix R (fire protection) and SBO. Yard structures that support this function are lighting poles. The yard structures perform functions that support SBO.

LRA Table 2.4-35 identifies yard structures component types within the scope of license renewal and subject to an AMR.

2.4.35.2 Staff Evaluation

The staff reviewed LRA Section 2.4.35 and UFSAR using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.35, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the yard structures. Therefore, the staff issued a RAI to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAI related to the LRA Section 2.4.35, the corresponding applicant responses, and the staff evaluation.

The staff reviewed LRA Section 2.4.35 and noted that the concrete (fire) walls are included within the scope of license renewal. Under the heading of 10 CFR 54.4(a)(3), the applicant identified only SBO as an intended function.

In RAI 2.4.35-1, dated June 4, 2008, the staff requested that the applicant clarify the intended function of the yard structures relative to fire protection.

In its response to RAI 2.4.35-1, dated July 24, 2008, the applicant revised LRA Section 2.4.35 to include the fire protection intended function associated with the concrete fire walls around the yard area transformers.

Based on its review, the staff finds the applicant's response to RAI 2.4.35-1 acceptable because the applicant has corrected LRA Section 2.4.35 to include the fire protection intended function associated with the concrete fire walls around the yard area transformers. Therefore, the staff's concern described in RAI 2.4.35-1 is resolved.

2.4.35.3 Conclusion

The staff reviewed the LRA, UFSAR, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the yard structures SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.36 Bulk Structural Commodities

2.4.36.1 Summary of Technical Information in the Application

In LRA Section 2.4.36, the applicant described the bulk structural commodities, structural component groups that support structures and mechanical and electrical systems within the scope of license renewal. They are common to multiple SSCs and share material and environment properties which allow a common program or inspection to manage their aging effects.

Structural commodities unique to a specific structure are evaluated with the structure. The evaluation of bulk structural commodities covered such structural component and commodity types as:

- Cranes, hoists, and miscellaneous monorails
- Service ladders, platforms, and stairs required for general access, equipment support, and maintenance activities
- Structural steel components common to systems and structures within the scope of license renewal (e.g., anchorage, baseplates, cable trays and conduits, equipment supports, framing, grating, panels and enclosures, and piping supports)
- Structural concrete components common to systems and structures within the scope of license renewal (e.g., equipment pads, floor curbs, and hatches)
- Elastomeric components common to systems and structures within the scope of license renewal (e.g., compressible joints and seals, roof membranes, and water stops)
- Fire barriers common to systems and structures within the scope of license renewal (e.g., fire doors, penetration fire seals, fireproofing, fire stops, and fire wraps)
- Miscellaneous materials common to systems and structures within the scope of license renewal (e.g., thermal insulation)

Bulk structural commodity categories:

- Steel and other metals
- Concrete
- Elastomers
- Fire Barriers
- Miscellaneous materials
- Threaded fasteners

Component types evaluated as bulk structural commodities support structures within the scope of license renewal. LRA Sections 2.4.1 through 2.4.35 list the intended functions for such structures with them.

LRA Table 2.4-36 identifies bulk structural commodities component types within the scope of license renewal and subject to an AMR.

2.4.36.2 Staff Evaluation

The staff reviewed LRA Section 2.4.36 using the evaluation methodology described in SER Section 2.4 and the guidance in SRP-LR Section 2.4.

During its review of LRA Section 2.4.36, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results for the bulk structural commodities. Therefore, the staff issued RAIs to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs related to the LRA Section 2.4.36, the corresponding applicant responses, and the staff evaluation.

The staff reviewed LRA Section 2.4.36 and noted that the applicant listed cranes, hoists and miscellaneous monorails as in-scope components.

In RAI 2.4.36-1, dated June 4, 2008, the staff requested that the applicant confirm that this component type includes all cranes, monorails, and/or hoists within the in-scope structures.

In its response to RAI 2.4.36-1, dated July 24, 2008, the applicant confirmed that the cranes, hoists and miscellaneous monorails located within safety-related structures, and that potentially could have an adverse interaction with safety-related SSCs resulting from seismic or heavy-lift events, are considered within the scope of license renewal and are subject to an AMR. The applicant also stated that those cranes, hoists and miscellaneous monorails that could have potential interaction with a regulated-event, 10 CFR 54.4(a)(3), or SSCs, are not considered for license renewal scoping or AMR. By letter dated August 22, 2008, the applicant provided further clarification relative to TB cranes and confirmed that the CLBs for Units 1 and 2 do not require consideration of interaction with TB cranes.

Based on its review and the guidance found in SRP-LR Table 2.1-2, the staff finds that a second level support system or a hypothetical failure need not be considered in determining the SSC within the scope of the rule in accordance with 10 CFR 54.4(a)(3). The staff further finds the applicant's response to RAI 2.4.36-1 acceptable because the applicant has confirmed that the TB cranes for Units 1 and 2 are not discussed in the CLB as having a possible adverse

interaction with in-scope SSCs. Therefore, the staff's concern described in RAI 2.4.36-1 is resolved.

The staff reviewed LRA Table 2.4-36 and noted that the applicant included "Crane girders and rails" as a component type subject to an AMR.

In RAI 2.4.36-2, dated June 4, 2008, the staff requested that the applicant confirm that other relevant components of the cranes and monorails (bridge and trolley, rail hardware, etc.) are within the scope of license renewal and subject to an AMR.

In its response to RAI 2.4.36-2, dated July 24, 2008, the applicant confirmed that bridges, trolleys, rails, girders, and related hardware associated with the in-scope cranes are included within the scope of license renewal and are subject to an AMR.

Based on it review, the staff finds the applicant's response to RAI 2.4.36-2 acceptable because the applicant has verified the relevant subcomponents of the cranes and monorails as within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.4.36-2 is resolved.

In RAI 2.4.36-3, dated June 24, 2008, the staff requested that the applicant confirm whether the following component types apply to the Units 1 and 2 and; therefore, screened in and subject to an AMR or provide the basis for their exclusion from the scope of license renewal.

- Grout pads for equipment and support (including building columns) base plates
- Vibration Isolators (if any) at the interface between the equipment and the support structure
- Steel or concrete missile shields and associated supports (support members, welds, bolts, etc.)
- Tank Foundations
- Battery Racks
- Plant Vent Stack
- Radiation Shield Panels

In its response to RAI 2.4.36-3, dated July 24, 2008, the applicant confirmed that:

- Grout pads are included with the bulk commodity "Equipment Pads" in LRA Section 2.4.36. Structural grout (column base plates) is grouped with concrete.
- Vibration Isolators at the interface between the equipment and the support structures are included with "Equipment Pads" in LRA Section 2.4.36.
- Components are specifically called "Missile shields" only when they perform no other structural function. Missile shields are not evaluated with bulk structural commodities and they are included in LRA sections for in-scope structure. The associated component supports, however, are included within LRA Section 2.4.36 (Bulk commodities) as "Equipment component supports."

- Tank foundation concrete is not evaluated with bulk structural commodities. They are evaluated for AMR separately in LRA sections for in-scope tanks.
- Battery racks in LRA Sections 2.4.12, "Emergency Response Facility (ERF) Substation Building," and in 2.4.16, "Guard House (Common)," are called "Battery racks." Battery racks in the Unit 1 and Unit 2 service buildings are grouped with "Instrument racks and frames" as a commodity in LRA Section 2.4.36.
- Units 1 and 2 do not have a structural vent stack. Ventilation exhausts that extend above building roofs are evaluated as "Duct" within a mechanical ventilation system in LRA Section 2.3.3.32, "Supplementary Leak Collection and Release System."
- "Hatches" that perform a shielding function are included with bulk commodities in LRA Section 2.4.36. Other radiation shielding panels - such as those in the Reactor Containment Building for Unit 1, are not included with bulk commodities, but rather, were subject to AMR as separate components in LRA Section 2.4.22, "Reactor Containment Building."

Based on its review, the staff finds the applicant's response to RAI 2.4.36-3 acceptable because the applicant has confirmed that the above items have not been omitted from the scope of license renewal. Therefore, the staff's concern described in RAI 2.4.36-3 is resolved.

2.4.36.3 Conclusion

The staff reviewed the LRA and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the bulk structural commodities SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls Systems

This Section documents the staff's review of the applicant's scoping and screening results for electrical and I&C systems. Specifically, this Section discusses:

- electrical and I&C component commodity groups

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant must list passive, long-lived SCs within the scope of license renewal and subject to an AMR. To verify that the applicant properly implemented its methodology, the staff's review focused on the implementation results. This focus allowed the staff to confirm that there were no omissions of electrical and I&C system components that meet the scoping criteria and are subject to an AMR.

The staff's evaluation of the information in the LRA was the same for all electrical and I&C systems. The objective was to determine whether the applicant has identified, in accordance with 10 CFR 54.4, components and supporting structures for electrical and I&C systems that

appear to meet the license renewal scoping criteria. Similarly, the staff evaluated the applicant's screening results to verify that all passive, long-lived components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its scoping evaluation, the staff reviewed the applicable LRA sections and letters dated July 11, 2008 and August 13, 2008, focusing on components that have not been identified as within the scope of license renewal.
The staff reviewed the UFSAR for each electrical and I&C system to determine whether the applicant has omitted from the scope of license renewal, components with intended functions pursuant to 10 CFR 54.4(a).

After its review of the scoping results, the staff evaluated the applicant's screening results. For those SCs with intended functions, the staff sought to determine whether (1) the functions are performed with moving parts or a change in configuration or properties or (2) the SCs are subject to replacement after a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those meeting neither of these criteria, the staff sought to confirm that these SCs were subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.5.1 Electrical and Instrumentation and Controls Systems

2.5.1.1 Summary of Technical Information in the Application

In LRA Section 2.5.1, the applicant described the electrical and I&C systems. The scoping method includes all plant electrical and I&C components. Evaluation of electrical systems includes electrical and I&C components in mechanical systems.

The bounding approach for the review of plant environments eliminates the need to indicate each unique component and its specific location and precludes improper exclusion of components from an AMR.

In LRA Table 2.5-1, the applicant identifies electrical and I&C systems component types within the scope of license renewal and subject to an AMR:

- cable connections (metallic parts)
- electrical cables and connections not subject to 10 CFR 50.49 EQ requirements
- electrical cables and connections not subject to 10 CFR 50.49 EQ requirements in instrumentation circuits
- electrical connections not subject to 10 CFR 50.49 EQ requirements exposed to borated water leakage
- fuse holders - insulation material
- high-voltage insulators
- inaccessible medium-voltage (2kV to 35kV) cables (*e.g.*, underground in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements
- metal enclosed bus (nonsegregated bus), bus/connections (Unit 2)
- metal enclosed bus (nonsegregated bus), enclosure assemblies (Unit 2)

- metal enclosed bus (nonsegregated bus), insulation/insulators (Unit 2)
- switchyard bus (switchyard bus for SBO recovery) and connections (Unit 1)
- transmission conductors (transmission conductors for SBO recovery) and connections

The intended functions of the electrical and I&C systems component types within the scope of license renewal include:

- electrical connections to electrical circuit sections for voltage, current, or signal delivery
- electrical conductor insulation and support
- structural or functional support to safety-related equipment

2.5.1.2 Staff Evaluation

The staff reviewed LRA Section 2.5.1 and UFSAR Sections 7 and 8 for both Units 1 and Unit 2 using the evaluation methodology described in SER Section 2.5 and the guidance in SRP-LR Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Controls Systems."

During its review of LRA Section 2.5.1 and UFSAR Sections 7 and 8 for both Unit 1 and Unit 2, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions pursuant to 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

General Design Criteria 17 of 10 CFR Part 50, Appendix A, requires that electric power from the transmission network to the onsite electric distribution system must be supplied by two physically independent circuits to minimize the likelihood of their simultaneous failure. In addition, the staff noted that the guidance it had provided by letter dated April 1, 2002, "Staff Guidance on Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout Rule (10 CFR 50.63) for License Renewal (10 CFR 54.4(a)(3))," and later incorporated in SRP-LR Section 2.5.2.1.1 states:

> For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes switchyard circuit breakers that connect to the offsite system power transformers (startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical system, and the associated control circuits and structures. Ensuring that the appropriate offsite power system long-lived passive SCs that are part of this circuit path are subject to an AMR will assure that the bases underlying the SBO requirements are maintained over the period of extended license.

Because the FENOC application includes the complete circuits between the onsite circuits and up to and including the switchyard circuit breakers and associated controls and structures, the staff concludes that the intent of the guidance issued April 1, 2002 is met.

2.5.1.3 Conclusion

The staff reviewed the LRA with amendments and the UFSAR to determine whether the applicant failed to identify any SSCs within the scope of license renewal. The staff finds no such omissions. In addition, the staff's review determined whether the applicant failed to identify any components subject to an AMR. The staff finds no such omissions.

Based on its review, the staff concludes that the applicant has adequately identified the electrical and I&C systems components within the scope of license renewal, as required by

10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1) and; therefore, is acceptable.

2.6 Conclusion for Scoping and Screening

The staff reviewed the information in LRA Section 2, "Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review and Implementation Results," and determines that the applicant's scoping and screening methodology was consistent with 10 CFR 54.21(a)(1) and the staff's positions on the treatment of safety-related and nonsafety-related SSCs within the scope of license renewal and on SCs subject to an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

On the basis of its review, the staff concludes, that the applicant has adequately identified those systems and components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

The staff concludes that the applicant will continue to conduct the activities authorized by the renewed licenses in accordance with the CLB and any changes to the CLB in compliance with 10 CFR 54.21(a)(1), in accordance with the Atomic Energy Act of 1954, as amended, and NRC regulations.