Progress Energy

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March 14, 2005

SERIAL: BSEP 05-0041 10 CFR 54

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62
Response to Audit Questions
License Renewal NUREG-1801 Consistency Audit

Reference: Letter from Cornelius J. Gannon to the U. S. Nuclear Regulatory Commission (Serial: BSEP 04-0006), "Application for Renewal of Operating Licenses," dated October 18, 2004

Ladies and Gentlemen:

On October 18, 2004, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., requested the renewal of the operating licenses for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2, to extend the terms of their operating licenses an additional 20 years beyond the current expiration dates.

From January 10 to 14, 2005, and from February 7 to 11, 2005, the NRC conducted an audit of BSEP License Renewal activities. In the course of the audit, questions were identified by the auditors. Responses to these questions are enclosed. Also enclosed is the summary list of regulatory commitments supporting License Renewal modified, as necessary, to reflect the information provided in the responses to the questions.

Please refer any questions regarding this submittal to Mr. Mike Heath, Supervisor - License Renewal, at (910) 457-3487.

A111

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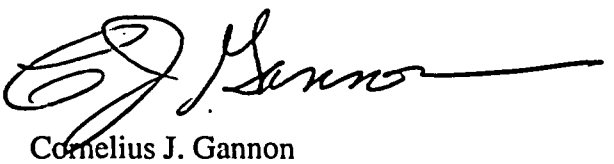
I declare, under penalty of perjury, that the foregoing is true and correct.
Executed on March 14, 2005.

Sincerely,



Cornelius J. Gannon

MHF/mhf

Enclosures:

1. Responses to Audit Questions
2. BSEP License Renewal Commitments, Revision 1

cc:

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Responses to Audit Questions
NRC Consistency with NUREG-1801 Audit
January 10 to 14, 2005 and February 7 to 11, 2005

Background

On October 18, 2004, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., requested the renewal of the operating licenses for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2, to extend the terms of their operating licenses an additional 20 years beyond the current expiration dates.

From January 10 to 14, 2005, and from February 7 to 11, 2005, the NRC conducted an audit of BSEP License Renewal activities to determine if aging management reviews (AMRs) and aging management programs (AMPs) described in the License Renewal Application (LRA) were consistent with NUREG-1801, Generic Aging Lessons Learned (GALL), i.e., the GALL Report. In the course of the audit, questions were identified by the auditors. Responses to the questions are enclosed. Footnotes have been added to identify those responses which have been substantively revised following the audit.

Table of Contents

ACRONYMS AND ABBREVIATIONS	
AHC	Access Hole Cover
ADS	Automatic Depressurization System
AMP	Aging Management Program
AMR	Aging Management Review
ASME	American Society of Mechanical Engineers
AST	Alternative Source Term
ASTM	American Society for Testing and Materials
BSEP	Brunswick Steam Electric Plant
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owners Group
BWRVIP	Boiling Water Reactor Vessel and Internals Program
CASS	Cast Austenitic Stainless Steel
CP&L	Carolina Power & Light Company, a Progress Energy Company
CS	Core Spray/Carbon Steel
CW	Circulating Water
EVT	Enhanced Visual Test
ESF	Engineered Safety Features
GALL	Generic Aging Lessons Learned (the GALL Report is NUREG-1801)
HWC	Hydrogen Water Chemistry
I/V	Current versus Voltage
IGSCC	Intergranular Stress Corrosion Cracking
IHSI	Induction Heating Stress Improvement
IR	Insulation Resistance
ISG	Interim (NRC) Staff Guidance
ISI	In-Service Inspection
LR	License Renewal
LRA	License Renewal Application
MFOST	Main Fuel Oil Storage Tank
MIC	Microbiologically Induced Corrosion
MSIV	Main Steam Isolation Valve
MSIP	Mechanical Stress Improvement Process

ACRONYMS AND ABBREVIATIONS	
MUD	Condensate Makeup System
NDE	Nondestructive Examination
NPS	Nominal Pipe Size
NRC	Nuclear Regulatory Commission
NUREG	Designation of publications prepared by the NRC staff
NWC	Normal Water Chemistry
PEC	Progress Energy Carolinas
PM	Preventive Maintenance
RCR	Reactor Coolant Recirculation System
RI	Risk Informed
RCS	Reactor Coolant System
RWCU	Reactor Water Cleanup System
SCC	Stress Corrosion Cracking
SRP-LR	Standard Review Plan for License Renewal
S/RV	Safety Relief Valve
TAC	Technical Assignment Control (internal NRC work management tool)
TDR	Time Domain Reflectometry
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Test
UV	Ultraviolet

Audit Question 3.1-1

In LRA Table 3.1.2-5, Reactor Coolant Recirculation System, the reduction of fracture toughness due to thermal aging embrittlement in piping and fittings made out of CASS material and exposed to reactor water is managed by one-time inspection program. In the referenced LRA Table 1 item 3.1.1-24, the applicant states that BSEP does not have CASS piping in the RCS, except the main steam line flow limiters and the reactor coolant recirculation pump discharge flow elements and these components have been assumed to be susceptible to thermal embrittlement. The applicant has selected the One-Time Inspection Program to manage the loss of fracture toughness due to thermal embrittlement and also stated that the need for an AMP may be obviated based on a formal screening for susceptibility in accordance with GALL. Also, the BSEP AMP, One-Time Inspection Program, states that managing this aging effect for CASS component may not be necessary based on the outcome of screening for material susceptibility.

GALL (in item IV.C1.1-g) recommends the GALL AMP XI.M12, Thermal Aging Embrittlement for CASS, to manage this aging effect in CASS components. This GALL AMP includes determination of the susceptibility of CASS components to thermal aging embrittlement based on casting method, molybdenum content, and percent ferrite, and for those "potentially susceptible" components, aging management is accomplished through either enhanced volumetric examination or plant- or component-specific flaw tolerance evaluation. Additional inspection or evaluations to demonstrate that the material has adequate fracture toughness are not required for components that are not susceptible to thermal aging embrittlement.

(a) Discuss when the screening for material susceptibility to thermal embrittlement of all BSEP CASS components will be completed.

(b) If found that certain CASS components are susceptible to thermal embrittlement, then explain how BSEP one-time inspection program would be comparable to the GALL AMP XI.M12 in order to manage the reduction of fracture toughness due to thermal embrittlement in these susceptible CASS components during the extended period of plant operation.

(c) In LRA Table B-1, Correlation of NUREG-1801 and BSEP Aging Management Programs, the GALL AMP XI.M12 is part of the BSEP AMP Reactor Vessel and Internals Structural Integrity Program (B.2.28). Explain why the reactor vessel and internals structural integrity program, instead of one-time inspection program, is not used to manage the CASS components.

AQ 3.1-1 Response

(a) Initial screening for material susceptibility to thermal embrittlement of the main steam line flow limiters and reactor coolant recirculation pump discharge flow elements has been completed. It has been determined that these components are not susceptible to reduction of fracture toughness due to thermal aging embrittlement. The affected AMRs will be updated to reflect this, and the One-Time Inspection Program will be updated to remove these components from the program.

(b) Based on the response to (a), this question is no longer applicable.

(c) The Reactor Vessel and Internals Structural Integrity Program manages Cast Austenitic Stainless Steel (CASS) components associated specifically with the vessel and internals. See Table 3.1.1, Item 3.1.1-33. The main steam line flow limiters and reactor coolant recirculation pump discharge flow elements are piping components; and, therefore, the One-Time Inspection Program was used for the management of reduction of fracture toughness due to thermal aging embrittlement. Based on the response to (a), the One-Time Inspection Program will be updated to remove these components from the program.

Audit Question 3.1-2

(a) In LRA Table 3.1.2-1, Reactor Vessel and Internals, the cracking due to SCC in access hole cover (AHC) made out of nickel-based alloy and exposed to reactor water is managed by the water chemistry program and the reactor vessel and internals structural integrity program. In the referenced LRA Table 1 item 3.1.1-32, the applicant also states that BSEP has only welded AHC and the cracking due to SCC in AHC will be managed by the ASME Section XI ISI program and the water chemistry program, which is consistent with the GALL recommendations. Clarify the discrepancy in the AMPs stated in the LRA Table 3.1.2-1 for the AHC and the LRA Table 1 item 3.1.1-32.

(b) In addition to the ASME Section XI ISI program and the water chemistry program, GALL (in item IV.B1.1-d) also requires an augmented inspection to be included (i.e.,

ultrasonic testing (UT) or other demonstrated acceptable inspection), since cracking initiated in crevice regions is not amenable to visual inspection for BWRs with a crevice in the access hole covers. Explain why the GALL-recommended augmented inspection program for the AHCs is not discussed in the LRA Table.

(c) Note that the AMPs credited for the Core Shroud and Core Plate (Access Hole Cover, Shroud Support Structure, and Thermal Sleeve) and for Jet Pump Assemblies (Holddown Beams, Diffuser) include Reactor Vessel Internals Structural Integrity Program instead of Reactor Vessel and Internals Structural Integrity Program. Explain if these two AMPs are the same.

AQ 3.1-2 Response

(a) The American Society of Mechanical Engineers (ASME) Code Section XI inservice inspection (ISI) requirements are captured as part of the Reactor Vessel and Internals Structural Integrity Program. As stated in Section B.2.28 of the LRA:

> The Reactor Vessel and Internals Structural Integrity Program is an existing plant-specific program that includes:
>
> > Inspection in accordance with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and inspection and flaw evaluation in conformance with the guidelines of the BWR Owner's Group, Boiling Water Reactor Vessel and Internals Project (BWRVIP) documents.

(b) The procedures that implement the Reactor Vessel and Structural Integrity Program include enhanced inspections of the access hole covers. Specifically, the inspections performed may be either a ultrasonic test (UT) or an enhanced visual test-1 (EVT-1).

(c) These two programs are indeed the same. This is a typographical error.

Audit Question 3.2-1

LRA Section 3.2.2.2.2.2 addresses aging management of loss of material due to general corrosion in the interior surfaces of the Standby Gas Treatment System. In addition to this system, the SRP-LR Section 3.2.2.2.2.2 requires aging management of several other components in the ESF systems, including the Drywell And Suppression Chamber Spray Systems header and spray nozzle components, containment isolation valves and associated piping, and the Automatic Depressurization System piping and fittings and spray nozzles. Discuss the aging management of loss of material due to general corrosion in the interior surfaces of these components.

AQ 3.2-1 Response [1]

Further evaluation of each of the items identified is provided as follows:

1) Drywell and Suppression Chamber Spray Systems header

The Standard Review Plan – License Renewal (SRP-LR), NUREG-1800, identifies loss of material due to general corrosion as a potentially applicable aging effect for the Drywell and Suppression Chamber Spray Systems header. Aging management reviews have identified that carbon steel piping in normally wetted portions of these subsystems is susceptible to general corrosion, managed by the Water Chemistry Program with a verification of program effectiveness using the One-Time Inspection Program. Regarding the portion of the Suppression Pool (Torus) Spray Subsystem downstream of the isolation valves, this piping is normally not wetted or pressurized, but rather exposed to the primary containment environment. Since the primary containment is inerted with nitrogen during operation, no significant corrosion of this piping is expected as a result. Similarly, drywell spray is considered a safety related function, but is not expected to be used except in post-accident conditions and the drywell spray headers are not subject to alternate wetting. This piping is assumed to be dry and normally exposed to the inerted drywell environment, and significant corrosion is not expected. Hence general corrosion of drywell and suppression chamber spray is not considered to be an aging mechanism requiring aging management.

2) Drywell and Suppression Chamber Spray Systems spray nozzle components

As noted above, the suppression spray function is not safety related at BSEP, hence, the suppression spray nozzles do not perform an intended function. Drywell spray is a safety related function. The drywell spray nozzles are constructed of brass and installed in a normally dry, inerted environment. As such, they are not subject to general corrosion and aging management is not required.

3) Containment isolation valves and associated piping

BSEP has not performed a separate aging management review of containment isolation valves and associated piping, but rather addressed aging management reviews of these components within the aging management reviews of the systems in which they occur. The BSEP methodology used for system aging management reviews conservatively predicts general corrosion in those applications where it might be applicable. Additional information regarding the aging management programs applied to manage general corrosion of containment isolation valves and associated piping is provided in line items for "Valves (including check valves and containment isolation) (body and bonnet)" in System AMR Tables 3.1.2, 3.2.2, 3.3.2 and 3.4.2.

4) Automatic Depressurization System piping and fittings and spray nozzles

BSEP includes the Automatic Depressurization System piping, including S/RV downcomers, as part of the Reactor Vessel and Internals System. Aging management review of these components is addressed in Section 3.1 of the LRA. These components are managed for general corrosion using the Systems Monitoring, Water Chemistry and One-Time Inspection Programs.

Audit Question 3.2-2

AMR 3.2-2: LRA Section 3.2.2.2.3.2 addresses aging management of loss of material due to pitting and crevice corrosion in the interior surfaces of the Standby Gas Treatment System. However, the SRP-LR Section 3.2.2.2.3.2 requires aging management of the Automatic Depressurization System (ADS) piping and fitting. Discuss the aging management of loss of material due to pitting and crevice corrosion in the ADS piping and fittings.

AQ 3.2-2 Response [1]

BSEP includes the Automatic Depressurization System piping, including S/RV downcomers, as part of the Reactor Vessel and Internals System. Aging management reviews of these components are summarized in Section 3.1 of the LRA, and have identified pitting and crevice corrosion as being applicable to wetted portions of these components. These aging management reviews have specified the Water Chemistry Program for aging management, with program effectiveness verification performed under the One-Time Inspection Program.

Audit Question 3.2-3

LRA Section 3.2.2.2.7 addresses aging management of buildup of deposits due to corrosion in drywell and torus spray nozzles and flow orifices. BSEP claims that plugging or fouling of drywell spray components is not considered as an applicable aging effect, since the drywell spray components are not used in normal operation and is maintained isolated. However, SRP-LR Section 3.2.2.2.7 states that the wetting and drying of these components due to their occasional use can aid in the acceleration of this particular corrosion. Discuss the reasons why plugging or fouling of drywell spray components is not an applicable aging effect.

AQ 3.2-3 Response [2]

Suppression pool (Torus) spray is not a safety-related function at BSEP and clogging of the suppression pool spray nozzles is not an aging concern for license renewal. Drywell spray is a safety-related function, but this post-accident subsystem is not subject to alternate wetting either as a result of normal operation or periodic flow testing. Moreover, the portion of the Drywell Spray Subsystem downstream of isolation valves is normally exposed to the inerted primary containment environment. Hence, significant accumulation of corrosion is not expected in the

drywell spray header, and plugging or fouling of spray components is not considered to be an aging effect requiring aging management.

Audit Question 3.2-4

LRA Table Line Item 3.2.1-18 in Table 3.2.1 for the ESF systems addresses aging management of closure bolting in the ESF systems. SRP-LR Table 3.2-1 for closure bolting in the ESF systems recommends GALL Bolting Integrity program to manage loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC in closure bolting in high-pressure or high-temperature systems. The applicant states that this is not applicable since these systems do not use high strength bolting. However, GALL AMP XI.M18, "Bolting Integrity," states that all pressure-retaining bolting within or outside the ASME Section XI boundary are required to be managed by an AMP consistent with the GALL AMP. Since the BSEP AMP B.2.6, "Bolting Integrity Program," is consistent with exceptions, clarify how the BSEP bolting integrity program would manage the aging effects in the pressure-retaining components during the extended period of operation.

AQ 3.2-4 Response

The Bolting Integrity Program will be revised to include ASME, Section XI, activities identified in GALL, as well as aspects of monitoring and trending under Systems Monitoring for bolted connections outside of ASME, Section XI, boundaries. Subsequent to these revisions, the Bolting Integrity Program will be consistent with GALL with the exception that structural bolting is not addressed.

Additionally, aging management review summaries in Sections 3.1, 3.2, 3.3, and 3.4 will be revised to address aging management requirements for each of the aging effects identified in GALL AMR line items pertaining to closure bolting in high pressure or high temperature systems. The following information will be included in these aging management reviews:

1) In general, BSEP treats bolting as a subcomponent of the parent component; and bolting does not have a separate line item in system level aging management reviews.
2) GALL identifies loss of material, loss of preload and cracking as applicable aging effects for high temperature, high pressure bolting.
3) The Bolting Integrity Program, updated as described above, is specified to manage these aging effects.

Audit Question 3.2-7

In LRA Table 3.2.2-1, Residual Heat Removal System, the loss of material due to various corrosion mechanisms and flow blockage due to fouling in valve body and bonnet made out of copper alloys and stainless steel are managed by Open-Cycle Cooling Water System Program, while the loss of material due to selective leaching in copper alloys is managed by the selective leaching of materials program. Generic note E is indicated, however, these AMPs appear to be

consistent with GALL. Note that similar AMR for piping and heat exchangers in the system are marked A or B, indicating that they are consistent with GALL. Clarify this inconsistency.

AQ 3.2-7 Response

The line item for valves should be consistent with that for comparable line items for piping and heat exchanger components. Specifically, the line item for Valves (Body and Bonnet) in Table 3.2.2-1 associated with Flow Blockage due to Fouling, Loss of Material due to Crevice Corrosion, Loss of Material due to MIC, and Loss of Material due to Pitting Corrosion should appropriately reflect note A, and that for Selective Leaching should receive note B.

Audit Question 3.3-1

AMR 3.3-1 The further evaluation in Section 3.3.2.2.5 of the BSEP LRA states that aging of both the exterior and interior surfaces of miscellaneous mechanical components associated with the control building, diesel generator building, service water intake structure, and reactor buildings will be managed for loss of material using the Preventive Maintenance Program (AMP B.2.30). These include sump pump components and back flow valves. However, the table included in the description of AMP B.2.30 does not include the reactor building in the line item associated with this claim (last line in table). Please explain this apparent discrepancy.

AQ 3.3-1 Response

The table included in the description of AMP B.2.30 is correct. The reactor building sump pumps are associated with the Radioactive Floor Drains System and are subject to one-time inspection. The further evaluation in Section 3.3.2.2.5 of the BSEP LRA should state:

> Aging of both the exterior and interior surfaces of miscellaneous mechanical components associated with the control building, diesel generator building, and service water intake structure will be managed for loss of material using the Preventive Maintenance Program.

Audit Question 3.3-4

Table 3.3.2-6 of the BSEP LRA includes line items for CW strainer for which the Open-Cycle Cooling Water System Program is credited for managing loss of material. The strainers are copper alloys in a raw water environment and generic note "C" is referenced, indicating consistency with GALL except for the component and exceptions for the AMP. GALL item VII.C1.6-a is referenced; however, that GALL line item does not identify copper alloy as one of the materials evaluated. Why was generic note "C" referenced for these AMRs?

AQ 3.3-4 Response

The strainers in question are Circulating Water (CW) Pump cooling water strainers in scope for spatial interaction. The assignment of note C, i.e., different component, same material and environment, was a result of comparing these housings to GALL line item VII.C1.1-a, for piping and fittings, which does include copper alloys in a raw water environment. As such, the appropriate GALL reference should be to VII.C1.1-a, not VII.C1.6-a. The Service Water basket strainers are addressed elsewhere in Table 3.3.2-6, are referenced to GALL VII.C1.6-a, and correctly assigned note A.

Audit Question 3.4-1

A program based solely on detecting structure and component failures is not considered an effective aging management program. Justify why monitoring the loss of condenser integrity is adequate as the only aging management program for ensuring M-1 "Provide pressure-retaining boundary" and M-7 "Provide post-accident containment, holdup, and plateout of MSIV bypass leakage."

AQ 3.4-1 Response

The Main Condensers were placed in scope due to application of the Alternative Source Term. The Main Condensers were inadvertently given intended functions M-1 and M-7. Intended function M-7, providing holdup and plateout of Main Steam Isolation Valve (MSIV) leakage, is the appropriate function for the Main Condensers in the Alternative Source Term role; whereas, M-1, pressure boundary, is not an appropriate intended function.

Table 2.3.4-5 and Table 3.4.2-5 currently state the Main Condenser components have intended functions M-1 and M-7. These Tables will be corrected to show that the Main Condenser tubes, tube sheet, and shell have an intended function of M-7 only. Item 3.4.1-05, Item 3.4.1-09, and Subsection 3.4.2.2.4 will have "pressure boundary" removed. Discussion of "pressure boundary" will be revised in plant-specific Note 404. Note 404 will be revised to read as follows:

> Aging management of the Main Condensers is not based on analysis of materials, environments and aging effects. Materials, environments, and aging effects were evaluated, however no traditional aging management program is required. The Main Condenser is required to perform a post accident intended function of holdup and plateout of MSIV leakage (M-7), and this function is continuously confirmed by normal plant operation. The M-7 intended function does not require the Main Condenser to be leak-tight, with the post-accident conditions in the Main Condenser essentially atmospheric. In maintaining vacuum, the Main Condenser proves its integrity continuously as a vital component of continued plant operation. Normal plant operation continuously monitors the integrity of the Main Condenser which provides assurance that the Main Condenser would be able to perform a post-accident intended function of holdup and plateout of MSIV leakage.

It is noted that the Main Steam piping immediately downstream of the MSIVs is in scope for B-11, required for seismic supporting functions, and conservatively given the M-1 intended function for pressure boundary as well as M-7 for providing holdup and plateout of MSIV leakage. In-scope piping components delivering water to the Main Condenser have been conservatively given both M-1 and M-7 intended functions for convenience, instead of arbitrarily choosing a given component as the boundary where M-1 and M-7 ends and M-7 only begins.

Audit Question 3.6-1

Non EQ Electrical and I & C Penetration Assemblies in Table 3.6.2-1 (Summary of aging management evaluation) was not assigned a generic note regarding consistency with NUREG-1801. Please clarify the basis for the omission of the note.

AQ 3.6-1 Response

Note J applies to this commodity group. The AMR table will be revised accordingly.

Audit Question 3.6-2

Non EQ Insulated Cable and Connections in Table 3.6.2-1, "radiolysis and photolysis (UV sensitive materials only) of organics" was omitted from aging effect requiring management. NUREG-1801, Volume 2, calls for that aging effect. Please clarify the omission.

AQ 3.6-2 Response

The AMR table will be revised to include this aging effect for this commodity group.

Audit Question B.2.1-1

For LR, the staff does not recognize nor consider a currently approved RI-ISI program (or any other currently approved relief request) in evaluating an applicant's claim of consistency with GALL AMP XI.M1. The following technical points are considered by the staff in making this determination:

- First and foremost, AMR evaluations for License Renewal are based on expectations of continued acceptable performance, and maintenance of intended functions; not on estimates of risk.

- NPPs applying for LR are typically ten years or more from the end of the current license term. There is significant additional operating time during which operating experience will likely necessitate revisions to currently approved RI-ISI programs (and other relief

requests). This is the basis for staff approval only for the current inspection interval. The staff does NOT determine whether a currently approved RI-ISI program (or other relief request) will be adequate to manage aging through the end of the current license term and through the extended period of operation.

The project team will evaluate the applicant's claim of consistency with GALL AMP XI.M1 based strictly on the applicant's commitment to the requirements of 10 CFR 50.55a. The staff recognizes that 10 CFR 50.55a will likely be revised several times before BSEP enters the extended period of operation. Therefore, at this time, neither the staff nor the applicant can define an ISI program that will be in accordance with 10 CFR 50.55a during the extended period of operation.

The project team will NOT evaluate the applicant's currently approved RI-ISI program, because it is not applicable to the extended period of operation. The project team notes that the applicant may submit a RI-ISI program (or any other relief request) for staff review and approval, in accordance with the provisions of 10 CFR 50.55a in effect at that time.

Therefore, the applicant is requested to (1) clearly state that it is committed to meet the requirements of 10 CFR 50.55a, without exception, during the extended period of operation; and (2) specifically indicate that its ISI program credited for LR is NOT in any way modified by the currently approved BSEP RI-ISI program.

AQ B.2.1-1 Response [3]

BSEP will comply with 10 CFR 50.55a for the extended period of operation. The ASME Section XI Inservice Inspection, Subsection IWB, IWC, and IWD program description to be integrated into the Updated Final Safety Analysis Report (UFSAR), in LRA, Appendix A, Section A.1.1.1, will be revised to omit reference to Risk-Informed Inservice Inspection (RI-ISI) as a part of the program and information concerning the details of a specific inspection interval.

The proposed wording of the UFSAR in LRA, Appendix A, Section A.1.1.1, follows:

> The ASME Section XI, Inservice Inspection, Subsection IWB, IWC, and IWD Program consists of periodic volumetric, surface, and/or visual examination of components for assessment, signs of degradation, and corrective actions in accordance with applicable requirements and provisions of 10 CFR 50.55a. The Program is consistent with the corresponding program described in NUREG-1801.

Audit Question B.2.1-2

LRA Section B.2.1 states that the program was developed and prepared to meet the ASME Code, Section XI, 1989 Edition (no addenda) and is subject to the limitations and modifications of 10 CFR 50.55a, with exception of design and access provisions and pre-service examination requirements. Please clarify these exceptions.

AQ B.2.1-2 Response

The ASME Section XI, Inservice Inspection, Subsection IWB, IWC, and IWD Program identifies those components, systems, and their supports that are subject to examination and testing. 10 CFR 50.55a(g) allows for exceptions to access and pre-service requirements for old plants, the idea being that it is unreasonable to require an old plant to design ISI access into already-constructed systems and to meet pre-service requirements for already-vaulted pre-service inspections. The Construction Permits for Units 1 and 2 were issued on February 7, 1970. Therefore, the exception cited in the LRA is allowed by and is quoted in 10 CFR 50.55a(g). See specifically 10 CFR 50.55a(g)(4) and 0BNP-TR-001, "Inservice Inspection Technical Report," Section 8.1.1, for additional information.

Audit Question B.2.1-4

Confirm that a) the scope of the ASME Section XI Subsections IWB, IWC, and IWD Inservice Inspection Program includes inspections that "can reveal crack initiation and growth; loss of material due to corrosion; leakage of coolant; and indications of degradation due to wear or stress relaxation, such as verification of clearances, settings, physical displacements, loose or missing parts, debris, wear, erosion, or loss of integrity at bolted or welded connections", as identified in GALL AMP Element 4 "Detection of Aging Effects," and b) identify where this is addressed.

AQ B.2.1-4 Response

The Program includes periodic visual, surface, and/or volumetric examination and leakage tests of all Class 1, 2, and 3 pressure-retaining components and their integral attachments. Inspection details are outlined in the implementing documents and sub-tier procedures.

The complete statement in GALL, Element 4, Detection of Aging Effects, is as follows:

> The extent and schedule of the inspection and test techniques prescribed by the program are designed to maintain structural integrity and ensure that aging effects will be discovered and repaired before the loss of intended function of the component. Inspection can reveal crack initiation and growth; loss of material due to corrosion; leakage of coolant; and indications of degradation due to wear or stress relaxation, such as verification of clearances, settings, physical displacements, loose or missing parts, debris, wear, erosion, or loss of integrity at bolted or welded connections.

BSEP agrees with the above as a statement of fact.

Audit Question B.2.2-4

The basis document, BNP-LR-600, states in its program element section 3-1 evaluation (page 13), that BSEP is a Normal Water Chemistry (NWC) Plant. However, the BSEP Water Chemistry Program is based on the current version of the BWRVIP-79, which recommends Hydrogen Water Chemistry (HWC). Clarify the discrepancy.

AQ B.2.2-4 Response

BSEP is a Hydrogen Water Chemistry (HWC) Plant. The basis document will be revised to reflect this.

Audit Question B.2.2-6

The degradation in the MUD tank, made out of aluminum and containing demineralized water, is managed by the Water Chemistry Program. Without periodic visual internal examination, justify how BSEP would verify that these tanks have not experienced crevice and pitting corrosion, and would not be subject to crevice and pitting corrosion during the extended period of operation.

AQ B.2.2-6 Response

BSEP aging management reviews have identified that the Demineralized Water (MUD) Tank is constructed of aluminum, and potentially susceptible to crevice, pitting and galvanic corrosion. BSEP had specified the Water Chemistry Program, augmented by the One-Time Inspection Program, to address this aging effect. BSEP performs routine internal visual inspections of the MUD Tank to ensure the tank is not experiencing corrosion. BSEP will credit a combination of the Water Chemistry Program and the Preventive Maintenance Program to manage these aging effects during the period of extended operation.

Audit Question B.2.3-1

In response to a pre-audit question, the applicant stated "Per Section XI ISI requirements, the reactor pressure vessel studs are inspected every 10 years. The next series of inspections will be performed in 2007 and 2008. All previous inspections have been satisfactory." Confirm that this response is accurate.

AQ B.2.3-1 Response

The pre-audit response to question B.2.03-1 has been confirmed to be accurate.

Audit Question B.2.4-1

a) Describe any preventive measures for IGSCC in stainless steel components.

b) Provide list of components and systems subjected to IGSCC at BSEP.

c) GALL states that the resistant materials used for new and replacement components include low carbon grades of austenitic SS and weld metal, with a maximum carbon of 0.035 wt.% and a minimum ferrite of 7.5% in weld metal and cast austenitic stainless steel (CASS). Inconel 82 is the only commonly used nickel base weld metal considered to be resistant to SCC; other nickel alloys, such as Alloy 600 are evaluated on an individual basis. Is this applicable to BSEP components?

d) Describe the leak detection program if applicable to this AMP for detection.

e) Applicable and approved BWRVIP-14, BWRVIP-59, and BWRVIP-60 documents provide guidelines for evaluation of crack growth in SSs, nickel alloys, and low alloy steels, respectively. Clarify if these documents are applicable to BSEP units.

f) An applicant may use BWRVIP-61 guidelines for BWR vessel and internals induction heating stress improvement effectiveness on crack growth in operating plants. Is this applicable to BSEP units?

g) Based on the BWR Vessel and Internals Project, Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection (BWRVIP 62), an applicant using HWC chemistry program may request for inspection relief. Clarify if any relief has been granted to any of the BSEP welds.

h) Provide the operating experience associated with austenitic SS IGSCC in any of reactor pressure boundary components at both BSEP plants.

AQ B.2.4-1 Response

a) The preventive measures for Intergranular Stress Corrosion Cracking (IGSCC) are twofold. First is the implementation of a Water Chemistry Program that controls the aggressive environment, i.e., coolant with high levels of dissolved oxygen or aggressive contaminants, such as sulfates or chlorides, that can foster IGSCC in susceptible materials with significant tensile stress. The BSEP Water Chemistry Program is provided in Section B.2.2 of the LRA and is evaluated separately. Second is the replacement of susceptible materials with resistant materials and/or the use of special processes that reduce tensile stresses. The following table discusses some of the major BSEP systems.

System	Discussion
Reactor Coolant Recirculation System (RCR)	The material in the RCR System can be characterized as follows: 1. Non-resistant to IGSCC - This includes the 22" and 28" feeder lines. The material used is Type 304 stainless steel. Selected welds in these lines have been weld overlayed and/or stress improved by the mechanical stress improvement process (MSIP) or the induction heating stress improvement process (IHSI). 2. Resistant to IGSCC - This includes the 12" riser piping and the 4" bypass lines. This piping was replaced with Type 316 NG (nuclear grade) stainless steel. This material is resistant to IGSCC (Category A) per Generic Letter 88-01.
Reactor Water Cleanup System (RWCU)	The Class 1 portion of the suction segment of the RWCU System is made from Type 316L (C and N content is equivalent to Type 316NG) stainless steel which is considered to be not susceptible to IGSCC. The Class 1 segment of the RWCU discharge line consists of carbon steel and stainless steel. The carbon steel is not susceptible to IGSCC. The Type 304 stainless steel piping in line 14-4-902 of both units was replaced with Type 316L with controlled nitrogen. This Type 316 MOD is equivalent to Type 316NG and is not considered susceptible.
Core Spray System (CS)	Stainless steel portions of the CS piping, from the drywell manual isolation valves to the reactor nozzle safe-end have been replaced with carbon steel. This design provides material compatibility and replacement with material not subject to stress corrosion cracking in the BWR coolant environment. Unit 1: The nozzle is A508 Class 2. The original inconel cladding was removed and replaced with Type 309L stainless steel weld metal. Unit 2: The nozzle is A508 Class 2. The cladding is a combination of Inconel 182 and stainless steel. Unit 1: The safe end is constructed of Type 316NG stainless steel. Unit 2: The safe end is constructed of Inconel Alloy 600. Unit 1 and Unit 2: The thermal sleeves are constructed of Type 316 stainless steel.

b) The list of components and systems managed by the BWR Stress Corrosion Cracking (SCC) Program is contained in Calculation BNP-LR-654.

c) Material replacement information is provided in the response to a) above. Weld material used in major systems managed by this AMP at BSEP can be characterized as follows:

For the Reactor Vessel and Internals System, the Alloy 182 weld butter on the Reactor Pressure Vessel (RPV) Nozzle N8A/B nozzle to safe-end weld is considered to be susceptible to IGSCC. For the Reactor Coolant Recirculation System, the Inconel buttering is called-out on the as-built drawings for the N1 nozzle. It is assumed that Alloy 182 weld butter was used and it is considered to

be susceptible to IGSCC. For the Reactor Water Cleanup System, one weld in the RWCU discharge line of each unit is listed as IGSCC Category D and is therefore considered to be susceptible to IGSCC. For the Residual Heat Removal System, the dissimilar metal weld to the RCR System (Type 304 stainless steel) for each loop is considered to be susceptible to IGSCC. For the Core Spray System, the Unit 2 safe-end weld is Alloy 600. The nozzle to safe-end weld received an IHSI treatment. The two safe-end welds per loop are Categories C and D and are therefore considered to be susceptible to IGSCC.

d) Leak detection requirements were addressed through a Technical Specification change request, Serial: NLS-90-112, Letter from A. B. Cutter, BSEP to USNRC, Brunswick Steam Electric Plant, Unit Nos. 1 and 2, Docket Nos. 50-325 & 50-326/License Nos. DPR-71 & DPR-62, Request for License Amendment, IGSCC Requirements, dated July 20, 1990. This request proposed the following:

> Monitoring leakage at eight hour intervals is in conformance with the 12/21/89 NRC SER for GL 88-01.

The Technical Specification changes were approved by letter from N. B. Le (USNRC) to L. W. Eury (CP&L), dated December 20, 1990: Issuance of Amendment No. 150 to Facility Operating License No. DPR-71 and Amendment No. 180 to Facility Operating License No. DPR-62 Regarding IGSCC Requirements in accordance with Generic Letter 88-01 – Brunswick Steam Electric Plant, Units 1 and 2, (TAC Nos. 77250 and 77251)).

e) BSEP has implemented RI-ISI for the management of IGSCC through the use of BWRVIP-75.

For risk-informed inspections, flaws that exceed the applicable acceptance criteria may be accepted by repair/replacement activities or by analytical evaluation per IWB-3130 of ASME Section XI.

For inspections performed per Generic Letter 88-01, methods and criteria for crack evaluation and repair are in conformance with IWB-3600 of Section XI of the 1986 Edition of the ASME Boiler and Pressure Vessel Code.

BWRVIP-14, BWRVIP-59, and BWRVIP-60 provide crack growth rates that are acceptable for use in evaluations.

BWRVIP-14 crack growth rates have been used in the evaluation of the Reactor Vessel Internals, i.e., core shroud, internal core spray piping and spargers, and feedwater spargers. However, these components manage IGSCC with a combination of the Reactor Vessel and Structural Integrity Program and the Water Chemistry Program.

f) Due to new reports of IGSCC, BWRVIP-61 reviewed factors that could influence the performance of the pipe cracking remedy known as IHSI. BSEP has implemented RI-ISI

for the management of IGSCC through the use of BWRVIP-75. This includes those welds that have had stress improvement by IHSI. Therefore, BWRVIP-61 is not applicable to BSEP.

g) BSEP does not currently credit HWC. As stated in the BSEP RI-ISI submittal, Serial: BSEP 01-0012, Letter from D. DiCello, CP&L, to USNRC, Brunswick Steam Electric Plant, Unit Nos. 1 and 2 Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62, Third 10-Year Inservice Inspection Program - Adoption of BWRVIP-75, dated February 19, 2001:

> The inspection frequency and scope of Category A, B, C, D, and E stainless steel piping welds will be in accordance with the BWRVIP-75 guidelines for normal water chemistry (NWC), as revised by the NRC Safety Evaluation dated September 15, 2000.

h) In support of the RI-ISI submittal per BWRVIP-75, an in-depth review of plant and industry databases and site documents was performed to characterize BSEP's operating experience with respect to piping pressure boundary degradation occurrences in the RI-ISI evaluation of Class 1 piping systems. This review is documented in CPL-53Q-303, "Brunswick Units 1 and 2 Service History and Susceptibility Review."

Audit Question B.2.13-1

GALL notes the benefits of periodic draining and cleaning of fuel oil storage tanks. Appendix B of the LRA notes an exception to periodic cleaning, but does not discuss periodic draining. Please clarify.

AQ B.2.13-1 Response

See LRA Appendix B.2.13 for a discussion of the exception to periodic cleaning of fuel oil tanks.

Based on current plant operating experience, there is no need to clean or drain the four-day or diesel fire pump tanks. Plans are currently being developed for inspection of the Main Fuel Oil Storage Tank (MFOST). Decisions on cleaning and/or draining of the MFOST will be made based on the inspection method chosen and the inspection results. Inspection of the MFOST will be performed prior to the period of extended operation.

Audit Question B.2.13-1-A

Follow-up Question B.2.13-1-A: GALL AMP XI.M30 provides specific benefits attributed to both periodic cleaning and periodic draining, as preventive actions. LRA Appendix B.2.13 only identifies an exception to periodic cleaning, and provides the bases for this exception. LRA Appendix B.2.13 does not identify an exception to periodic draining. Please clarify for which in-

scope tanks the exception to periodic draining is taken, and provide the bases for this exception. Describe any alternate preventive actions taken in lieu of periodic draining and cleaning. Identify the specific changes necessary in LRA Appendix B.2.13 and the FSAR supplement in LRA Appendix A, to document the exception to periodic draining.

AQ B.2.13-1-A Response

GALL AMP XI.M30 discusses the benefits of fuel oil tank "Draining" in two different contexts: first, for the removal of water and second as an adjunct to cleaning. These are distinctly different activities and are discussed separately below:

Draining water from tanks

The XI.M30 Fuel Oil Chemistry Program Description notes:

> Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic draining **or** cleaning of tanks...[emphasis on "or" added].

Section 2, Preventive Actions, notes:

> Periodic cleaning of a tank allows removal of sediments, and periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of contact time.

Section 7, Corrective Actions, notes:

> For example, corrective actions are taken to prevent recurrence when the specified limits for fuel oil standards are exceeded or when water is drained during periodic surveillance.

The BSEP Fuel Oil Chemistry Program does not take exception to draining accumulated water from the fuel oil tanks. As noted in LRA section B.2.13:

> Exposure to fuel oil contaminants, such as water and microbiological organisms is minimized by verifying the quality of new oil before its introduction into the storage tanks and by periodic sampling to assure that the tanks are free of water and particulates.

The sampling procedures include requirements for water removal, i.e., draining, should water be found in a fuel oil tank. This also has the effect of flushing other contaminates that settle on the tank bottom.

Draining as an adjunct to cleaning

The XI.M30 Fuel Oil Chemistry Program, Section 4, Detection of Aging Effects notes:

> Tanks that are drained for cleaning are visually inspected to detect potential degradation.

Based on current plant operating experience, there is no need to clean the four-day, saddle or diesel fire pump tanks.

Therefore, the draining of these tanks as an adjunct to cleaning is not applicable. Additional information about the four-day, saddle, and diesel fire pump tanks is provided in the response to Question B.2.13-6.

Plans are currently being developed for the internal inspection and bottom thickness measurement of the MFOST. Decisions on cleaning and/or draining of the MFOST will be made based on the inspection method chosen and the inspection results. The inspections will be in accordance with methodology acceptable to the Environmental Protection Agency such as API-STD-653. Inspection of the MFOST will be performed prior to the period of extended operation.

In summary, there is no exception to the NUREG-1801 recommendation to drain water from the diesel fuel oil tanks. This is an inherent feature of the Fuel Oil Chemistry Program. As stated in the original response to Question B.2.13-1, plans are currently being developed for inspection of the MFOST. Decisions on cleaning and/or draining of the MFOST will be made based on the inspection method chosen and the inspection results. No specific changes are necessary in LRA Appendix B.2.13 and the UFSAR supplement in LRA Appendix A, to document an exception to periodic draining.

Audit Question B.2.13-3

Appendix B notes an exception to GALL whereby additional materials and components wetted by fuel oil will be included to the scope. However, Appendix B and the program description document is essentially silent on how aging will be managed and detected for these components. Discussions with BSEP personnel indicate that the intent is to consider the condition of the fuel oil storage tanks as limiting and bounding. In the event aging degradation is detected in the tanks appropriate inspections and evaluations will be performed on these additional components. Please confirm.

AQ B.2.13-3 Response

The condition of the fuel oil storage tanks is considered to be a leading indicator that bounds other in-scope materials wetted by fuel oil. In the event aging degradation is detected in in-scope fuel oil tanks, appropriate inspections and evaluations of other Fuel Oil System components will be directed by the corrective action program.

Audit Question B.2.13-4

What upgrades are currently planned for the BSEP Fuel Oil Chemistry program at BSEP?

AQ B.2.13-4 Response [4]

BSEP is currently in the process of upgrading the Fuel Oil Chemistry Program to more contemporary testing standards as follows: American Society for Testing and Materials (ASTM) Standards D975-04, ASTM D130-94, ASTM D1796-97 and ASTM D4057-88 will apply. Although we are currently using ASTM 2276-89 for particulate determination, ASTM D6217-98 will replace ASTM D2276-89 due to issues associated with filter quality control by the supplier. The key difference in these two methods is that ASTM D6217-98 accounts for clogging filters. ASTM D6217-98 only filters 100 ml at a time and if any 100 ml take longer than 10 minutes to filter, a new set of filters are used. The total particulate volume is the sum of all the filters used. This prevents filters from clogging to the point that a particulate calculation can not be done.

Audit Question B.2.13-5

What has been the experience with external ultrasonic inspection of in-scope tanks?

AQ B.2.13-5 Response

In accordance with the Corrective Action Program, on November 16, 2003, a non-destructive examination (NDE) was completed on the Emergency Fire Pump Diesel Fuel Oil Storage Tank, 2-FO-DIESEL-PMP-TK, and each of the four four-day fuel oil storage tanks, 2-FOD-4-DAY-TK-1, -2, -3, and -4 using NDEP-408. No problems relating to tank wall thickness degradation were found on any of the subject tanks.

However, there were three locations on 2-FOD-4-DAY-TK-3 that indicated a potential wall thickness less than the typical thickness readings taken at various other locations on the tank. Each of the three locations indicated a point approximately ¼ inch round and approximately ½ the normal wall thickness. The typical wall thickness indications were generally 0.47 inches with the subject three points reading approximately 0.20 inches. The indications noted were isolated indicating they contained embedded inclusions by the fabrication process, i.e. plate rolled steel. The inspection personnel stated they were able to maintain a constant backwall signal during the ultrasonic examination process verifying the three noted indications were not a tank wall degradation issue. Subsequent review of the examination data by a plant engineering staff knowledgeable in this area support the conclusion the three noted indications were not a tank wall degradation issue. No further action was required.

Audit Question B.2.13-6

In LRA Section B.2.13, the applicant states that internal inspection of tanks is limited to the Main Fuel Oil Storage Tank, because it is impractical for other tanks (4-day, saddle, and diesel fire pump) due to their size and location. Specifically describe the features of each tank that make an internal inspection impractical.

AQ B.2.13-6 Response

Internal inspection of the four-day tanks is not planned. Per section 6.5 of American Petroleum Institute Standard-653, external inspections of tanks can be substituted for internal inspections where bottom thickness can be determined by other means. The four-day tanks are accessible in all areas of concern. Loss of material due to aging effects can be monitored by NDE. Fuel oil quality monitoring and trending will detect adverse trends in internal surface material condition. Corrective actions will be initiated as necessary. To verify effectiveness of the aging management program, a one-time inspection will be completed prior to the extended period of plant operation.

Internal inspection of the fuel oil saddle tanks and the diesel fire pump fuel tank is not planned. Access to these elevated small tanks is limited making cleaning and internal inspections impractical. BSEP operating experience indicates that degradation of these tanks is not occurring. The fuel oil chemistry program ensures high quality, non-corrosive, non-biologically-contaminated fuel oil is maintained. Fuel analysis results are monitored and trended to detect degradation of tank internals. Corrective action is initiated as necessary to maintain tank integrity. To verify effectiveness of the aging management program, a one-time inspection will be completed prior to the extended period of plant operation.

Audit Question B.2.13-7

The GALL program description discusses the addition of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. The applicant states that it does not use additives, but this option is retained on an as-needed basis. Under what conditions would this option be implemented? Would it be one-time or continuing?

AQ B.2.13-7 Response

BSEP fuel oil is purchased to ASTM D975 requirements which address stability and corrosion. The need for additives is dependent on specific properties of the oil procured, turnover rate and storage environment. Certain distilled refinery products are generally more suitable for long-term storage than others. The stability properties of distillates are highly dependent on the crude oil sources, severity of processing, and whether additional refinery treatment has been carried out.

The BSEP evaluation of NRC Information Notice 91-46, "Degradation of Emergency Diesel Generator Fuel Oil Delivery Systems," includes the following summary:

- BSEP fuel oil quality is trended with very stable results.
- Storage tanks maintained full to minimize internal condensation designed with internal sump.

- Storage tank/day tank bottom samples have not revealed water. The concern for microbiological degradation is minimal.
- Metal deactivators and corrosion inhibitors are added by Amerada Hess, the fuel oil vendor.
- Emergency Diesel Generator fuel oil filters are not experiencing fouling problems.

Based on operating history and fuel oil management activities, the use of biocide, stabilizers, and corrosion inhibiting additives at BSEP has not been necessary. The potential exists that future fuel supplies may require additives to meet our stability and storage requirements. The future use of additives will be dependent on the attributes of the procured fuel and will be evaluated on a case-by-case basis. Adding a biocide, stabilizers, or additives will require an evaluation.

Audit Question B.2.13-8

Are fuel oil pipes at BSEP managed by other AMPs?

AQ B.2.13-8 Response

The Fuel Oil Chemistry Program is credited for managing the aging of the interior surface of all diesel fuel oil piping components as well as tanks. The external surfaces of buried fuel lines are managed by the Buried Piping and Tanks Inspection Program.

Audit Question B.2.15-1

For LR, the staff does not recognize a current RI-ISI evaluation as an acceptable technical basis for excluding inspection of small bore piping (4" and less NPD) from the scope of the One-Time Inspection Program. The following technical points are considered by the staff in making this determination:

- First and foremost, AMR evaluations for License Renewal are based on expectations of continued acceptable performance, and maintenance of intended functions; not on estimates of risk.

- Typically, small bore piping (4" and less NPD) is exempted from ASME Code IWB/IWC inspection. Therefore, there is no or very little direct observation and documentation of the condition of such piping during the CLB, unless a failure occurs. A lack of operating failures to date does not provide a quantitative measure of the current and future condition of the piping.

- NPPs applying for LR are typically ten years or more from the end of the current license term. There is significant additional operating time during which operating experience will likely necessitate revisions to currently approved RI-ISI programs. This is the basis for staff approval only for the current inspection interval. The staff does NOT determine

whether a currently approved RI-ISI program will be adequate to manage aging through the end of the current license term and through the extended period of operation.

- Since the Code typically exempts small bore piping (4" and less NPD) from inspection, staff approval of a RI-ISI program for the current inspection interval is not defacto acceptance of a licensee's RI evaluation of small bore piping.

Consequently, the project team rejects the applicant's technical basis for concluding that inspection of small bore piping can be excluded from the scope of the One-Time Inspection Program. The staff's expectation is that one-time inspection, in accordance with the guidance contained in the GALL report, will be conducted for small bore piping. Both piping >1" to 4" NPD and piping 1" and less NPD need to be addressed in the applicant's program.

Therefore, the applicant is requested to submit a revision to its One-Time Inspection Program that (1) includes small piping in the program scope, and (2) describes an inspection plan that is consistent with the guidance in GALL AMP XI.M32.

AQ B.2.15-1 Response

BSEP will revise the One-Time Inspection Program to include verification of aging management program effectiveness on less than four inch piping and fittings within ASME Code Class 1 boundaries.

The BSEP One-Time Inspection Program will be revised to include the following description of how cracking will be detected:

> The inspection includes a representative sample of the population, and, where practical, focuses on the bounding or lead components most susceptible to aging due to time in service, severity of operating conditions, and lowest design margin. For small-bore piping, actual inspection locations are based on physical accessibility, exposure levels, NDE techniques, and locations identified in NRC Information Notice 97-46, as applicable. Combinations of NDE, including visual, ultrasonic, and surface techniques, are performed by qualified personnel following procedures consistent with the ASME Code and 10 CFR50, Appendix B. For small-bore piping less than NPS 4 inches, including pipe, fittings, and branch connections, a plant-specific destructive examination of replaced piping due to plant modifications or NDE that permits inspection of the inside surfaces of the piping will be performed to ensure that cracking has not occurred. Follow-up of unacceptable inspection findings includes expansion of the inspection sample size and locations. With respect to inspection timing, the one-time inspection is to be completed before the end of the current operating license. The applicant may schedule the inspection in such a way as to minimize the impact on plant operations. However, the inspection is not to be scheduled too early in the current operating term, which could raise questions regarding continued absence of aging effects prior to and near the extended period of operation.

BSEP credits the Water Chemistry Program and ASME Section XI Inservice Inspection, Subsections IWB, IWC and IWD Program, i.e., for leakage inspections, for aging management of cracking in less than 4 inches NPS Class 1 piping components. These components will be subject to physical inspections for leakage under the latter program. Additionally, the One-Time Inspection Program will be used, as described above, to verify the effectiveness of these programs. Upon inclusion of small bore piping in the BSEP One-Time Inspection Program as described above, the program will be consistent with the program description found in NUREG-1801, Aging Management Program XI.M32. Details regarding the implementation of the one-time inspections, including identification of specific sampling techniques and inspection locations, will be formalized prior to the end of the current license term.

Audit Question B.2.15-2

GALL discusses the elements of the one-time inspection program including sample size determination. As discussed, the inspection is to include a representative sample of the system population while focusing on identifying the components/locations most susceptible to aging. BNP-LR-632, Table 6.2-1, Item 4-1 states "Where feasible, it is permissible to use like material and environment combinations in alternate systems/components for verification of the Water Chemistry Program." Provide the basis for this approach. Please discuss how feasibility will be determined given that operating conditions may vary. Discuss how BSEP will address sample size determination for one-time inspections.

AQ B.2.15-2 Response [5]

Consistent with the GALL Program description in XI.M32, the one-time inspection for aging management program effectiveness verification will include: (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of any aging degradation.

The details of this inspection plan, including identification of specific sampling techniques and inspection locations, will be formalized prior to the end of the current license term.

Audit Question B.2.17-1

Based on previous discussions with ACRS and DE this exception is a GALL Update issue. There must be a commitment to do a periodic inspection. Opportunistic inspection for maintenance or other activities qualify. However, in no case of buried pipe can the period of inspection exceed 10 years. Therefore, indicate your commitment to inspecting buried piping at least one every 10 years or your basis for not doing so.

AQ B.2.17-1 Response [3]

BSEP will revise the Buried Piping and Tanks Inspection Program to do periodic inspections of buried piping. Opportunistic inspection may be used to satisfy inspection requirements, but in no case will the frequency of inspection exceed 10 years.

This revision results in a change to the description of the program in Appendix A, Section A.1.1.17:

> The Buried Piping and Tanks Inspection Program manages the aging effect of loss of material for the external surfaces of buried piping components in BSEP systems in scope for License Renewal. There are no buried tanks in this Program. The Program includes preventive measures to mitigate corrosion by protecting the external surface of buried piping components through use of coating or wrapping. The Program includes visual examinations of buried piping components on a frequency not to exceed 10 years.
>
> The Program will be implemented prior to the period of extended operation and will include procedural requirements to: (1) ensure an appropriate as-found pipe coating and material condition inspection is performed whenever buried piping within the scope of this Program is exposed, (2) add precautions concerning excavation and use of backfill to the excavation procedure to include precautions for License Renewal piping, (3) add a requirement that coating inspection shall be performed by qualified personnel to assess its condition, and (4) add a requirement that a coating engineer or other qualified individual should assist in evaluation of any coating degradation noted during the inspection.

Audit Question B.2.23-1

The applicant is requested to verify that periodic monitoring of groundwater for aggressiveness will be conducted under BSEP AMP B.2.23 during the extended period of operation. Please also indicate whether this is currently part of the Structures Monitoring Program or whether this is an enhancement to the Structures Monitoring Program.

If monitoring of groundwater for pH, chlorides, sulfates and phosphates has been previously conducted, please provide the quantitative results. Also provide an assessment of aggressiveness/non-aggressiveness of the groundwater, based on comparison of the quantitative results to the criteria in the GALL report.

AQ B.2.23-1 Response

Periodic groundwater monitoring is currently being performed under Section 10.7 of implementing procedure 0E&RC-3250 and will be continued during the period of extended operation. An enhancement to the Structures Monitoring Program implementing procedure EGR-NGGC-0351 will be performed prior to the period of extended operation that requires the Structures System Engineer to review the groundwater monitoring results against the applicable parameters for determination of an aggressive below grade environment. Periodic monitoring of groundwater is discussed in the response to Audit Question B.2.23-2.

Groundwater monitoring for pH, chlorides, and sulfates has been performed twice since 2002. The groundwater monitoring for phosphates was performed once and is not part of the groundwater monitoring program. The following table provides the results against the criteria in GALL, which shows the values to be below the aggressive limits.

	GALL Criteria	Well # ESS-1B		Well # ESS-2B		Well # ESS-3B		Well # ESS-13C		Manhole 2-MH-CB7	
		Date		Date		Date		Date		Date	
		2002	2004	2002	2004	2002	2004	2002	2004	2002	2004
pH	< 5.5	7.53	7.04	6.57	6.88	6.96	7.16	6.61	6.69	N/A	6.39
Chlorides	> 500 ppm	36	26	49	31	27	12	34	21	N/A	11
Sulfates	> 1500 ppm	2	< 5	66	48	50	10	18	<5	N/A	45

A one-time inspection was performed on well # ESS-3B to determine a groundwater phosphate level; that value was found to be 0.12 ppm.

Audit Question B.2.23-2

LRA Table B-1 indicates that GALL AMP XI.S7 is not credited for aging management. Does the Structures Monitoring Program include the program elements of GALL AMP XI.S7 to manage aging of water control structures, as allowed by GALL? If not, how is aging management of water control structures accomplished? If yes, do the basis document and implementing procedures for AMP B.2.23 address the program elements of GALL AMP XI.S7? Is it completely consistent with GALL AMP XI.S7, or are there exceptions/enhancements? What are the exceptions/enhancements, if any?

In a preliminary response, the applicant stated:

> The CLB for BSEP does not credit R.G. 1.127 (XI.S7), the Service Water Building is managed by the Maintenance Rule procedure "Condition Monitoring of Structures". The Condition Monitoring of Structures procedure is the primary implementing procedure for the SMP (Structures Monitoring Program). The SMP is credited for the management of all other structures at BSEP and has been found to be effective for management of the Service Water Building, as evidenced by plant operational experience; as such, the Service Water Building

was categorized with the generic note "E" (Consistent with NUREG-1801 for material, environment, and aging effect, but a different AMP is credited). Note: R.G. 1.127 is primarily utilized for management of Dams and given that BSEP has an established history with an effective management program, reconciliation to R.G. 1.127 does not appear appropriate.

As a follow-up question, the applicant is requested to (1) identify all structures, components and plant features (e.g., canals) that are essential to maintaining an adequate supply of cooling water for safe shutdown; (2) identify the AMPs that will manage aging for each: and (3) identify how the credited AMP is consistent with the applicable program elements of GALL AMP XI.S7.

AQ B.2.23-2 Response [3]

1) Intake Canal, including sheet-pile cellular bulkhead surrounding the Service Water Intake Structure, and the Service Water Intake Structure

2) Both structures are managed by the Structures Monitoring Program.

3) The Intake Canal is managed by the Structures Monitoring Program, which specifically includes guidance from Regulatory Guide 1.127, as stated in Attachment 1, sheet 5 of 6, of EGR-NGGC-0351. The Structures Monitoring Program will be clarified to specify that the inspection interval for the Intake Canal is not to exceed five (5) years.

   Based on a comparison, the BSEP Structures Monitoring Program effectively envelopes the inspection attributes of Regulatory Guide 1.127 with the exception of inspection frequency, as it relates to the Service Water Intake Structure. The Structures Monitoring Program specifies an inspection frequency commensurate with the safety significance of the structure and its condition but shall not exceed ten (10) years; Regulatory Guide 1.127 specifies an inspection frequency not to exceed five (5) years. The Structures Monitoring Program shall be enhanced to change the inspection frequency for the Service Water Intake Structure to not exceed five (5) years.

This response results in a change to the enhancements provided in the second paragraph of the description of the program in LRA, Appendix A, Section A.1.1.23:

> Prior to the period of extended operation, the Structures Monitoring Program will be enhanced to: (1) identify License Renewal systems managed by the Program and inspection boundaries between structures and systems, (2) require notification of the responsible engineer regarding availability of exposed below-grade concrete for inspection and require that an inspection be performed, (3) identify specific license renewal commodities and inspection attributes, (4) require responsible engineer review of groundwater monitoring results, (5) specify that an increase in sample size for component supports shall be implemented (rather than should be) commensurate with the degradation mechanisms found, (6) improve training of System Engineers in condition monitoring of structures, (7) include inspections of the submerged portions of the Service

Water Intake Structure on a frequency not to exceed five years, (8) specify an annual groundwater monitoring inspection frequency for concrete structures, and (9) specify the inspection frequency for the Service Water Intake Structure and Intake Canal to not exceed five years. Following enhancement, the Structures Monitoring Program will be consistent with the corresponding program described in NUREG-1801.

Audit Question B.2.24-1

The Protective Coating Monitoring and Maintenance Program applies only to the clogging of the containment sump strainers, and assures that the mass of qualified paints that could become debris during a design basis accident is less than 71 lbm-dry. Other debris considered in 0MISCEL-1027, "RHR/CS Strainer Debris Head Loss Analysis Post LOCA," includes sludge, dirt/dust, rust, unqualified paint/coating, and miscellaneous. The combined mass limit for these other debris is 1,442 lbm-dry. Why aren't there aging management programs for these other debris similar to the program for qualified paint coatings?

AQ B.2.24-1 Response

BSEP will use the Preventive Maintenance (PM) Program to manage accumulation of sludge, dirt/dust, rust, and other miscellaneous debris in the torus. PM Program activities will include regular monitoring and removal of debris as required to ensure that allowable limits are not exceeded.

Audit Question B.2.26-1

BSEP AMP B.2.26 does not require a review of calibration or surveillance results for indication of cable degradation, as recommended by ISG-15. Provide technical justification of why this review is not necessary.

AQ B.2.26-1 Response [3]

AMP B.2.26 will be revised to include a review of calibration or surveillance results for indication of cable degradation consistent with NRC Interim Staff Guidance (ISG)-15, Revision to Generic Aging Lessons Learned (GALL) Aging Management Program XI.E2. The first reviews will be completed before the end of the initial 40-year license term and at least once every 10 years thereafter.

This response results in a change to the description of the program in LRA, Appendix A, Section A.1.1.26. The updated description reads:

The Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is credited for the aging management of radiation monitoring and neutron flux monitoring instrumentation cables

not included in the BSEP EQ Program. Exposure of electrical cables to adverse localized environments caused by heat or radiation can result in reduced insulation resistance (IR). A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation circuits since it may contribute to signal inaccuracies. For radiation monitoring instrumentation circuits, the review of calibration results or findings of surveillance testing will be used to identify the potential existence of cable system aging degradation. This review will be performed at least once every 10 years, and the first review will be completed before the end of the current license term. Cable systems used in neutron flux instrumentation circuits will be tested at a frequency not to exceed 10 years based on engineering evaluation, and the first testing will be completed before the end of the current license term. Testing may include IR tests, time domain reflectometry (TDR) tests, current versus voltage (I/V) testing, or other testing judged to be effective in determining cable system insulation condition. This Program is consistent with the corresponding program described in NUREG-1801, as modified by NRC Interim Staff Guidance Issue No. 15, with the exception that it allows direct cable testing of neutron monitoring cable systems.

Audit Question B.2.26-2

Does cable testing, as recommended by ISG-15, for BSEP AMP B.2.26, include connection (plug-in multiple connection pins, splices, etc.)? If not, provide technical justification for excluding connections from cable testing.

AQ B.2.26-2 Response

Cable testing includes the entire cable system which includes cable connections.

Audit Question B.2.26-4

ISG-15 requires that the test frequency of the cable systems be determined by the applicant based on engineering evaluation not to exceed 10 years. Provide clarification or technical justification for the 10-year testing frequency for BSEP AMP B.2.26.

AQ B.2.26-4 Response

The test frequency of the Neutron Monitoring System cable systems shall be determined based on engineering evaluation not to exceed ten years. The first test shall be completed prior to the end of the initial 40-year license term. Refer to the revised program description provided with the response to Audit Question B.2.26-1.

Audit Question B.2.27-1

Periodic actions are taken to minimize cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water, as needed. The above action may not be sufficient to assure that water is not trapped elsewhere in the raceways. Therefore, the in-scope medium voltage cables exposed to significant moisture and voltage should also be tested to provide an indication of the condition of the conductor insulation. It is not clear if the above actions are being performed by BSEP AMP B.2.27. Provide the inspection frequency of the manholes and the testing frequency for the inaccessible medium voltage cables.

AQ B.2.27-1 Response [3]

In-scope, medium-voltage cables exposed to significant moisture and significant voltage are tested at least once every 10 years as stated in Section A.1.1.27 of Appendix A and Section B.2.27 of Appendix B of the BSEP LRA. This frequency is consistent with that recommended in Section XI.E3 of NUREG-1801.

The medium-voltage License Renewal manholes will be inspected and accumulated water will be removed by the Preventive Maintenance Program. The inspection frequency will be based on actual field data and shall not exceed two years.

This response results in a change to the description of the program in LRA, Appendix A, Section A.1.1.27. The updated description reads:

> The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is credited for aging management of cables not included in the BSEP EQ Program. In-scope, medium-voltage cables exposed to significant moisture and significant voltage are tested at least once every 10 years to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, or other testing that is state-of-the-art at the time the test is performed. Significant moisture is defined as periodic exposures that last more than a few days (e.g., cable in standing water). Periodic exposures that last less than a few days (e.g., normal rain and drain) are not significant. Significant voltage exposure is defined as being subjected to system voltage for more than 25% of the time. The moisture and voltage exposures described as significant in these definitions are not significant for medium-voltage cables that are designed for these conditions (e.g., continuous wetting and continuous energization are not significant for submarine cables). Manholes associated with inaccessible non-EQ medium-voltage cables will be inspected for water accumulation and drained, as needed. The manhole inspection frequency will be based on actual field data and shall not exceed two years. This program is consistent with the corresponding program description in NUREG-1801.

Audit Question B.3.1-1

LRA Appendix B, Section B.3.1 identifies an exception to GALL AMP X.M1. For the program element "Monitoring and Trending", the applicant states "The limiting locations selected for monitoring will be those with a 60-year CUF value (including environmental effects, where applicable) of 0.5 or greater. The monitoring sample may not include all locations identified in NUREG/CR-6260 that are within the scope of the program if they do not meet this criterion."

GALL AMP X.M1 specifically states that "as a minimum" the locations identified in NUREG/CR-6260 are to be included in the fatigue monitoring program.

The project team notes that implementation of the exception, as presented in LRA Appendix B. Section B.3.1, may eliminate all locations identified in NUREG/CR-6260 from the plant-specific fatigue monitoring program. This is a potentially significant departure from the guidance in GALL AMP X.M1, and will require a detailed technical justification for each location not subject to fatigue monitoring.

Therefore, the applicant is requested to (1) specifically identify which, if any, of the locations identified in NUREG/CR-6260 will be subject to fatigue monitoring; and (2) provide a detailed technical justification for excluding each location that will not be subject to fatigue monitoring. In its response to (2), the applicant is requested to address how it will accomplish the objectives of the NUREG/CR-6260 recommendations, for each location that will not be subject to fatigue monitoring.

AQ B.3.1-1 Response [3]

The BSEP Fatigue Monitoring Program will be enhanced to monitor fatigue for each of the six locations from NUREG/CR-6260 applicable to the older-vintage General Electric plants, considering reactor water environmental effects. There will no longer be an exception to GALL Program Element 5-1 for Monitoring and Trending. Since each of the NUREG/CR-6260 locations will be monitored, this question is not applicable.

This response results in a change to the description of the program in LRA, Appendix A, Section A.1.1.28. The updated description reads:

> The Reactor Coolant Pressure Boundary (RCPB) Fatigue Monitoring Program includes preventive measures to mitigate fatigue cracking caused by anticipated cyclic strains in metal components of the reactor coolant pressure boundary. This is accomplished by monitoring and tracking the significant thermal and pressure transients for limiting reactor coolant pressure boundary components in order to prevent the fatigue design limit from being exceeded. The Program addresses the effects of the reactor coolant environment on component fatigue life by including, within the Program scope, environmental fatigue evaluations of the sample locations specified in NUREG/CR-6260, "Application of NUREG/CR-5999, Interim Fatigue Curves to Selected Nuclear Power

Plant Components," for older-vintage BWRs. This Program is consistent with the corresponding Program described in NUREG-1801.

Prior to the period of extended operation, the Program will be enhanced to: (1) expand the Program scope to include an evaluation of each reactor coolant pressure boundary component included in NUREG/CR-6260, (2) provide preventive action requirements including requirement for trending and consideration of operational changes to reduce the number or severity of transients affecting a component, (3) include a requirement to reassess the locations that are monitored considering the RCPB locations that were added to the Program scope, (4) specify the selection criterion to be locations with a 60-year CUF value (including environmental effects where applicable) of 0.5 or greater, other than those identified in NUREG/CR-6260, (5) address corrective actions for components approaching limits, with options to include a revised fatigue analysis, repair or replacement of the component, or in-service inspection of the component (with prior NRC approval), and (6) address criteria for increasing sample size for monitoring if a limiting location is determined to be approaching the design limit.

Footnotes:

1. The term Reactor Coolant System pressure boundary was changed to Reactor Vessel and Internals System to employ the system title consistently with the LRA and to avoid confusion with the term Reactor Coolant Pressure Boundary.
2. The statement regarding Torus Spray being occasionally used was deleted; as there are currently no recurring surveillance or operational requirements to use Torus Spray, and this statement added no support for the technical basis or adequacy of the response.
3. The words to be included in Appendix A of the UFSAR were added to the response.
4. ASTM Standard D975-00 was changed to D975-04. The latter standard refers to the use of ASTM Standard D6217-98, which is discussed in the response.
5. A commitment to provide the program to the NRC for approval prior to the period of extended operation was deleted. This additional commitment is not a necessary part of the review process.

Brunswick Steam Electric Plant (BSEP) License Renewal Commitments, Revision 1		
License Renewal Commitment Subject	**LRA, Appendix A, Section**	**Scope of Commitment**
Quality Assurance (QA)	A.1.1	Prior to the period of extended operation, the elements of corrective action, confirmation process, and administrative controls in the BSEP QA Program will be applied to required aging management activities for both safety related and non-safety related structures and components subject to aging management review.
Flow-Accelerated Corrosion (FAC) Program	A.1.1.5	Prior to the period of extended operation, the BSEP FAC susceptibility analyses will be updated to include additional components potentially susceptible to FAC.
Bolting Integrity Program	A.1.1.6	Prior to the period of extended operation, a precautionary note will be added to plant bolting guidelines to limit the sulfur content of compounds used on bolted connections.
Open-Cycle Cooling Water System Program	A.1.1.7	Prior to the period of extended operation, the Open-Cycle Cooling Water System Program will be enhanced to require that: (1) Program scope include portions of the Service Water (SW) System credited in the Aging Management Review, including non-safety related piping, (2) the Residual Heat Removal (RHR) Heat Exchangers will be subject to eddy current testing with results compared to previous testing to evaluate degradation and aging, (3) A representative sampling of SW Pump casings be inspected, (4) Program procedures be enhanced to include verification of cooling flow and heat transfer effectiveness of SW Pump Oil Cooling Coils, inspections associated with SW flow to the Diesel Generators (including inspection of expansion joints), and inspection and replacement criteria for RHR Seal Coolers, and (5) Piping inspections will include locations where throttling or changes in flow direction might result in erosion of copper-nickel piping.
Closed-Cycle Cooling Water System Program	A.1.1.8	Prior to the period of extended operation, Closed-Cycle Cooling Water System Program activities will be enhanced to assure that Preventive Maintenance activities include inspections of DG combustion air intercoolers and heat exchangers.
Inspection of Overhead Heavy Load and Light Load Handling	A.1.1.9	Administrative controls for the Program will be enhanced, prior to the period of extended operation to: (1) include in the Program all cranes/platforms within the scope of License Renewal, (2) specify an annual inspection frequency for the Reactor Building Bridge Cranes and the Intake Structure Gantry Crane, and every fuel cycle for the Refuel Platforms, (3) allow use of maintenance crane inspections as input for the condition monitoring of License Renewal cranes, (4) require maintenance inspection reports to be forwarded to the responsible engineer, and (5) include inspection of structural component corrosion and monitoring crane rails for abnormal wear.
Fire Water System Program	A.1.1.11	Prior to the period of extended operation, Fire Water System Program administrative controls will be enhanced to require assessing results from the initial 40-year service life tests and inspections to determine whether a representative sample of such results has been collected and whether expansion of scope and use of alternate test/inspection methods are warranted.
Aboveground Carbon Steel Tanks Program	A.1.1.12	The Aboveground Carbon Steel Tanks Program is a new aging management program that will be implemented prior to the period of extended operation.

Brunswick Steam Electric Plant (BSEP) License Renewal Commitments, Revision 1		
License Renewal Commitment Subject	**LRA, Appendix A, Section**	**Scope of Commitment**
Fuel Oil Chemistry Program	A.1.1.13	Prior to the period of extended operation: (1) Fuel Oil Chemistry Program administrative controls will be enhanced to add a requirement to trend data for water and particulates, (2) the condition of the in-scope fuel oil tanks will be verified by means of thickness measurements under the One-Time Inspection Program, and (3) an internal inspection of the Main Fuel Oil Storage Tank will be performed under the One-Time Inspection Program.
Reactor Vessel Surveillance Program	A.1.1.14	The Reactor Vessel Surveillance Program will be enhanced to ensure that any additional requirements that result from the NRC review of Boiling Water Reactor Vessel Internals Program (BWRVIP)-116 are addressed prior to the period of extended operation.
One-Time Inspection Program	A.1.1.15	This is a new aging management program that requires procedural controls for implementation and tracking of One-Time Inspection Program activities. The One-Time Inspection Program will be implemented prior to the period of extended operation.
Selective Leaching of Materials Program	A.1.1.16	The Selective Leaching of Materials Program is a new aging management program that requires a sample population of susceptible components to be selected for inspection. The Selective Leaching of Materials Program will be implemented prior to the period of extended operation.
Buried Piping and Tanks Inspection Program Revised commitment	A.1.1.17	The Buried Piping and Tanks Inspection Program is a new aging management program that will be implemented prior to the period of extended operation and will include procedural requirements to (1) ensure an appropriate as-found pipe coating and material condition inspection is performed whenever buried piping within the scope of the Buried Piping and Tanks Inspection Program is exposed, or, as a minimum, once every 10 years, (2) add precautions concerning excavation and use of backfill to the excavation procedure to include precautions for License Renewal piping, (3) add a requirement that coating inspection shall be performed by qualified personnel to assess its condition, and (4) add a requirement that a coating engineer or other qualified individual should assist in evaluation of any coating degradation noted during the inspection.
ASME Section XI, Subsection IWF Program	A.1.1.20	Prior to the period of extended operation, the ASME Section XI, Subsection IWF Program will be enhanced to include the torus vent system supports within the scope of the Program.
Masonry Wall Program	A.1.1.22	Prior to the period of extended operation, the administrative controls for the Masonry Wall Program will be enhanced to require inspecting all accessible surfaces of the walls for evidence of cracking.

Brunswick Steam Electric Plant (BSEP) License Renewal Commitments, Revision 1		
License Renewal Commitment Subject	**LRA, Appendix A, Section**	**Scope of Commitment**
Structures Monitoring Program Revised commitment	A.1.1.23	Prior to the period of extended operation, the Structures Monitoring Program will be enhanced to: (1) identify License Renewal systems managed by the Program and inspection boundaries between structures and systems, (2) require notification of the responsible engineer regarding availability of exposed below-grade concrete for inspection and require that an inspection be performed, (3) identify specific license renewal commodities and inspection attributes, (4) require responsible engineer review of groundwater monitoring results, (5) specify that an increase in sample size for component supports shall be implemented (rather than should be) commensurate with the degradation mechanisms found, (6) improve training of system engineers in condition monitoring of structures, (7) include inspections of the submerged portions of the Service Water Intake Structure on a frequency not to exceed five years, (8) specify an annual groundwater monitoring inspection frequency for concrete structures, and (9) specify the inspection frequency for the Service Water Intake Structure and Intake Canal to not exceed five years. Following enhancement, the Structures Monitoring Program will be consistent with the corresponding program described in NUREG-1801.
Protective Coating Monitoring an Maintenance Program	A.1.1.24	Prior to the period of extended operation, the Protective Coating Monitoring an Maintenance Program administrative controls will be enhanced to: (1) add a requirement for a walk-through, general inspection of containment areas during each refueling outage, including all accessible pressure-boundary coatings not inspected under the ASME Section XI, Subsection IWE Program, (2) add a requirement for a detailed, focused inspection of areas noted as deficient during the general inspection, (3) assure that the qualification requirements for persons evaluating coatings are consistent among the Service Level I coating specifications, inspection procedures, and application procedures, and meet the requirements of ANSI N 101.4, "Quality Assurance for Protective Coatings Applied to Nuclear Facilities," and (4) document the results of inspections and compare the results to previous inspection results and to acceptance criteria.
Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	A.1.1.25	The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new aging management program that will be implemented prior to the period of extended operation.
Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program	A.1.1.26	The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new aging management program that will be implemented prior to the period of extended operation.

Brunswick Steam Electric Plant (BSEP) License Renewal Commitments, Revision 1		
License Renewal Commitment Subject	**LRA, Appendix A, Section**	**Scope of Commitment**
Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	A.1.1.27	The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new aging management program that will be implemented prior to the period of extended operation.
Reactor Coolant Pressure Boundary (RCPB) Fatigue Monitoring Program Revised commitment	A.1.1.28	Prior to the period of extended operation, the Program will be enhanced to: (1) expand the Program scope to include an evaluation of each reactor coolant pressure boundary component included in NUREG/CR-6260; (2) provide preventive action requirements including requirement for trending and consideration of operational changes to reduce the number or severity of transients affecting a component, (3) include a requirement to reassess the locations that are monitored considering the RCPB locations that were added to the Program scope, (4) specify the selection criterion to be locations with a 60-year CUF value (including environmental effects where applicable) of 0.5 or greater, other than those identified in NUREG/CR-6260, (5) address corrective actions for components approaching limits, with options to include a revised fatigue analysis, repair or replacement of the component, or in-service inspection of the component (with prior NRC approval), and (6) address criteria for increasing sample size for monitoring if a limiting location is determined to be approaching the design limit.
Reactor Vessel and Internals Structural Integrity Program	A.1.1.30	Prior to the period of extended operation, the Reactor Vessel and Internals Structural Integrity Program will be enhanced to: (1) incorporate augmented inspections of the top guide using enhanced visual examination that will focus on the high fluence region and (2) establish inspection criteria for the VT-3 examination of the Core Shroud Repair Brackets.
Systems Monitoring Program	A.1.1.31	Prior to the period of extended operation, a procedure will be developed to implement: 1) inspection of in-scope License Renewal components for identified aging effects, 2) guidelines for establishing inspection frequency requirements, 3) listing of inspection criteria in checklist form, 4) recording of extent of condition during system walkdowns and 5) addressing of appropriate corrective action(s) for degradations discovered.
Preventive Maintenance (PM) Program	A.1.1.32	Prior to the period of extended operation, preventive maintenance activities will be incorporated into the PM Program, as needed, to satisfy aging management reviews of components that rely on the PM Program for management of aging effects.
Phase Bus Aging Management Program	A.1.1.33	The Phase Bus Aging Management Program is a new aging management program that will be implemented prior to the period of extended operation.

Brunswick Steam Electric Plant (BSEP) License Renewal Commitments, Revision 1		
License Renewal Commitment Subject	**LRA, Appendix A, Section**	**Scope of Commitment**
Fuel Pool Girder Tendon Inspection Program	A.1.1.34	Prior to the period of extended operation, the Fuel Pool Girder Tendon Inspection Program will be enhanced to: (1) specify inspection frequencies, numbers of tendons to be inspected, and requirements for expansion of sample size, (2) identify test requirements and acceptance criteria for tendon lift-off forces, measurement of tendon elongation, and determination of ultimate strength, (3) specify inspections for tendons, tendon anchor assemblies, surrounding concrete, and grease, (4) require prestress values to be trended and compared to projected values, and (5) identify acceptable corrective actions for tendons that fail to meet testing criteria.
Time Limited Aging Analysis (TLAA) – Core Plate Plug Spring Stress Relaxation	A.1.2.1.7 A.1.1.30	Management of Core Plate Plug Spring Stress Relaxation will be performed by means of the Reactor Vessel and Internals Structural Integrity Program.
TLAA – Fuel Pool Girder Tendon Loss of Prestress	A.1.2.6 A.1.1.34	Prior to the period of extended operation, a Fuel Pool Girder Tendon Inspection Program will be implemented to assure design basis anchor forces required for the tendons to perform their intended function will continue to be maintained.
TLAA – Torus Component Corrosion Allowance	A.1.2.8 A.1.1.15	Prior to the period of extended operation, measurements are planned, using the One-Time Inspection Program, to verify by volumetric measurements the actual rate of corrosion of the supports and platform steel in the Torus.