May 18, 2005

Mr. Cornelius J. Gannon
Vice President
Carolina Power & Light Company
P.O. Box 10429
Southport, NC 28461-0429

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION (RAIs) FOR THE REVIEW OF THE BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MC4639 AND MC4640)

Dear Mr. Gannon:

By letter dated October 18, 2004, Carolina Power & Light Company, (CP&L, or the applicant) submitted an application pursuant to 10 CFR Part 54, to renew the operating licenses for Brunswick Steam Electric Plant, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC). The NRC staff is reviewing the information contained in the license renewal application (LRA) and has identified, in the enclosure, areas where additional information is needed to complete the review.

These RAIs were discussed with your staff, Mike Heath, and a mutually agreeable date for this response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-2783 or e-mail SKM1@nrc.gov.

Sincerely,

/RA./

Sikhindra K. Mitra, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-325 and 50-324

Enclosure: As stated

cc w/encls: See next page

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DISTRIBUTION: Letter to C. Gannon, Re: RAI for review of the Brunswick Steam Electric Plant, Dated: May 18, 2005

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2.3.2.7 Standby Gas Treatment System (SGTS)

RAI 2.3.2.7-1

Brunswick Steam Electric Plant, Units 1 and 2 SGTS is described in LRA Section 2.3.2.7 and on LRA Drawings F-40073-LR, Sheet 3 (BSEP, Unit 1), F-04073-LR, Sheet 3 (BSEP, Unit 2), and Common LRA Drawings D-04104-LR and F-02314-LR (BSEP, Units 1 and 2), LRA Table 2.3.2-6, "Component/Commodity Groups Requiring Aging Management Review and Their Intended Functions: Standby Gas Treatment System," and LRA Table 3.2.2-6, "Engineered Safety Features – Summary of Aging Management – Evaluation Standby Gas Treatment System (SGTS)." However, these documents do not contain all the components of the SGTS as highlighted on the drawings. For example, while the tables list duct work (equipment frames and housing), filters (housing and supports), filters (elastomers seals), etc., they do not list exhaust fan housings, valve bodies, and screens for exhaust and intake structure(s), just to name a few. Clarify whether these components and all other applicable components of the system, are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an Aging Management Review (AMR) in accordance with 10 CFR 54.21(a)(1). If these components are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

2.3.3.29 Heating, Ventilation, and Air Conditioning Service Water Intake Structure (HVAC SWIS)

RAI 2.3.3.29-1

LRA Section 2.3.3.29, "HVAC Service Water Intake Structure," states as follows:

- The HVAC Service Water Intake Structure (SWIS) consists of two 100%-capacity independent ventilation systems (one for each unit). Each independent system contains discharge fans, discharge dampers, associated electrical equipment, instrumentation and controls, and supply air openings with bird screens.

- The HVAC SWIS is in the scope of License Renewal, because it contains components that are safety-related and are relied upon to remain functional during and following design basis events.

- The system is necessary to control the environment in safety-related equipment areas so that contained safety-related equipment can perform its safety-related function.

However, the applicant chose not to provide applicable LRA drawing(s) and LRA table(s) for the HVAC SWIS described in LRA Section 2.3.3.29. The licensee stated that the fans are not ducted and do not have an associated pressure boundary.

The HVAC SWIS provides a safety-related cooling function (for the intake structure) to control the environment in safety-related equipment areas so that contained safety-related equipment

can perform its safety-related function. Clarify whether system discharge fans and associated housings, discharge dampers and associated housings, and supply air openings with bird screens should be within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1). If they are, they should be included in appropriate LRA tables. If they are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

2.5 Scoping and Screening Results - Electrical and I & C Systems

RAI 2.5-1

In this section you have stated that the assessment of electrical racks, panels, cabinets, cable trays, conduit and their supports is documented in Section 2.4. However, it is not clear to the staff why these components are not included in an aging management program (AMP). Please clarify.

2.5.1 Electrical and I & C Component Commodity Groups

RAI 2.5.1-1

It is not clear to the staff why electrical racks, panels, cabinets, junction boxes, switchyard bus connections and transmission conductors connections are not included in the Electrical I&C component commodity groups table. Please clarify.

2.1.4.2 ISG-2 Station Blackout (SBO) Scoping

RAI 2.1.4.2-1

a. Are there any underground power circuits used in the station blackout (SBO) recovery paths? If so, were they identified as requiring an AMR? If not, please explain.

b. Provide a detailed description of the SBO recovery path.

c. Is motor operated disconnect (MOD) qualified as a first breaker in the SBO recovery path?

3.1.2.1.1 Reactor Vessel and Internals

RAI 3.1.2.3.1.1-1

LRA Table 3.1.2-1 identifies reduction of fracture toughness due to neutron irradiation embrittlement as AMR entries only for the following RV beltline materials:

a. RV Shell (Intermediate Beltline Shell)
b. RV Shell (Beltline Welds)

In contrast, Tables 4.2-5 and 4.2-6 of the LRA indicate that the following RV beltline components are within the scope of the staff's TLAAs on neutron irradiation embrittlement of RV base metal and weld materials:

a. RV Lower Shell Plates
b. RV Lower Intermediate Shell Plates
c. RV Beltline Vertical (Axial) Welds
d. RV Beltline Girth (Circumferential) Welds
e. N–16 A and B Instrumentation Nozzle Forgings

The AMRs in LRA Table 3.1.2-1 currently only list AMRs on reduction in fracture toughness/neutron irradiation embrittlement as being applicable to the "RV intermediate beltline shell plates" and the "RV beltline welds."

Part A: Confirm that the term RV "Lower Intermediate Shell" identified in LRA Tables 4.2-5 and 4.2-6 refers to the same RV shell course as the commodity group term "RV Shell (Intermediate Beltline Shell)" used in LRA Table 3.1.2-1.

Part B: Justify why "reduction of fracture toughness due to neutron irradiation embrittlement" has been omitted as an applicable aging effect in LRA Table 3.1/2-1 for the "Vessel Shell (Lower Shell)" plates when you have identified it and analyzed it as an applicable aging effect for these components in Tables 4.2-5 and 4.2-6 of the LRA. In addition, justify why "reduction of fracture toughness due to neutron irradiation embrittlement" has been omitted as an applicable aging effect In LRA Table 3.1/2-1 for the BSEP-1/2 N-16 instrumentation nozzles when you have identified it and analyzed it as an applicable aging effect for these components in Tables 4.2-5 and 4.2-6 of the LRA. If these are omissions in the application, submit supplemental AMR line entries on "reduction of fracture toughness due to neutron irradiation embrittlement" of the "RV Shell (Lower Shell)" plates and the "N-16 instrumentation nozzles" that, with the exception of the component names, are identical to that provided for "reduction of fracture toughness due to neutron irradiation embrittlement" of the "RV Shell (Intermediate Beltline Shell)" plates.

RAI 3.1.2.3.1.2-1

Table 3.1.2-1 of the BSEP-1/2 LRA includes an AMR on loss of preload due to stress relaxation in the nickel-based alloy core plate plugs. To be consistent with the TLAA that is discussed in Section 4.2.8 of the BSEP-1/2 LRA, the staff requests confirmation that the AMR on loss of preload due to stress relaxation in the nickel-based alloy core plate plugs is applicable to only the spring-loaded core plate plugs at BSEP-2, and that the core plate plugs at BSEP-1 are fabricated from stainless steel and involve a welded design.

RAI 3.1.2.3.1.2-2

Table 3.1.2-1 of the BSEP-1/2 LRA includes an AMR on cracking of the low alloy steel RV drain line penetrations. In this AMR line item, CP&L identified that the cracking was due to cyclical loading. CP&L did not identify that stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC) were applicable aging mechanisms that could potentially induce cracking in the low alloy steel RV drain line penetrations. Industry experience has

demonstrated the SCC and/or IGSCC are concerns for nickel-based alloy weld filler metals. The staff is concerned that cracking due to SCC or IGSCC could be an aging effect requiring management (AERM) for the RV drain line penetrations if the drain lines are joined to the RVs using nickel-based alloy weld filler metals. Confirm whether or not the structural welds for the low alloy steel RV drain line penetrations are fabricated from nickel-based alloy weld filler metals, and if so, provide your basis for concluding that cracking due to SCC or IGSCC is not an AERM for these weld filler metal materials. If the low alloy steel RV drains lines are joined to the RVs using nickel-based alloy weld filler metals and cracking due to SCC or IGSCC is determined to be an AERM for these materials, supplement your LRA to include an AMR on cracking of these components as a result of SCC/IGSCC and identify in the AMR which AMP will be used to monitor for these aging mechanisms. If cracking due to SCC/IGSCC is an AERM for the RV drain line structural welds and is within the scope of an NRC-approved BWRVIP report, identify which NRC-approved BWRVIP Topical Reports is applicable to the assessment of this AERM. Otherwise, clarify how the AMP credited with aging management will be capable of managing SCC or IGSCC in the structural welds for the RV drain lines during the periods of extended operation for BSEP-1/2.

RAI 3.1.2.3.3-1

Table 3.1.2-1 of the BSEP-1/2 LRA includes an AMR on nozzle safe end (Unit 2 Feedwater), piping and fittings (Main Steam, Feedwater, and Vessel head Vent) that are fabricated from carbon steels but connected to stainless steel or nickel alloy components. In the AMR line items, CP&L identified that the cracking was due to cyclical loading. CP&L did not identify that stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC) are applicable aging mechanisms in these components where there are stainless steel and nickel-based alloy welds. Industry experience has demonstrated that SCC and/or IGSCC are concerns for these weld materials. Confirm whether or not the structural welds for these components are fabricated from stainless steel or nickel-based alloy weld filler metals, and if so, provide your basis for concluding that cracking due to SCC or IGSCC is not an aging effect requiring management (AERM) for these weld filler metal materials.

If cracking due to SCC/IGSCC is an AERM for these components and is within the scope of an NRC-approved BWRVIP report or reports, identify which NRC-approved BWRVIP Topical Report(s) is (are) applicable to the assessment of this AERM., clarify how the AMP credited with aging management will be capable of managing SCC or IGSCC in these components during the periods of extended operation for BSEP-1/2.

RAI 3.1.2.3.3-2

Table 3.1.2-1 of the BSEP-1/2 LRA includes an AMR on nozzle safe end (Unit 1 Feedwater) that were a replacement of an original safe end that cracked. In the footnote, CP&L stated that, “previously there had been a gap between the nozzle and its thermal sleeve that appeared to be related to feedwater sparger cracking.” Please identify if Unit 2’s safe end is still of the original design with a gap that may prone to promote cracking. Identify if additional inspection, in addition to Section XI ISI requirements, may be needed.

RAI 3.1.2.3.3-3

Tables 3.1.2-1, 3.1.2-2, 3.1.2-3, 3.1.2-4, 3.1.2-5 and 3.3.2-1 of the BSEP-1/2 LRA include class 1 small bore piping and fittings. For the associated aging effects, CP&L identified Section XI Inservice Inspection (ISI) and Water Chemistry as the AMPs. However, the applicant did not identify any of these items for a one time inspection. Please provide technical bases that no additional inspection is needed, other than those required by Section XI, for the periods of extended operation for BSEP-1/2.

RAI 3.1.2.3.3-4

Table 3.1.2-4 of the BSEP-1/2 LRA includes CRD gearbox coolers made with carbon steel that are exposed to a lube oil environment. In the AMR line items, CP&L did not identify any aging mechanisms. Previous licensee renewal review and industry experience have demonstrated that loss of material and cracking, and reduction of heat transfer for coolers, are applicable aging effects for carbon steel components in a lube oil environment. Clarify if these aging effects are applicable to the carbon steel components in the CRDM gear box coolers that are exposed to lube oil. If any of these aging effects are applicable AERMs, propose aging management activities or programs to manage the applicable aging effects.

3.6 Aging Management of Electrical and Instrumentation and Control

RAI 3.6.2.3-1

With regards to BSEP AMP B.2.31, "Phase Bus Aging Management Program," provide the following:

a. Describe what portions of the iso-phase bus, non-segregated phase buses (4.16KV and 480V) within the scope of License Renewal are included in the scope of this AMP.

b. Under Element 3, you have stated that a sample of accessible bolted connections will be checked for adequate torque. Bolted connections covered with heat shrink tape, sleeving, insulation boots, etc., are inaccessible and are not covered by this activity. This program will also inspect the bus enclosure for cracks, corrosion, foreign debris, excessive dust build up, and evidence of water intrusion.

    1. Clarify if this inspection will cover inside of the bus enclosure for foreign debris, excessive dust build up, and evidence of water intrusion. Does plant specific structure monitoring program inspect the external of the bus ducts for corrosion and bus duct seals for cracking?

    2. Vendors and bolting practices do not typically recommend to re-torque of bolted connections unless the joint requires service or the bolted connections are clearly loose. The torque required to turn the fastener in the tightening direction (restart torque) is not a good indication of the preload once the fastener is in service. Due to relaxation of the parts of

the joint, the final loads are likely to be lower than the installed loads. Provide a technical justification detailing how retorquing of bolted connections is a good indicator of the preload once the fastener is in service. The Acceptance Criteria (Element 6) needs to be modified accordingly.

3. You have stated that bolted connections covered with heat sink tape, sleeving, insulating boots, etc., are inaccessible and are not covered by this activity. Provide another method for detecting bolted connection loosening due thermal cycling or provide a technical justification of why inaccessible bolted connections are not subject to thermal cycling.

RAI 3.6.2.3-2

Address AMR for metals and inorganic materials (such as cable fillers, epoxies, potting compounds, connector pins, plugs, and facial grommets) associated with non-EQ electrical/I&C penetration assemblies.

RAI 3.6.2.3-3

Various airborne materials such as dust, salt and industrial effluent can contaminate insulator surfaces. A large buildup of contamination enables the conductor voltage to track along the surface more easily and can lead to insulator flash over. Surface contamination can be problem in areas where there are greater concentration of airborne particles such as near facilities that discharge soot or near the sea coast where salt spray is prevalent. Industry operating experience identified the potential of loss of offsite power due to salt contamination of switchyard insulators at other plants beside BSEP. On March 17, 1993, Crystal River Unit 3 experienced a loss of the 230 kV switchyard (normal off-site power to safety-related busses) when a light rain caused arcing across salt-laden 230 kV insulators and opened breakers in switchyard. Since 1982, Pilgrim station has also experienced several loss of offsite power events when heavy ocean storms deposited salt on the 345 kV switchyard causing the insulator to arc to ground. In light of these industry operating experiences, provide an AMP to manage the aging effects of insulator or provide a justification of why an AMP is not necessary.

RAI 3.6.2.3-4

Loss of material due to the corrosion of connections due to surface oxidation is an aging effect for the switchyard bus, switchyard bus connections and transmission conductor connections. Explain why loss of material due to corrosion is not an applicable aging effect for switchyard bus, switchyard bus connections and transmission conductor connections.

RAI 3.6.2.3-5

The most prevalent mechanism contributing to loss of high voltage transmission conductor strength is corrosion which includes corrosion of steel core and aluminum strand pitting. Provide a technical basis for why the loss of conductor strength due to corrosion of ACSR transmission conductor is a slow process and therefore is not significant.

RAI 3.6.2.3-6

Torque relaxation for bolted connections is a concern for switchyard bus connections and transmission conductor connections. An electrical connection must be designed to remain tight and maintain good conductivity through a large temperature range. Meeting this design requirement is difficult if the material specified for the bolt and the conductor are different and have different rates of thermal expansion. For example, copper or aluminum bus materials expand faster than most bolting materials. If thermal stress is added to stresses inherent at assembly, the joint members or fasteners can yield. If plastic deformation occurs during thermal loading (i.e., heat up) when the connections cools, the joint will be loose. Provide a discussion why torque relaxation for bolted connections of switchyard bus and transmission conductor connections is not a concern.

RAI 4.2.1-1

In the License Renewal Application (LRA) for the Brunswick Steam Electric Station, Units 1 and 2 (BSEP-1/2), Carolina Power and Light Company (CP&L) establishes that the number of effective full power years (EFPY) in the projected 60-year design basis is 54 EFPY. Clarify how the current historical capacity factors for the current operating terms and the projected capacity factors for the periods of extended operation for BSEP-1/2 establish 54 EFPY as a reasonable conservative estimate of the capacity factor..

AMP B.2.28 Reactor Vessel and Internals Structural Integrity Program (RV&ISIP)

RAI B.2.28-1

[Scope of Program] Program Attribute: In Table 3.1.2-1 of the LRA for BSEP-1/2, CP&L credits the Reactor Vessel and Internals Structural Integrity Program (henceforth in the RAIs for this aging management program abbreviated as the RV&ISIP) with the management of aging effects requiring management (henceforth referred to as AERMs in the RAIs for this AMP) for the following RV and RV internal components:

- vessel shell attachment welds
- feedwater nozzles and their thermal sleeves
- vessel instrumentation penetrations
- standby liquid control penetrations
- flux monitor penetrations
- RV drain line penetration
- low pressure core spray line thermal sleeves
- core shroud shell (including upper, middle, and lower shell components)
- core shroud access hole covers
- core shroud repair hardware
- core plates and their bolts
- core spray line nozzle thermal
- jet pump instrument penetrations
- jet pump assembly components, including thermal sleeves, inlet headers, riser brace arms, hold down beams, inlet elbows, mixing assemblies, diffusers, castings, sensing lines, and fastener components (hold own beam keeper, lock plate, and bolts)
- fuel support and CRD assembly components, including orifice fuel support and CRD housings

- core plate plugs (welded plugs at BSEP-1 and spring-loaded plugs at BSEP-2)
- core shroud support structure
- top guide
- core spray line headers, nozzles, spargers, and spray-rings
- flux monitor dry tubes, including those for the source range monitors, intermediate range monitors,
- steam dryers (non-safety)
- shroud head and separators (non-safety)
- feedwater spargers (non-safety)
- RV surveillance capsule holder (non-safety)

In addition, Table B.2.28-1 on the following page provides a list of Boiling Water Reactor Vessel and Internals Project (BWRVIP) Topical Reports that are applicable to the RV and RV internal components at BSEP-1/2. CP&L's [*Scope of Program*] program attribute for the RV&ISIP does not identify which RV and RV internal components are within the scope of the RV&ISIP or which additional BWRVIP topical report guidelines (i.e., in addition to BWRVIP-74-A and BWRVIP-94) are within the scope of the RV&ISIP relative to the management of AERMs in these components. Provide the following clarifications with respect to the [*Scope of Program*] program attribute for the RV&ISIP:

a. Confirm that the RV and RV internal components provided in the bulleted list are within the scope of the RV&ISIP. Identify any additional RV or RV internal components that are within the scope of the RV&ISIP that have not been included in the list of components for this RAI.

b. Identify all BWRVIP and Boiling Water Reactor Owners Group (BWROG) Topical Report Guidelines (i.e., in addition to Topical Report Nos. BWRVIP-74-A and BWRIP-94) that are within the scope of RV&ISIP and clarify which RV and/or RV internals components are within the scope of the applicable BWRVIP/BWROG guidelines. For those BWRVIP Topical Reports in Table B.2.28-1 that are currently under the NRC's review and are pending NRC approval, discuss the process that will be taken by CP&L to endorse the report as being applicable to BSEP-1/2 once the reports have been approved and endorsed by the NRC.

c. The [Scope of Program] Program Attribute, in part, states that CP&L will implement the RV&ISIP and the applicable BWRVIP Guidelines within the scope of the AMP in accordance with BWRVIP-94. Section 3.5 of BWRVIP-94 includes the following guidance on implementing exceptions or deviations to BWRVIP Guideline recommendations:

"Each utility will inform the NRC of any decision to not fully implement a BWRVIP guideline approved by the NRC staff within 45 days of the report approval."

"The NRC should be notified if changes are made to the vessel and internals program that affect implementation of the BWRVIP guidelines."

"Flaw evaluations that deviate from guidance in BWRVIP reports shall be submitted to the NRC for approval."

Confirm that these BWRVIP-94 recommendations are within the scope of the RV&ISIP and the

scope of your responses to Applicant Action Item (AAI) No. 1 on Topical Report Numbers. BWRVIP-74-A, -18, -25, -26, -27, -38, -41, -47, -48, and -49.

Table B.2.28-1

Component	Reference	SER Date	SER Accession Nos.
Reactor Vessel (RV) Components	BWRVIP-74-A	10/18/01	ML012920549
Core Shroud Support and Attachments	BWRVIP-38	03/01/01	ML010600211
Core Shroud	BWRVIP-76	Under Review	N/A
Nozzle Safe Ends and Piping	BWRVIP-75	09/15/00	ML003751105
Core Support Plate	BWRVIP-25	12/07/00	ML003775989
Core ΔP/SLC Line and Nozzle	BWRVIP-27	12/20/99	ML993630179
Core Spray, Jet Pump Riser Brace, and Other Attachments	BWRVIP-48	01/17/01	ML010180493
Core Spray Lines and Spargers	BWRVIP-18	12/07/00	ML003775973
Top Guide	BWRVIP-26	12/07/00	ML003776110
Jet Pump Assemblies	BWRVIP-41	05/01/01	ML011310322
CRDH Stub Tubes and Guide Tubes and ICM Housing Guide Tubes and Penetrations	BWRVIP-47	12/07/00	ML003775765
Instrument Penetrations	BWRVIP-49	03/13/02	Fiche A9153/241-253

RAI B.2.28-2

Preventative Actions Program Attribute: The program attribute identifies that the control of water chemistry quality (maintaining high water quality) is used to reduce the susceptibility of the RV and RV internal components to stress corrosion cracking (including intergranular stress corrosion cracking) and is accomplished through implementation of the latest BWRVIP Guidelines on water chemistry control. Confirm that control of water chemistry quality is also used to reduce the susceptibility of the RV and RV internal components to loss of material by general corrosion, pitting corrosion, and crevice corrosion. Identify (reference), by title and report number, which water chemistry guidelines will be used for mitigation of these corrosion-induced aging mechanisms in the RV and RV internal components. The scope of this RAI response is also applicable to the applicant's response to Applicant Action Item (AAI) No. 6 on Topical Report BWRVIP-74-A.

RAI B.2.28-3

Detection of Aging Effects and Monitoring and Trending Program Attributes: The program attributes states that CP&L will inspect the RV and RV internal components using a combination of visual, surface, and ultrasonic examination techniques, and that the examination methods and frequencies will be consistent with applicable BWRVIP Guideline Reports and, for feedwater nozzles, the BWROG "Alternate BWR Feedwater Nozzle Inspection" Report. The RV&ISIP also states that CP&L will conduct augmented inspections of the BSEP-1/2 top guides in accordance with the recommendations of BWRVIP-26 and that the inspections of the top guides will be similar to the enhanced inspections that are proposed for the control rod drive housing (CRDH) guide tubes. CP&L's program for the CRDH guide tubes calls for an enhanced VT-1 inspection of a 10% sample of the CRDH guide tubes within 12 years, with half of these inspections (5%) being completed within six years. Confirm that the augmented inspections of the top guides will be performed in accordance with Topical Report BWRVIP-26, as approved by the staff in its FSER of December 7, 2000, and that the sample size attributes on the enhanced VT-1 examinations of the BSEP-1/2 top guide structures are in terms of percent of exposed area for examination. Clarify what the sample size and inspection frequency will be for the enhanced VT-1 examinations of the top guides at BSEP-1/2. Clarify whether the selection of top guide locations for inspection will be based on those that are projected to have the highest projected neutron fluence values (E $ 1.0 MeV) at the expiration of the periods of extended operation, or if another basis is being used to top guide location selection, clarify what it is. If any of the information in your response to this question is proprietary in content, identify which data or information is considered to proprietary in content, and, pursuant to the withholding criteria of 10 CFR 2.390, submit a proprietary affidavit on the data or information that is considered to be proprietary in content. The response to this RAI is also applicable to the CP&L's response to AAI No. 4 of BWRVIP-26, as defined in Table 4 of the RV&ISIP.

RAI B.2.28-4

Detection of Aging Effects and Monitoring and Trending Program Attributes: In CP&L Serial Letter No. BSEP-00-0069, dated June 23, 2000, CP&L indicated that it inspects 25 percent of the BSEP core shroud repair clamps (bracket assemblies) during scheduled refueling outages for the units. This differs from the recommended sample size for repair assemblies in Proprietary Topical Report BWRVIP-76 (i.e., Proprietary EPRI Topical Report No. TR-114232, "BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines" [BWRVIP-76].). State whether CP&L is committed to continue its practice of performing augmented inspections of the core shroud repair clamps (bracket assemblies) in each unit during the scheduled refueling outages in the periods of extended operation, and if so, identify what type of inspection methods, sample size and inspection frequency will be used for the augmented inspection of the core shroud repair clamps during the periods of extended operation for BSEP-1/2. If the inspection method(s), sample sizes, or inspection frequency will be different from the inspection method, sample size, or inspection frequency in BWRVIP-76, justify how the alternatives to BWRVIP-76 recommendations will continue to provide assurance of the integrity of core shroud repair clamps during the periods of extended operation for BSEP-1/2. If any of the information in your response to this question is proprietary in content, identify which data or information is considered to proprietary in content, and, pursuant to the withholding criteria of 10 CFR 2.390, submit a proprietary affidavit on the data or information that is considered to be proprietary in content.

RAI B.2.28-5

Detection of Aging Effects and Monitoring and Trending Program Attributes: In Section 4.2.8 of the BSEP-1/2 LRA, CP&L's states that the RV&ISIP will be used to manage loss of preload/stress relaxation in the spring-loaded core plate plugs at BSEP-2. The Detection of Aging Effects and Monitoring and Trending program attributes did not discuss how the RV&ISIP will be used to manage loss of preload/stress relaxation in the spring-loaded core plate plugs. Discuss how the RV&ISIP will capable of managing loss of preload/stress relaxation in the spring-loaded core plate plugs. In particular, discuss what type of inspection method, inspection qualifications, inspection sample size, and inspection frequency will be used for the examinations of the spring-loaded core plate plugs at BSEP-2. If a particular BWRVIP Guideline Report will be implemented for the examinations of the spring-loaded core plate plugs, reference the report that is applicable to the examinations of the core plate plugs. If any of the information in your response to this question is proprietary in content, identify which data or information is considered to proprietary in content, and, pursuant to the withholding criteria of 10 CFR 2.390, submit a proprietary affidavit on the data or information that is considered to be proprietary in content.

RAI B.2.28-6

Part A and B - on the [Detection of Aging Effects] and [Monitoring and Trending] Program Attributes for the RV&ISIP: In CP&L's response to NRC Audit Question 3.1-2, as given in CP&L Serial Letter No. BSEP 05-0041, dated March 14, 2005, CP&L provided the following clarification of its management strategy for the welded access hole covers (AHCs):

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 Owners Group, Boiling Water Reactor Vessel and Internals (BWRVIP) documents.

b. The procedures that implement the Reactor Vessel and Internals 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.

In Item (b) of the response to th Audit Question 3.1-2, CP&L indicates that an enhanced VT-1 visual examination technique may be an acceptable technique for detecting and monitoring for cracks in the crevice region of welded AHCs; yet the staff's AMR discussion in GALL

Commodity Group line item IV.B1.1-b states that visual inspection techniques are not capable of detecting cracks that could initiate in the crevice regions of welded AHCs. In Item C. of the applicant's response to the audit question, CP&L also indicates that the RV&ISIP and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program are equivalent. While the staff would concur that the RV&ISIP incorporates all of the applicable ASME Section XI inspections for the RV and RV internal components, the RV&ISIP also incorporates additional augmented inspections that are recommended by the BWRVIP as industry initiatives and that go beyond those inspections that are required under Table IWB-2500-1 of Section XI of the ASME Code.

Part A: Relative to Item (b) in your response to Audit Question 3.1-2, justify how, contrary to the recommendation in GALL Commodity Group item IV.B1.1-b, an enhanced VT-1 visual examination of the weld in a welded AHC will be capable of detected cracking in the crevice region of the AHC. If an enhanced VT-1 visual examination method is determined to be an insufficient inspection method for detecting cracks in crevice region of a welded AHC, the augmented inspection of the welded AHC should be performed using an acceptable UT technique and the responses to this RAI and NRC Audit Question 3.1-2 will need to be amended to reflect this.

Part B: Relative to Item C in your response to Audit Question 3.1-2, confirm that, although the RV&ISIP incorporates all ISI inspections required for RV and RV internal components under Table IWB-2500-1 of Section XI of the ASME Code, the scope of the RV&ISIP also includes additional augmented inspections that are recommended by the BWRVIP as industry initiatives and is therefore considered to be a more comprehensive inspection program for the RV and RV internals than is the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

Joint RAI B.2.28-7/RAI 3.1.2.3.1.2-3

Parts A and B - on the [Detection of Aging Effects] and [Monitoring and Trending] Program Attributes for the RV&ISIP:

Part A: In CP&L's AMR for the core spray nozzles, as given in LRA Table 3.1.2-1, CP&L identifies that flow blockage is an AERM for the BSEP-1/2 core spray nozzles and credits the RV&ISIP with management of this aging effect. BWRVIP Topical Report No. BWRVIP-18-A, "BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines," as approved in the NRC's FSER of December 7, 2000, provides the BWRVIP's recommended inspections and flaw evaluation methods for RV internal core spray lines and their subcomponents. The NRC-approved topical report focuses on the management of cracking and loss of material in these components, but does not appear to focus on how flow blockage will be managed in core spray nozzles. Identify all aging mechanisms (fouling mechanisms) that are considered to capable of impeding the flow of emergency coolant through the core spray nozzles. Clarify how the RV&ISIP will implemented to detect flow blockage of the core spray nozzles. With respect to this request, identify what type of inspection method will used to detect flow blockage in the core spray nozzles, what sample size of nozzles will be inspection as part of the inspection, and what frequency will be implemented for reinspection of the components. Identify whether CP&L's inspection method for detecting and monitoring for flow blockage is within the scope of Topical Report BWRVIP-18-A, and if not, justify why a plant-specific commitment would not be

necessary for these inspections. In addition, clarify what mitigative programs or activities will be implemented, if any, to mitigate flow blockage in the core spray nozzles.

Part B: The staff has noted that Table 3.1.2-1 of the BSEP-1/2 LRA includes an AMR analysis for the internal non-safety related feedwater spargers. In this AMR, CP&L identifies that cracking and loss of material are AERMs for the internal feedwater spargers. Clarify whether the feedwater spargers are designed with spray nozzles, and if so, provide your justification why flow blockage due to fouling is not an AERM for the non-safety related feedwater sparger nozzles. If flow blockage due to fouling is an AERM for the feedwater sparger nozzles, clarify how the RV&ISIP will implemented to detect flow blockage of the feedwater sparger nozzles. With respect to this request, identify what type of inspection method will used to detect flow blockage in the feedwater sparger nozzles, what sample size of nozzles will be inspection as part of the inspection, and what frequency will be implemented for reinspection of the components. Since aging management of the feedwater sparger and nozzles is not yet within the scope of an NRC-approved BWRVIP Topical Report, justify why a plant-specific commitment would not be necessary for these inspections. In addition, clarify what mitigative programs or activities will be implemented, if any, to mitigate flow blockage in the feedwater sparger nozzles.

RAI B.2.28-8

On the [Detection of Aging Effects] and [Monitoring and Trending] Program Attributes for the RV&ISIP: The staff has determined that, in Table 3.1.2-1 of the LRA, CP&L identifies that cracking due to stress corrosion cracking (SCC) and/or irradiation assisted stress corrosion cracking (IASCC) and loss of materials due to pitting or crevice corrosion are applicable aging effects requiring management (AERMs) for four non-safety related RV internal components: (1) steam dryers, (2) core shroud head and separators, (3) internal feedwater spargers, and (4) the RV surveillance capsule holders. The staff also determined that the applicant has credited the RV&ISIP with the management of these aging effects/aging mechanisms during the periods of extended operation for BSEP-1/2.

Clarify how the RV&ISIP will be used to manage cracking and loss of material that could potentially occur in the non-safety related steam dryers, core shroud headers and separators, the feedwater spargers, and surveillance capsule holders during the periods of extended operation for BSEP-1/2. Include in your discussion what type of inspection method or methods will be used to manage these aging effects, what sample size of the steam dryers (in terms of percent area inspected) will be covered by the examinations, what frequency will be used for re-examination of the steam dryers, and what corrective actions will be taken by BSEP-1/2 if cracking or loss of material is detected in the steam dryers as a result of the examinations. The staff is of the opinion the current set of BWRVIP Topical Reports do not address license renewal aging management strategies/activities for these non-safety related RV internal components. Therefore the staff also requests that the CP&L address the staff's request that a plant-specific commitment be included in the application that the RV&ISIP will be used to manage cracking and loss of material in the non-safety related steam dryers, core shroud headers and separators, the feedwater spargers, and surveillance capsule holders during the periods of extended operation for BSEP-1/2 (Refer to RAI B.2.28-15, Part B).

RAI B.2.28-9

CP&L's Collective Response to Applicant Action Item No. 2 on BWRVIP Topical Report Numbers BWRVIP-74-A, -18, -25, -26, -27, -38, -41, -47, -48, and -49: The staff has confirmed that the applicant has satisfied 10 CFR 54.21(d) by FSAR Supplement summary descriptions for each AMP and TLAA in the LRA, but has only generally commented on the BWRVIP programs that may be invoked as part of these AMPs or TLAAs. To make the response to AAI No. 2 consistent with this determination, the staff recommends that the applicant replace the response with the following sentences:

> "To satisfy the requirements of 10 CFR 54.21(d), the FSAR Supplement for the BSEP-1/2 LRA includes a summary description for each AMP and TLAA that is within the scope of the LRA. Should the scope of a specific AMP or TLAA invoke a specific BWRVIP report as a subset of the AMP or TLAA, the summary description will state that CP&L is an active participant in the BWRVIP programs, and that CP&L will implement the guidelines of the applicable BWRVIP report, as approved in the NRC's final safety evaluation report on the specific BWRVIP guideline."

The change in the response to AAI No. 2 will make the AAI response consistent with the manner in which CP&L has worded its FSAR Supplement summary descriptions to comply with 10 CFR 54.21(d).

RAI B.2.28-10

CP&L's Response to Applicant Action Item No. 4 on BWRVIP Topical Report Number BWRVIP-74-A: Pending the proposed resolution discussed in the staff's conference calls with CP&L dated April 28, 2005, and May 2, 2005, Draft RAI B.2.28-10 has been deleted from the staff's review.

RAI B.2.28-11

Parts A and B - CP&L's Response to Applicant Action Item No. 5 on BWRVIP Topical Report Number BWRVIP-25: In CP&L's response to AAI No. 5 on BWRVIP-25, the applicant stated that an analysis by CP&L determined that only 48 of the 72 rim hold-down bolts in each of the BSEP-1/2 core plates were needed to maintain the structural integrity of the plates. CP&L has stated that it confirms the presence of an adequate number of bolts by performing a UT inspection of the outside diameter of the core support ring. The examination performed by CP&L to maintain the structural integrity of the core plate and rim hold-down bolts is different from that recommended by the BWRVIP in BWRVIP-25. The staff requests that CP&L provide the following additional clarifications relative to the alternative UT examinations that are proposed for the core plate rim hold-down bolts:

Part A: Pursuant to conformance with the criteria of the "Implementation of BWRVIP Documents" process in BWRVIP-94, state whether CP&L's alternative UT examination of the outside diameter of the core support plate has been identified as an alternative to the recommended inspections of core plate rim hold-down bolts, as defined in BWRVIP-25, and whether a justification for the alternative examinations has been approved by the staff. If the UT examinations of the outside diameter of the core support rings have been approved by the

staff as an alternative to the recommended BWRVIP-25 examinations of the core plate rim hold-down bolts, identify which CP&L submittal requested approval of the alternative examination method and which NRC safety evaluation provided the staff's approval of the alternative examination method.

Part B: If CP&L's alternative UT examination method for the core plate rim hold down bolts has not been approved by the NRC as an alternative to the BWRVIP-25 recommendations, clarify, using a sufficient technical basis, how the alternative examinations will be capable of detecting cracking or potential stress relaxation in the BSEP-1/2 core plate rim hold-down bolts and will be capable of achieving the same objective as the recommended examinations for core plate rim hold-down bolts, as defined in BWRVIP-25. Provide a commitment of the LRA that the alternative UT examinations of the core plate rim hold down bolts, as approved by the NRC, from the outside diameter of the core plate will be implemented during the periods of extended operation for BSEP-1/2 (Refer to RAI B.2.28-15, Part B).

RAI B.2.28-12/RAI 4.2-3

CP&L's Response to Applicant Action Item No. 4 on BWRVIP Topical Report Number BWRVIP-26: Pending the proposed resolution discussed in the staff's conference calls with CP&L dated April 28, 2005, and May 2, 2005, Draft Joint RAI B.2.28-12/RAI 4.2-3 has been deleted from the staff's review.

RAI B.2.28-13/RAI 4.3-1

CP&L's Response to Applicant Action Item No. 4 on BWRVIP Topical Report Number BWRVIP-27: In its response to AAI No. 4 on BWRVIP-27 (as given in "Table 5 - BWRVIP-27" of the RV&ISIP), CP&L stated that fatigue of the shroud supports was included as a TLAA in Chapter 4 of the BSEP-1/2 LRA. The BWRVIP issued BWRVIP-27 to provide the U.S. BWR industry with recommended guidelines and flaw evaluation criteria for standby liquid control(SLC)/core ΔP line penetrations to BWR RVs.

The scope of the topical report does not cover core shroud supports. Thus, any response by the applicant to AAI No. 4 on BWRVIP-27 should have been in reference to the need to assess whether a TLAA fatigue analysis is needed for the SLC/core ΔP lines penetrations of the BSEP-1/2 RVs. The staff requests that CP&L provide a revised response to AAI No. 4 on BWRVIP-27 that is relevant to a determination on whether the SLC/core ΔP lines is a fatigue analysis TLAA. If in the revised response, CP&L determines that fatigue of the SLC/core ΔP lines is not a TLAA to the BSEP-1/2, justify the basis for making this conclusion relevant to the definition for a TLAA in 10 CFR 54.3 and to the Section G of staff's Statement of Consideration on 10 CFR Part 54. If CP&L determines that thermal fatigue of the SLC/core ΔP lines is a TLAA, either justify how the CP&L's thermal fatigue analysis, as discussed in Section 4.3 of the LRA, covers the topic of thermal fatigue of the SLC/core ΔP lines, or else supplement TLAA 4.3 to include a thermal fatigue analysis for these lines for the period of extended operation.

RAI B.2.28-14

CP&L's Response to Applicant Action Item No. 4 on BWRVIP Topical Report Number BWRVIP-47: In CP&L's response to AAI No. 4 on BWRVIP-27 (as given in "Table 8 - BWRVIP-47" of the RV&ISIP), CP&L stated that the it did not identify any fatigue-related TLAAs for the RV internal lower plenum components. In Section 3.5 of the staff's license renewal FSER on BWRVIP-47, the staff made the following statement on whether a TLAA on fatigue of the RV internal lower plenum components would be needed in an LRA for a BWR-designed light-water reactor:

> "The BWRVIP-47 report stated that some plants may have lower plenum pressure boundary component fatigue cumulative usage factors (CUF) greater than the 1.0 threshold specified in NUMARC 90-02 for the license renewal term. For these plants, a plant-specific description of how this issue will be addressed will be needed.
>
> The BWRVIP-47 report further stated that, based on the above criteria, there are no generic TLAA issues that require evaluation for the lower plenum components."

The evaluation in Section 3.5 of the staff's FSER on BWRVIP-47 focuses on a determination that a TLAA on fatigue would only needed to be included in the application if the CUF for the lower plenum components was determined to be in excess of 1.0 for the extended design life of a given BWR (54 EFPY for BSEP-1/2). To validate your determination that a TLAA does not need to be identified for the RV internal lower plenum components, the staff requests confirmation that the CUF for the RV internal lower plenum components has been determined to be less than 1.0 for the design cycles assumed through 54 EFPY.

RAI B.2.28-15

CP&L's FSAR Supplement Summary Description and Commitment for the RV&ISIP:

Part A: The staff requests that the FSAR Supplement summary description for the RV&ISIP, as given in Section A.1.1.30 of the LRA, be supplemented to include the following items:

1. A statement that scope of the RV&ISIP includes conformance with and implementation of applicable BWRVIP Topical Reports, including BWRVIP-18, -25, -26, -27, -38, -41, -47, -48, -49, -74-A, -76, and -94.

2. A statement that the RV&ISIP will be used to manage loss of preload/stress relaxation in the BSEP-2 spring-loaded core plate plugs by the implementing augmented inspections of the BSEP-2 spring-loaded core plate plugs during the period of extended operation for BSEP-2.

3. A statement that the RV&ISIP will be used to manage flow blockage of the core spray nozzles by implementing augmented inspections of the core spray nozzles during the periods of extended operation for BSEP-1/2.

4. A statement the RV&ISIP will be used to manage cracking and loss of material in the non-safety related steam dryers, feedwater spargers, core shroud holders and separators, and RV surveillance capsule holders during the periods of extended operation for BSEP-1/2.

Part B: The staff requests that the existing commitment for the RV&ISIP, as given in the commitment tracking list for the BSEP-1/2 LRA (i.e., in Enclosure 1 of CP&L Serial Letter No. BSEP 04-0006, dated October 18, 2004) be supplemented to include the following additional items:

1. A statement that scope of the RV&ISIP includes conformance with and implementation of applicable BWRVIP Topical Reports, including BWRVIP-18, -25, -26, -27, -38, -41, -47, -48, -49, -74-A, -76, and -94.

2. A statement that the RV&ISIP will be used to manage flow blockage of the core spray nozzles by implementing augmented inspections of the core spray nozzles during the periods of extended operation for BSEP-1/2.

3. A statement the RV&ISIP will be used to manage cracking and loss of material in the non-safety related steam dryers, feedwater spargers, core shroud holders and separators, and RV surveillance capsule holders during the periods of extended operation for BSEP-1/2.

4. A statement that the alternative UT examinations of the core plate rim hold down bolts, from the outside diameter of the core plates, as submitted as an exception to the BWRVIP-25 recommendations and approved by the NRC, will be implemented during the periods of extended operation for BSEP-1/2 (This commitment will only be need if the UT examination method for the core plate rim hold down bolts from the outside diameter of the core support rings has not been approved by the NRC as an acceptable supplemental inspection method and has yet to be incorporated into an NRC-approved revision of the BWRVIP-25 recommendations - Refer to RAI B.2.28-11, Part B).