Template NRR-028

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 17, 2000

Mr. J. S. Keenan, Vice President
Brunswick Steam Electric Plant
Carolina Power & Light Company
Post Office Box 10429
Southport, North Carolina 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2 - INSERVICE INSPECTION PROGRAM - THIRD 10-YEAR INTERVAL - EVALUATION OF REQUESTS FOR RELIEF NOS. RR-1 THROUGH RR-25 (TAC NOS. MA2108 AND MA2109)

Dear Mr. Keenan:

By letter dated April 23, 1998, you submitted the third 10-year Inservice Inspection (ISI) Program for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2. This submittal included Requests for Relief RR-1 through RR-25. This information was supplemented by a telephone conference on November 10, 1998, and by letters dated February 18, April 26, August 11 and September 14, 1999. As part of these submittals, you requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the Code) Section XI examination requirements for the third 10-year interval of the ISI program at Brunswick. By letter dated May 4, 1999, the NRC staff responded (in part) to your request, granting RR-8 regarding snubbers, RR-15 regarding component examinations, and, for Unit 2 refueling outage 13 only, RR-17 regarding leakage at bolted connections. The evaluation of RR-17 for both units without the outage restriction has since been completed, as documented in the enclosed Safety Evaluation. Your September 14, 1999, letter withdrew RR 5, RR-12, RR-13, RR-14, RR-22, RR-23, RR-24 and RR-25.

The NRC staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has completed the review of the subject relief requests. Based on the information provided in the relief requests, the staff concludes that relief is granted for: RR-1, RR-3, RR-11 Revision 1, RR-16 Revision 1, RR-17 Revision 3, RR-18, and RR-21 Revision 1 pursuant to 10 CFR 50.55a(a)(3)(i) because the proposed alternatives provide an acceptable level of quality and safety; RR-2, RR-4 and RR-7 pursuant to 10 CFR 50.55a(a)(3)(ii) because compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; and RR-6, RR-9 and RR-10 per Regulatory Guide 1.147 because the alternative requirements of the respective ASME Code cases have been accepted by the staff. Relief is denied for RR-19 and RR-20 because the alternatives provided in the referenced Code cases have not been accepted by the staff.

The granting of relief is based upon the fulfillment of any commitments made by you in the basis for each relief request and the alternatives proposed. Program changes involving new or revised relief requests should be submitted to NRC.

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The staff's evaluation is enclosed. A copy of the INEEL Technical Letter Report is attached to the evaluation.

Sincerely,

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management

Docket Nos. 50-324 and 50-325

Enclosure: As stated

cc w/encl: See next page

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF NOS. 1 THROUGH 25

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

CAROLINA POWER & LIGHT COMPANY

DOCKET NUMBERS 50-325 AND 50-324

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (the Code) and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for the Brunswick Steam Electric Plant, Units 1 and 2, third 10-year ISI interval, which began on May 11, 1998, is the 1989 Edition of Section XI of the Code.

2.0 EVALUATION

By letter dated April 23, 1998, as supplemented by a telephone conference on November 10, 1998, and letters dated February 18, April 26, August 11 and September 14, 1999, Carolina Power and Light (the licensee) requested relief from Code Section XI examination requirements for the third 10-year interval of the inservice inspection program at Brunswick Units 1 and 2. By

Enclosure

letter dated May 4, 1999, the NRC staff responded (in part) to the request, granting Relief Request RR-8 regarding snubbers, RR-15 regarding component examinations, and, for Unit 2 refueling outage 13 only, RR-17 regarding leakage at bolted connections. The evaluation of RR-17 for both units without the outage restriction has since been completed, as documented below. The September 14, 1999, letter withdrew RR 5, RR-12, RR-13, RR-14, RR-22, RR-23, RR-24 and RR-25.

The Idaho National Engineering and Environmental Laboratory (INEEL) has evaluated the information provided by the licensee in support of its third 10-Year Interval ISI Program Plan Requests for Relief for Brunswick Steam Electric Plant, Units 1 and 2. The results of that review are summarized in Attachment 1, "Table 1 - Summary of Relief Requests." The staff has reviewed INEEL's evaluation and based on the results of the review, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report (Attachment 2).

RR 5, RR-12, RR-13, RR-14, RR-22, RR-23, RR-24 and RR-25

These requests were withdrawn by the licensee by letter dated September 14, 1999.

RR-8, RR-15 and, for Unit 2 refueling outage 13 only, RR-17

These requests were granted by the staff by letter dated May 4, 1999.

RR-1, RR-3, RR-11 Rev 1, RR-16 Rev 1, RR-17 Rev 3, RR-18, and RR-21 Rev 1

The staff concludes that relief is granted pursuant to 10 CFR 50.55a(a)(3)(i) because the proposed alternatives provide an acceptable level of quality and safety.

RR-2, RR-4 and RR-7

The staff concludes that relief is granted pursuant to 10 CFR 50.55a(a)(3)(ii) because compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

RR-6, RR-9 and RR-10

The staff concludes that relief is granted per Regulatory Guide 1.147 because the alternative requirements of the respective ASME Code cases have been accepted by the staff.

RR-19 and RR-20

Relief is denied based on the evaluation in Attachment 2. The staff also notes that the licensee's basis for the proposed alternative states that "(t)his type of repair was approved for austenitic stainless steel piping (ASME Code Case N-504) and authorized for use by the Nuclear Regulatory Commission in Regulatory Guide 1.147 (Revision 11)." Code Case N-504 pertains to the use of weld overlay repairs for intergranular stress corrosion cracking (IGSCC) in austenitic stainless steel. The weld overlays consist of an IGSCC resistant material and

introduce a compressive stress field in the region of the cracking being repaired. Accordingly, the weld overlays provide two mitigating measures that have been shown to be highly effective in inhibiting further growth of IGSCC. Furthermore, licensees have inspection programs in effect in response to NRC Generic Letter 88-01 to aggressively monitor IGSCC and continue to inspect the weld overlay locations under these inspection programs. Also, due to the mechanism of cracking, the degradation is limited to heat-affected zones adjacent to the weldment. Therefore, the staff found Code Case N-504 acceptable. As noted in the attached contractor evaluation, Code Cases N-561 and N-562 have deficiencies with respect to the areas discussed above. The staff will consider case-specific applications of weld overlay repairs for degradation modes other than IGSCC, for example, micro biologically-induced corrosion, if accompanied by information to address the shortcomings discussed in the attached contractor evaluation.

3.0 CONCLUSION

Relief is granted or denied as stated above and in the attached summary table. The granting of relief is based upon the fulfillment of any commitments made by the licensee in the basis for each relief request and the alternatives proposed. Program changes involving new or revised relief requests should be submitted to NRC.

Attachments: 1. Table 1 - Summary of Relief Requests
2. Technical Letter Report

Principal Contributor: A. Hansen

Date: **February 17, 2000**

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
Third 10-Year ISI Interval

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
RR-1	Records and Reports	IWA -6000	N/A	N/A	Prepare & submit Owners Report for Inspection, Form NIS-1, & Owner's Report for Repair or Replacements, Form NIS-2.	Implement alternative requirements of ASME Code Case N-532.	Authorized 10 CFR 50.55a(a)(3)(i)
RR-2	High Pressure (HP) Coolant Injection main pump studs	C-D	C4.30	HPCI pump studs	Volumetric Examination	Volumetric examination from bottom in-place on the accessible nine (9) studs. Volumetric examination on the remaining eight (8) studs if the HP main pump is disassembled during the Interval.	Authorized 10 CFR 50.55a(a)(3)(ii)
RR-3	Various	IWA -2430(d)	N/A	N/A	Inspection interval requirements specified in para. IWA-2430(d) for components inspected under Program B.	Implement alternative requirements of ASME Code Case N-535.	Authorized 10 CFR 50.55a(a)(3)(i)
RR-4	Control Rod Drive (CRD)	B-G-2	B7.80	CRD housing bolts	Visual (VT-1) Examination	Implement alternative requirements of ASME Code Case N-547	Authorized 10 CFR 50.55a(a)(3)(ii)
RR-6	Various	B-J	B9.12	Pressure retaining longitudinal welds	Surface and Volumetric Examination	Implement alternative requirements of ASME Code Case N-524	Acceptable per RG 1.147
RR-7	RPV	F-A	F1.40	Component supports for RPV skirt	Visual (VT-3) Examination	Implement alternative requirements of ASME Code Case N-491	Authorized 10 CFR 50.55a(a)(3)(ii)

ATTACHMENT 1

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
RR-9	Various	IWA -4700(a)	N/A	Welded repairs	Hydrostatic test following repair of pressure boundary by welding	Implement alternative requirements of ASME Code Case N-416-1	Acceptable per RG 1.147
RR-10	Various	B-P, C-H, D-A, D-B, and D-C	N/A	Components	10-year hydrostatic test.	Implement alternative requirements of ASME Code Case N-498-1	Acceptable per RG 1.147
RR-11 Rev. 1	Service Water (SW)	IWA -5244(b)	N/A	Class 3 buried piping	Visual (VT-2) Examination	Take and evaluate flow measurements during IST and TS testing	Authorized 10 CFR 50.55a(a)(3)(i)
RR-16 Rev. 1	N/A	IWA -2300 IWA -2312	N/A	VT-2 Examination Personnel Qualifications	Personnel performing visual examinations shall be qualified and certified to levels comparable to SNT-TC-LA and employees written practice.	Implement alternative requirements of ASME Code Case N-546 and additional supplemental requirements.	Authorized 10 CFR 50.55a(a)(3)(i)
RR-17 Rev. 3	Various	IWA -5250(a)(2)	N/A	Area around bolting.	Remove bolting, VT-3 examine for corrosion, and evaluate according to Paragraph IWA-3100.	Implement alternative requirements of ASME Code Case N-566-1 and supplemental actions.	Authorized 10 CFR 50.55a(a)(3)(i)

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
RR-18	N/A	IWA -4400(a)	N/A	Transfer of Procedure Qualification Records	Welding/brazing to be performed IAW welding procedure specifications (WPS) qualified by owner or repair organization IAW requirements of codes specified in repair program IAW para. IWA-4120.	Implement alternative requirements of ASME Code Case N-573	Authorized 10 CFR 50.55a(a)(3)(i)
RR-19	Various	IWA -4000	N/A	N/A	IWA-4000 requirements for repair of pressure retaining components	Implement alternative requirements of ASME Code Case N-561	Not Authorized
RR-20	Various	IWA -4000	N/A	N/A	IWA-4000 requirements for repair of pressure retaining components	Implement alternative requirements of ASME Code Case N-562	Not Authorized
RR-21 Rev. 1	N/A	IWC-2412	N/A	Examination Categories with Less Than Three Items or Welds	Complete examinations in each examination category according to percentage requirements of Table IWC-2412-1.	Perform examinations for ASME Code Category C-B in their entirety during the same inspection period as was performed in second inspection interval	Authorized 10 CFR 50.55a(a)(3)(i)

TECHNICAL LETTER REPORT
ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF
FOR
CAROLINA POWER AND LIGHT COMPANY
BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
DOCKET NUMBERS: 50-325 AND 50-324

1. INTRODUCTION

By letter dated April 23, 1998, the licensee, Carolina Power and Light Company (CP&L), submitted Revision 0 of their ISI program for Class 1, 2, and 3 Components and Supports, including requests for relief from the requirements of the ASME Code, Section XI, for the Brunswick Steam Electric Plant, Units 1 and 2, third 10-year inservice inspection (ISI) interval. In response to issues raised during a conference call, additional information was provided in a letter to NRC dated February 18, 1999. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject requests for relief is in the following section.

2. EVALUATION

The information provided by CP&L in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The Code of record for Units 1 and 2, third 10-year ISI interval, which began on May 11, 1998, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code.

2.1. Request for Relief No. RR-1, Use of Code Case N-532, *Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000, Section XI, Division 1*

Code Requirement: Article IWA-6000 requires the Owner to prepare and submit the Owners Report for Inservice Inspection, Form NIS-1, and the Owners Report for Repair or Replacements, Form NIS-2.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes to implement the alternative requirements outlined in ASME Code Case N-532, *Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000*, in lieu of those specified in Article IWA-6000, 1989 Edition.
The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements of ASME Code Case N-532. Accordingly, CP&L will prepare and submit the Owners Activity Report for Inservice Inspection, Form OAR-1

and the Repair/ Replacement Certification Record, Form NIS-2A in accordance with the alternative requirements of ASME Code Case N-532. The other applicable requirements of Article IWA-6000 of the ASME Section XI Code, 1989 Edition, will be met."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) is requesting approval to implement alternative requirements to those specified in Article IWA-6000, Records and Reports. CP&L proposes to implement the alternative requirements outlined in ASME Code Case N-532, Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000.

"The alternative requirements outlined in ASME Code Case N-532 have been evaluated by CP&L, and CP&L has determined that implementation of these requirements will provide an acceptable level of quality and safety for the following reasons:

"1. ASME Code Case N-532 provides alternative requirements for the documentation of inservice inspection, repair, and replacement activities for components (including their supports) that are classified ASME Code Class 1, 2, and 3. Implementation of this ASME Code Case will still require the reviews and approvals by the Authorized Nuclear Inservice Inspection (ANII). In addition, CP&L will be required to prepare the Repair/Replacement Plan in accordance with IWA-6340 of the ASME Section XI Code, 1992 Edition.

"2. The alternative requirements of ASME Code Case N-532 simplifies reporting, particularly for repair and replacement activities, and reduces the frequency of summary reports from once per outage to once per Inspection Period. The implementation of this ASME Code Case will significantly reduce man-hours being spent after each outage without jeopardizing the quality or availability of records.

"3. CP&L considers the alternative requirements of this ASME Code Case an improvement over the reports required by the 1989 Edition of the ASME Section XI Code. For example, Form OAR-1, includes the status of examination credited and percent credited by Examination Category. This type of information provides a more comprehensive report on the status of BSEP's Inservice Inspection Program.

"4. ASME Code Case N-532 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on December 12, 1994.This approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants.

"5. ASME Code Case N-532 was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. As specified in the Safety Evaluation Report, the implementation of this ASME Code Case would provide an acceptable level of quality and safety at BSEP, Unit 1 and 2. The alternative requirements evaluated by the NRC for use during the Second Inspection Interval has not changed."

Evaluation: The INEEL staff reviewed the proposed alternative documentation requirements of Code Case N-532 and determined that although the required forms have changed, the information required by the Code remains available for review. Code Case N-532 requires preparation of the Repair/Replacement Certification Record, Form NIS-2A. The completed form NIS-2A shall be certified by an Authorized Nuclear Inservice Inspector (ANII) as defined in ASME Code, Section XI, IWA-2130 and shall be maintained by the Owner. Furthermore, the Owner's Activity Report Form, OAR-1 shall be prepared and certified by an ANII upon completion of each refueling outage. The OAR-1 form shall contain an abstract of applicable examinations and tests, a list of item(s) with flaws or relevant conditions that require evaluation to determine acceptability for continued service, and an abstract of repairs, replacements and corrective measures performed as a result of unacceptable flaws or relevant conditions. Hence, the information provided in the documentation required by Code Case N-532 can be used to assess the safety implications of Code activities performed during an outage.

A review using the information as prescribed by the Code Case will, therefore, provide the same or improved level of quality and safety as reviews that may be conducted using the Code reporting requirements. In addition, more detailed information may be requested by the NRC staff if it is deemed necessary. Therefore, it is recommended that the use of this alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third-ten year inspection interval, or until Code Case N-532 is approved for general use by reference in Regulatory Guide 1.147. After that time, the licensee must follow the conditions, if any, specified in the regulatory guide.

2.2 Request for Relief No. RR-2, Examination Category C-D, Item No. C4.30, Pressure Retaining Bolting Greater Than 2 Inches in Diameter

Code Requirement: Table IWC-2500-1, Examination Category C-D, Item No. C4.30, requires 100% volumetric examination of pump studs either in place under load or upon disassembly of the connection, each inspection interval, as defined in figure IWC-2500-6.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested relief from 100% volumetric examination of the High Pressure Coolant Injection (HPCI) main pump studs.

The licensee stated:
"During the Third Inspection Interval, CP&L will perform a volumetric examination on the accessible nine (9) studs. This volumetric examination will be performed from the bottom of each stud while in-place. In addition, CP&L will perform a volumetric examination on the remaining eight (8) studs if the HP main pump is disassembled for maintenance or repair during the Third Inspection Interval."

Licensee's Basis for Proposed Alternative (as stated):
"A volumetric examination of the HP main pump studs requires removal of the stud cap nuts, which are torqued to 8,000 foot-pounds. Carolina Power & Light (CP&L) attempted removal of the nuts during the 1996 refueling outage (B111R1) using HyTorc™ equipment, but these attempts were unsuccessful. Further attempts to non-destructively remove the stud cap nuts could potentially damage the studs or pump casing. The seventeen (17) studs are inaccessible for in-place examinations from the top of each stud due to protective cap nuts. Eight (8) studs are inaccessible from the bottom due to the design of the pump casing. The remaining nine (9) studs are accessible for a volumetric examination from the bottom of each stud.

"In accordance with 10 CFR 50.55a(a)(3)(ii), CP&L is requesting approval to implement an alternative examination requirement to those specified in Table IWC-2500-11 Examination Category C-D (Item No. C4.30). CP&L proposes to perform a volumetric examination on nine (9) of the seventeen (17) inaccessible studs. CP&L also proposes to examine the remaining (eight) 8 studs in accordance with Table IWC-2500-11 Examination Category C-D (Item No. C4.30) if the HP main pump requires disassembly for maintenance or repair during the Third Inspection Interval.

"This alternative requirement has been evaluated by CP&L, and CP&L has determined that implementation of this alternative requirement will provide an acceptable level of quality and safety for the following reasons:

"1. During the Second Inspection Interval, a volumetric examination was performed on nine (9) of the seventeen (17) studs (i.e., greater than 50 percent of the HP main pump studs) with no indications or degradation noted. This sampling provided an acceptable assurance that the remaining eight (8) inaccessible studs (#1, 2, 3, 9, 10, 12, 13, & 17) had not experienced significant degradation. The nine (9) studs examined during the Second Inspection Interval will be reexamined during the Third Inspection Interval. This same sampling of the HP main pump studs will provide an acceptable level of quality and safety.

"2. As required by Table IWC-2500-1, Examination Category C-H, a visual (VT-2) examination of the pressure retaining boundary of the HP main pump is performed once per Inspection Period during the required pressure tests. The visual examination is also an acceptable method for detecting

degradation of the pressure retaining bolted connection. These visual examinations are performed more frequently than the volumetric examination required by Table IWC-2500-1, Examination Category C-D (Item No. C4.30).

"3. The alternative requirement to perform an volumetric examination on the accessible nine (9) studs was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. As specified in the Safety Evaluation Report, the implementation of this alternative requirement would provide an acceptable level of quality and safety at BSEP, Unit 1 and 2. The alternative requirement, to perform a volumetric examination on the accessible nine (9) studs, evaluated by the NRC for use during the Second Inspection Interval has not changed."

Evaluation: The Code requires that Class 2 studs greater than 2-inch in diameter receive 100% volumetric examination. The examination may be performed with the bolting in place and under tension, when the connection is disassembled, or when the bolting is removed. This examination is usually performed using a 0° longitudinal scan from the exposed end of the bolt. However, a portion of the HPCI main pump studs at Brunswick are inaccessible for in-place examinations. All 17 of the pump studs are inaccessible for examination from the top due to protective cap nuts. Volumetric examination of these studs from the top requires removal of the stud cap nuts, which are torqued to 8,000 foot-pounds. CP&L has unsuccessfully attempted to remove the nuts. Further attempts to remove the stud cap nuts could potentially damage the studs or pump casing. Eight of the studs are inaccessible for examination from the bottom due to the design of the pump casing. Nine of the studs are accessible for examination from the bottom. Volumetric examination of all the studs to the extent required by the Code would pose a significant hardship on the licensee.

The licensee proposed to perform a volumetric examination from the bottom of the nine accessible studs. The licensee also proposed to examine the remaining eight studs if the HPCI main pump is disassembled for maintenance or repair during the ISI Interval. Based on the number of studs (nine of seventeen) that can be volumetrically examined, it is reasonable to conclude that existing patterns of degradation, if present, will be detected and adequate assurance of structural integrity will be maintained. Therefore, imposition of the Code requirements would result in an undue hardship without a compensating increase in quality and safety. Therefore, it is recommended that the alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.3 Request for Relief No. RR-3, Use of Code Case N-535, *Alternative Requirements for Inservice Inspection Intervals*

Code Requirement: Paragraph IWA-2430(d) allows an inspection interval variance of up to one year for components inspected under Inspection

Program B. Adjustments shall not cause alteration of successive intervals by more than one year from the original interval pattern.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed to implement the alternative requirements contained in ASME Code Case N-535, *Alternative Requirements for Inservice Inspection Intervals*, in lieu of the inspection interval requirements specified in paragraph IWA-2430(d) for components inspected under Inspection Program B.

The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements of ASME Code Case N-535."

Licensee's Basis for Proposed Alternative (as stated):
" The alternative requirements outlined in ASME Code Case N-535 have been evaluated by CP&L, and CP&L has determined that implementation of these requirements will provide an acceptable level of quality and safety for the following reasons:

"1. ASME Code Case N-535 provides alternative requirements for scheduling inservice inspection of components inspected under Inspection Program B. Implementation of this ASME Code Case will not alter the examination method, examination frequency, or function of these Class 1, 2, or 3 components (including their supports) at BSEP, Unit 1 and 2.

"2. The alternative requirements of ASME Code Case N-535 clarifies situations that are not explicitly described in the 1989 Edition of the ASME Section XI Code. This ASME Code Case was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on December 12, 1994. Following approval, the provision stated within this ASME Code Case has been incorporated in paragraph IWA-2430(d) of the 1996 Edition of the ASME Section XI Code. Both actions signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants."

Evaluation: Inspection Program B of the Code requires inspection intervals of 10 years in length. Paragraph IWA-2430(d) allows an inspection interval to be extended or reduced by as much as one year to coincide with a refueling outage. The licensee proposed to apply the requirements of Code Case N-535 for the scheduling of intervals and examinations of Code Class 1, 2, and 3 piping and components.

Code Case N-535 consists of four parts which can be summarized as follows:

a) Each inspection interval may be reduced or extended by one-year. For extended intervals, neither the start or end dates nor the inservice inspection

program for the successive interval need be revised. Thus, a successive interval may start prior to the end of the previous interval that was extended.

b) Examinations performed to satisfy the requirements of the extended interval may be performed in conjunction with examinations performed to satisfy the requirements for the successive interval. However, examinations cannot be credited to both intervals.

c) Inspection periods may be extended or reduced to coincide with an outage. This adjustment shall not alter the requirements for scheduling inspection intervals.

d) Examination records must identify in which interval the examination was performed.

Part (a) of Code Case N-535 is the only change from current Section XI philosophy. The one-year extension is independent of the plant operating cycle and two intervals can be open concurrently during that year. Although slightly different from the current Code requirements, implementation of this Code Case does not change the number of examinations, acceptance criteria, or any other Code requirement, with the possible exception of distribution of examinations. However, this is considered to be a minimal change, therefore, the INEEL staff concludes that Code Case N-535 provides an acceptable level of quality and safety. Therefore, it is recommended that the use of Code Case N-535 be authorized pursuant to 10 CFR 50.55a(a)(3)(i). The use of this Code Case should be authorized for the third interval or until the Code Case is approved for general use by reference in Regulatory Guide 1.147. After that time, the licensee must follow the conditions, if any, specified in the regulatory guide.

2.4 Request for Relief No. RR-4, Use of Code Case N-547, *Alternative Requirements for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings*

Code Requirement: Examination Category B-G-2, Item No. B7.80, requires a visual (VT-1) examination of pressure retaining bolting 2 inches and less in diameter, when disassembled.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested relief from the visual (VT-1) examination of CRD housing bolting as specified in Table IWB-2500-1, Examination Category B-G-2 (Item No. B7.80), and proposed to (1) implement ASME Code Case N-547, *Alternative Requirements for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings*, for those bolted connections being reinstalled with new bolting, or (2) perform a VT-1 examination of bolting that has been in service prior to reinstallation.

The licensee stated:
"When a CRD housing bolted connection is disassembled and the bolting is to be reused, CP&L will perform a VT-1 examination of the bolting prior to reinstallation. If the bolted connection is reinstalled with new bolting, CP&L will implement the alternative requirement of ASME Code Case N-547 during the Third Inspection Interval."

Licensee's Basis for Proposed Alternative (as stated):
" . . .CP&L proposes to (1) implement ASME Code Case N-547, Alternative Requirements for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings, for those bolted connections being reinstalled with new bolting or (2) perform a VT-1 examination of the bolting that has been in service prior to their reinstallation.

"ASME Code Case N-547 has been evaluated by CP&L, and CP&L has determined that implementation of this ASME Code Case will provide an acceptable level of quality and safety for the following reasons:

"1. ASME Code Case N-547 will discontinue the visual examination of bolting on CRD housing as specified in Table IWB-2500-1, Examination Category B-G-2 (Item No, B7.80). The ASME Committee determined that a visual examination of the CRD housing bolting was no longer required. CP&L agrees that the visual examination of this bolting, unless being reinstalled, is unwarranted and does not increase the level of quality and safety at BSEP, Unit 1 and 2. CP&L has determined that implementation of this ASME Code Case will eliminate personnel exposure associated with the examination of this bolting when disassembled. Thus, the continued examination of this bolting as specified in Table IWB-2500-1, Examination Category B-G-2 (item No. B7.80) will create a hardship for CP&L without a compensating increase in quality and safety.

"2. ASME Code Case N-547 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on August 24, 1995. Following approval, the provision stated within this ASME Code Case has been incorporated in the 1995 Addenda of the ASME Section XI Code. Thus, the ASME Section XI Code no longer requires the examination of the CRD bolting when disassembled. Both of the actions described above signify that discontinuing this examination will provide an acceptable level of quality and safety for nuclear power plants.

"3. As required by Table IWB-2500-1, Examination Category B-P, a visual (VT-2) examination of the pressure retaining boundary of the CRD housing is performed each refueling outage during the required pressure tests. The performance of this visual examination is an acceptable method for detecting degradation of the pressure retaining bolted connection. Implementation of this ASME Code Case will not alter this examination requirement.

Evaluation: The Code requires a VT-1 visual examination of Control Rod Drive bolting, studs, and nuts when the CRD housing is disassembled for maintenance. However, the licensee stated that performing examinations on bolting that will be replaced exposes plant personnel to unnecessary radiation exposure. The imposition of this requirement would result in an undue hardship for the licensee.

The licensee has proposed an alternative to the Code requirement that includes the use of Code Case N-547, *Alternative Requirement for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings*. This Code Case eliminates the requirement to perform VT-1 visual examination of control rod drive bolting. The INEEL staff believes that Code Case N-547 is acceptable only when CRD bolting is replaced with new bolting. When CRD bolting is reused, a visual examination (VT-1) should be performed to verify that the condition of the bolting is acceptable for continued service. The licensee has committed to performing a VT-1 examination of reused bolting prior to reinstallation. Therefore, the licensee's proposed alternative, in conjunction with the Code-required preservice examination per IWB-2200(c) provides reasonable assurance of the continued structural integrity of CRD bolting.

Based on the evaluation above, it is concluded that imposing the Code requirements on the licensee for bolting that will be replaced would result in a burden without a compensating increase in the level of quality and safety. Therefore, it is recommended that the licensee's proposal to implement Code Case N-547 for new CRD bolting, and performing a visual VT-1 on reused bolting prior to reinstallation, be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.5 Request for Relief No. RR-6, Use of Code Case N-524, *Alternative Rules for Longitudinal Welds in Class 1 and 2 Piping*

Code Requirement: Examination Category B-J, Item 9.12, requires 100% surface and volumetric examination of at least a pipe-diameter length but not more than 12 inches of each longitudinal weld intersecting the circumferential welds required to be examined.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the surface and volumetric examination of Class 1 longitudinal welds as specified in Examination Category B-J, Item B9.12, and proposed to implement the alternative requirements outlined in ASME Code Case N-524, *Alternative Rules for Longitudinal Welds in Class 1 and 2 Piping.*

The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements outlined ASME Code Case N-524 for the examination of longitudinal welds."

Licensee's Basis for Proposed Alternative (as stated):
" ...CP&L proposes to implement the alternative requirements outlined in ASME Code Case N-524, Alternative Examination Requirements for Longitudinal Welds in Class 1 and 2 Piping. Unit 1 and 2 does not contain any Class 2 longitudinal welds. Therefore, the alternative requirements outlined in ASME Code Case N-524 for Class 2 longitudinal welds are not applicable.

"ASME Code Case N-524 have been evaluated by CP&L, and CP&L has determined that implementation of this ASME Code Case for Class 1 longitudinal welds will provide an acceptable level of quality and safety for the following reasons:

"1. Longitudinal welds are not produced in the field or fabrication shops as is the case of a circumferential weld. Longitudinal piping welds for Class 1 applications were made by the piping manufacturer under controlled conditions which produced higher quality welds and more uniformed residual stress patterns. These welds were examined in accordance with the appropriate ASTM or ASME specifications with additional nondestructive examination requirements imposed by the purchasing specifications. The manufacturing controls specified by the appropriate ASTM or ASME specifications along with the additional examinations imposed by the purchasing specification provides assurance of the structural integrity of the longitudinal weld at the time the piping is manufactured.

"2. Inservice inspections have provided assurance of the structural integrity of the longitudinal welds during the service life of the plant to date. Based on results of these inservice inspections, BSEP has not experienced degradation that would warrant continued examination beyond the intersection area or volume bounded by this ASME Code Case. If any degradation associated with a longitudinal weld were to occur, it is expected that it would be located at the intersection with a circumferential weld. The inspection of this intersection is within the scope of this ASME Code Case.

"3. ASME Code Case N-524 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on August 9, 1993. Following approval, the provision stated within this ASME Code Case has been incorporated in the 1995 Addenda of the ASME Section XI Code. Both actions signify that the examination of longitudinal welds as described in ASME Code Case N-524 and the 1995 Addenda will provide an acceptable level of quality and safety for nuclear power plants.

"4. A significant accumulation of person-rem is associated with the examination of Class 1 longitudinal welds. The radiological exposure associated with the examination of longitudinal welds are dependent on the time it would take to remove and reinstall insulation and interference, prepare the weld for examination, and perform the examinations. Therefore, the imposition of the examination requirements for longitudinal welds as described in the 1989 Edition of the ASME Section XI Code constitutes a hardship to BSEP without a compensating increase in quality and safety.

"5. ASME Code Case N-524 was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. As specified in the Safety Evaluation Report, the implementation of this ASME Code Case would provide an acceptable level of quality and safety at BSEP, Units 1 and 2. The alternative requirements evaluated by the NRC for the examination of longitudinal welds during the Second Inspection Interval has not changed. The acceptance of ASME Code Case N-524 was also included in the proposed revision to Regulatory Guide 1.147 (i.e., Draft DG-1050)."

Evaluation: ASME Section XI requires the examination of one pipe diameter, but not more than 12 inches, of Class 1 longitudinal piping welds. For Class 2 piping welds, the length of longitudinal weld required to be examined is 2.5 times the pipe thickness. These lengths are measured from the intersection with the circumferential weld. The licensee's proposed alternative is to examine only the portions of longitudinal weld within the examination area of the intersecting circumferential weld in accordance with Code Case N-524, *Alternative Examination Requirements for Longitudinal Welds in Class 1 and Class 2 Piping.*

The NRC staff has reviewed Code Case N-524 and has found the Code Case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability,* Revision 12, (May 1999). Therefore, the use of this Code Case with the conditions specified in the Regulatory Guide is considered acceptable for use at Brunswick Steam Electric Plant Units 1 and 2.

2.6 Request for Relief No. RR-7, Examination Category F-A, Item No. F1.40, Visual (VT-3) Reactor Pressure Vessel Skirt Support

Note: Code Case N-491 is being utilized by the licensee during the third ten year interval.

Code Requirement: Code Case N-491, Examination Category F-A, Item No. F1.40, requires visual (VT-3) examination of 100% of supports other than piping supports in Class 1, 2, and 3 MC components.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee has requested relief from the visual (VT-3) examination of the internal surface of the RPV skirt support, and proposed to perform visual (VT-3) examination of the RPV skirt support exterior surface only.

The licensee stated:
"During the Third Inspection Interval, CP&L proposes no alternative examination of the RPV skirt support's interior surfaces. CP&L will perform the visual (VT-3) examination of the RPV skirt support's exterior surfaces..."

Licensee's Basis for Proposed Alternative (as stated):
". . . CP&L will perform the required visual (VT-3) examination on the exterior surface of the RPV skirt support. CP&L has evaluated not performing the visual (VT-3) examination on the interior surface and has determined that implementation of the request for relief will provide an acceptable level of quality and safety for the following reasons:

"1) The design bases failure mode of the RPV skirt support is buckling caused by primary bending compressive stress. After forming, the material has ample ductility and is expected to exhibit significant plastic deformation prior to fracture. Any service induced damage would be associated with buckling failure and would be evident during the visual (VT-3) examination of the exterior surface. Thus, the visual (VT-3) examination of the exterior surface will provide assurance of the continued structural integrity of the RPV skirt support.

"2) A visual (VT-3) examination of the interior surfaces of the RPV skirt support is impractical and constitutes a hardship to BSEP without a compensating increase in quality and safety. In order to examine the interior surface of the RPV skirt support, insulation is required to be removed. Removing the insulation and leaving it in the skirt support area during the examination is not possible because of the limited space between the control rod drives and the skirt support area. Removal of the insulation outside the skirt support area is not possible without damaging the insulation. The access opening to the skirt support area is 18 inches in diameter and the size of the insulation sections is a minimum of 20 inches by 30-5/8 inches. In addition, the insulation is constructed of inner and outer casings of 304 stainless steel and the inner radiation shields of aluminum alloy (e.g., mirror-type insulation).

"Removal of the insulation would require disassembly by either unscrewing each piece of the insulation or by cutting and would result in permanent damage to the insulation. Thus, reinstallation of the existing insulation would not be possible due to this damage. For this reason, new insulation would be required to be designed and installed in place of the existing insulation. The tasks associated with the removal and reinstallation would result in a significant hardship to CP&L for the following reasons: (1) radiation exposure

of approximately 1.4 R per unit (removal and reinstallation); (2) costs associated with the design packages required to document installation of new insulation; (3) material costs of new insulation (approximately $30,000 per unit), and (4) cost reduction in radwaste volume of approximately $26,129 per unit.

"3) A request for relief to not perform the visual (VT-3) examination on the interior surface of the RPV skirt support was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. The basis for requesting relief, that was evaluated by the NRC for use during the Second Inspection Interval, has not change."

Evaluation: Code Case N-491, Examination Category F1.40 requires visual (VT-3) examination of 100% of interior and exterior surfaces of the RPV skirt support surfaces. The licensee proposed to perform a visual (VT-3) examination of only the exterior surfaces of the RPV support skirt. Visual (VT-3) examination of the interior surface of the RPV support skirt necessitates the removal of insulation. Tasks associated with the insulation removal would result in excessive radiation exposure to plant personnel (1.4R per Unit) and large quantities of radwaste. The access port for removal of insulation is 18 inches in diameter and the size of the insulation sections are a minimum of 20 inches by 30-5/8 inches. Attempts to remove and transport the insulation outside the support skirt area would damage it and make reinstallation more difficult or require design and installation of new insulation. Therefore, the tasks associated with removal and reinstallation would pose a significant hardship for the licensee.

The licensee is capable of performing the visual (VT-3) examination of the exterior surface. This examination should enable detection of the primary failure mode (buckling) and provides adequate assurance of the continued structural integrity of the RPV support. The licensee has provided information to support the determination that the Code/Code Case requirement for surface examination of the interior surface of the RPV support skirt presents a hardship without a compensating increase in safety; therefore, it is recommended that the alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.8 Request for Relief No. RR-9, Use of Code Case N-416-1, *Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2 and 3*

Code Requirement: Paragraph IWA-4700(a) requires a system hydrostatic test to be performed following a repair of a pressure retaining boundary by welding except as exempted by IWA-4700(b).

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the system hydrostatic test specified in IWA-4700(a). The licensee proposed to implement the alternative requirements of Code Case N-416-1, *Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2 and 3*. In addition to the alternative requirements of the Code Case, the licensee will perform a surface examination on the root pass of Class 3 butt and socket welds when the surface examination method is used in accordance with the ASME Section III Code.

The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements outlined ASME Code Case N-416-1 for pressure testing of welded repairs or installation of replacement items by welding of Class 1, 2 and 3 components. In addition to the alternative requirements specified in this ASME Code Case, CP&L will perform a surface examination on the root pass of Class 3 butt and socket welds when the surface examination method is used in accordance with the ASME Section III Code."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(ii), Carolina Power and Light (CP&L) is requesting approval to use the alternative requirements to those specified in paragraph IWA-4700(a). CP&L proposes to (1) implement the alternative requirements outlined in ASME Code Case N-416-1, Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2 and 3 and (2) perform a surface examination on the root pass of Class 3 butt and socket welds when the surface examination method is used in accordance with the ASME Section III Code.

"The alternative requirements discussed above have been evaluated by CP&L, and CP&L has determined that implementation of this ASME Code Case and surface examination on the root pass of Class 3 butt and socket welds will provide an acceptable level of quality and safety for the following reasons:

"1. Piping components are designed for a number of different loadings that are postulated to occur under the various modes of plant operation. Hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leakage detection during the examination of components under pressure, rather than solely as a measure to determine the structural integrity of the components.

"2. Since hydrostatic test pressures are higher than nominal operating pressures, hydrostatic pressure testing frequently requires significant effort

to set-up and perform. The need to use special equipment (e.g., temporary attachment of test pumps and gauges) and the need for individual valve lineups, can cause the testing to become the critical path activity during outages. Experience has demonstrated that leaks are not being discovered as a result of hydrostatic test pressures propagating a preexisting through wall flaw. Typically when leaks are identified, they occur at flanges, packing, seals, etc., at normal operating pressure. Therefore, the imposition of the pressure testing requirements specified in IWA-4700(a) of the 1989 Edition of the ASME Section XI Code constitutes a hardship to BSEP without a compensating increase in quality and safety.

"3. ASME Code Case N-416-1 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on February 15, 1994. This approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants.

"4. ASME Code Case N-416-1 was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. As specified in the Safety Evaluation Report, the implementation of this ASME Code Case would provide an acceptable level of quality and safety at BSEP, Units 1 and 2. The alternative requirements evaluated by the NRC, for pressure testing of welded repairs or installation of replacement items by welding, for uses during the Second Inspection Interval has not changed. The acceptance of ASME Code Case N-416-1 was also included in the proposed revision to Regulatory Guide 1.147 (i.e., Draft DG-1050)."

Evaluation: Section XI of the Code requires a system hydrostatic test to be performed in accordance with IWA-5000 after repairs by welding on the pressure-retaining boundary. The licensee proposed to implement the alternative to hydrostatic pressure tests contained in Code Case N-416-1, *Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2 and 3,* for repairs/replacements. In addition, the licensee will supplement the Code Case requirements with an additional surface examination on the root pass layer of Class 3 butt and socket welds when the surface examination method is used in accordance with the ASME Section III Code.

The NRC staff has reviewed Code Case N-416-1 and has found the Code Case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability,* Revision 12, (May 1999) subject to the following condition; Additional surface examinations should be performed on the root (pass) layer of butt and socket welds of the pressure retaining boundary of Class 3 components when the surface examinations method is used in accordance with Section III. Therefore, the use of this Code Case with the conditions specified in the

Regulatory Guide is considered acceptable for use at Brunswick Steam Electric Plant Unit 1, and 2.

2.9 Request for Relief No. RR-10, Use of Code Case N-498-1, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems*

Code Requirement: Examination Categories B-P, C-H, D-A, D-B, and D-C require a system hydrostatic test of Class 1, 2, and 3 pressure-retaining components once per inspection interval.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee has proposed to implement the alternative requirements of ASME Code Case N-498-1, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems* in lieu of the system hydrostatic test specified in Examination Categories B-P, C-H, D-A, D-B, and D-C for Class 1, 2, and 3 pressure-retaining components.

The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements outlined ASME Code Case N-498-1."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(ii), Carolina Power and Light (CP&L) is requesting approval to use the alternative requirements to those specified in Table IWB-2500-1, Examination Category B-P; Table IWC-2500-1, Examination Category C-H; and Table IWD-2500-1, Examination Category D-A, D-B, and D-C of the ASME Section XI Code, 1989 Edition. CP&L proposes to implement the alternative requirements outlined in ASME Code Case N-498-1, Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems.

"ASME Code Case N-498-1 has been evaluated by CP&L, and CP&L has determined that implementation of this ASME Code Case will provide an acceptable level of quality and safety for the following reasons:

"1. CP&L regards the system hydrostatic test as an enhanced leakage test, rather than a test of the structural integrity of the system. During a hydrostatic test, components within the test boundary are subject to a small increase in pressure over the design pressure. Thus, the hydrostatic test does not present a significant challenge to the pressure boundary integrity. Accordingly, this testing is primarily regarded as a means to enhance leakage detection, rather than as a measure to determine the structural integrity of the component.

"2. Since hydrostatic test pressures are higher than nominal operating pressures, hydrostatic pressure testing frequently requires significant effort to set-up and perform. The need to use special equipment (e.g., temporary

attachment of test pumps and gauges) and the need for individual valve lineups, can cause the testing to become the critical path activity during outages. Experience has demonstrated that leaks are not being discovered as a result of hydrostatic-test pressures propagating a preexisting through-wall flaw. Typically, when leaks are identified, they occur at flanges, packing, seals, etc., at normal operating pressure. Therefore, the imposition of the pressure testing requirements specified in Table IWB-2500-1, Examination Category B-P; Table IWC-2500-1, Examination Category C-H; and Table IWD-2500-1, Examination Category D-A, D-B, and D-C of the 1989 Edition of the ASME Section XI Code constitutes a hardship to BSEP without a compensating increase in quality and safety.

"3. ASME Code Case N-498-1 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on February 15, 1994. Following approval, the provision stated within this ASME Code Case has been incorporated in the 1994 Addenda of the ASME Section XI Code. Both actions signify that the alternative requirements described in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants.

"4. ASME Code Case N-498-1 was approved by the Nuclear Regulatory Commission (NRC) for implementation during the Second Inspection Interval. As specified in the Safety Evaluation Report, the implementation of this ASME Code Case would provide an acceptable level of quality and safety at BSEP, Units 1 and 2. The acceptance of ASME Code Case N-498-1 was also included in the proposed revision to Regulatory Guide 1.147 (i.e., Draft DG-1050)."

Evaluation: The Code requires a system hydrostatic test once per interval in accordance with the requirements of IWA-5000 for Class 1,2, and 3 pressure-retaining systems. In lieu of the Code-required hydrostatic testing, the licensee has requested authorization to use Code Case N-498-1, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2 and 3 Systems*, dated May 11, 1994.

The NRC staff has reviewed Code Case N-498-1 and has found the Code Case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999). Therefore, the use of this Code Case is considered acceptable for use at Brunswick Steam Electric Plant, Units 1 and 2.

2.10 Request for Relief No. RR-11 Revision 1, VT-2 Test on Class 3 Buried Piping Components

Code Requirement: Paragraph IWA-5244(b) requires that buried piping be tested by measuring the change in flow between the ends of the buried components in lieu of a visual VT-2 examination.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the flow measurement requirements as specified in Paragraph IWA-5244(b) for the Class 3 service water (SW) buried piping.

The licensee stated:
"During the Third Inspection Interval, CP&L will demonstrate adequate flow through the Class 3 SW buried piping in accordance with BSEP's Inservice Testing Program and Technical Specifications. Accordingly, CP&L will (1) demonstrate adequate flow through the buried SW piping during the quarterly inservice testing of the RHR/SW pumps and (2) demonstrate adequate flow from the SW Nuclear Header through the buried piping to the DG Jacket Water piping during the monthly testing of the Diesel Generators."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) Company is requesting approval to use alternative requirements to those specified in IWA-5244(b). CP&L proposes to (1) demonstrate adequate flow through the buried SW piping during the quarterly inservice testing of the Residual Heat Removal (RHR)/SW pumps and (2) demonstrate adequate flow from the SW Nuclear Header through the buried piping to the DG Jacket Water piping during the monthly testing of the Diesel Generators.

"CP&L has determined that implementation of the alternative requirements will provide an acceptable level of quality and safety for the following reasons:

"1. The function of the buried SW piping is to provide an adequate supply of inventory to the safety related pumps and equipment. Adequate flow through these buried portions of the headers is demonstrated during quarterly pump testing of the RHR/SW pumps under CP&L's Inservice Testing Program. CP&L also performs monthly testing of the Diesel Generators (DG) that demonstrates adequate flow from the SW Nuclear Header through the buried piping to the DG Jacket Water piping. The satisfactory completion of this testing verifies adequate flow to applicable safety related components.

"2. Every other refueling outage, a hydraulic performance test is also performed on the SW Nuclear Header piping. During the performance of this test, both Nuclear SW pumps are running and discharging into the Nuclear Header. This hydraulic performance test verifies a flow path through the Class 3 SW buried piping from the Nuclear Header and satisfactory completion of this testing verifies adequate flow to applicable safety related components.

"3. Every other refueling outage, this Class 3 SW buried piping is periodically drained and a visual examination performed from the

inside of the pipe. Although this examination is not per the ASME Code, Section XI, the purpose of this visual examination is to detect degradation of this piping.

"4. No permanent flow measurement instrumentation is installed in the area of the underground piping. In addition, this portion of the SW system has no straight runs of pipe with sufficient length to permit accurate measurements using portable flow instrumentation (e.g.,Controlotron). Thus, CP&L would be required to install special equipment and/or the need for individual valve lineups which can impact returning this safety related system to service."

Evaluation: Paragraph IWA-5244(b) requires that non-isolable, buried piping be examined by measuring the change in flow between the ends of the buried components. However, the licensee has no permanent flow measurement instrumentation installed in the area of the underground service water (SW) piping. Also, the subject portion of the SW system has no straight runs of pipe with sufficient length to permit accurate measurements using portable flow instrumentation. Measuring the flow through this buried piping would require installation of special equipment and/or special off-normal valve lineups.

The licensee has proposed to demonstrate adequate flow through the Class 3 SW buried piping during quarterly inservice testing of the RHR/SW pumps, and by monitoring flow in the SW Nuclear Header through the buried piping to the diesel generator (DG) jacket during monthly testing of the DG. The licensee also performs a periodic hydraulic performance test of the SW Nuclear Header piping with both Nuclear SW pumps running and discharging into the Nuclear Header. These tests verify a flow path and adequate flow through the Class 3 SW buried piping. In addition, every other refueling outage, the licensee drains the buried SW piping and visually examines the inside of the pipe to detect degradation due to corrosion. The INEEL staffs regards the performance of the proposed testing and visual examination as an effective and conservative approach to verify the structural integrity of the subject piping. Therefore, it is concluded that the licensee's proposed testing and internal visual inspection provide an acceptable level of quality and safety, and it is recommended that the alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.11 Request for Relief No. RR-16 Revision 1, Use of Code Case N-546, *Alternative Requirements for Qualification of VT-2 Examination Personnel*

Code Requirement: Subarticle IWA-2300 provides the qualifications of nondestructive examination (NDE) personnel. Paragraph IWA-2312 states that personnel performing visual examinations shall be qualified and certified to comparable levels of qualifications as defined in SNT-TC-1A and the employees written practice.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the Code's visual examination (VT-2) personnel qualification requirements and proposed to implement the alternative requirements of Code Case N-546, *Alternative Requirements for Qualification of VT-2 Examination Personnel.*

The licensee stated:
"During the Third Inspection Interval, CP&L will implement all the requirements, in their entirety, of ASME Code Case N-546. Training, qualifications and certification of personnel under this relief request will be documented and administratively controlled by CP&L procedures. Examinations will be performed in accordance with approved CP&L procedures. Examination data sheets of personnel qualified under this relief request will be independently reviewed."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) Company is requesting approval to use alternative requirements for the qualification of visual (VT-2) examination personnel to those specified in Subarticle IWA-2300. CP&L proposes to implement the alternative requirements outlined in ASME Code Case N-546, Alternative Requirements for Qualification of VT-2 Examination Personnel.

"CP&L has determined that implementation of ASME Code Case N-546 for the visual (VT-2) examination of Class 1, 2, and 3 components will provide an acceptable level of quality and safety for the following reasons:

"1. This ASME Code Case allows the visual (VT-2) examination of properly trained personnel that are already present during the performance of a system pressure test (e.g., Operators, System Engineers, etc.). Implementation of ASME Code Case N-546 would eliminate requiring personnel, such as QC personnel, who only perform the VT-2 examination to enter a radiation field. This reduction in number of personnel involved in the pressure test will reduce personnel exposure at BSEP.

"2. The purpose of a visual (VT-2) examination is to locate evidence of leakage from pressure retaining components during the conduct of a system pressure test. Unlike other visual examinations (VT-1 or VT-3), personnel locating evidence of leakage do not require the same level of qualification requirements needed to determined the mechanical and structural condition of components. The plant experience, training, and visual acuity requirements specified in this ASME Code Case provide adequate qualification for personnel performing visual (VT-2) examinations at BSEP, Units 1 and 2.

"3. ASME Code Case N-546 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on August 24, 1995. This

approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety."

Evaluation: The Code requires that VT-2 visual examination personnel be qualified to levels of competency comparable to those identified in ANSI N45.2.6. The Code also requires that the examination personnel be qualified for near and far distance vision acuity. In lieu of the Code requirements, the licensee proposed to implement Code Case N-546 for personnel performing VT-2 visual examinations, this Code Case includes the following requirements:

1. At least 40 hours plant walkdown experience, such as that gained by licensed and nonlicensed operators, local leak rate personnel, system engineers, and inspection and nondestructive examination personnel.

2. At least four hours of training on Section XI requirements and plant specific procedures for VT-2 visual examination.

3. Vision test requirements of IWA-2321, 1995 Edition.

The qualification requirements in Code Case N-546 are not significantly different from those for VT-2 visual examiner certification. Licensed and non-licensed operators, local leak rate personnel, system engineers, and inspection and nondestructive examination personnel typically have a sound working knowledge of plant components and piping layouts. This knowledge makes them acceptable candidates for performing VT-2 visual examinations.

In addition to meeting the requirements contained in Code Case N-546, the licensee has committed to use procedural guidelines for consistent, quality VT-2 visual examinations, verify and maintain records of the qualification of persons selected to perform VT-2 visual examinations, and perform independent reviews and evaluations of leakage by a person(s) other than those that performed the VT-2 visual examination.

Based on a review of Code Case N-546 and the additional commitments made by the licensee, the INEEL staff believes that the proposed alternative to the Code requirements will provide an acceptable level of quality and safety. Therefore, it is recommended that the licensee's request to implement Code Case N-546 with the additional commitments be authorized pursuant to 10 CFR 50.55a(a)(3)(i). Use of this Code Case should be authorized until such time as the Code Case is published in a future revision of Regulatory Guide 1.147. At that time, if the licensee intends to continue to implement this Code Case, the licensee is to follow all provisions in Code Case N-546 with limitations issued in Regulatory Guide 1.147, if any.

2.12 Request for Relief No. RR-17 Revision 3, IWA-5250(a)(2) Leakage at Bolted Connections

Code Requirement: If leakage occurs at a bolted connection, Paragraph IWA-5250(a)(2) requires the removal of the bolting, a visual (VT-3) examination of the bolting for corrosion, and an evaluation in accordance with Paragraph IWA-3100.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has proposed the use of Code Case N-566-1, *Corrective Action for Leakage Identified at Bolted Connections*, and supplemented by additional actions in those cases where the evaluation of specified factors indicate the need for further evaluation.

The licensee stated:
"When leakage is detected at bolted connections, as an alternative to the requirements of IWA-5250(a)(2), the requirements of either 1 or 2 shall be met:

1. "The leakage shall be stopped and the bolting and component material shall be evaluated to determine joint integrity and the susceptibility of the bolting to corrosion and failure. The evaluation will, at a minimum, consider the following factors:

    a) The number and service age of the bolts
    b) Bolt and component material
    c) Corrosiveness of the process fluid that is leaking
    d) Leakage location and system function
    e) Leakage history at the connection or other system components
    f) Visual evidence of corrosion at the connection (i.e., while the connection is assembled)

2. "If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 to determine joint integrity and the susceptibility of the bolting to corrosion and failure. The evaluation will, at a minimum, consider the following factors:

    a) The number and service age of the bolts
    b) Bolt and component material
    c) Corrosiveness of the process fluid that is leaking
    d) Leakage location and system function
    e) Leakage history at the connection or other system components
    f) Visual evidence of corrosion at the connection (i.e., while the connection is assembled)

    "When the evaluation of the above factors is concluded, and if the evaluation determines that the leaking condition has not degraded the

fasteners, then no further action is required. However, reasonable attempts shall be made to stop the leakage as appropriate. In accordance with IWB-3144(b), the evaluation analyses will be submitted to the regulatory authority having jurisdiction at the plant site.

"If the evaluation of the factors in 1 or 2 above indicates the need for further evaluation, then a bolt closest to the source of leakage shall be removed. The bolt will receive a VT-1 examination and be evaluated and dispositioned in accordance with IWB-3517. If the removed bolting shows evidence of rejectable degradation, all remaining bolts shall be removed and receive a VT-1 examination in accordance with IWB-3140. If leakage is identified when the bolted connection is in service and the information in the evaluation is supportive, the removal of the bolt for the VT-1 examination may be deferred until the next refueling outage."

Licensee's Basis for Proposed Alternative (as stated):
"Paragraph IWA-5250(a)(2) requires that if leakage occurs at a bolted connection, the bolting be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. ASME Code Case N-566-1, 'Corrective Action for Leakage Identified at Bolted Connections,' was approved by the ASME on February 15, 1999, provides an alternative to the requirements of IWA-5250(a)(2) if one of the following requirements is met:

a) The leakage shall be stopped, and the bolting and component material shall be evaluated for joint integrity as described in (c) below.

b) If the leakage is not stopped, the joint shall be evaluated in accordance wit IWB-3142.4 for joint integrity. This evaluation shall include the considerations listed in (c) below.

c) The evaluation of (a) and (b) above is to determine the susceptibility of the bolting to corrosion and failure. This evaluation shall include the following:

   (1) the number and service age of bolts;
   (2) bolt and component material;
   (3) corrosiveness of process fluid;
   (4) leakage location and system function;
   (5) leakage history at the connection or other system components;
   (6) visual evidence of corrosion at the assembled connection.

"Code Case N-566-1 has not yet been incorporated into the latest revision of NRC Regulatory Guide 1.147, 'Inservice Inspection Code Case Acceptability-ASME Section XI, Division 1.'

"Revision 1 of ASME Code Case N-566 (i.e., N-566-1) stipulates that either (1) the leakage at the bolted connection be stopped and the bolting and component material evaluated for joint integrity or (2) evaluating the joint integrity in accordance with IWB-3142.4 for joint integrity if the leakage is not stopped. IWB-3142.4 states that components containing relevant conditions are acceptable for continued service if any analytical evaluation demonstrates the component's acceptability. IWB-3142.4 also requires that the analysis and evaluation acceptance criteria be specified. Code Case N-566-1 also specifies the factors that should be used in performing the evaluation.

"As an alternative to the requirements of IWA-5250(a)(2), CP&L proposes to follow the requirements of ASME Code Case N-566-1. Also, in addition to the requirements of Code Case N-566-1, CP&L proposes an additional action in those cases where the evaluation of the specified factors indicates the need for further evaluation. In such cases, a bolt closest to the source of leakage will be removed. The removed bolt will receive a VT-1 examination and be evaluated and dispositioned in accordance with IWB-3517. If the removed bolt shows evidence of rejectable degradation, all remaining bolts will be removed and receive a VT-1 examination in accordance with IWB-3140. If leakage is identified when the bolted connection is in service and the information in the evaluation is supportive, the removal of the bolt for the VT-1 examination may be deferred until the next refueling outage.

"CP&L has determined that implementation of the proposed alternative will provide an acceptable level of quality and safety for the following reasons:

1. "CP&L has determined that implementation of the IWA-5250(a)(2) requirement can have an adverse impact on plant operation and personnel exposure. For example, the disassembly and re-assembly of components for the performance of the visual (VT-3) examination on the bolting has the potential to delay the return of a safety related system to service, delay of plant startup following the completion of the Class 1 leakage test, and the potential for significant additional radiation dose.

2. "A significant portion of the pressure retaining bolting is made of stainless steel materials. Since the normal Class 1 pressure boundary of a boiling water reactor contains only demineralized water, the likelihood of severe corrosion is minimal. While stainless steel bolting is more susceptible to stress corrosion cracking under certain conditions, the detection of this type of corrosion on bolting material is difficult with the visual (VT-3) examination technique.

3. "During each refueling outage, a Class 1 ASME Section XI leakage test is performed. A majority of the bolted connection leakage found during these leakage tests is associated with the Control Rod Drive

(CRD) housing connections. This is a common industry occurrence and, in most cases, the leakage stops within 8 hours of being pressurized to greater than 1000 psig. In addition, a number of CRDs are replaced each refueling outage. As with current practice, the bolting is replaced and a baseline visual (VT-3) examination performed prior to installation. Should leakage be detected at these CRDs, the requirements of IWA-5250(a)(2) would mandate removal of the bolting and performance of a VT-3 examination on the bolting that has just been examined, even though the bolting has not been exposed to the service environment. Thus, the removal of the bolting for the sole purpose of performing a visual (VT-3) examination would result in personnel exposure without a compensating increase in quality and safety.

4. "The majority of the Class 2 systems transport a non-corrosive medium such as demineralized water, nitrogen, or air. Since the medium is non-corrosive, the bolted connections associated with these systems would not be susceptible to severe corrosion. Thus, the disassembly and re-assembly of a bolted connection for the performance of the visual (VT-3) examination of the bolting has the potential to delay the return of a safety related system to service.

"Based on the above, the proposed alternative will ensure the structural integrity of the affected joint is maintained, while reducing operational, maintenance, and radiological hardships resulting from the current ASME Code Requirement.

Evaluation: In accordance with IWA-5250(a)(2), if leakage occurs at a bolted connection, the bolting must be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. In lieu of this requirement, the licensee has proposed the use of Code Case N-566-1 *Corrective Action for Leakage Identified at Bolted Connections*, supplemented by additional actions in those instances where the evaluation of the specified factors identified in the Code Case indicate the need for further evaluation. The additional actions include the removal of a bolt closest to the source of leakage. The bolt will be visually examined (VT-1) and evaluated in accordance with the acceptance criteria of IWB-3517. If the removed bolt shows evidence of rejectable degradation, all remaining bolts shall be removed and receive a visual examination (VT-1).

Based on the items included in Code Case N-566-1 and the additional actions proposed by the licensee, the INEEL staff believes that the alternative proposed by the licensee presents a sound engineering approach and will provide an acceptable level of quality and safety. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i). Use of this Code Case should be authorized until such time as the Code Case is published in a future revision of Regulatory

Guide 1.147. At that time, if the licensee intends to continue to implement this Code Case, the licensee is to follow all provisions in Code Case N-546 with limitations issued in Regulatory Guide 1.147, if any.

2.13 Request for Relief No. RR-18, Use of Code Case N-573, *Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1*

Code Requirement: Paragraph IWA-4400(a) requires welding (including brazing) to be performed in accordance with welding procedure specifications (WPS) that have been qualified by the Owner or repair organization in accordance with the requirements of the codes specified in the repair program in accordance with paragraph IWA-4120.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the Code's requirements applicable to the welding and brazing procedure qualification records for Class 1, 2, and 3 components (including their supports) and proposed to implement Code Case N-573, *Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1*.

The licensee stated:
"During the Third Inspection Interval, CP&L will implement the alternative requirements of ASME Code Case N-573."

Licensee's Basis for Proposed Alternative (as stated):
"In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) is requesting approval to implement alternative requirements to those specified in paragraph IWA-4400(a). CP&L proposes to implement the alternative requirements outlined in ASME Code Case N-573, Transfer of Procedure Qualification Records Between Owners.

"The alternative requirements outlined in ASME Code Case N-573 have been evaluated by CP&L, and CP&L has determined that implementation of these requirements will provide an acceptable level of quality and safety for the following reasons:

"1. The alternative requirements of ASME Code Case N-573 allows the transfer of a procedure qualification record (PQR) qualified by one owner to another owner. ASME Code Case N-573 requires the owner to certify that the testing was performed in accordance with ASME Section IX and the procedure qualification was conducted in accordance with a Quality Assurance Program that satisfies the requirements of paragraph IWA-1400. CP&L has evaluated the alternative requirements specified for the owner qualifying the PQR and determined them acceptable for assuring quality and safety at BSEP.

"2. The alternative requirements of ASME Code Case N-573 specify an acceptable level of controls for the owner accepting a PQR. For example, CP&L would be required to (1) review and accept the responsibility of the PQR and (2) demonstrate technical competence in application of the received PQR by completing a performance qualification test using the parameters of a resulting WPS. These actions will ensure the acceptability of the PQR prior to it being used at BSEP.

"3. ASME Code Case N-573 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on March 12, 1997. This approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants. CP&L agrees that implementation of this ASME Code Case will provide an acceptable level of quality and safety."

Evaluation: IWA-4400(a) requires that all welding be performed in accordance with Welding Procedure Specifications (WPS) that have been qualified by the Owner or repair organization in accordance with the requirements of the codes specified in the Repair Program, per IWA-4120. The licensee has proposed the use of Code Case N-573, *Transfer of Procedure Qualification Records Between Owners*. This Code Case essentially allows the use of a welding or brazing procedure qualification record (PQR) qualified by one Owner to be used by another Owner for the development of the WPS. The specific requirements listed in Code Case N-573 shall be met by the Owner that performed the procedure qualification, and by the Owner intending to use the PQR. These requirements are:

(a) The Owner that performed the procedure qualification test shall certify, by signing the PQR, that testing was performed in accordance with Section IX.

(b) The Owner that performed the procedure qualification test shall certify, in writing, that the procedure qualification was conducted in accordance with a Quality Assurance Program that satisfies the requirements of IWA-1400.

(c) The Owner accepting the completed PQR shall accept responsibility for obtaining any additional supporting information needed for WPS development.

(d) The Owner accepting the completed PQR shall document, on each resulting WPS, the parameters applicable to welding. Each WPS shall be supported by all necessary PQR's.

(e) The Owner accepting the completed PQR shall accept responsibility for the PQR. Acceptance shall be documented by the Owner's approval of each WPS that references the PQR.

(f) The Owner accepting the completed PQR shall demonstrate technical competence in application of the received PQR by completing a performance qualification test using the parameters of a resulting WPS.

(g) The Owner may accept and use a PQR only when it is received directly from the Owner that certified the PQR.

(h) Use of this Code Case shall be shown on the NIS-2 form documenting welding or brazing.

The INEEL staff believes that qualification of a procedure for the purpose of joining materials by either welding or brazing may be performed by any Owner provided the applicable requirements for procedure qualification are maintained. The INEEL staff also believes that Owners may use procedures qualified by other Owners provided the conditions/requirements listed in Code Case N-573 are met. The licensee has committed to comply with requirements specified in Code Case N-573. Therefore, the proposed alternative provides an acceptable level of quality and safety and the use of this alternative should be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third inspection interval at BSEP, or until Code Case N-573, *Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1*, is approved for general use by reference in Regulatory Guide 1.147. After that time, the licensee must follow the conditions, if any, specified in the regulatory guide.

2.14 Request for Relief No. RR-19, Use of Code Case N-561, *Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping*

Code Requirement: IWA-4000 provides the rules and requirements for repair of pressure retaining components.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed the use of Code Case N-561.
The licensee stated:

> "During the Third Inspection Interval, CP&L will implement (as required) the requirements of ASME Code Case N-561. CP&L will not implement these provisions on conditions involving corrosion-assisted cracking or any other form of cracking."

Licensee's Basis for Proposed Alternative (as stated):

> "In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) is requesting approval to implement the requirements of ASME Code N-561 for Class 2 and high-energy (i.e., greater than 200°F or 275 psig maximum operating conditions) Class 3 carbon steel piping. CP&L proposes to implement the requirements specified in this ASME

Code Case as a supplement to the rules and requirements specified in Article IWA-4000.

"The requirements outlined in ASME Code Case N-561 have been evaluated by CP&L, and CP&L has determined that implementation of these requirements will provide an acceptable level of quality and safety for the following reasons:

1. The requirements of ASME Code Case N-561 allows carbon steel piping experiencing internal thinning or pitting to be restored by means of a weld-deposited carbon or low-alloy steel reinforcement (i.e., weld overlay) on the outside surface of the piping. This type of repair was approved for austenitic stainless steel piping (ASME Code Case N-504) and authorized for use by the Nuclear Regulatory Commission (NRC) in Regulatory Guide 1.147 (Revision 11). CP&L has reviewed the requirements of ASME Code Case N-561 and ASME Code Case N-504 and determined the controls governing the design, installation, and examination to be comparable. Thus, CP&L has determined that the implementation of ASME Code Case N-561 would provide the same acceptable level of quality and safety at BSEP as ASME Code Case N-504.

2. The General Requirements specified in ASME Code Case N-561 will provide appropriate controls for evaluating the wall thickness restoration. An initial evaluation must be performed to establish the existing average wall thickness, the extent of the degradation, and impact of the repair on the piping. This evaluation is also required to consider the cause of degradation. CP&L has evaluated these requirements and determined them to be acceptable. If this ASME Code Case is used, CP&L will perform this evaluation in accordance with a plant approved procedure.

3. The wall thickness restoration activity will be performed in accordance with CP&L's Repair/Replacement Program. Performance of this activity in accordance with CP&L's Repair/Replacement Program will ensure the requirements specified in paragraph IWA-4140 are met and the services of the Authorized Inspection Agency are used. Upon completion of this activity, a NIS-2 or NIS-2A Form will be completed and approved.

4. ASME Code Case N-561 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on December 31, 1996. This approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants. CP&L agrees that the implementation of this ASME Code Case will provide an acceptable level of quality and safety.

Evaluation: IWA-4000 provides the rules and requirements for repair of pressure retaining components. As an alternative to replacement the licensee has proposed the use of Use of Code Case N-561, *Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping*. Code Case N-561 allows the licensee to perform wall thickness restoration of piping experiencing internal erosion/corrosion degradation (corrosion-assisted cracking or any other form of cracking is excluded) by means of a carbon or low-alloy steel weld overlay applied to the outside surface of the affected area of piping.

Many licensees have detected degradation in certain portions of carbon steel piping due to phenomena such as flow-assisted corrosion (FAC), microbiological influenced corrosion (MIC), or other forms of localized erosion/corrosion. Historically, the Code has required these portions of degraded piping to be replaced with new piping segments. Code Case N-561 would allow the licensee to repair localized regions of corrosion with welded overlays. Code repairs require that an assessment of the structural integrity be performed to maintain safety margins throughout the intended service period until the next scheduled inspection occurs. In order to make such an assessment, licensees must 1) determine the extent of degradation, 2) make assumptions concerning the expected rate of future degradation (including providing a basis for these assumptions), and 3) apply appropriate rules for the reinspection of the repaired areas.

The Staff has evaluated Code Case N-561 and concluded that neither the Code nor the Code Case have sufficient rules for determining the rate or extent of the degradation of the repair or the surrounding based metal. In addition, reinspection requirements are not specifically defined to verify the structural integrity of the component since the root cause may not be mitigated. Therefore, Code Case N-561 does not provide an acceptable level of quality and safety, and it is recommended that the licensee's proposed alternative not be authorized.

2.15 Request for Relief No. RR-20, Use of Code Case N-562, *Alternative Requirements for Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping*

Code Requirement: IWA-4000 provides the rules and requirements for repair of pressure retaining components.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed the use of Code Case N-562.
The licensee stated:

"During the Third Inspection Interval, CP&L will implement (as required) the requirements of ASME Code Case N-562. CP&L will not implement these provisions on conditions involving corrosion-assisted cracking or any other form of cracking."

Licensee's Basis for Proposed Alternative (as stated):

"In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) is requesting approval to implement the requirements of ASME Code N-562 for Class 3 moderate energy (i.e., less than or equal to 200°F or 275 psig maximum operating conditions) carbon steel piping. CP&L proposes to implement the requirements specified in this ASME Code Case as a supplement to the rules and requirements specified in Article IWA-4000.

"The requirements outlined in ASME Code Case N-562 have been evaluated by CP&L, and CP&L has determined that implementation of these requirements will provide an acceptable level of quality and safety for the following reasons:

1. The requirements of ASME Code Case N-562 allows carbon steel piping experiencing internal thinning or pitting to be restored by means of a weld-deposited carbon or low-alloy steel reinforcement (i.e., weld overlay) on the outside surface of the piping. This type of repair was approved for austenitic stainless steel piping (ASME Code Case N-504) and authorized for use by the Nuclear Regulatory Commission (NRC) in Regulatory Guide 1.147 (Revision 11). CP&L has reviewed the requirements of ASME Code Case N-562 and ASME Code Case N-504 and determined the controls governing the design, installation, and examination to be comparable. Thus, CP&L has determined that the implementation of ASME Code Case N-562 would provide the same acceptable level of quality and safety at BSEP as ASME Code Case N-504.

2. The General Requirements specified in ASME Code Case N-562 will provide appropriate controls for evaluating the wall thickness restoration. An initial evaluation must be performed to establish the existing average wall thickness, the extent of the degradation, and impact of the repair on the piping. This evaluation is also required to consider the cause of degradation. CP&L has evaluated these requirements and determined them to be acceptable. If this ASME Code Case is

used, CP&L will perform this evaluation in accordance with a plant approved procedure.

3. The wall thickness restoration activity will be performed in accordance with CP&L's Repair/Replacement Program. Performance of this activity in accordance with CP&L's Repair/Replacement Program will ensure the requirements specified in paragraph IWA-4140 are met and the services of the Authorized Inspection Agency are used. Upon completion of this activity, a NIS-2 or NIS-2A Form will be completed and approved.

4. ASME Code Case N-562 was approved by the ASME's Main Committee and the Board of Nuclear Codes and Standards on December 31, 1996. This approval signifies the requirements outlined in this ASME Code Case will provide an acceptable level of quality and safety for nuclear power plants. CP&L agrees that the implementation of this ASME Code Case will provide an acceptable level of quality and safety.

Evaluation: IWA-4000 provides the rules and requirements for repair of pressure retaining components. As an alternative to replacement the licensee has proposed the use of Use of Code Case N-562, *Alternative Requirements for Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping*. Code Case N-562 allows the licensee to perform wall thickness restoration of piping experiencing internal erosion/corrosion degradation (corrosion-assisted cracking or any other form of cracking is excluded) by means of a carbon or low-alloy steel weld overlay applied to the outside surface of the affected area of piping.

Many licensees have detected degradation in certain portions of carbon steel piping due to phenomena such as flow-assisted corrosion (FAC), microbiological influenced corrosion (MIC), or other forms of localized erosion/corrosion. Historically, the Code has required these portions of degraded piping to be replaced with new piping segments. Code Case N-562 would allow the licensee to repair localized regions of corrosion with welded overlays. Code repairs require that an assessment of the structural integrity be performed to maintain safety margins throughout the intended service period until the next scheduled inspection occurs. In order to make such an assessment, licensees must 1) determine the extent of degradation, 2) make assumptions concerning the expected rate of future degradation (including providing a basis for these assumptions), and 3) apply appropriate rules for the reinspection of the repaired areas.

The Staff has evaluated Code Case N-562 and concluded that neither the Code nor the Code Case have sufficient rules for determining the rate or extent of the degradation of the repair or the surrounding based metal. In

addition, reinspection requirements are not specifically defined to verify the structural integrity of the component since the root cause may not be mitigated. Therefore, Code Case N-562 does not provide an acceptable level of quality and safety, and it is recommended that the licensee's proposed alternative not be authorized.

2.16 Request for Relief No. RR-21 Revision 1, Examination Categories with Less Than Three Items or Welds

Code Requirement: IWC-2412(a) requires that the examinations in each examination category be completed according to the percentage requirements of Tables IWC-2412-1.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has proposed an alternative to the Code's examination percentages for examination categories with less than three items or welds.

The licensee stated:
"During the Third Inspection Interval, CP&L shall perform the examinations for ASME Code Category C-B in their entirety during the same inspection period as was performed in the Second Inspection Interval.

Licensee's Basis for Proposed Alternative (as stated):

"The alternative requirement discussed above has been evaluated by CP&L, and CP&L has determined that implementation of these alternative requirements will provide an acceptable level of quality and safety for the following reasons:

1. Paragraph IWC-2412(a) of the 1989 Edition infers that if a plant has less than three items or welds, the owner must still distribute the corresponding examinations over three Inspection Periods to meet the percentage requirements. This results in dividing an examination between Inspection Periods or performing an examination more than once during the same Interval. Neither provides an additional level of quality or safety and both impose an unnecessary burden on CP&L due to equipment and scaffolding setup time and personnel radiation exposure.

2. Recognizing this burden to the owners, paragraphs IWC-2412(a) was revised in the 1994 Addenda to permit an alternative to the percentage requirements specified in Table IWC-2412-1 for owners with less than three items or welds in an Examination Category. As evaluated by CP&L, this revision to the ASME Code paragraph provides an acceptable level of quality and safety at BSEP. Approval of this change to the ASME Code, Section XI by the ASME Main Committee and the Board of Nuclear Codes and Standards also

RR-3, RR-11, Revision 1, RR-16, Revision 1, RR-17, Revision 3, RR-18, and RR-21 Revision 1, the INEEL concludes that the licensee's proposed alternatives will provide an acceptable level of quality and safety, and should be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third ISI interval.

For Requests for Relief Nos. RR-2, RR-4, RR-7, the licensee has demonstrated that the Code examination coverage requirements are a hardship without a compensating increase in quality and safety. Therefore, it is recommended that the proposed alternatives be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Requests for Relief Nos. RR-6, RR-9, and RR-10 have been found acceptable by the Staff, as shown in Revision 12 of Regulatory Guide 1.147. Therefore, these relief requests are acceptable for use by the licensee, subject to the conditions listed in the Regulatory Guide, if any.

For Requests for Relief RR-19, and RR-20, the Staff concludes that the licensee's proposed alternatives do not provide an acceptable level of quality and safety. Therefore, it is recommended that the proposed alternatives not be authorized.

cc:

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Template NRR-028

The staff's evaluation is enclosed. A copy of the INEEL Technical Letter Report is attached to the evaluation.

Sincerely,

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management

Docket Nos. 50-324 and 50-325

Enclosure: As stated

cc w/encl: See next page

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