July 20, 2007

Mr. L. M. Stinson
Vice President
Southern Nuclear Operation
Company, Inc
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2, EVALUATION OF THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN REQUEST FOR RELIEF NOS. RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR-56, RR-57 AND RR-61 (TAC NOS. MD2592, MD2593, MD2594, MD2595, MD2596, MD2598, MD2599, MD2602, MD2603, MD2604, MD2605, MD2606, MD2607, MD2608, AND MD2612)

Dear Mr. Stinson:

By letter dated July 10, 2006, as supplemented on April 13, and May 30, 2007, Southern Nuclear Operating Company, Inc. (the licensee), submitted requests for relief (RR) RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR-56, RR-57 and RR-61 from certain requirements of Section XI of the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* (ASME Code), under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a for the Edwin I. Hatch Nuclear Plant, Unit No.1 (HNP-1) and Unit No. 2 (HNP-2).

Based on the review of the information the licensee provided, the NRC staff finds that ASME Code examination coverage requirements for RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR-56, RR-57 and RR-61 are impractical and that the licensee's proposed alternatives provide reasonable assurance of integrity of the subject welds. Therefore, the requested relief is authorized pursuant to 10 CFR 50.55a(g)(6)(i) for the remainder of the third 10-year inservice inspection interval for HNP-1 and HNP-2. Granting of relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Bob Martin at 301-415-1493.

Sincerely,

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Safety Evaluation

cc w/encl: See next page

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Bob Martin at 301-415-1493.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF NOS. RR-46, RR-47, RR-48, RR-49, RR-50

RR-52, RR-53, RR-54, RR-55, RR-56, RR-57, AND RR-61

EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-321 AND 50-366

1.0 INTRODUCTION

By letter dated July 10, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML061910425), as supplemented on April 13, 2007 (ML071030409), and May 30, 2007 (ML071500585), Southern Nuclear Operating Company, Inc. (the licensee), submitted requests for relief (RR) RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR-56, RR-57 and RR-61 from certain requirements of Section XI of the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* (ASME Code), under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a for the Edwin I. Hatch Nuclear Plant, Unit 1 (HNP-1) and Unit 2 (HNP-2).

2.0 REGULATORY REQUIREMENTS

Inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i).

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 ASME 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 ASME Code of record for the HNP-1 and HNP-2 third 10-year interval ISI program is the 1989 edition with no addenda of Section XI of the ASME Code. In addition,10 CFR 50.55a(g)(6)(ii)(C) required a scheduled implementation of Appendix VIII to Section XI. Licensees implementing the 1989 edition of Section XI are required to implement the 1995 edition with the 1996 addenda of Appendix VIII and the supplements to Appendix VIII, of Section XI.

3.0 EVALUATION

The following additional information on the HNP-1 and HNP-2 leakage and radiation monitoring systems was provided in the licensee's letter dated April 13, 2007, and May 30, 2007, and applies to RR Nos. RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR- 56, RR-57, and RR-61 as a basis for relief regarding identifying leakage from system and component welds identified in each of the licensee's RRs.

NRC Staff's (Staff's) Request for Additional Information

Describe the plant's leakage and radiation monitoring systems with regard to identifying leakage from the system and component welds identified in each of the RRs.

Licensee's Response (As Stated)

Leakage Detection System (LDS)

The LDS is described in more detail in HNP-1 [Final Safety Analysis Report] FSAR Section 4.10 and HNP-2 FSAR Section 5.2.7.

Inside drywell

Drywell floor drain sump measurement monitors the normal design leakage collected in the floor drain sump. The drywell equipment drain sump measurement monitors identified leakage collected in the equipment drain sump, and is a closed system which receives leakage only from identified sources. All leakage inside the drywell will flow to one of these two sumps. The "unidentified leakage" is the portion of the total leakage rate received in the drywell sumps that cannot be attributed to pumps, valve seals, and the [Reactor Pressure Vessel] RPV head seal. The [Technical Specifications] TS limit for unidentified leakage is 5 gpm [gallons per minute]. This value is based on, but conservatively much less than, the calculated flow (150 gpm) from a critical crack inside the drywell. The LDS is required to detect unidentified leakage of 5 gpm within one hour, but is capable of measuring much lower leakage rates. The post-accident radiation monitoring system (RMS) is part of the redundant LDS. The drywell fission products monitoring system provides a continuous air sampling of the drywell atmosphere through monitoring gross particulates, iodine, and noble gases. This system supplements the other methods and provides improved sensitivity to aid in determining the size and general source of leaks, particularly steam leaks.

Reactor Building

Outside the primary containment, each system is monitored in compartments, or rooms, so that leakage may be detected by leak detection sumps and area temperature indications. An increase in the normal rate of leakage into the floor drain sumps results in actuation of an alarm in the Main Control Room (MCR). Thermocouples in the Reactor Building rooms monitor ambient air temperature as well as temperature differential in the inlet/outlet of the normal ventilation and the standby coolers. High ambient air temperature or high differential temperature causes an alarm to annunciate in the MCR.

Main Steam Pipe Chase

The main steam lines are continuously monitored for leaks via the following operating parameters: sensed temperature, flowrate, and low level in the RPV. Upon leak detection, an alarm annunciates in the MCR, and, depending on the parameter, initiates steam line isolation. In addition, main steam line radiation monitoring supplements the leak detection capability and aids in determining the size and general source of the leak.

Turbine Building

The turbine building contains thermocouples and temperature-indicating switches, and an excessive rise in temperature from multiple indicators automatically isolates the main steam lines. The turbine building also contains an equipment drain sump and a floor drain sump. The frequency and duration of sump pumpout are monitored to aid in leak detection. In addition, turbine building radiation monitoring supplements the leak detection capability and aids in determining the size and general source of the leak.

RR-46 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Category B-F, Item B5.130, stainless steel pipe to Inconel buttered carbon steel valve weld 1E11-1RHR-24A-R-12. This shop weld joins a 304 stainless steel extension piece to carbon steel valve 1E11-F060A. This carbon steel valve was buttered with INCO-WELD A and then machined to a final configuration. The buttering was designed to be a minimum of 3/16" thick after machining. The buttered valve was then welded to the stainless steel extension piece. INCO-WELD A has properties similar to Inconel 182.

ASME Code Requirements

Table IWB-2500-1, Examination Category B-F, Item B5.130 requires that 100 percent (%) of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination (As Stated)

While the ultrasonic examination coverage was limited, alternatively, much of the area where potential circumferential stress corrosion cracking (SCC) would originate (weld root and the inside surface of adjacent material on each side of the weld) was examined

with a 60° [refracted longitudinal (RL)] wave. Additionally, this weld was Induction Heat Stress Improved (IHSI) during the 1985/1986 refueling outage to reduce the potential for stress corrosion cracking.

Because of the limited coverage and the presence of Inconel, a flaw tolerance evaluation was performed for the weld by Structural Integrity Associates. The evaluation showed that the flaw tolerance is substantial even for a full circumferential crack. For example, a fully circumferential flaw with a depth of less than 43% of the wall would be acceptable for continued operation.

Although the limited coverage does not meet the ASME Code Section XI inspection coverage requirements, there remains reasonable assurance that the structural integrity of the joint will be maintained. This conclusion is based on: (1)The potential for SCC at this location has been mitigated, (2) the examination covered much of the SCC susceptible area, and (3) the weld has been evaluated as having substantial tolerance to flaws.

Licensee's Basis for Relief Request

The licensee proposes that it is impractical to achieve 100% coverage of the subject weld. The coverage obtained was 29% based on the Performance Demonstration Initiative (PDI) procedural requirements. The licensee provided a figure which shows that the examination is limited by the overall configuration of the weld joint. Once the leading edge of the transducer reaches the pipe/weld interface, scanning is stopped. Even with grinding the weld, the PDI procedural requirements would not allow further examination due to the taper. Appreciably increasing the PDI coverage is impractical. With the configuration, coverage for circumferential flaws using a 45° transducer is limited to the heat affected zone of the stainless steel extension piece side. When scanning for circumferential flaws using a 60° RL wave, coverage is limited to (1) the heat affected zone of the stainless steel extension piece side, (2) the root of the weld, and (3) a portion of the INCO-WELD A buttering. The licensee stated that to obtain additional coverage the valve would require replacement with a different design or overlaying the weld.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining dissimilar metal welds in piping. The licensee performed the examination using PDI requirements. As shown on the sketches and technical descriptions provided by the licensee, the examination of the subject weld was limited by the configuration. For the licensee to achieve 100% volumetric coverage, the valve would have to be redesigned and replaced. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examination is impractical.

The licensee was able to examine approximately 29% of the ASME Code-required volume. The ultrasonic examination performed by the licensee did not detect any unacceptable indications. The licensee supplemented the limited examination by performing a flaw tolerance evaluation. The evaluation showed that the flaw tolerance is very high even for a full circumferential crack. In addition, the weld was induction heat stress improved during the 1985/1986 refueling outage to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for the subject weld and the evaluated high flaw tolerance, if significant service induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected. In

addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject weld.

RR-47 (HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Category B-F, Item B5.130, carbon steel pipe to Inconel safe-end extension piece - weld 2B21-1FW-12AA-8

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-F, Item B5.130 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination

Coverage of the subject weld was about 75%, using pre-Performance Demonstration Initiative ultrasonic examination procedures. On the Inconel side of the weld, there is a weld overlay which extends out to the edge of the weld. The examination was performed using an automated system utilizing 45° shear wave and 45°/60° refracted longitudinal wave search units. Coverage for circumferentially oriented flaws was essentially 100% with scans for axial flaws being limited to the carbon steel pipe side. It is impractical to appreciably increase code coverage. Obtaining more coverage would require replacement of the feedwater nozzle safe-end configuration and associated thermal sleeve to eliminate the overlay obstruction or, alternately, the overlay would need to be extended over 2B21-1FW-12AA-8.

Licensee's Basis for Relief Request (As Stated)

> This weld had a mechanical stress improvement process (MSIP) performed on it in 1994, which mitigated the potential for stress corrosion cracking (SCC). With the SCC mitigation and the high level of coverage for circumferential flaws there is reasonable assurance of structural integrity.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining dissimilar metal piping welds. As shown on the sketch and technical description provided by the licensee, the examinations of the subject weld were limited due to the configuration of the weld, including a weld overlay on one side of the weld which restricted the examination. For the licensee to achieve 100% volumetric coverage, the subject feedwater nozzle safe-end configuration and associated thermal sleeve would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 75% of the ASME Code-required volume for the subject weld. The ultrasonic examination of the subject weld was performed using ASME Code, Section XI, Appendix III. The examination performed by the licensee did not detect any unacceptable indications and the weld was mechanically stress improved in 1994 to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for the subject weld (2B21-1FW-12AA-8), if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examination that was performed. In addition, HNP-2 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject weld.

RR-48 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Examination Category B-F, Item B5.10, low alloy steel nozzle to 304 stainless steel safe-end joined by Inconel welds 1B31-1RC-28A-1 and 1B31-1RC-28B-1.

ASME Code Requirements

ASME Code, Table IWB-2500-1, Examination Category B-F, Item B5.10, requires that essentially 100% of the length of each weld is to be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination

Using Performance Demonstration Initiative (PDI) procedural requirements, the licensee obtained 77% coverage for weld 1B31-1RC-28A-1 and 85% coverage for weld 1B31-1RC-28B-1. The licensee provided figures that show the examination is limited by the presence of an adjacent weld overlay. The overlay adjacent to 1B31-1RC-28A-1 is closer to the weld edge than the one adjacent to 1B31-1RC-28B-1; therefore, the coverage for 1B31-1RC-28B-1 is greater than the coverage for 1B31-1RC-28A-1. The 45° and 60° refracted longitudinal coverage scanning for circumferential flaws was 100%. The licensee finds that it is impractical to obtain appreciably more coverage.

Obtaining more coverage would require replacement of the recirculation nozzle safe-ends for the two nozzles to eliminate the overlay obstruction. The existing stainless steel overlay can not be practically extended over Inconel welds 1B31-1RC-28A-1 and 1B31-1RC-28B-1.

Licensee's Basis for Relief Request (As Stated)

> These welds were stress improved using the induction heat stress improvement (IHSI) process during the 1985/1986 outage, which mitigated the potential for stress corrosion cracking (SCC). With the SCC mitigation and the high level of coverage for circumferential flaws there is reasonable assurance of structural integrity.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining dissimilar metal nozzle to safe end welds. As shown on the sketches and technical description provided by the licensee, the examinations of the subject welds were limited by the presence of adjacent weld overlays. For the licensee to achieve 100% volumetric coverage, the associated recirculation nozzle safe-ends for the two nozzles would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 77% for weld 1B31-1RC-28A-1 and 85% for weld 1B31-1RC-28B-1 of the ASME Code-required volumes. The ultrasonic examinations of the subject welds were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, as administered through the PDI program. The examinations performed by the licensee did not detect any unacceptable indications. In addition, these welds were stress improved during the 1985/1986 outage to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for the subject nozzle to safe-end welds, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject nozzle welds.

RR-49 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Examination Category B-F, Item B5.130, carbon steel pipe to 304 stainless steel safe-end extension piece welds with Inconel welds identified as 1E21-1CS-10A-18A and 1E21-1CS-10B-19A.

ASME Code Requirements

ASME Code, Section XI, Examination Category B-F, Item B5.130 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination

Using Performance Demonstration Initiative (PDI) procedural requirements, the licensee obtained 73% to 74% coverage for welds 1E21-1CS-10A-18A and 1E21-1CS-10B-19A. The licensee provided a figure that shows the examination is limited by the overall configuration of the weld joint. The 45° and 60° refracted longitudinal coverage scanning for circumferential

flaws was 100%. Scans for axially oriented flaws were limited to the pipe side. The licensee finds that it is impractical to obtain appreciably more coverage.

Obtaining more coverage would require replacement of the core spray nozzle safe-end configurations for the two nozzles.

Licensee's Basis for Relief Request (As Stated)

> These welds had a mechanical stress improvement process (MSIP) performed on them in 1994 which mitigated the potential for stress corrosion cracking (SCC). With the SCC mitigation and the high level of coverage for circumferential flaws there is reasonable assurance of structural integrity. Therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining dissimilar metal piping butt welds. As shown on the sketches and technical descriptions provided by the licensee, the examinations of the subject nozzles were limited by the configuration of the nozzle and safe-end. For the licensee to achieve 100% volumetric coverage, the subject nozzles would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine 73% of weld 1E21-1CS-10A-18A and 74% of weld 1E21-1CS-10B-19A of the ASME Code-required volumes. The ultrasonic examinations of the subject welds were performed using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, as administered through the PDI program. The examinations performed by the licensee did not detect any unacceptable indications. In addition, these welds had a mechanical stress improvement process performed on them in 1994 to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for the nozzle to safe-end welds 1E21-1CS-10A-18A and 1E21-1CS-10B-19A, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-50 (HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Examination Category B-J, Item B9.11, austenitic piping welds:

2B31-1RC-4JP-A-2	Safe End to Seal Penetration Weld
2B31-1RC-4JP-B-2	Safe End to Seal Penetration Weld

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, Item B9.11 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination

Coverage of the subject welds was about 75%, using pre-Performance Demonstration Initiative ultrasonic examination procedures. The examination limitations for these welds are due to the design of components which restricts the access for ultrasonic examinations (UT). The licensee provided a figure which shows there is no access on the seal penetration side because of a large upward taper starting near the weld; therefore, the examination could only be performed from the safe-end side. For circumferentially oriented flaws 100% coverage was obtained and 50% for axially oriented flaws. Appreciably increasing coverage is impractical. The licensee states that to increase coverage would require replacement of the jet pump nozzle safe-end configurations for the two nozzles.

Licensee's Basis for Relief Request (as stated)

> Each of these welds was stress improved in 1994 to protect against stress corrosion cracking using the mechanical stress improvement process (MSIP), which mitigated the potential for stress corrosion cracking (SCC). With the SCC mitigation and the high level of coverage for circumferential flaws there is reasonable assurance of structural integrity.

Staff's Evaluation

ASME Code, Section XI, Examination Category B-J, Item B9.11 requires 100% volumetric examination of pressure retaining circumferential welds in piping. As shown on the sketches and technical descriptions provided by the licensee, the examinations of the subject welds were limited by the configuration of the components. Access on the seal penetration side of the subject welds is restricted due to a large upward taper that starts near the welds. For the licensee to achieve 100% volumetric coverage, the subject welds would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine 75% of the ASME Code-required volumes for the subject safe end to seal penetration welds. The ultrasonic examinations of these welds are listed as pre-PDI examination and were performed using ASME Code, Section XI, Appendix III. The examinations performed by the licensee did not detect any unacceptable indications. In addition, these welds were stress improved in 1994 to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for welds 2B31-1RC-4JP-A-2 and 2B31-1RC-4JP-B-2 , if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-2 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-52 (HNP1 and HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Examination Category B-J, Item B9.11, carbon steel piping welds as shown in Table RR-52-1 (HNP-1) and Table RR-52-2 (HNP-2) below.

TABLE RR-52-1

Weld	Description	Coverage	Basis for Limited Coverage
1B21-1MS-24B-10	Pipe to Elbow	49%	PDI Examination. Dual-sided examination. Obstructed by a welded pipe support
1B21-1FW-18A-15	Elbow to Tee	75%	Pre-PDI Examination. Single-sided examination with 100% coverage for circumferential flaws from the elbow side. Coverage for axial flaws was limited to the elbow side.
1R11-1RHR-24A-R-9	Valve to Pipe	75%	Pre-PDI Examination. Single-sided examination with 100% coverage for circumferential flaws from the pipe side. Coverage for axial flaws was limited to the pipe side.
1E21-1CS-10A-7	Valve to Elbow	65%	PDI Examination. Single-sided examination from the elbow side. The curvature of the elbow limited coverage to 65%
1E51-1CIC-4-D-23	Pipe to Valve	68%	Pre-PDI Examination. Single-sided examination with 100% coverage obtained for circumferential flaws from the pipe side. Coverage for axial flaws was limited to the pipe side.

TABLE RR-52-2

Weld	Description	Coverage	Basis for Limited Coverage
2E21-1CS-10A-1	Valve to Pipe	73%	Pre-PDI Examination. Single-sided examination. The volume covered in two beam directions was 63% and an additional 20% from a single direction.
2E21-1CS-10A-10	Elbow to Pipe	100% UT 75% MT	PDI Examination. Coverage obtained for UT examination was 100%. Surface examination coverage 75% due to clamp. Later, approval of relief request RR-40 eliminated surface examinations
2E41-1HPCI-10-D-1	Branch Connection to Elbow	89%	Pre-PDI Examination. Single-sided examination. Coverage for circumferential flaws was 100% and 78% coverage for axial flaws. The coverage for axial flaws was limited by the branch connection configuration.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, Item B9.11 requires a volumetric examination of essentially 100% of the weld.

Licensee's Proposed Alternative Examinations and Basis

The examination limitations for the welds listed in Tables RR-52-1 and RR-52-2 are inherent to the design of the components, which restricts the access for the examinations. The ultrasonic examinations are primarily one-sided examinations from the pipe side of the welds; however, because they are performed on carbon steel, coverage from two beam directions was obtained, except in limited areas. The ultrasonic examinations performed should provide reasonable assurance of structural integrity, especially since the coverage for circumferential cracking was high for these welds.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining circumferential welds in piping. As discussed in the technical descriptions provided by the licensee, the examinations of the subject welds were limited by the configuration of the components. For the licensee to achieve 100% volumetric coverage, the subject piping would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 49% to 89% of the ASME Code-required volumes for the welds listed in Table RR-52-1 (HNP-1) and Table RR-52-2 (HNP-2). The ultrasonic examinations of the subject welds listed as a PDI examination in Table RR-52-1 and Table RR-52-2 were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, as administered through

the PDI program. The remaining welds that are listed as pre-PDI examination in Table RR-52-1 and Table RR-52-2 were performed using the ASME Code, Section XI, Appendix III. The examinations performed by the licensee under either requirement did not detect any unacceptable indications.

The staff determined that, based on the level of examination coverage obtained for the welds listed in Tables RR-52-1 and RR-52-2, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 and HNP-2 leakage and radiation monitoring systems, which are located in the drywell, the steam chase and the reactor building as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject component welds.

RR-53 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Examination Category B-J, Item B9.11, austenitic piping welds as shown in Table RR-53-1 below.

TABLE RR-53-1

Weld	Description	Coverage	Basis for Limited Coverage
1E21-1CS-10B-20A	Safe-end extension to safe-end	75%	PDI Examination. Single-sided examination from pipe side. Additional scans for axial flaws were performed on safe-end extension side. The weld was stress improved in 1993 using MSIP process.
1B31-1RC-4A-10A 1B31-1RC-12BR-E-1 1E11-1RHR-24B-R-14	Branch to cap Branch to pipe Pipe to tee	50%	PDI Examination. Single-sided exam. Procedure not qualified for examination beyond centerline, weld coverage defined as 50%. These welds were stress improved during 1985/1986 outage using the IHSI process.

Weld	Description	Coverage	Basis for Limited Coverage
1B31-1RC-4A-1A	Branch connection to cap	63%	Pre-PDI Examination. Essentially single-sided examination. Very little access from the cap side due to configuration. This weld was stress improved during the 1985/1986 outage using the IHSI process.
1B31-1RC-4JP-A-2 1B31-1RC-4JP-B-2	Safe-end to penetration seal	50%	Pre-PDI Examination. Essentially single-side examination with little access from the penetration seal because it tapered upward about a 45° slope near the edge of the weld. These welds were stress improved in 1993 using the MSIP process.
1B31-1RC-12AR-F-1 1B31-1RC-12AR-G-1 1B31-1RC-12AR-K-1 1B31-1RC-28A-11BC 1B31-1RC-28A-14BC	Branch connection to pipe Pipe to branch connection	75%	Pre-PDI Examination. Credit for single-side examination was 100% from the pipe side and over the weld scans for circumferential flaws. Scanning for axial flaws was performed on the pipe side but could not be performed on the branch side due to configuration. These welds were stress improved during the 1985/1986 outage using IHSI process.
1B31-1RC-12AR-H-1 1B31-1RC-12AR-J-1	Reducer to pipe Branch to pipe	42-43%	Pre-PDI Examination. A partial single-side examination from the pipe side and no access from the component side due to configuration. These welds were stress improved during the 1985/1986 outage using the IHSI process.
1B31-1RC-22AM-2	Pipe to cross	77%	Pre-PDI Examination. Essentially a single-sided examination with limited access from the cross side due to configuration. This weld was stress improved during the 1985/1986 outage using the IHSI process.
1B31-1RC-22AM-3	Cross to pipe	67%	Pre-PDI Examination. Essentially a single-sided examination with limited access from the cross side due to configuration. This weld was stress improved during the 1985/1986 outage using the IHSI process.

Weld	Description	Coverage	Basis for Limited Coverage
1B31-1RC-28A-13 1B31-1RC-28A-15	Valve to elbow Pipe to tee	62%	Pre-PDI Examination. Essentially a single-sided examination with limited access from the component side due to configuration. These welds were stress improved during the 1985/1986 outage using the IHSI process.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, Item B9.11 requires a volumetric examination of essentially 100% of the weld.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination and Basis

Each of the subject welds was stress improved using the induction heating stress improvement (IHSI) process during the 1985/1986 outage except for 1E21-1CS-10B-20A, 1B31-1RC-4JP-A-2, and 1B31-1RC-4JP-B-2 which received a mechanical stress improvement process (MSIP) in 1993. Additionally, all are protected by effective water chemistry except for 1E21-1RHR-24B-R-14 and 1E21-1CS-10B-20A, where credit was not taken because of stagnant conditions. The ultrasonic examinations performed from at least one side of the weld in conjunction with the resistant materials, the stress improvement, and the hydrogen protection should provide reasonable assurance of structural integrity.

The examination limitations for these welds are inherent to the design of the components (e.g., pumps, valves, crosses, and tees) which restricts the access for ultrasonic examinations. The examinations are primarily single-sided examinations from the pipe side of the weld. Increasing coverage is impractical due to the limitations described in Table RR-53-1.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining circumferential piping welds. As discussed in the technical descriptions provided by the licensee, the examinations of the subject welds were limited by the component configurations. For the licensee to achieve 100% volumetric coverage, the subject components would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 42% to 75% of the ASME Code-required volumes for the welds listed in Table RR-53-1 (HNP-1). The ultrasonic examinations of the subject welds listed as a PDI examination in Table RR-53-1 were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section

XI, Appendix VIII, as administered through the PDI program. The remaining welds that are listed as pre-PDI examination, in Table RR-53-1 were performed using ASME Code, Section XI, Appendix III. The examinations performed by the licensee under either requirement did not detect any unacceptable indications. In addition, these welds were stress improved to reduce the potential for stress corrosion cracking.

The staff determined that, based on the level of examination coverage obtained for the piping welds listed in Tables RR-53-1, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-54 (HNP-1 and HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Class 2, Category C-F-2, Item C5.51, carbon steel piping welds as identified in Table RR-54-1 (HNP-1) and RR-54-2 (HNP-2) below:

TABLE RR-54-1

Weld	Description	Coverage	Basis for Limited Coverage
1E11-2RHR-16B-HXO-2	Elbow to valve	75%	PDI Examination. Single-sided examination from the elbow side. Coverage for axial flaws was limited to the elbow side. Coverage for circumferential cracking was near 100%.
1N11-2MSAR-10C-SSR-4	Pipe to valve	86%	PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.
1E21-2CS-16A-TS-S	Pipe to elbow	50%	PDI Examination. The configuration limited scanning to the pipe side. The weld crown condition prohibited the use of a 1-1/2 V-Path. Therefore, only a ½ V-Path was used yielding 50% coverage.

TABLE RR-54-1			
Weld	Description	Coverage	Basis for Limited Coverage
1E11-2RHR-16B-SH-8A	Pipe to valve	81%	Pre-PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.
1E41-2HPCI-14-R-39	Pipe to valve	78%	Pre-PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.
1T48-2CPI-18-PIT-2	Pipe to Flange	65%	Pre-PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.
TABLE RR-54-2			
Weld	Description	Coverage	Basis for Limited Coverage
2E11-2RHR-24B-R-3	Pipe to valve	84%	PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.
2E21-2CS-14A-CTS-1	valve to pipe	76%	Pre-PDI Examination. Single-sided examination from the pipe side. Coverage for axial flaws was limited to the pipe side. Coverage for circumferential cracking was near 100%.

ASME Code Requirements

Table IWC-2500-1, Examination Category C-F-2, Item C5.51 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for

any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination and Basis (As Stated)

> The ultrasonic examinations are primarily single-sided examinations from the pipe side of the weld; however, because they are performed on carbon steel, coverage from two beam directions was obtained, except in limited areas. The ultrasonic examinations performed should provide reasonable assurance of structural integrity, especially since coverage for circumferential cracking was good for these welds.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of selected ASME Code Class 2 pressure retaining carbon or low alloy steel circumferential piping welds. As explained in the technical descriptions provided by the licensee, the examinations of the subject piping welds were limited by the weld configuration. For the licensee to achieve 100% volumetric coverage, the subject components would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 50% to 86% of the ASME Code-required volumes for the welds listed in Table RR-54-1 (HNP-1) and Table RR-54-2 (HNP-2). The ultrasonic examinations of the subject welds listed as PDI examination in Table RR-54-1 and Table RR-54-2 were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, as administered through the PDI program. The remaining welds that are listed as pre-PDI examination in Table RR-54-1 and Table RR-54-2 were performed using ASME Code, Section XI, Appendix III. The examinations performed by the licensee under either requirement did not detect any unacceptable indications.

The staff determined that, based on the level of examination coverage obtained for the nozzle-to-vessel welds listed in Tables RR-54-1 and RR-54-2, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 and HNP-2 leakage and radiation monitoring systems which are located in the reactor building and the turbine building as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each period provide reasonable assurance of integrity of the subject welds.

RR-55 (HNP-2)

ASME Code Component Identification (As Stated)

> ASME Code, Section XI, Class 1, Category B-F, Item B5.130, carbon steel pipe to Inconel buttered 316 Nuclear Grade (NG) stainless steel elbow. This includes welds 2E11-1RHRM-24A-10 and 2E11-1RHRM-24B-10. These welds originally joined 304 stainless steel piping to carbon steel piping. Drawings indicate that the carbon steel piping was buttered in the shop with Inconel, machined and then stress relieved. During the 1984 pipe replacement to replace 304 stainless steel piping with 316 NG stainless

steel piping, a cut was made at each end. The Inconel butter remained and possibly a portion of the original weld remained as a "safe-end." This "safe-end" was then machined, welded to the 316 NG stainless steel with Inconel 82, and then Induction Heat Stress Improved (IHSI).

ASME Code Requirements

Table IWB-2500-1, Examination Category B-F, Item B5.130 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination

The Performance Demonstration Initiative (PDI) examinations were performed in February 2005 with a total coverage of 76%. No scans for axially oriented flaws were possible due to the configuration. These welds consist of a thick elbow with the weld tapering down to the thinner carbon steel piping. Additionally, there is a dip on the carbon steel side near the edge of the weld butter. From the 2005 coverage plots, there was no coverage for scans looking for axial flaws due to the configuration. For scans looking for circumferentially oriented cracking the following coverage was obtained:

45° shear wave - 100% of the base metal
45° refracted longitudinal wave - 78% of the required volume
60° refracted longitudinal wave - 91% of the required volume

Licensee's Basis for Relief Request

While the ultrasonic examination coverage was limited, the area of interest for potential stress corrosion cracking in the weld joint was scanned with the 45° refracted longitudinal transducer from the stainless steel elbow side and scanned from both sides with the 60°refracted longitudinal transducer. With the coverage for circumferential flaws in the area of interest, the licensee finds there is reasonable assurance of structural integrity.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 pressure retaining dissimilar metal piping butt welds. As shown on the sketches and the technical description provided by the licensee, the examinations of the subject welds were limited by the component configuration, a thick elbow with the weld tapering down to a thinner carbon steel pipe. For the licensee to achieve 100% volumetric coverage, the subject welds would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine a significant volume looking for circumferential flaws of the ASME Code-required volumes for the subject welds. The ultrasonic examinations of the

subject welds were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, as administered through the PDI program. The examinations performed by the licensee did not detect any unacceptable indications.

The staff determined that, based on the level of examination coverage obtained for the piping welds 2E11-1RHRM-24A-10 and 2E11-1RHRM-24B-10, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-2 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-56 (HNP-1 and HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Category B-J, Item B9.11, austenitic piping welds as listed in Table RR-56-1 below:

TABLE RR-56-1

Weld	Description	Coverage	Basis for Limited Coverage
1G31-1RWCUM-6-D-4	316NG Pipe to Valve	50%	PDI Examination. A single side exam from the pipe side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1993 using the MSIP process.
1G31-1RWCUM-6-D-5	Valve to 316NG Elbow	50%	PDI Examination. A single side exam from the elbow side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1993 using the MSIP process.
1G31-1RWCUM-6-D-14	316NG Elbow to Valve	50%	PDI Examination. A single side exam from the pipe side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1993 using the MSIP process.

TABLE RR-56-1			
Weld	Description	Coverage	Basis for Limited Coverage
2B31-1RCM-28AD-3	Valve to 316NG Pipe	50%	PDI Examination. A single side exam from the pipe side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-28AD-5	316NG Pipe to 316NG Cross	50%	PDI Examination. A single side exam from the pipe side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-28BD-5	316NG Pipe to 316NG Cross	50%	PDI Examination. A single side exam from the pipe side. Procedure not qualified by PDI for examination beyond centerline. The coverage is therefore 50%. Weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-12AF-1	316NG manifold to 316NG Pipe	73%	Pre-PDI Examination. Essentially a one sided exam with limited access from the manifold side due to configuration. This weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-12BA-1	316NG manifold to 316NG Pipe	73%	Pre-PDI Examination. Essentially a one sided exam with limited access from the manifold side due to configuration. This weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-28AD-1	Pump to 316NG Pipe	62%	Pre-PDI Examination. Essentially a one sided exam with limited access from the pump side due to configuration. This weld was stress improved in 1984 using the IHSI process.

TABLE RR-56-1			
Weld	Description	Coverage	Basis for Limited Coverage
2B31-1RCM-28AS-8	316NG Elbow to Valve	62%	Pre-PDI Examination. Essentially a one sided exam with limited access from the valve side due to configuration. This weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-28AS-10	316NG Elbow to Pump	62%	Pre-PDI Examination. Essentially a one sided exam with limited access from the pump side due to configuration. This weld was stress improved in 1984 using the IHSI process.
2B31-1RCM-28BD-3	316NG Elbow to Valve	62%	Pre-PDI Examination. Essentially a one sided exam with limited access from the valve side due to configuration. This weld was stress improved in 1984 using the IHSI process.
2E11-1RHRM-24A-13	316NG Elbow to 316NG Tee	86%	Pre-PDI Examination. 100% coverage on both sides scanning for axial indications. Coverage on the elbow side scanning was 100% for circumferential flaws. Scanning for circumferential flaws from the tee side was limited to 57% due to configuration. This weld was stress improved in 1984 using the IHSI process.
2G31-1RWCUM-6-D-14	316NG Pipe to Valve	84%	Pre-PDI Examination. 100% coverage scanning for circumferential indications and 68% coverage scanning for axial indications. This weld was stress improved in 1984 using the IHSI process.
2G31-1RWCUM-6-D-16	316NG Pipe to Valve	82%	Pre-PDI Examination. 65% coverage scanning for circumferential indications and 100% coverage scanning fro axial indications. This weld was stress improved in 1984 using the IHSI process.

ASME Code Requirements

Table IWB-2500-1, Examination Category B-J, Item B9.11 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination and Basis

The examination limitations for these welds are inherent to the design of the components (e.g., pumps, valves, elbows, crossed, and tees) which restricts the access for the ultrasonic examinations shown in Table RR-56-1. With few exceptions, the examinations are primarily one-sided examinations from the pipe side of the weld. To increase coverage would require redesign and/or replacement of the components.

Per the NRC staff positions found in Generic Letter 88-01 these welds are considered resistant to Intergranular Stress Corrosion Cracking (IGSCC) and are defined as Category A. The subject welds have been stress improved using induction heating stress improvement (IHSI) or the Mechanical Stress Improvement Process (MSIP) and all are protected by effective hydrogen water chemistry except for 2E11-1RHRM-24A-13 which is not considered to be protected due to stagnant conditions. The licensee finds that the ultrasonic examinations performed in conjunction with the resistant materials, the stress improvement, and the hydrogen water chemistry should provide reasonable assurance of structural integrity.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of selected ASME Code Class 1 pressure retaining circumferential piping welds. As discussed in the technical descriptions provided by the licensee, the examinations of the subject piping welds were limited by the configuration and material properties. For the licensee to achieve 100% volumetric coverage, the subject nozzles would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 50% to 86% of the ASME Code-required volumes for the welds listed in Table RR-56-1 (HNP-1 and HNP-2 welds). The ultrasonic examinations of the subject welds listed as PDI examinations in Table RR-56-1 and were performed by the licensee using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, 2001 edition, as administered through the PDI program. The remaining welds that are listed as pre-PDI examinations in Table RR-56-1 were performed using ASME Code, Section XI, Appendix III. The examinations performed by the licensee under either requirement did not detect any unacceptable indications. In addition, each of these welds were stress improved to reduce the potential for stress corrosion cracking and most of the welds are protected by effective hydrogen water chemistry.

The staff determined that, based on the level of examination coverage obtained for the

nozzle-to-vessel welds listed in Tables RR-56-1, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 and HNP-2 leakage and radiation monitoring systems which are located in the drywell and the reactor building as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-57 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Category B-K, Item B10.20, lug attachment welds:

1E41-1HPCI-10-D-7HL-1
1E41-1HPCI-10-D-7HL-2

ASME Code Requirements

Table IWB-2500-1 of Code Case N-509, Examination Category B-K, Item B10.20 requires that 100% of the length of each weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination and Basis

The configuration consists of two lugs welded to the pressure-retaining boundary with insufficient distance between them to perform an examination. Three sides of each lug was examined for a total of 57% of the required surface area. Increasing coverage is impractical. Compliance would require redesign and/or replacement of the existing lugs with new lugs fabricated with a design that would allow examination.

The licensee finds that the surface examination performed on three sides of each lug should provide reasonable assurance of structural integrity.

Staff's Evaluation

The ASME Code requires 100% surface examination of ASME Code Class 1 integral attachments for pumps. As described in the technical description provided by the licensee, the examinations of the subject lugs welded to the pressure retaining boundary were limited by the configuration, insufficient distance between the two lugs that restricted the examinations. For the licensee to achieve 100% surface coverage, the subject welded lugs would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately three sides of each lug yielding 57% of the ASME Code-required areas for the subject welded lugs. The examinations performed by the licensee did not detect any unacceptable indications.

The staff determined that, based on the level of examination coverage obtained for the subject attachment lugs, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated May 30, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject welds.

RR-61 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Category B-A, Item B5.13, reactor pressure vessel (RPV) to flange weld, 1B11\C-1.

ASME Code Requirements

Table IWB-2500-1, Examination Category B-A, Item B1.30 requires that essentially 100% of the length of weld be examined.

ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

Licensee's Proposed Alternative Examination and Basis

Composite coverage of the examination of the subject weld was calculated as 52%. Examinations were performed from the outer diameter of the RPV shell and from the top of the flange, as follows:

> No scans were performed from the flange side of the weld (except those from the top) due to the flange configuration. Approximately 80% coverage was obtained from the top of the flange.
>
> From the shell side, scans for axially oriented flaws were limited to about 49%.
>
> From the shell side, scans for circumferentially oriented flaws were performed from one beam direction over about 76% of the required volume. The limitation was the inability to reach the outer quarter of the examination volume. This volume was scanned to the extent practical with a 70° transducer.

Compliance would require redesign and replacement of the RPV with a special design to allow examination from the flange.

Adequate coverage for circumferential flaws was obtained to assure that the structural integrity of the flange is being maintained. Therefore, relief should be granted per 10 CFR 59,55a(g)(i).

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 shell-to-flange weld each inspection interval. As discussed in the technical descriptions provided by the licensee, the examinations of the subject weld were limited by the configuration of the shell-to-flange weld. For the licensee to achieve 100% volumetric coverage, the reactor pressure vessel would have to be redesigned and modified. This would place a burden on the licensee to the extent that the ASME Code-required 100% volumetric examinations are impractical.

The licensee was able to examine approximately 52% of the required examination volume. Examinations were performed from the outer diameter of the reactor pressure vessel and from the top of the flange. The examinations performed by the licensee did not detect any unacceptable indications and there has not been any industry history of failures for the vessel to flange welds.

The staff determined that, based on the level of examination coverage obtained for the shell-to-flange weld, if significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 leakage and radiation monitoring systems which are located in the drywell as described in the licensee's RAI response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject weld.

4.0 CONCLUSION

Based on the review of the information the licensee provided, the NRC staff finds that ASME Code examination coverage requirements for RR-46, RR-47, RR-48, RR-49, RR-50, RR-52, RR-53, RR-54, RR-55, RR-56, RR-57 and RR-61 are impractical and that the licensee's proposed alternatives provide reasonable assurance of integrity of the subject welds. Therefore, the requested relief is authorized pursuant to 10 CFR 50.55a(g)(6)(i) for the remainder of the third 10-year inservice inspection interval for HNP-1 and HNP-2. Granting of relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Furthermore, based on the coverages obtained, if significant service-induced degradation were occurring there is reasonable assurance that evidence of it would have been detected by the examinations that were performed. In addition, HNP-1 and HNP-2 leakage and radiation monitoring systems, and VT-2 visual examinations performed each refueling outage or period, provide further assurance of integrity of the subject welds.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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