June 5, 2007

Mr. L. M. Stinson
Vice President
Southern Nuclear Operating
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-42, RR-43, RR-44, RR-45, RR-51, RR-58, RR-59, RR-60, AND RR-62 (TAC NOS. MD2587, MD2588, MD2589, MD2590, MD2591, MD2597, MD2609, MD2610, MD2611, AND MD2613)

Dear Mr. Madison:

By letter dated July 10, 2006, as supplemented on April 13, 2007, Southern Nuclear Operating Company, Inc. (the licensee), submitted requests for relief (RR) RR-42, RR-43, RR-44, RR-45, RR-51, RR-58, RR-59, RR-60, and RR-62 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). In its letter dated April 13, 2007, the licensee withdrew RR-42 and RR-43 and those RRs are not discussed further in this evaluation.

The staff finds that ASME Code examination coverage requirements are impractical for RR Nos. RR-44, RR-51, RR-58, RR-59, RR-60, and RR-62. 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.

For RR-45 for HNP-2, the staff finds that the ASME Code requirements would impose a hardship without a compensating increase in quality and safety. Therefore, although the licensee requested relief pursuant to 10 CFR 50.55a(g)(6)(i) for RR-45, the NRC staff authorizes the requested relief pursuant to 10 CFR 50.55a(a)(3)(ii). Section 50.55a(a)(3)(ii) is applicable for RR 45 because the relief is necessary due to a hardship rather than an impracticality and the relief is a modified version of a previously approved alternative to the ASME Code.

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. 50-348 and 50-366

Enclosure:
Safety Evaluation

cc w/encl: See next page

June 5, 2007

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

Sincerely,

/RA/

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cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION (ISI) PROGRAM PROPOSED ALTERNATIVE ISI-ALT-06-02

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), Southern Nuclear Operating Company, Inc. (the licensee), submitted requests for relief (RR) RR-42, RR-43, RR-44, RR-45, RR-51, RR-58, RR-59, RR-60, and RR-62 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). In its letter dated April 13, 2007, the licensee withdrew RR-42 and RR-43 and those RRs are not discussed further in this evaluation.

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). Section 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 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.

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 applies to RR Nos. RR-45, RR-51, RR-58, RR-59, RR-60, and RR-62 as a basis for relief regarding identifying leakage from system and component welds identified in each of the licensee's RRs.

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.

RR-44 (HNP-1 and HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Class 1, Category B-D, Item B3.90, nozzle-to-vessel welds. HNP-1 welds are shown in Table RR-44-1 and HNP-2 welds are shown in Table RR-44-2 recreated from the licensee's submitals.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.90 requires that 100% volumetric examination of the volumes shown in Figures IWB-2500-7(a) through (d).

ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, as an alternative approved for use by the NRC in Regulatory Guide (RG 1.147), Revision 14, *Inservice Inspection Code Case Acceptability*, *Section XI, Division 1*, 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)

> Coverage was limited due to the geometry of the nozzles and in some cases the proximity of other nozzles or components, as defined in the attached tables. In general, the barrel-type nozzle configuration [Section XI, Figure IWB-2500-7(a)] had less coverage than the flange-type nozzle configuration [Section XI, Figure IWB-2500-7(b)]. In most cases, examination for axially-oriented flaws could not be performed from the nozzle side of the weld due to the configuration of the nozzle; however, the presence of an axial flaw does not have a significant impact on the structural integrity of a nozzle weld. Adequate scanning for the detection of circumferentially-oriented flaws was obtained for these welds, which provides reasonable assurance of structural integrity. Therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).
>
> While the amount of scanned volume is limited by the nozzle configuration, calculated coverage generally increased for those nozzles using Performance Demonstration Initiative (PDI) examination techniques versus those examined using pre-PDI methodology. The coverage increase is due primarily to the allowance of single-sided coverage for these PDI examinations versus the earlier two beam direction examination requirements. Additionally, while it is not practical to re-calculate the coverage using NRC approved Code Case N-613-1 [*Ultrasonic Examination Category B-D, Item Nos. B3.10 and B3.90, Reactor Nozzle-to-Vessel Welds, Figs. IWB-2500-7(a), (b), and (c), Section XI, Division 1*], a general overview indicates that given the same scanning

limitations, coverage would be significantly greater for most nozzles because of the reduced examination volumes defined in the [ASME] Code Case.

Licensee's Basis for Relief Request (As Stated)

Coverage was limited due to the geometry of the nozzles and in some cases the proximity of other nozzles or components. When automated scanning was limited, qualified supplemental manual examinations were used to increase the coverage where possible; therefore, coverage was maximized to the extent practical and it would be impractical to obtain any more appreciable coverage.

Table RR-44-1 (HNP-1)

Weld Number	Description	Coverage	Basis for Limited Coverage
1B11\1N1A 1B11\1N1B	Recirculation Outlet Shell-to-Nozzle Weld	65%-70%	Pre-Performance Demonstration Initiative (PDI) Examination. Flange-type nozzle geometry [Figure IWB-2500-7(b)] limited scans for axial flaws to about 40 to 50% coverage. When scanning for circumferential flaws there are limitations due to the nozzle geometry, plus a welded support ring/bracket restricts coverage for about a 90° sector. Supplemental manual coverage was used to increase coverage. Total 45°/ 60° coverage for circumferential flaws was about 70% to 80%.
1B11\1N2A 1B11\1N2B 1B11\1N2D 1B11\1N2E 1B11\1N2G 1B11\1N2H 1B11\1N2K	Recirculation Inlet Nozzle-to-Shell Weld	42%-44%	Pre-PDI Examination. Barrel-type nozzle geometry [Figure IWB-2500-7(a)] severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are limitations due to the nozzle geometry, plus a welded support ring/bracket restricts coverage for about a 130° sector. Supplemental manual coverage was used to increase coverage. Total 45°/60° coverage for circumferential flaws was about 40% to 60%.
1B11\1N2C 1B11\1N2F 1B11\1N2J	Recirculation Inlet Nozzle-to-Shell Weld	51%	Post-PDI Examination. These have the same limitations as the other N2 nozzles, except that, by using qualified procedures credit was taken for single-sided examinations.
1B11\1N3A 1B11\1N3B 1B11\1N3D	Main Steam Shell-to-Nozzle Weld	63%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws to about 55% to 60% coverage. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 80% to 90%.

Weld Number	Description	Coverage	Basis for Limited Coverage
1B11\1N3C	Main Steam Shell-to-Nozzle Weld	38%	Pre-PDI Examination. Unlike the remaining three main steam nozzles, this nozzle is a barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 30% to 45%.
1B11\1N4A 1B11\1N4B 1B11\1N4C 1B11\1N4D	Feedwater Nozzle-to-Shell Weld	38%-40%	Pre-PDI Examination. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Additionally, the proximity of the N11A/B nozzles restricts coverage. Supplemental manual coverage was used in the restricted coverage area to increase coverage. Total 45°/60° coverage for circumferential flaws was about 40%
1B11\1N5A 1B11\1N5B	Core Spray Nozzle-to-Shell Weld	37%-42%	Post-PDI Examination for 1N5A and Pre-PDI Examination for 1N5B. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry, plus the proximity of a welded support ring/bracket restricts coverage for about a 125 sector. Supplemental manual coverage was used in the area to increase coverage. Total 45°/60° coverage for circumferential flaws was about 35% to 50%.

Weld Number	Description	Coverage	Basis for Limited Coverage
1B11\1N6A 1B11\1N6B	Head Spray Nozzle-to-Head Weld	37%	Pre-PDI Examination. Barrel-type nozzle geometry severely limited 0°scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry and the curvature of the head. Total 45°/60° coverage for circumferential flaws was about 65%-70%.
1B11\1N7	Vent Head-to-Nozzle Weld	45%	Pre-PDI Examination. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45/60° coverage for circumferential flaws was about 80% to 85%
1B11\1N8A 1B11\1N8B	Jet Pump Instrument Nozzle-to-Shell Weld	76%-81%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws to about 50%. When scanning for circumferential flaws there was 100% coverage from the shell side.
1BI1\1N9	Control Rod Drive (CRD) Shell-to-Nozzle Weld	42%	Pre-PDI Examination. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry, plus the proximity of a welded support ring/bracket restricted 45°/60° coverage for about a one 30° sector. Supplemental manual coverage was used in this area to increase coverage. Total 45°/60° coverage for circumferential flaws was about 65% in the unobstructed areas and about 5% to 15% in the obstructed area.

Table RR-44-2 (HNP-2)

Weld Number	Description	Coverage	Basis for Limited Coverage
2B11\2N1A	Recirculation Outlet Shell-to-Nozzle Weld	57%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws to about 40% to 50% coverage. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 80% to 90%
2B11\2N2C 2B11\2N2E 2B11\2N2H	Recirculation Inlet Nozzle-to-Shell Weld	60%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws to about 50% coverage. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 80% to 90%.
2B11\2N2A 2B11\2N2B 2B11\2N2D 2B11\2N2F 2B11\2N2G 2B11\2N2J 2B11\2N2K	Recirculation Inlet Nozzle-to-Shell Weld	82%	Post-PDI Examination. These have the same limitations as the other N2 nozzles, except that, by using qualified procedures credit was taken for single-sided examinations.
2B11\2N3A 2B11\2N3B	Main Steam Shell-to-Nozzle Weld	86%	Post-PDI Examination. These have the same limitations as the other N4 nozzles, except that, by using qualified procedures credit was taken for single-sided examinations.
2B11\2N3C 2B11\2N3D	Main Steam Shell-to-Nozzle Weld	56%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws to about 50% coverage. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 75% to 80%.

Weld Number	Description	Coverage	Basis for Limited Coverage
2B11\2N4A 2B11\2N4C	Feedwater Nozzle-to-Shell Weld	76%-77%	Post PDI Examination. Flange-type nozzle geometry limited scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry, plus there is interference from adjacent nozzles that restricted 45°/60° coverage.
2B11\2N4B 2B11\2N4D	Feedwater Nozzle-to-Shell Weld	84%-86%	Post-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry, plus there is interference from adjacent nozzles that restricted 45°/60° coverage.
2B11\2N6A 2B11\2N6B	Head Spray Nozzle-to-Head Weld	66%	Pre-PDI Examination. Flange-type nozzle geometry limited scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry and the curvature of the head. Total 45°/60° coverage for circumferential flaws was about 86% to 87%.
2B11\2N7	Vent Head-to-Nozzle Weld	61%	Pre-PDI Examination. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry. Total 45°/60° coverage for circumferential flaws was about 79% to 80%.
2B11\2N9	CRD Shell-to-Nozzle Weld	84%	Post-PDI Examination. Barrel-type nozzle geometry severely limited 0° scans and scans for axial flaws. When scanning for circumferential flaws there are scanning limitations due to the nozzle geometry and the proximity of the 2N4B nozzle.

Staff's Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 full penetration nozzle-to-vessel welds for all RPV nozzles. The licensee performed the examinations from the outside of the nozzles. As shown on the sketches and technical descriptions provided by the licensee, the examinations of the subject nozzles were limited by the nozzle configuration, proximity of a welded support ring/bracket, and interference from adjacent nozzles that restricted the examinations. 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 37% to 86% of the ASME Code-required volumes for the welds listed in Table RR-44-1 (HNP-1) and Table RR-44-2 (HNP-2). The ultrasonic examinations of the subject welds listed as post-PDI examinations in Table RR-44-1 and Table RR-44-2 were performed by the licensee in spring 2005 and spring 2006 using personnel, equipment and procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, 2001 edition, as administered through the Electric Power Research Institute (EPRI) PDI. The remaining welds that are listed as pre-PDI examination in Table RR-44-1 and Table RR-44-2 were performed using ASME Code, Section XI, Appendix III. The examinations performed by the licensee under either requirement did not detect any unacceptable indications and there has not been any industry history of failures for these particular nozzle-to-vessel welds.
The staff determined that, based on the level of examination coverage obtained for the nozzle-to-vessel welds listed in Tables RR-44-1 and RR-44-2, 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 as described in the licensee's Request for Additional Information (RAI) response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage provide reasonable assurance of integrity of the subject nozzles.

RR-45 (HNP-2)

ASME Code Component Identification

ASME Code, Section XI, Category B-K, Item B10.10, Reactor Pressure Vessel (RPV) Stabilizer Brackets SB1 through SB6

ASME Code Requirements
ASME Code, Section XI, Table IWB-2500-1, Code Case N-509 *Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments*, *Section XI, Division 1*, Category B-K, Item B10.10 requires a surface examination of essentially 100% of the length of each RPV attachment subject to examination. ASME Code Case N-509 has been approved for use by the NRC in RG 1.147, Revision 13, and incorporated in the1995 addenda to the 1995 edition of the ASME Code, Section XI.

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)

> These six RPV stabilizer brackets are welded to the shell to prevent the RPV from tilting during a seismic event. Since the function of these loads is for seismic restraint, these welds should not undergo fatigue during normal operation.
>
> Without a known failure mechanism and with approximately 68% of each lug examined, there is reasonable assurance of structural integrity.

Licensee's Basis for Relief Request (As Stated)

> There is no access on the lower side of the brackets due to the vicinity of the mating pieces of the support. As a result, approximately 68% of each bracket weld was examined. Appreciably increasing coverage is impractical. Increasing coverage would require replacement of the existing RPV support system with new components that are fabricated with a design to allow examination.

Staff's Evaluation

ASME Code, Section XI, Table IWB-2500-1, Code Case N-509, Category B-K, Item B10.10 requires a surface examination of essentially 100% of the length of the RPV stabilizer bracket attachment welds SB1 through SB6. The licensee is unable to examine essentially 100% of the length of the HNP-2 RPV stabilizer bracket attachment welds SB1 through SB6, because there is no access on the lower side of the brackets due to the vicinity of the mating pieces of the RPV support. Based on the licensee's description that there is no access to the lower side of the subject brackets, the ASME Code Case N-509 examinations would impose a hardship without a compensating increase in quality and safety. The licensee examined 68% of each bracket weld. Based on the level of examination coverage obtained for welds SB1 through SB6, 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 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 the integrity of the HNP-2 RPV stabilizer bracket attachment welds SB1 through SB6.

RR-51 (HNP-1)

ASME Code Component Identification

ASME Code, Section XI, Examination Category B-A, Item B1.12 RPV longitudinal welds, as shown in Table R-51-1 below:

Table RR-51-1 (HNP-1)

Weld Number	Coverage	Basis for Limited Coverage
C-2-A	78%	Outside Diameter (OD) examination. Proximity of insulation support ring.
C-3-A	45%	Inside Diameter (ID) Examination. Proximity of a specimen bracket and jet pump riser braces.
C-3-B	79%	ID Examination. Proximity of jet pump riser braces and shroud modification hardware.
C-3-C	80%	ID Examination. Proximity of a specimen bracket and jet pump riser braces.
C-4-A	73%	ID Examination. Manipulator lower limit and proximity of shroud gusset plates.
C-4-B	0%	ID Examination. Proximity of shroud modification hardware (tie rod).
C-4-C	73%	ID Examination. Manipulator lower limit and proximity of shroud gusset plates.

ASME Code Requirements

ASME Code, Table IWB-2500-1, Examination Category B-A, Item B1.12, Note 2 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 (As Stated)

> 10 CFR 50.55a(g)(6)(ii)(A)(2) required that licensees augment their reactor pressure vessel examination by implementing once, as part of the inservice inspection interval in effect on September 8, 1992, the examination requirements for reactor vessel shell welds specified in Item B 1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB-2500-1 of subsection IWB of the 1989 [ASME Code] Edition of Section XI.
> Per 10 CFR 50.55a(g)(6)(ii)(A)(3) licensees with fewer than 40 months remaining in the inservice inspection interval in effect on September 8, 1992 could defer the augmented reactor vessel examination to the first period of the next inspection interval. HNP-1 met this criteria; therefore, the augmented examinations were deferred until the 1st period of the 3rd [10-year ISI] interval. Additionally, as allowed, the augmented examination was used as a substitute for the reactor vessel shell weld examinations normally scheduled for the 3rd inspection interval.

Examination coverage was reported by letters dated January 19, 1999 and February 5, 1999. Pursuant to 10 CFR 50.55a(g)(6)(ii)(A)(5) the NRC granted approval by letter from Herbert N. Berkow to H. L. Sumner, Jr. dated March 11, 1999 with the caveat that weld C-4-B be examined if the obstructing tie rod is removed or if technology became available for examination with the tie rod in place. The NRC concluded that the proposed alternative provided an acceptable level of quality and safety. (SNC will attempt to examine behind C-4-B during the examinations scheduled for February 2008 if equipment allows). Sufficient coverage was obtained during the examinations to assure the structural integrity of the welds. Therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).

Licensee's Basis for Relief Request (As Stated)

As shown in Table R-51-1, coverage could not be obtained for seven welds. Appreciably increasing coverage was impractical due to the interferences described in Table R-51-1.

Staff's Evaluation

ASME Code, Section XI, Examination Category B-A, Item B1.12 requires that essentially 100% of the length of RPV Shell Welds C-2-A, C-3-A, C-3-B, C-3-C, C-4-A, C-4-B, and C-4-C are to be volumetrically examined each 10-year ISI Interval. The licensee was unable to examine the subject RPV shell welds due to interference from various internal components i.e., insulation support ring, jet pump riser braces, shroud modification hardware, and shroud gusset plates. Based on the drawings and technical descriptions of the interferences, the staff determined that the licensee would have to redesign the RPV internal and external components in order to perform the ASME Code-required volumetric examinations. 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 45% to 80% of the ASME Code-required volumes for welds C-2-A, C-3-A, C-3-B, C-3-C, C-4-A, and C-4-C. Based on the level of examination coverage obtained for RPV shell welds C-2-A, C-3-A, C-3-B, C-3-C, C-4-A, and C-4-C the staff determined that 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.

For weld C-4-B, the licensee was unable to examine the subject weld due to the proximity of shroud modification hardware (tie rod). The tie rod would only be removed if there was a problem with the component. The staff determined, that based on the examinations of the other RPV shell welds, the HNP-1 leakage and radiation monitoring system which is 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, there is reasonable assurance of the integrity of RPV shell weld C-4-B.

The licensee has requested a vendor to develop tooling to volumetrically examine weld C-4-B and will attempt to volumetrically examine weld C-4-B during the fourth 10-year ISI interval[1] examinations scheduled for February 2008. The licensee noted it will perform a VT-1 visual examination if the

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[1] 1. The licensee's third 10-year ISI interval for HNP-1 and HNP-2 ended on December 31, 2005, and the fourth 10-year ISI interval for HNP-1 and HNP-2 began on January 1, 2006.

volumetric examinations can not be performed during the February 2008 outage. However, the licensee will be required to submit a request for relief for the fourth10-year ISI interval, if it decides to perform the VT-1 visual exam. Alternatives to ASME Code pursuant to 10 CFR 50.55a(a)(3)(i) or 10 CFR 50.55a(a)(3)(ii) should be submitted prior to the implementation of the alternative.

RR-58 (HNP-1)

ASME Code Component Identification

Residual Heat Removal (RHR) Exchanger Nozzle-to-Shell Weld 1E11-2HX-B-O.

ASME Code Requirements

ASME Code, Section XI, Examination Category C-B, Item C2.21 requires 100% volumetric and surface examinations in accordance Figure IWC-2500-4(b) for pressure-retaining nozzle welds in vessels.

Licensee's Proposed Alternative Examination (As Stated)

> The 90% coverage obtained for circumferential cracking from the shell side (in at least one beam direction); provides reasonable assurance that structural integrity is being maintained; therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i). The proposed relief request is applicable for the 3rd Interval.

Licensee's Basis for Relief Request (As Stated)

> [ASME Code, Section XI] Table IWB-2500-1, Examination Category C-B, Item C2.21 requires examination per Figure IWC-2500-4(b). Only 68% coverage was obtained. Due to the configuration there was no scanning from the nozzle side and scans for axial flaws were limited to approximately 50%. About 90% coverage was obtained for circumferential cracking from the shell side in at least one beam direction. It would be impractical to appreciably increase the coverage.

Staff's Evaluation

ASME Code, Section XI, Examination Category C-B, Item C2.21 requires 100% volumetric and surface examinations in accordance with Figure IWC-2500-4(b) for RHR heat exchanger nozzle-to-shell weld 1E11-2HX-B-O. The RHR heat exchanger shell and head were made from ASME SA-516 carbon steel for plates and ASME SA-541 carbon and alloy steel forgings. The licensee was unable to examine weld 1E11-2HX-B-O as required by the ASME Code because of the configuration on the subject nozzle. Based on the drawings and description provided by the licensee, the staff determined that the RHR heat exchanger nozzle-to-shell weld 1E11-2HX-B-O would have to be redesigned which would be a burden for the licensee such that the ASME Code requirements are impractical.

The licensee obtained an aggregate volumetric coverage of 68% and the scans for axial flaws were limited to approximately 50% because the licensee was unable to scan from the nozzle side of the heat exchanger. The licensee obtained 90% volumetric coverage for circumferential cracking from

the shell side in at least one beam direction. The licensee obtained 100% surface examination coverage for weld 1E11-2HX-B-O. Based on the level of examination coverage obtained for weld 1E11-2HX-B-O staff determined that 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. For RHR heat exchanger nozzle-to-shell weld 1E11-2HX-B-O, the staff determined, that based on the examinations performed, the HNP-1 leakage and radiation monitoring systems as described in the licensee's RAI response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage, there is reasonable assurance of the integrity of weld 1E11-2HX-B-O.

RR-59 (HNP-2)

ASME Code Component Identification

RHR Heat Exchanger Weld 2E11-2HX-A-O

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category C-B, Item C2.21 requires 100% volumetric and surface examinations in accordance Figure IWC-2500-4(a) for pressure-retaining nozzle welds in vessels.

Licensee's Proposed Alternative Examination (As Stated)

> The 100% coverage obtained for circumferential cracking from the shell side provides reasonable assurance that structural integrity is being maintained; therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).

Licensee's Basis for Relief Request (As Stated)

> Only 85% coverage was obtained. Due to the configuration there was no scanning from the nozzle side and scans for axial flaws were limited to approximately 50%. However, essentially 100% coverage was obtained for circumferential cracking from the shell side in two beam directions. It would be impractical to appreciably increase the coverage. Compliance would require replacement of the existing heat exchanger with a new heat exchanger fabricated with a special design to allow examination.

Staff's Evaluation

ASME Code, Section XI, Examination Category C-B, Item C2.21 requires 100% volumetric and surface examinations in accordance Figure IWC-2500-4(a) for RHR heat exchanger nozzle-to-shell weld 2E11-2HX-A-O. The RHR heat exchanger shell and head were made from ASME SA-516 carbon steel plates and ASME SA-541 carbon and alloy steel forgings. The licensee was unable to examine weld 2E11-2HX-A-O as required by the ASME Code because of the configuration on the subject nozzle. Based on the drawings and description provided by the licensee, the staff determined that the RHR heat exchanger nozzle-to-shell weld 2E11-2HX-A-O would have to be redesigned which would be a burden for the licensee such that the ASME Code requirements are impractical.

The licensee obtained an aggregate volumetric coverage of 85% and the scans for axial flaws were limited to approximately 50% because the licensee was unable to scan from the nozzle side of the heat exchanger. The licensee obtained 100% volumetric coverage for circumferential cracking from the shell side in at least one beam direction. The licensee obtained 100% surface examination coverage for weld 2E11-2HX-A-O. Based on the level of examination coverage obtained for weld 2E11-2HX-A-O staff determined that 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. For RHR heat exchanger nozzle-to-shell weld 2E11-2HX-A-O, the staff determined that, based on the examinations performed, the HNP-2 leakage and radiation monitoring systems as described in the licensee's RAI response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage, there is reasonable assurance of the integrity of weld 2E11-2HX-A-O.

RR-60 (HNP-2)

ASME Code Component Identification

RHR Heat Exchanger Head-to-Shell Weld 2E11-2HX-A-3.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category C-A, Item C1.20 requires a volumetric examination of essentially 100% of the weld length per Figure IWC-2500-1.

Licensee's Proposed Alternative Examination (As Stated)

> The 90% coverage obtained for circumferential cracking from the shell side provides reasonable assurance that structural integrity is being maintained; therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).

Licensee's Basis for Relief Request (As Stated)

> Only 70% composite coverage was obtained. Due to the configuration there was no scanning from the flange side. Circumferential scanning from the shell side was performed for axial cracking. Essentially 90% coverage was obtained for circumferential cracking from the shell side. It would be impractical to appreciably increase the coverage obtained. Compliance would require replacement of the existing heat exchanger with a new heat exchanger fabricated with a special design to allow examination.

Staff's Evaluation

ASME Code, Section XI, Table IWB-2500-1, Examination Category C-A, Item C1.20 requires essentially 100% volumetric examinations in accordance figure IWC-2500-1 for RHR heat exchanger head-to-shell weld 2E11-2HX-A-3. The RHR heat exchanger shell and head were made from ASME SA-516 carbon steel for plates and ASME SA-541 carbon and alloy steel forgings. The licensee was unable to examine weld 2E11-2HX-A-3 as required by the ASME Code because of the configuration on the subject head-to-shell weld. Based on the drawings and description provided by the licensee, the staff determined that the RHR heat exchanger head-to-shell weld 2E11-2HX-A-3

would have to be redesigned which would be a burden for the licensee such that the ASME Code requirements are impractical.

The licensee obtained an aggregate volumetric coverage of 70% and for the circumferential scanning from the shell side essentially 90% coverage was obtained for circumferential cracking from the shell side of the RHR heat exchanger. Based on the level of examination coverage obtained for weld 2E11-2HX-A-3, the staff determined that 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. For RHR heat exchanger head-to-shell weld 2E11-2HX-A-3, the staff determined that, based on the examinations performed, the HNP-2 leakage and radiation monitoring systems as described in the licensee's RAI response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage, there is reasonable assurance of the integrity of weld 2E11-2HX-A-3.

RR-62 (HNP-2)

ASME Code Component Identification

RHR Heat Exchanger Upper Shell Ring-to-Lower Shell Ring Weld 2E11-2HX-A-2.

ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category C-A, Item C1.10 requires a volumetric examination of essentially 100% of the weld length per Figure IWC-2500-1.

Licensee's Proposed Alternative Examination

> The ultrasonic examination performed should provide reasonable assurance of structural integrity, especially since coverage from one side was 100%. Therefore, relief should be granted per 10 CFR 50.55a(g)(6)(i).

Licensee's Basis for Relief Request (As Stated)

> Only 78% coverage was obtained. There was limited examination on the downstream side of the weld due to four permanently welded support brackets. The total length of the subject weld is 220" [inches]. There are 4 support bracket 24" [inches] in length each (96" total). Only 124" [inches] could be examined on the downstream side of the weld (56%), while 100% was examined on the upstream side of the weld. Increasing coverage is impractical. Compliance would require replacement of the existing heat exchanger with a new heat exchanger fabricated with a special design to allow examination.

Staff's Evaluation

ASME Code, Section XI, Table IWB-2500-1, Examination Category C-A, Item C1.10 requires essentially 100% volumetric examinations in accordance Figure IWC-2500-1 for RHR heat exchanger upper shell ring-to-lower shell ring weld 2E11-2HX-A-2. The RHR heat exchanger shell and head were made from ASME SA-516 carbon steel plates and ASME SA-541 carbon and alloy steel forgings. The licensee was unable to examine weld 2E11-2HX-A-2 as required by the ASME

Code because of the configuration on the subject weld. Based on the drawings and description provided by the licensee, the staff determined that the RHR heat exchanger upper shell ring-to-lower shell ring weld 2E11-2HX-A-2 would have to be redesigned which would be a burden for the licensee such that the ASME Code requirements are impractical.

The licensee obtained an aggregate volumetric coverage of 78% and 100% was examined on the upstream side of the subject RHR heat exchanger upper shell ring-to-lower shell ring weld. Based on the level of examination coverage obtained for weld 2E11-2HX-A-2, the staff determined that 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. For RHR heat exchanger upper shell ring-to-lower shell ring weld 2E11-2HX-A-2, the staff determined that based on the examinations performed, the HNP-2 leakage and radiation monitoring systems as described in the licensee's RAI response dated April 13, 2007, and VT-2 visual examinations performed each refueling outage, there is reasonable assurance of the integrity of weld 2E11-2HX-A-2.

4.0 CONCLUSION

The staff concluded that ASME Code examination coverage requirements are impractical for RR Nos. RR-44, RR-51, RR-58, RR-59, RR-60, and RR-62. 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 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 provides reasonable assurance of integrity of the subject welds. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted for RR Nos. RR-44, RR-51, RR-58, RR-59, RR-60, and RR-62, for the third 10-year ISI interval for t 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.

For RR-45 (HNP-2) the staff concluded the ASME Code Case N-509 requirements would impose a hardship without a compensating increase in quality and safety. Based on the level of examination coverage obtained for welds SB1 through SB6, 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 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 the integrity of the HNP-2 RPV stabilizer bracket attachment welds SB1 through SB6. Therefore, the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the for the third 10-year ISI interval at HNP-2.

While the submittal requested relief pursuant to 10 CFR 50.55a(g)(6)(i) for RR-45, the NRC staff has determined, based on the licensees submittal, that authorizing an alternative pursuant to 10 CFR 50.55a(a)(3)(ii) is more appropriate for RR 45, because the relief is necessary due to a hardship rather than an impracticality and the relief is a modified version of a previously approved alternative to the ASME Code.

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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Date: June 5, 2007

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