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

May 25, 2010

Vice President, Operations
Entergy Operations, Inc.
Grand Gulf Nuclear Station
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1–RELIEF REQUESTS GG-ISI-005 THROUGH GG-ISI-012 FOR SECOND 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NOS. ME1376, ME1377, ME1378, ME1379, ME1380, ME1381, ME1382, AND ME1383)

Dear Sir or Madam:

By letter dated May 29, 2009, as supplemented by letters dated October 1, 2009, and February 11 and April 29, 2010, Entergy Operations, Inc. (the licensee), submitted relief request (RR) Nos. GG-ISI-005, GG-ISI-006, GG-ISI-007, GG-ISI-008, GG-ISI-009, GG-ISI-010, GG-ISI-011, and GG-ISI-012 for the second 10-year inservice inspection (ISI) interval at the Grand Gulf Nuclear Station, Unit 1. In its submittals, the licensee requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) required volumetric examination for certain ASME Code Class 1 and Class 2 components due to the impracticality of performing the examinations.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review as documented in the enclosed Safety Evaluation. Based on a review of the licensee's submittals, the NRC staff determined that the ASME Code requirements are impractical, and that reasonable assurance of structural integrity of the subject components has been provided by the examinations performed. Therefore, pursuant to paragraph 50.55a(g)(6)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR), the Commission grants RRs GG-ISI-005, GG-ISI-006, GG-ISI-007, GG-ISI-008, GG-ISI-009, GG-ISI-010, GG-ISI-011, and GG-ISI-012 for the second 10-year ISI interval on the basis that obtaining the ASME Code-required examination coverage is impractical. The NRC staff concludes that granting 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 given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact Mr. Fred Lyon at 301-415-2296 or via e-mail at fred.lyon@nrc.gov.

Sincerely,

James R. Hall for

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure:
As stated

cc w/encl: Distribution via Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUESTS GG-ISI-005 THROUGH GG-ISI-012

SECOND 10-YEAR INSERVICE INSPECTION INTERVAL

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated May 29, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091490755), as supplemented by letters dated October 1, 2009, and February 11 and April 29, 2010 (ADAMS Accession Nos. ML092750079, ML100470747, and ML101200081, respectively), Entergy Operations, Inc. (Entergy, the licensee), submitted relief requests (RRs) GG-ISI-005, GG-ISI-006, GG-ISI-007, GG-ISI-008, GG-ISI-009, GG-ISI-010, GG-ISI-011, and GG-ISI-012. In its submittals, the licensee requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) required volumetric examination for the ASME Code Class 1 and Class 2 components for second 10-year inservice inspection (ISI) interval for Grand Gulf Nuclear Station, Unit 1 (GGNS).

The U.S. Nuclear Regulatory Commission (NRC) staff, with technical assistance from its contractor, the Pacific Northwest National Laboratory (PNNL), has reviewed and evaluated the RRs requested by the licensee. The staff has adopted the evaluations and recommendations for granting relief contained in PNNL's Technical Letter Report (TLR) dated May 17, 2010 (ADAMS Accession No. ML101370764, non-publicly available), which has been incorporated into this safety evaluation (SE). The Attachment to this SE lists each relief request and the status of approval.

2.0 REGULATORY EVALUATION

Inservice inspection of the ASME Code, Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code, and applicable addenda, as required by Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulations in 10 CFR 50.55a(a)(3) state that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that (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 preservice examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI 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, which was incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

The ASME Code of record for GGNS's second 10-year interval ISI program, which ended on May 31, 2008, is the 1992 Edition, with portions of the 1993 Addenda, of Section XI of the ASME Code, as approved by the NRC.

3.0 TECHNICAL EVALUATION

The information provided by the licensee in support of the requests for relief from ASME Code requirements has been evaluated and the bases for disposition are documented below for each individual RR. For clarity, the licensee's requests have been evaluated in several parts according to ASME Code Examination Category.

3.1 Request for Relief GG-ISI-005, ASME Code, Section XI, Examination Category B-A, Items B1.12, B1.22, B1.30, and B1.40, Pressure Retaining Welds in Reactor Vessel

3.1.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-A, Items B1.12, B1.22, B1.30, and B1.40 require essentially 100 percent volumetric examination, as defined by ASME Code, Figures IWB-2500-2, -3, -4, and -5, as applicable, of the length of various reactor pressure vessel (RPV) shell welds. "Essentially 100 percent," as clarified by ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in Regulatory Guide 1.147, Revision 15, "Inservice Inspection Code Case Acceptability" (RG 1.147, Revision 15).

3.1.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination for the ASME Code Class 1 RPV welds shown in Table 3.1.1 below.

Table 3.1.1 – ASME Code, Section XI, Examination Category B-A

ASME Code Item	Weld Identifier	Weld Type	ASME Code Coverage Obtained
B1.12	BJ	RPV Longitudinal Shell Weld	86%
B1.22	DA	RPV Meridional Bottom Head Weld	44.4%
B1.22	DB	RPV Meridional Bottom Head Weld	44.4%
B1.22	DC	RPV Meridional Bottom Head Weld	17.2%
B1.22	DD	RPV Meridional Bottom Head Weld	17.2%
B1.30	AE	RPV Shell-to-Flange Weld	75%
B1.40	AG	RPV Head-to-Flange Weld	77.2%

3.1.3 Licensee's Basis for Relief Request (as stated)

During ultrasonic [(UT)] examination of the Pressure Retaining Reactor Vessel [RPV] welds listed in Table 1 [(see Table 3.1.1 above)] of this relief request, 100 % coverage of the required examination volume could not be obtained.

Component BJ was subjected to the requirements of [ASME Code, Section XI,] Appendix VIII, Supplement 4 and 6. The weld configuration and the close proximity of the [control rod drive (CRD)] nozzle and core spray nozzle resulted in scan limitations, which cannot be overcome by adding additional examination angles. As a result, the technique and angles, demonstrated through [performance demonstration initiative (PDI)], were not capable of achieving the [ASME] Code required examination volume.

Components DA through DD were not subjected to the requirements of [ASME Code, Section XI,] Appendix VIII as they were examined prior to November 20, 2000. [November 22, 2000 was the implementation date specified by 10 CFR 50.55a(g)(6)(ii)(c) for ASME Code, Section XI, Appendix VIII, Supplements 4 and 6.] The weld configuration, the location in relation to RPV Skirt and the CRD tubes resulted in scan limitations, which cannot be overcome by adding additional examination angles. As a result, the use of 45°S (shear), 60°S, and 0°L (Longitudinal) beam angles in the axial direction, and 45°S and 60°S beam angles in the circumferential direction, were not capable of achieving the [ASME] Code required examination volume. The procedure used for these examinations was written to the requirements of [ASME Code, Section V, Article 4].

Component AE and AG are not covered by [ASME Code, Section XI,] Appendix VIII, per [ASME Code,] Article I, I-2110(a), therefore were not subjected to the exam requirements of [ASME Code, Section XI,] Appendix VIII.

As a result, the use of 45°S, 60°S, and 0°L beam angles in the axial direction, and 45°S and 60°S beam angles in the circumferential direction, were not capable of achieving the [ASME] Code required examination volume due to the component configuration and location of these welds. The procedure used for these examinations was written to the requirements of [ASME Code, Section V, Article 4.]

Radiography [(RT)] is not practical on these types of weld configurations, which prevents placement of the film and exposure source.

3.1.4 Licensee's Proposed Alternative Examination (as stated)

No alternative testing is proposed at this time. Entergy has examined these welds to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code.

3.1.5 NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of the accessible length of pressure retaining welds in the RPV. However, for the subject welds at GGNS, complete examinations are restricted by design configuration and the proximity of adjacent appurtenances. The RPV would require modifications to increase the amount of weld volume that can be inspected. Imposing this requirement would place a burden on the licensee; therefore, the ASME Code-required 100 percent volumetric examinations are considered impractical.

As shown in technical descriptions and sketches provided by the licensee, the GGNS RPV design includes core spray nozzles and CRD penetrations located in close proximity to the inspected weld regions. These design conditions restrict access and transducer movement during scanning, which limits volumetric coverage for the subject welds. In addition, access is limited to only one side of Flange Welds AE and AG due to the shell-to-flange and head-to-flange blend radii, respectively. Manual UT examinations were conducted from the exterior surface of the RPV shell and head using 0-degree longitudinal, 60-degree refracted longitudinal, and 45-, and 60-degree shear wave techniques, as applicable. The licensee obtained coverage ranging from approximately 44 to 86 percent of the ASME Code-required inspection volumes for five of the seven subject welds. For Meridional Bottom Head Welds DC and DD, the licensee obtained approximately 17 percent volumetric coverage due to interference from the CRD housings and vessel skirt. This represents the accessible portion of these welds as accessed from the outside of the RPV and above the vessel support skirt region.

The volumetric examinations of Longitudinal Shell Weld BJ were conducted with equipment, procedures, and personnel that were qualified to the process outlined in ASME Code, Section XI, Appendix VIII. The remaining weld examinations were performed in accordance with the applicable requirements of the ASME Code at the time of the examinations. Full coverage was achieved during the ASME Code-required surface examination on RPV Head-to-Flange Weld AG. No recordable indications were observed during any of the volumetric and surface examinations.

Based on the above, the NRC staff concludes that the licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject welds due to their design configuration and proximity of adjacent RPV appurtenances. However, based on the examination volumes that were obtained, along with the examinations of other RPV welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the staff concludes that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.2 Request for Relief GG-ISI-006, ASME Code, Section XI, Examination Category B-D, Item B3.90, Full Penetration Welded Nozzles in Vessels

3.2.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-D, Item B3.90 requires 100 percent volumetric examination, as defined by ASME Code, Figures IWB-2500-7(a) through (d), as applicable, of RPV nozzle-to-vessel welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

3.2.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of Class 1 RPV nozzle-to-vessel welds shown in Table 3.2.1 below.

Table 3.2.1 – ASME Code, Section XI, Examination Category B-D, Item B3.90

Weld Identifier	Weld Type	ASME Code Coverage Obtained
N01B-KA	24" Recirculation Outlet Nozzle-to-Shell	50.0%
N02B-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02C-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02D-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02E-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02F-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02G-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02H-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N02J-KA	12" Recirculation Inlet Nozzle-to-Vessel	60.0%
N03A-KA	24" Main Steam Nozzle-to-Vessel	60.0%
N03B-KA	24" Main Steam Nozzle-to-Vessel	60.0%
N04A-KA	14" Feedwater Nozzle-to-Vessel	58.0%

Table 3.2.1 – ASME Code, Section XI, Examination Category B-D, Item B3.90		
Weld Identifier	**Weld Type**	**ASME Code Coverage Obtained**
N04B-KA	14" Feedwater Nozzle-to-Vessel	58.0%
N04C-KA	14" Feedwater Nozzle-to-Vessel	58.0%
N04D-KA	14" Feedwater Nozzle-to-Vessel	58.0%
N05A-KA	Core Spray Nozzle-to-Vessel	58.0%
N06A-KA	12" RHR/LPCI(1) Inlet Nozzle	58.0%
N06B-KA	12" RHR/LPCI Inlet Nozzle	58.0%
N06C-KA	12" RHR/LPCI Inlet Nozzle	58.0%
N07-KA	15.5" RCIC(2) Top Head Spray Inlet Nozzle	62.0%
N08-KA	15.5" RCIC Top Head Spray Inlet Nozzle	62.0%
N09A-KA	12" Instrument Nozzle-to-Shell	59.0%
N01A-KA	24" Recirculation Outlet Nozzle-to-Shell	76.0%
N02A-KA	12" Recirculation Inlet Nozzle-to-Vessel	70.0%
N02K-KA	12" Recirculation Inlet Nozzle-to-Vessel	70.0%
N02M-KA	12" Recirculation Inlet Nozzle-to-Vessel	70.0%
N02N-KA	12" Recirculation Inlet Nozzle-to-Vessel	70.0%
N03C-KA	24" Main Steam Nozzle-to-Vessel	75.0%
N03D-KA	24" Main Steam Nozzle-to-Vessel	75.0%
N04E-KA	14" Feedwater Nozzle-to-Vessel	72.0%
N05B-KA	Core Spray Nozzle-to-Vessel	73.0%
N04F-KA	14" Feedwater Nozzle-to-Vessel	72.0%
N09B-KA	12" Instrument Nozzle-to-Shell	77.0%
N10-KA	CRD Nozzle-to-Shell	72.0%
N16-KA	Instrument Nozzle-to-Shell	77.0%

(1) Residual heat removal/low-pressure coolant injection.
(2) Reactor core isolation cooling.

3.2.3 Licensee's Basis for Relief Request (as stated)

During [UT] examination of the [RPV] nozzle-to-vessel welds listed in Table 1 [(see Table 3.2.1 above)] of this relief request, 100% coverage of the required examination volume could not be obtained.

Components N01B-KA through N09A-KA were not subjected to the requirements of Appendix VIII as they were examined prior to November 22, 2002, the implementation date specified [in 10 CFR 50.55a(g)(6)(ii)(c)] for [ASME Code] Supplement 7. The weld configuration and the close proximity of the nozzle taper resulted in geometric scan limitations, which cannot be overcome by adding additional examination angles. As a result, the use of 45°S, 60°S, and 0°L beam angles in the axial direction, and 45°S and 60°S beam angles in the

circumferential direction, were not capable of achieving the [ASME] Code required examination volume.

Components [N01A-KA] through N16-KA were subjected to the requirements of [ASME Code, Section XI,] Appendix VIII. The procedure used for these examinations has been demonstrated for the detection of flaws at [Electric Power Research Institute (EPRI)] in accordance with the requirements of Appendix VIII. In accordance with this procedure 60° refracted longitudinal (RL) wave examinations were performed in both the axial (radial) and circumferential scan directions. Additional examinations were performed in accordance with another qualified procedure and EPRI modeling was performed for each of these nozzle configurations. This scanning was performed from both the vessel shell and nozzle blend, where accessible. As a result, the use of 60°RL beam angle in the axial and [circumferential] directions, and the additional beam angles required by the EPRI modeling, were not capable of achieving the [ASME] Code required examination volume.

[RT] is not practical on these types of nozzle-to-vessel weld configurations, which prevent placement of the film and exposure source. To perform any additional [ASME] Code allowable UT examination, modification and/or replacement of the component would be required. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of integrity.

3.2.4 Licensee's Proposed Alternative Examination (as stated)

No alternative testing is proposed at this time. Entergy has examined these welds to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code.

3.2.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of ASME Code Class 1 RPV nozzle-to-vessel welds. However, at GGNS, the design geometry of the subject nozzle-to-vessel welds limits ultrasonic examination. In order to effectively increase the examination coverage, these nozzle welds would require design modification, or replacement. This would place a burden on the licensee; therefore, the ASME Code-required 100 percent volumetric examinations are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, examination of the subject nozzles has been performed to the extent practical with the licensee obtaining volumetric coverage ranging from approximately 50 to 77 percent (see Table 3.2.1 above). The nozzles are of the "set-in" design, which essentially makes the welds concentric rings aligned parallel with the nozzle axes in the through-wall direction of the RPV shell. This design geometry limits ASME Code-required UT angle beam examinations to the shell side of

the nozzles. In addition, the outside surface nozzle-to-shell blend radii causes contact of the ultrasonic search unit to be interrupted, further limiting these examinations.

Manual UT examinations on these carbon steel nozzle welds, with stainless steel inside diameter (ID) cladding, included 0-degree longitudinal, 60-degree refracted longitudinal, and 35-, 45-, 50-, and 60-degree shear waves, as applicable, from the shell side. These angles were the result of computer modeling recommendations performed to maximize effective coverage. The examinations encompassed most of the weld and base materials near the inside surface of the vessel, which is the area where one would expect service degradation to initiate, if occurring. Although UT scans were primarily limited to the shell side only, recent studies have found that inspections conducted through carbon steel are equally effective whether the UT waves have only to propagate through the base metal, or have to also propagate through the carbon steel weldment[1].

Volumetric examinations for Welds N01B-KA through N09A-KA were conducted using ASME Code-required technical guidance at the time of the examinations. For the remaining welds, volumetric examinations were conducted with equipment, procedures, and personnel that were qualified to the process outlined in ASME Code, Section XI, Appendix VIII. No recordable indications were observed during any of the volumetric examinations.

The NRC staff concludes that the licensee has shown that examining the full ASME Code-required volumes for the subject RPV nozzle-to-vessel welds is impractical. However, based on the volumetric coverage that was obtained on these nozzles, and considering the licensee's performance of ultrasonic techniques employed to maximize this coverage, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.3 Request for Relief GG-ISI-007, ASME Code, Section XI, Examination Category B-F, Item B5.10, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles

3.3.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-F, Item B5.10 requires 100 percent volumetric and surface examination, as defined by ASME Code, Figure IWB-2500-8 of nominal pipe size (NPS) 4-inch or larger nozzle-to-safe end dissimilar metal full penetration welds on vessel nozzles. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

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[1] P. G. Heasler and S. R. Doctor. 1996. *Piping Inspection Round Robin*, NUREG/CR-5068, PNNL-10475, U.S. Nuclear Regulatory Commission, Washington, DC.

3.3.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination of ASME Code, Class 1 dissimilar metal welds shown in Table 3.3.1 below.

Table 3.3.1 – ASME Code, Section XI, Examination Category B-F			
ASME Code Item	**Comp. ID**	**Weld Type**	**ASME Code Coverage Obtained**
B5.10	N01A-KB	24" Recirculation Nozzle-to-Safe End, SS(1)	75.6%
B5.10	N02K-KB	14" Recirculation Nozzle-to-Safe End, SS	77.3%

(1) Stainless steel.

3.3.3 Licensee's Basis for Relief Request (as stated)

During [UT] examination of the piping welds listed in Table 1 [see Table 3.3.1 above] of this relief request, 100% coverage of the required examination volume could not be obtained.

[ASME Code,] Class 1 piping and components are often designed with welded joints such as nozzle-to-pipe, pipe-to-valve and pipe-to-pump which can physically obstruct a large portion of the required examination volume. For the welds listed in [Table 1], the examinations were performed after the 10CFR50.55a mandatory implementation date (November 22, 2002) for [ASME Code, Section XI, Appendix VIII]. The provided [ASME Code] coverage percentages reflect what is currently allowed by qualified [ASME Code, Section XI,] Appendix VIII techniques. [ASME Code, Section XI,] Appendix VIII qualified (PDI) procedures have demonstrated that sound beams may potentially be attenuated and distorted when required to pass through austenitic weld metal. Still, the PDI qualified methods employ the best available technology for maximizing examination coverage of these types of welds. For the components listed in this relief request, examination was extended to the far side of the weld to the extent permitted by geometry as qualified through PDI.

Entergy has used the best available techniques to examine the subject piping welds. To improve upon these examination coverage percentages, modification and/or replacement of the component would be required. Consistent with the ASME [Code,] Section XI sampling approach, examination of the subject welds, when combined with examinations that have been performed on other welds within the same Examination Category, is adequate to detect generic degradation, if it existed, therefore demonstrating an acceptable level of integrity.

3.3.4 Licensee's Proposed Alternative Examination (as stated)

No alternative testing is proposed at this time. Entergy has examined the subject welds to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code.

3.3.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of the subject ASME Code Class 1 dissimilar metal welds. However, complete examinations are restricted by the geometric configuration of these reactor vessel nozzle welds. In order to effectively increase the examination coverage, these nozzle welds would require design modifications. This would place a burden on the licensee; therefore, 100 percent ASME Code-required volumetric examinations of the subject welds are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, UT examinations of dissimilar metal welds N01A-KB and N02K-KB have been completed to the extent practical with the licensee obtaining approximately 75.6 percent and 77.3 percent of the ASME Code-required volumes, respectively. The design configuration of the subject welds consists of a carbon steel nozzle, buttered and welded to a stainless steel safe end. The volumetric examination coverage obtained included the adjacent safe end material, and most of the dissimilar metal weld volume, except for a small portion on the nozzle side of the weld. Recirculation nozzle-to-safe-end butt welds N01A-KB and N02K-KB are fabricated such that outside diameter (OD) surface concavities on the weld crowns create inaccessible scan regions. Consequently, UT probes cannot make the necessary contact to allow ultrasonic beam projection into the full ASME Code-required regions. These surface concavities affect both axial and circumferential scanning of the ASME Code-required examination for the subject welds.

The manual volumetric examinations were conducted with equipment, procedures, and personnel that were qualified to the process outlined in ASME Code, Section XI, Appendix VIII, and included scans from the safe-end side using 40-, 45-, and 60-degree refracted longitudinal, as applicable, and 45-degree shear waves. The combined shear and L-wave examinations account for the aggregate coverage reported. The L-wave method is believed capable of detecting planar ID surface-breaking flaws on the far-side of wrought stainless steel welds. Studies[2,3] reported in the technical literature recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds. One indication was noted on weld N02K-KB, but was evaluated as ID surface geometry. Two indications were noted on weld N01A-KB; one was evaluated as root geometry and the other as ID geometry that was previously recorded in refueling outage RF05.

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[2] F. V. Ammirato, X. Edelmann, and S. M. Walker. 1987. "Examination of Dissimilar Metal Welds in BWR Nozzle-to-Safe End Joints," 8th International Conference on NDE in the Nuclear Industry, ASM International.

[3] P. Lemaitre, T. D. Koble, and S. R. Doctor. 1995. "PISC III Capability Study on Wrought-to-Wrought Austenitic Steel Welds: Evaluation at the Level of Procedures and Techniques," *Effectiveness of Nondestructive Examination Systems and Performance Demonstration*, PVP-Volume 317, NDE-Volume 14, American Society of Mechanical Engineers.

The NRC staff concludes that the licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the recirculation nozzle-to-safe-end butt welds N01A-KB and N02K-KB due to the design configuration. However, based on the volumetric coverage obtained, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.4 Request for Relief GG-ISI-008, ASME Code, Section XI, Examination Category B-G-1, Item B6.40, Pressure Retaining Bolting Greater Than 2 Inches in Diameter

3.4.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-G-1, Item B6.40, requires 100 percent volumetric examination, as defined by Figure IWB-2500-12, of Class 1 RPV threads-in-flange.

3.4.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of Class 1 RPV threads-in-flange regions, licensee-designated as FLG LIG 1 through FLG LIG 76.

3.4.3 Licensee's Basis for Relief Request (as stated)

> During [UT] examination of the threaded area in the upper [RPV] flange, 100% coverage of the required examination volume could not be obtained. A 0° [UT] examination of threaded flange is required to be performed on the adjacent 1" area around the RPV stud hole. This scan is limited to approximately 85% around the circumference of each stud hole due to the RPV head raised seal surface. [RT] is not practical due to the component configuration, which prevents effective placement of the film and exposure source. To perform any additional [ASME] Code allowable [UT] examination, modification and/or replacement of the component would be required. The examination of 86.6% of the required volume of the subject items would detect generic degradation, if it existed, therefore demonstrating an acceptable level of integrity.

3.4.4 Licensee's Proposed Alternative Examination (as stated)

> No alternative testing is proposed at this time. Entergy has examined the subject items to the extent practical and will continue to perform pressure testing on the subject areas as required by the [ASME] Code.

3.4.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of ASME Code Class 1 threaded ligament areas in the RPV closure flange. However, examinations of these areas at GGNS are

limited due to the design of the flange geometry and adjacent cladding. In order for the licensee to obtain 100 percent of the ASME Code-required examination coverage, the closure head flange would need to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examinations are considered impractical.

The RPV threaded flange ligament areas, designated as FLG LIG 1 through FLG LIG 76 by the licensee, are designed such that the cladding seal surface is approximately ½-inch higher than the surface of the carbon steel ligament areas. This machined edge creates an inaccessible 1-inch area between the edge of cladding seal and stud hole. Thus, UT probes cannot make the necessary contact in this area to allow ultrasonic beam projection into the full ASME Code-required threaded (flange ligament) region. As shown on the sketch and technical descriptions included in the licensee's submittal, examination of the RPV flange threads has been performed to the extent practical in accordance with the applicable requirements of the ASME Code at the time of the examinations. The licensee has achieved approximately 86.6 percent of the ASME Code-required coverage using 0-degree longitudinal wave techniques being applied from the vessel flange. No reportable indications were observed during the manual ultrasonic examination of these threaded areas.

The NRC staff concludes that the licensee has shown that examining the ASME Code-required volume of the threaded ligaments in the RPV flange is impractical due to its design configuration. However, based on the volumetric coverage obtained, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject components.

3.5 Request for Relief GG-ISI-009, ASME Code, Section XI, Examination Category B-J, Items B9.11 and B9.31, Pressure Retaining Welds in Piping

3.5.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-J, Items B9.11 and B9.31, require essentially 100 percent volumetric and surface examinations, as defined by ASME Code, Section XI, Figures IWB-2500-8, -9, -10, or -11, as applicable, of the length of Class 1 circumferential and branch piping welds 4-inch NPS, or larger, in diameter. "Essentially 100 percent," as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 15.

3.5.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of the circumferential piping and branch pipe connection welds shown in Table 3.5.1 below.

Table 3.5.1 – ASME Code, Section XI, Examination Category B-J

ASME Code Item	Weld Identifier	Weld Type	Weld/ Base Material	ASME Code Coverage Obtained
B9.11	B33G001-W34	24" RCS(1) Pipe-to-Cross	Stainless	50.00%
B9.11	B33G10-B1-A	16" RCS Pipe-to-Cross	Stainless	50.00%
B9.11	B33G10-B1-B	16" RCS Pipe-to-Cross	Stainless	50.00%
B9.11	E51G001-W40	6" RCIC Valve-to-Elbow	Carbon	60.00%
B9.11	B33G001-W20	12" RCS Pipe-to-Tee	Stainless	50.00%
B9.11	B33G001-W22	12" RCS Pipe-to-Tee	Stainless	50.00%
B9.11	B33G001-W33	12" RCS Valve-to-Pipe	Stainless	50.00%
B9.11	1B33G10-A1-B	24" Pipe-to-Cross	Stainless	50.00%
B9.11	1B33G001W11	24" Pipe-to-Tee	Stainless	50.00%
B9.11	1B33G10-A1-A	24" Pipe-to-Tee	Stainless	50.00%
B9.31	B33G10-B1-H	12" RCS Sweep-o-let to Pipe	Stainless	50.00%
B9.31	B33G10-B1-G	12" RCS Sweep-o-let to Pipe	Stainless	50.00%
B9.31	B33G10-B1-F	12" RCS Sweep-o-let to Pipe	Stainless	50.00%
B9.31	1B33G10-A1-F	12" RCS Branch	Stainless	83.00%
B9.31	1B33G10-A1-G	12" RCS Branch	Stainless	83.00%
B9.31	1B33G10-A1-H	12" RCS Branch	Stainless	83.00%

(1) Reactor coolant system.

3.5.3 Licensee's Basis for Relief Request (as stated)

During UT examination of the piping welds listed in Table 1 [(see Table 3.5.1 above)] of this relief request, 100% coverage of the required examination volume could not be obtained.

[ASME Code] Class 1 piping and components are often designed with welded joints such as nozzle-to-pipe, pipe-to-valve and pipe-to-pump which can physically obstruct a large portion of the required examination volume. The provided code coverage percentages reflect what is currently allowed by qualified [ASME Code, Section XI,] Appendix VIII techniques. [ASME Code, Section XI,] Appendix VIII qualified (PDI) procedures have demonstrated that sound beams may potentially be attenuated and distorted when required to pass through austenitic weld metal. Still, the PDI qualified methods employ the best available technology for maximizing examination coverage of these types of welds. For all the components listed in this relief request, examination was extended to the far

side of the weld to the extent permitted by geometry, but this portion of the examination is not included in the reported coverage for welds examined under PDI and [ASME Code, Section XI,] Appendix VIII rules.

Entergy has used the best available techniques to examine the subject piping welds. To improve upon these examination coverage percentages, modification and/or replacement of the component would be required. Consistent with the ASME [Code,] Section XI sampling approach, examination of the subject welds, when combined with examinations that have been performed on other welds within the same Examination Category, is adequate to detect generic degradation, if it existed, therefore demonstrating an acceptable level of integrity.

3.5.4 Licensee's Proposed Alternative Examination (as stated)

No alternative testing is proposed at this time. Entergy has examined the subject welds to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code.

3.5.5 NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examinations of selected ASME Code, Section XI, Examination Category B-J pressure retaining welds in piping. However, complete volumetric examinations of the subject welds are restricted by geometrical configurations and materials. These conditions preclude the licensee from obtaining full volumetric examinations from both sides of these welds. To gain access for examination, the welds would require design modifications or replacement. Imposition of this requirement would place a burden on the licensee; therefore, the ASME Code-required 100 percent volumetric examinations are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, examinations of the subject circumferential girth welds have been performed to the extent practical with the licensee obtaining volumetric coverage ranging from approximately 50 to 60 percent from the accessible side of the welds. Volumetric scan limitations were caused by the weld pipe-to-sweep-o-let, -cross, -tee, -valve, and valve-to-elbow configurations. For the three branch-to-pipe welds, UT examinations have also been performed to the extent practical with approximately 83 percent volumetric coverage of the ASME Code-required volume (see Table 3.5.1 above). Full volume coverage was achieved from the pipe side for the branch-to-pipe welds, but was restricted in the circumferential direction on the branch side due to the OD surface curvature.

The manual UT examinations conducted by the licensee included 45-, 60-, and 70-degree shear wave and 45-, and 60-degree refracted longitudinal wave (L-wave) examinations, as applicable, from the accessible pipe side of the welds. The combined shear and L-wave examinations account for the aggregate coverage reported. Although the licensee did not claim credit for coverage on the inaccessible side of these welds, the L-wave technique is believed capable of detecting planar ID surface-breaking flaws on the far-side of wrought stainless steel welds.

Studies[4,5] reported in the technical literature recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds. For all but three of the subject piping welds, volumetric examinations were conducted using techniques qualified in accordance with performance demonstration requirements listed in ASME Code, Section XI, Appendix VIII. Welds B33G001-W34, B33G10-B1-A, and B33G10-B1-B were examined prior to the 10 CFR 50.55a(g)(6)(ii)(c) required implementation date of May 22, 2000, for ASME Code, Section XI, Appendix VIII, Supplement 3 examinations. No recordable indications were observed during the UT examinations.

The NRC staff concludes that the licensee has shown that it is impractical to meet the ASME Code-required volumetric and surface examination coverage, as applicable, for the subject welds due to the design geometry of the welds. Based on the coverage obtained, and considering the full examination of other pressure retaining piping welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.6 Request for Relief GG-ISI-010, ASME Code, Section XI, Examination Category B-K, Items B10.10 and B10.20, Integral Attachments for Class 1 Vessels, Piping, Pumps, and Valves

3.6.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-K, Items B10.10 and B10.20 require essentially 100 percent surface examination, as defined by ASME Code, Figures IWB-2500-13, -14, and -15, as applicable, of selected integrally welded attachments to Class 1 components. "Essentially 100 percent," as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 15.

Note: During the second 10-year ISI interval, the licensee invoked ASME Code Case N-509, "Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments," which replaces ASME Code, Category B-H, Integral Attachments for Vessels, and ASME Code, Category B-K-1, Integral Attachments for Piping, Pumps, and Valves, in ASME Code, Table IWB 2500-1 with ASME Code, Category B-K, Integral Attachments for Class 1 Vessels, Piping, Pumps, and Valves. ASME Code Case N-509 has been approved for use by the NRC in RG 1.147, Revision 13, subject to the following condition in addition to those conditions specified in the ASME Code Case: a minimum 10 percent sample of integrally welded attachments for each item in each code class per interval should be examined. GGNS

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[4] F. V. Ammirato, X. Edelmann, and S. M. Walker. 1987. "Examination of Dissimilar Metal Welds in BWR Nozzle-to-Safe End Joints," 8th International Conference on NDE in the Nuclear Industry, ASM International.

[5] P. Lemaitre , T. D. Koble, and S. R. Doctor. 1995. "PISC III Capability Study on Wrought-to-Wrought Austenitic Steel Welds: Evaluation at the Level of Procedures and Techniques," *Effectiveness of Nondestructive Examination Systems and Performance Demonstration*, PVP-Volume 317, NDE-Volume 14, American Society of Mechanical Engineers.

has met this condition and, therefore, the subject request for relief has been evaluated using ASME Code Case N-509, Category B-K.

3.6.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required surface examination of the RPV Support Skirt and Piping Attachment Welds CG and 1B21G11-D1-P, respectively.

3.6.3 Licensee's Basis for Relief Request (as stated)

> During surface examination of both the RPV Skirt weld and pipe support integral attachment weld, 100% coverage of the required examination area could not be obtained.
>
> The configuration of "CG", the Support Skirt Weld, is such that access is only available from the outside surface of the support leaving half of the exam volume inaccessible; refer to [ASME Code,] Figure IWB-2500-13, 14, and 15 for the exam volume. The later Edition of the ASME Code recognizes this and only requires the examination from the accessible surface.
>
> The configuration of 1B21G11-D1-P is four steel lugs evenly spaced around the pipe and integrally welded in place. The lugs are located within a box-type pipe support that is structurally anchored to a wall, serving to restrain the pipe from horizontal motion. [ASME] Code examination of this type of integral attachment weld requires a surface examination technique, such as Liquid Dye Penetrant [(PT)] or Magnetic Particle Testing [(MT)], of the weld crown surface and ½- inch of base material on either side of the weld toes. However, due to the configuration of this integral attachment, and associated pipe support, access to the weld and surrounding base material, for examination, is very limited.
>
> In order to perform any type of additional [ASME] Code examination, modification and/or replacement of the component would be required.

3.6.4 Licensee's Proposed Alternative Examination (as stated)

> No alternative testing is proposed at this time. Entergy has examined the subject item to the extent practical.

3.6.5 NRC Staff Evaluation

The ASME Code requires essentially 100 percent surface examination of ASME Code Class 1 integrally welded attachments. However, surface examinations for the GGNS subject welds are limited by the design configuration and surrounding appurtenances. In order for the licensee to obtain 100 percent of the ASME Code-required examination coverage on these welds, they would need to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code surface examination requirements are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, surface examinations of the subject integrally welded attachments have been performed to the extent practical obtaining 32 percent and 50 percent of the ASME Code-required coverage. No recordable indications were detected on any of the examined areas. Surface examination for Support Skirt Weld CG was limited to the outside of the GGNS RPV skirt. Access to the support skirt inner weld surface is restricted by insulation panels and control rod drives. The four piping attachment welds, designated as 1B21G11-D1-P by the licensee, are enclosed within a box support which is structurally attached to the adjacent wall. Because of the box support design and location, access to the subject attachment welds is limited to 4-inches of the approximate total of 12.5-inch weld length.

The NRC staff concludes that the licensee has demonstrated that examination of the subject integral attachment welds was performed to the extent practical. Based on the surface coverage that was obtained on these welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.7 Request for Relief GG-ISI-011, ASME Code, Section XI, Examination Category C-F-2, Item C5.51, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping

3.7.1 ASME Code Requirement

ASME Code, Section XI, Examination Category C-F-2, Item C5.51 requires 100 percent volumetric and surface examinations, as defined by Figure IWC-2500-7 of selected circumferential Class 2 carbon or low alloy steel piping welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

3.7.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of Class 2 Reactor Core Isolation Cooling (RCIC) Pipe-Elbow Weld 1E51G004-16-8-3.

3.7.3 Licensee's Basis for Relief Request (as stated)

> During [UT] examination of the pipe to elbow circumferential weld, 100% coverage of the required examination area could not be obtained.
>
> The configuration of [Pipe-Elbow Weld] 1E51G004-16-8-3 is such that 13.5" (49%) of the 27.5" circumferential weld is located under an adjacent pipe restraint that is permanently anchored to a wall, serving to restrain the pipe from

horizontal motion. 100% of the [ASME] Code Required Volume was obtained in the accessible area.

Entergy has used the best available techniques to examine the subject piping welds. To improve upon these examination coverage percentages, modification and/or replacement of the component or restraint would be required. Consistent with the ASME [Code,] Section XI sampling approach, examination of the subject weld, when combined with examinations that have been performed on other welds within the same [ASME Code] Examination Category, is adequate to detect generic degradation, if it existed, therefore demonstrating an acceptable level of integrity.

3.7.4 Licensee's Proposed Alternative Examination (as stated)

No alternative testing is proposed at this time. Entergy has examined the subject welds to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code.

3.7.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination for the selected Examination Category C-F-2 pressure retaining piping weld. However, volumetric examinations are limited by surrounding appurtenances. In order to increase volumetric coverage, the weld would require design modifications. Imposition of this requirement would create a burden on the licensee; therefore, the ASME Code-required 100 percent volumetric examination of the subject weld is considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, access for examination to the carbon steel pipe-to-elbow weld is limited due to a permanent pipe restraint surrounding nearly half of the pipe. The licensee obtained approximately 51 percent volumetric coverage from both sides of Pipe-Elbow Weld 1E51G004-16-8-3, using 45-degree shear waves. The weld examinations were performed in accordance with the applicable requirements of the ASME Code at the time of the examinations. Results of recent nondestructive examination (NDE) reliability studies[6] for UT examination have typically shown a high probability (>0.9) of detecting significant flaws in ferritic welds. No recordable indications were noted during the performance of the volumetric examinations.

The NRC staff concludes that the licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject pipe-to-elbow weld due to the surrounding pipe restraint. However, based on the volumetric coverage obtained, it is reasonable to conclude that if significant service-induced degradation had occurred in the subject weld, evidence of it would have been detected by the examinations that were performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

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[6] P. G. Heasler and S. R. Doctor. 1996. *Piping Inspection Round Robin*, NUREG/CR-5068, PNNL-10475, U.S. Nuclear Regulatory Commission, Washington, DC.

3.8 Request for Relief GG-ISI-012, ASME Code, Section XI, Examination Category F-A, Item F1.40, Supports

3.8.1 ASME Code Requirement

ASME Code, Section XI, Examination Category F-A, Item F1.40 requires 100 percent visual VT-3 examination, as defined by ASME Code, Figure IWF-1300-1, of selected ASME Code, Class 1, 2, 3, and MC supports other than piping supports. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

3.8.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required visual examination of the Class 1 RPV Support Skirt Weld B13D003S1.

3.8.3 Licensee's Basis for Relief Request (as stated)

> During the Visual examination of the support listed in Table 1 [(table not included in this SE)] of this relief request, 100% coverage of the required examination volume could not be obtained.
>
> The configuration of B13D003S1, RPV Support Skirt, is such that access is only available from outside of the support leaving the inside surface inaccessible for visual examination.

3.8.4 Licensee's Proposed Alternative Examination (as stated)

> No alternative testing is proposed at this time. Entergy has examined this weld to the extent practical.

3.8.5 NRC Staff Evaluation

The ASME Code requires 100 percent visual examination of ASME Code Class 1 supports. However, complete visual examinations of the subject RPV Support Skirt Weld B13D003S1 at GGNS are limited due to inaccessibility caused by their design and adjacent components. These conditions preclude the licensee from obtaining full visual examinations of the subject weld. To gain access for examination, the weld and adjacent items would require design modifications and possible disassembly or removal. Imposition of this requirement would place a burden on the licensee; therefore, the ASME Code-required visual examinations are considered impractical.

As shown on the sketch and technical descriptions included in the licensee's submittal, visual VT-3 examination of the subject support weld has been performed to the extent practical obtaining 50 percent of the ASME Code-required coverage. Weld B13D003S1 is only

accessible from the outer surface of the RPV support skirt for examination. While potential access to the inner surface is available through support skirt man-ways, removal of the insulation panels would be required to access the weld inner surface. The subject weld visual VT-3 examination was conducted using ASME Code-required technical guidance at the time of the examination. No indications were detected during the visual VT-3 examination.

The NRC staff concludes that the licensee has demonstrated that visual VT-3 examination of the subject integral attachment weld was performed to the extent practical. Based on the visual coverage that was obtained, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations performed. Furthermore, the staff determined that the examinations performed provide reasonable assurance of structural integrity of the subject components.

4.0 CONCLUSIONS

The NRC staff has reviewed the licensee's submittal and concludes that the ASME Code examination coverage requirements are impractical for the subject welds listed in RRs GG-ISI-005, GG-ISI-006, GG-ISI-007, GG-ISI-008, GG-ISI-009, GG-ISI-010, GG-ISI-011, and GG-ISI-012. The NRC staff further concludes that, based on the volumetric and surface examination coverage obtained on the subject welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Based on the above, the staff concludes that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject welds.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i), and is in compliance with the requirements of 10 CFR 50.55a with the granting of these reliefs. Therefore, the NRC staff grants relief for the subject examinations of the components contained in RRs GG-ISI-005, GG-ISI-006, GG-ISI-007, GG-ISI-008, GG-ISI -009, GG-ISI-010, GG-ISI-011, and GG-ISI-012 for GGNS for the second 10-year ISI interval, which ended on May 31, 2008. The NRC staff concludes that granting 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 given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: Thomas K. McLellan
Carol Nove

Date: May 25, 2010

Attachment

TABLE 1
SUMMARY OF RELIEF REQUESTS
Grand Gulf Nuclear Station, Unit 1
Second 10-Year ISI Interval

Relief Request Number	TLR RR Sec.	System or Component	Exam. Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
GG-ISI-005	3.1	Class 1 Pressure Retaining Welds in Reactor Vessels	B-A	B1.12 B1.22 B1.30 B1.40	Essentially 100% of the accessible length of longitudinal shell, Meridional head, and shell and head-to-flange welds	Volumetric and Surface, as applicable	Use volumetric and surface coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-006	3.2	Class 1 Full Penetration Welded Nozzles in Reactor Vessel	B-D	B3.90	100% of RPV nozzle-to-vessel Welds	Volumetric	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-007	3.3	Class 1 Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles	B-F	B5.10	100% of nozzle-to-safe end butt welds	Volumetric and Surface	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-008	3.4	Class 1 Threads in RPV Flange Weld	B-G-1	B6.40	100% of RPV threads-in-flange	Volumetric	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-009	3.5	Class 1 Pressure Retaining Welds in Piping	B-J	B9.11 B9.31	Essentially 100% of circumferential piping and branch connection welds	Volumetric and Surface	Use volumetric achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-010	3.6	Class 1 Integral Attachments for Vessels Piping, Pumps, and Valves	B-K	B10.10 B10.20	100% of ASME Code-required surface of welds	Surface	Use surface coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-011	3.8	Class 2 Pressure Retaining Welds in Carbon or Low Alloy Steel Piping	C-F-2	C5.51	100% of Class 2 circumferential piping welds	Volumetric and Surface	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
GG-ISI-012	3.7	Class 1 Supports Other Than Piping Supports	F-A	F1.40	100% of RPV support skirt welds	Visual, VT-3	Use visual coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)

Attachment

If you have any questions, please contact Mr. Fred Lyon at 301-415-2296 or via e-mail at fred.lyon@nrc.gov.

Sincerely,

/RA by James R. Hall for/

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

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