

April 29, 2003

Mr. William A. Eaton
Vice President, Operations GGNS
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - RE: RELIEF FROM THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE (CODE) CONCERNING USE OF NON-ASME CODE REPAIR TO STANDBY SERVICE WATER (SSW) PIPING IN ACCORDANCE WITH U.S. NUCLEAR REGULATORY COMMISSION (NRC) GENERIC LETTER (GL) 90-05 (TAC NO. MB6970)

Dear Mr. Eaton:

By letter dated December 18, 2002, subsequently superseded by letter dated March 5, 2003, Entergy Operations Inc. (the licensee) requested relief from ASME Code requirements for use of a non-ASME Code repair to SSW Piping in accordance with the NRC GL 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," dated June 15, 1990. As documented in the Relief Request GG-R&R-002, Revision 0, the licensee proposes a temporary non-code repair to the SSW supply piping at the Grand Gulf Nuclear Station, Unit 1 (GGNS), following the guidance of GL 90-05, and the implementation of the repair to remove the degradation, in compliance with the applicable code, to take place at the next scheduled outage with a duration of 30 days or more, but no later than the next refueling outage.

The NRC staff has reviewed the licensee's request. Based on the information provided by the licensee, and the regulatory commitments made, the NRC staff has concluded that the licensee's flaw evaluation has been consistent with the guidelines and acceptance criteria of GL 90-05, the performance of a Code repair by the licensee at this time would be impractical, and that the proposed evaluation provides reasonable assurance of pressure boundary integrity. This grant of relief pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 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. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(g)(6)(i) for the second ten-year inservice inspection interval at GGNS.

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

The NRC staff's safety evaluation is enclosed.

Sincerely,

/RA/

Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure: Safety Evaluation

cc w/encl: See next page

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

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Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure: Safety Evaluation

cc w/encl: See next page

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PDIV-1 Reading

RidsNrrDlpmLpdiv (HBerkow)

RidsNrrDlpmLpdiv1 (RGramm)

RidsNrrPMBVaidya

RidsNrrLADJohnson

RidsOgcRp

RidsAcrcAcnwMailCenter

GHill (2)

RHernandez-Figueroa (RXH1)

RLorson, RIV Plants (RKL)

RidsRgn4MailCenter (AHowell)

ADAMS Accession No. ML031200025

* No Significant Change from SE Input NRR-028

OFFICE	PDIV-1/PM	PDIV-1/LA	EMCB/SC*	OGC	PDIV-1/SC
NAME	BVaidya	DJohnson	TLChan	RHoeffling	DJaffe for RGramm
DATE	4/21/03	4/21/03	4/2/2003	4/28/03	4/29/03

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

NON-CODE REPAIR OF STANDBY SERVICE WATER SYSTEM PIPING

REQUEST FOR RELIEF GG-R&R-002, REVISION 0

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated December 18, 2002, subsequently superceded by letter dated March 5, 2003, Entergy Operations Inc. (Entergy or the licensee), pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(6)(i), submitted Relief Request GG-R&R-002, Revision 0, and requested relief from the repair requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, IWA-4170 (Reference 5.1).

The licensee proposed a temporary non-Code repair to the Standby Service Water (SSW) supply piping at the Grand Gulf Nuclear Station, Unit 1 (GGNS), following the guidance of Generic Letter (GL) 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," (Reference 5.2), and implementation of the repair to remove the degradation to take place at the next scheduled outage with a duration of 30 days or more, but no later than the next refueling outage.

2.0 BACKGROUND

In service Inspection of the ASME Code Class 1, 2, and 3 components are performed in accordance with Section XI of the ASME Code and the applicable addenda as required by 10 CFR 50.55a(g), except where written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that in service examination of components and system pressure tests conducted during the first ten-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 applicable Code

for the second ten-year in service inspection for GGNS is the ASME Code Section XI, 1989 Edition, no addenda.

ASME Code for Class 3 piping (Reference 5.3) allows the licensee to perform temporary non-Code repairs as long as it follows the guidance included in GL 90-05. The licensee is required to document the repair by requesting the NRC to grant a relief for temporary non-Code repairs of ASME Code Class 3 piping. The NRC staff uses the guidance of GL 90-05 as its criteria for performing safety evaluation of relief requests for temporary non-Code, ASME Code Class 3 piping.

On December 3, 2002, a Condition Report was initiated to document a potential condition that a leak existed in ASME Code Class 3 piping submerged in the "B" SSW basin. Leakage was causing periodic low level alarms for the SSW Fill Tank. During subsequent troubleshooting activities on December 5, 2002, a diver entered the "B" SSW basin to inspect the submerged piping and discovered a pin-hole flaw in the 24-inch supply piping on the "B" loop. The flaw initiated on the outside surface of the pipe and appeared to be consistent with microbiologically induced corrosion (MIC).

The piping containing the flaw is the supply line to plant heat exchangers and is submerged in the SSW basin. It is impractical either to repair the flaw with the SSW "B" basin filled or to drain the SSW "B" basin during power operation. A plant shutdown would be required to repair or replace the piping containing the flaw. Therefore, the Code-repair of the through-wall flaw is not practicable during power operation.

3.0 EVALUATION OF RELIEF REQUEST

Use of Non-ASME Code Repair to SSW Piping in Accordance with GL 90-05

The Items for Which Relief is Requested:

Component/Number 24"-HBC-79, SSW System "B" supply piping from SSW Pump to Residual Heat Removal (RHR) heat exchangers, Code Class 3

Code Requirement:

Reference 5.1 requires that repairs and installation of replacement items be performed in accordance with the original Owner's Design Specification and the original Construction Code of the component or system, and that later editions and addenda of the Construction Code or ASME Code Section III (Reference 5.4), either in their entirety or portions thereof, and Code Cases may be used. For the SSW system, the original Construction Code is provided as Reference 5.3.

Reference 5.2 establishes guidance for temporary non-code repair of ASME Code Class 3 piping, which consists of assessing the structural integrity of the flawed piping by a flaw evaluation, assessing the overall degradation of the system by an augmented inspection. In addition, the evaluation should address system interactions such as flooding, spraying water on equipment, and loss of flow. Furthermore, Reference 5.2 establishes that temporary non-Code repairs should be evaluated for design loading conditions.

The intent of these rules serves to provide an acceptable means of restoring the structural integrity of a degraded code class system back to the original design requirements.

Licensee's Proposed Alternative (as stated):

Background

On December 3, 2002, a Condition Report was initiated to document a potential condition that a leak existed on ASME Class 3 piping submerged in the "B" SSW basin. Leakage was causing periodic SSW Fill Tank low level alarms. During subsequent troubleshooting activities on December 5, 2002, a diver entered the "B" basin to inspect the submerged piping and discovered a pinhole flaw in the 24-inch supply piping on the "B" loop. The flaw initiated on the outside surface of the pipe and appears to be consistent with microbiological induced corrosion (MIC).

The profile of the pinhole flaw is cone-shaped, with a 1/8-inch [to] 3/16-inch diameter through-wall hole located on the inside diameter (ID) of the piping, and with a 1-inch cone base located on the outside diameter (OD) of the piping. The nominal wall thickness of the piping is 0.375-inch. The piping wall thickness in the area immediately outside the 1-inch cone base diameter and outward was ultrasonically (UT) measured. The results indicated that the nominal wall thickness outside the pinhole cone base diameter was unaffected and remained at nominal thickness of 0.375-inch.

The affected piping was evaluated for structural integrity in accordance with Generic Letter 90-05 guidance. The evaluation has demonstrated acceptable structural integrity. Also, the SSW system was evaluated for impact of a postulated 3/8-inch diameter through-wall flaw for reduced system flow due to flow-diversion through the pinhole. It was determined that required design basis flows to safety-related heat exchangers supplied by the subject piping are maintained with a margin. Cooling water inventory was unaffected since the leakage was from the SSW piping into the SSW basin.

A Code repair of the through-wall flaw is not practicable on-line. The piping containing the flaw is the supply piping to plant heat exchangers and is submerged in the SSW basin. It is impracticable to repair the flaw with the basin filled, and draining the basin is impracticable during power operation. Therefore, a plant shutdown is required to repair or replace the piping containing the flaw.

Generic Letter 90-05 requires augmented inspection of at least the 5 most susceptible (and accessible) locations for the failure mode (for Class 3, moderate energy piping) within 15 days. The generic letter specifies augmented inspection sample increases, up to 100% of the susceptible (and accessible) locations. The initial inspection activities following discovery involved the submerged accessible Division 1, 2, and 3 SSW piping that supports post-LOCA [Loss-of-Coolant Accident] functions. Excluded were the recirculation lines and the small bore stainless steel sensing lines for flow rate indication located in both basins. Entergy evaluated identified MIC indications to determine if actual piping wall thickness for these indications met or exceeded minimum wall thickness requirements. Minimum wall thickness was evaluated in accordance with ASME Code Case N-513-1 (with the limitations as specified in 10 CFR 50.55a) at locations where actual wall thickness was less than required. These locations were found to be acceptable.

Subsequent to the initial inspections that were part of the original discovery, Entergy has completed additional inspections that include the recirculation lines and sensing lines. Identified MIC indications were evaluated in accordance with Code Case N-513-1. These locations were acceptable.

Proposed Alternative

Pursuant to 10 CFR 50.55a(g)(6)(i), Entergy Operations, Inc. (Entergy) requests relief from the repair requirements of ASME Section XI, IWA-4170 for the period of time the degradation exists. Entergy proposes a temporary non-code repair of the SSW supply piping following the guidance of NRC Generic Letter 90-05, as presented below. Entergy will implement a code repair to remove the degradation at the next scheduled outage with a duration of 30 days or more, but no later than the next refueling outage.

The proposed temporary non-code repair has been evaluated utilizing the "through-wall flaw" methodology. System design basis decay heat removal flow to the heat exchanger is maintained. To prevent additional growth, the pin-hole and surrounding area were mechanically cleaned to remove rust and scale and coated to inhibit corrosion until the flaw can be repaired or piping replaced, not later than the next refueling outage (Spring 2004). The coating provides corrosion protection that is designed for underwater application and curing.

Additionally, a soft patch has been installed over the pin-hole and strapped to the outside of the piping utilizing metal strapping. The patch has essentially eliminated inventory loss from the SSW fill tank.

Licensee's Basis for Relief (as stated):

NRC Generic Letter 90-05 specifically provides an alternative to performing weld repair or replacement of Class 3 moderate energy piping due to rather frequent instances of small leaks in some Class 3 systems (i.e., service water systems). According to the generic letter, a non-code repair may be utilized until the next outage exceeding 30 days, but not later than the next refueling outage.

Generic Letter 90-05 discusses the normal case of "inside - out" corrosion for pipes in air. In this case, the basin water surrounding the pipe is the source of corrosion driving an "outside - in" process. However, the analytical methodologies for local evaluation of flaws are valid for either case because flaw geometry is similar for either case.

Periodic Assessment of the Non-Code Repair

The guidance contained in Enclosure 1 to Generic Letter 90-05 recommends that the temporary non-code repair of code Class 3 piping be assessed at least every 3 months by a suitable nondestructive examination method. Entergy will comply with the generic letter by performing a volumetric examination of the repair at least once every 3 months. Additionally, Entergy will qualitatively assess SSW leakage using normal operator rounds and System Engineering trending on at least a weekly basis.

Evaluation:

Upon discovering the leakage, the licensee inspected 100% of the submerged accessible Division 1, 2, and 3 piping and evaluated identified MIC indications. The actual piping wall thickness for these indications was evaluated to determine if they met or exceeded minimum wall thickness requirements. Minimum wall thickness was evaluated in accordance with ASME Code Case N-513-1 (Reference 5.5) and the limitations as specified in 10 CFR 50.55a at locations where actual wall thickness was less than required. These locations were found to be acceptable.

The flaw in the 24-inch supply piping on the "B" loop is cone-shaped, with a 1/8-inch to 3/16-inch diameter through-wall hole located on the ID of the piping, and with a 1-inch cone base located on the OD of the piping. The nominal wall thickness of the piping is 0.375-inch. The piping wall thickness in the area immediately outside the 1-inch cone base diameter and outward, was ultrasonically measured by UT. The results of the licensee's measurements determined that the nominal wall thickness outside the pin-hole cone base diameter was unaffected and remained at nominal thickness of 0.375-inches.

The licensee evaluated the affected piping structural integrity in accordance with Reference 5.2 guidance. The evaluation has demonstrated acceptable structural integrity. Also, the SSW system was evaluated for impact of a postulated 3/8-inch diameter through-wall flaw for reduced system flow due to flow-diversion through the pin-hole. The licensee determined that the required design basis flows to safety-related heat exchangers supplied by the subject piping are maintained with a margin. Cooling water inventory was unaffected since the leakage was from the SSW piping into the SSW basin. To prevent additional growth of the flaw, the pin-hole and surrounding area was mechanically cleaned to remove rust and scale and coated to inhibit corrosion until the flaw can be repaired or piping replaced at the next scheduled outage with a duration of 30 days or more, but not later than the next refueling outage (Spring 2004). The coating provides corrosion protection that is designed for underwater application and curing.

Additionally, a soft patch has been installed over the pin-hole and strapped to the outside of the piping utilizing metal strapping. The patch has essentially eliminated inventory loss from the SSW fill tank.

The NRC staff determined that since the flaw is submerged under water and located on the SSW basin, any flooding or spraying from the flaw would not affect any equipment and is, therefore, of little or no concern.

4.0 CONCLUSIONS

The NRC staff has concluded that the licensee's flaw evaluation has been consistent with the guidelines and acceptance criteria of Reference 5.2, the performance of a Code repair by the licensee at this time would be impractical, and that the proposed evaluation provides reasonable assurance of pressure boundary integrity. This grant 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. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(g)(6)(i) for the second ten-year inservice inspection interval at GGNS.

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

5.0 REFERENCES

- 5.1 ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, no Addenda, Subsection IWA-4170, "Code Applicability."
- 5.2 NRC Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," dated June 15, 1990
- 5.3 ASME Code, Section III, "Rules for Construction of Nuclear Facility Components," Division 1, Subsection ND, "Class 3 Components," 1974 Edition1 Summer 1974 Addenda
- 5.4 ASME Code, Section III, "Rules for Construction of Nuclear Facility Components," Division 1, Subsection ND, "Class 3 Components," 1989 Edition
- 5.5 ASME Code Case N-513-1, "Evaluation Criteria for Temporary Acceptance of Flaws in Class 3 Piping, Section XI, Division 1," August 14, 1997.

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Date: April 29, 2003

Grand Gulf Nuclear Station

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March 2003