February 9, 2006

Mr. Joseph E. Venable
Vice President Operations
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - RE: REQUEST FOR RELIEF FROM THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERED (ASME) BOILER AND PRESSURE VESSEL CODE (CODE) (TAC NO. MC8542)

Dear Mr. Venable:

By letter dated September 16, 2005, Entergy Operations, Inc. (the licensee) submitted, pursuant to Title 10 of *Code of Federal Regulations* (10 CFR), Section 55a(a)(3)(ii), an alternative to the ASME Code, Section XI requirements to repair a non-radioactive steam leak on line 2MS2-123 at its Waterford Steam Electric Station, Unit 3. The line is a part of the containment pressure boundary and is classified as an ASME Class 2 drain line. In lieu of repairing the piping, the licensee proposed to use a clamping device to stop the leak and to monitor the clamping device for leakage once per shift.

The staff finds that compliance with the specified ASME Code requirements would result in hardship without a compensating increase in the level of quality and safety and, therefore, the alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the next scheduled outage exceeding 30 days, but not beyond the next refueling outage. The staff further finds that the licensee's proposed alternative provides reasonable assurance that the pressure integrity of the pipe will be maintained. In view of the immediate need during the restart of the plant after Hurricane Katrina, the NRC staff gave verbal authorization on September 16, 2005.

The staff's safety evaluation is enclosed.

Sincerely,

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure: Safety Evaluation

cc w/encls: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. WF3-R&R-004

ENTERGY OPERATIONS, INC.

WATERFORD STEAM ELECTRIC STATION, UNIT 3

DOCKET NO. 50-382

1.0 INTRODUCTION

By letter dated September 16, 2005, Entergy Operations, Inc. (Entergy or the licensee), requested, pursuant to Title 10 of *Code of Federal Regulations* (10 CFR), Section 55a(a)(3)(ii), a relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Section XI to repair a non-radioactive steam leak on line 2MS2-123 at its Waterford Steam Electric Station, Unit 3 (Waterford 3). The line is a part of the containment pressure boundary and is classified as an ASME Class 2 drain line. Instead, the licensee proposed to use a clamping device to stop the leak and to monitor the clamping device for leakage once per shift. Waterford 3 is currently in the second 10-year inservice inspection (ISI) interval. The 1992 Edition of ASME Code, Section XI through 1993 Addenda governs the current repair and replacement activities at Waterford 3.

In view of the immediate need during the restart of the plant after Hurricane Katrina, the NRC staff gave verbal authorization on September 16, 2005. The staff may grant verbal authorization for relief under 10 CFR 50.55a(a)(3) when, due to unforeseen circumstances, licensees need NRC authorization before the staff is able to issue its safety evaluation. The steam leak was an unforeseen circumstance. In addition, the licensee had provided its proposed alternative in writing and the technical staff had completed its review and determined that the proposed alternative was technically justified, before the staff granted verbal authorization.

2.0 BACKGROUND

On September 14, 2005, an operator identified a non-radioactive steam leak on line 2MS2-123, which is an ASME Class 2 drain line (off a drain pot) located outside the Reactor Containment Building but upstream of #2 Main Steam Isolation Valve on the +46-foot elevation (roof) of the Reactor Auxiliary Building. The piping for 2MS2-123 is 2-inch, Schedule 80 (0.218-inch wall thickness), SA106 Grade B piping and is designed in accordance with the 1971 Edition, Winter 1972 Addenda of ASME Section III, Subsection NC. The design and operating conditions for 2MS2-123 are as follows:

- Design: 1085 pound per square inch gauge (psig) at @ 555 EF
- Operating: 985 psig at 545 EF

The leak on 2MS2-123 is located in the base material of the SA106, Grade B piping and not in a weld. Based on visual examination of the defect area, the leak source was determined to be a 1/16-inch diameter through-wall pinhole that appears to be the result of an outside diameter environmental initiated corrosion mechanism. In addition, an ultrasonic testing (UT) examination was performed that demonstrated that the base material region surrounding the pinhole complied with minimum wall requirements and was of sufficient thickness to install a mechanical clamping device. Since the time of discovery, the leak has been closely monitored and has remained stable.

Entergy has determined that a permanent ASME Code Section XI repair is not possible during power operation because the leak is incapable of being isolated and subject to full steam generator pressure. Therefore, Entergy intends to implement a code repair in accordance with design provisions of the ASME Section XI Code Case –523-2. However, a deviation from a provision of Code Case –523-2, as described below, is required.

3.0 REGULATORY EVALUATION

As specified in 10 CFR 50.55a(g), ISI of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). As stated in 10 CFR 50.55a(a)(3), 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.

4.0 TECHNICAL EVALUATION

4.1 Components

Component/Number:	2MS2-123
Description:	2-inch NPS [Nominal Pipe Size] Piping Off of Drip Pot to the #2 Main Steam Isolation Valve
Code Class:	2
Unit:	Waterford Steam Electric Station, Unit 3
Inspection Interval:	Second 10-Year Interval

4.2 Code Requirements

ASME Section XI, Code Case –523-2, establishes requirements that may be used for mechanical clamping devices to control leakage through the pressure boundary and to maintain the structural integrity of Class 2 and Class 3 piping.

The NRC has unconditionally approved the use of Code Case –523-2 in Regulatory Guide 1.147, “Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1,” Revision 14.

Paragraph 1.0(a) of Code Case –523-2 states in part, “The provisions of this Case apply to piping and tubing, and their associated fittings and flanges, and the welding ends of pumps, valves, and pressure vessels except for those that form the containment boundary.”

4.3 Licensee's Proposed Alternative

As stated by the licensee in Section III of the enclosure to its letter dated September 16, 2005:

> According to paragraph 1.0(a) of Code Case –523-2, “the provisions of this Case apply to piping and tubing, and their associated fittings and flanges… except for those that form the containment boundary.” Pursuant to the provisions of 10 CFR 50.55a(a)(3)(ii), Entergy requests a deviation from the containment boundary restriction of paragraph 1.0(a) of the Case so that a repair may be performed on line 2MS2-123 using a mechanical clamping device that meets the provisions of Code Case –523-2. All other provisions of the Case will be met. As required by paragraph 1.0(c) of the Case, the proposed clamping device will remain in service until the next scheduled outage exceeding 30 days, but no longer than the next refueling outage at which time the defect will be repaired or piping replaced in accordance with IWA-4000 of ASME Section XI.

4.4 Licensee's Basis for Proposed Alternative

As stated by the licensee in Section IV of the enclosure to its letter dated September 16, 2005:

> A permanent ASME Code repair is not possible during plant operation, as the affected piping cannot be isolated. Although a mechanical clamping device would provide an acceptable repair to control leakage and ensure continued structural integrity of line 2MS2-123, paragraph 1.0(a) of Code Case –523-2 prohibits its use in a containment boundary. Under these conditions, it would be necessary for Waterford 3 to shut down in order to perform a permanent Code repair. This creates a hardship in that the shutdown and subsequent restart unnecessarily cycles plant systems and components.
>
> Entergy prefers to use a mechanical clamping device to control the leak and to ensure structural integrity of the piping. The proposed mechanical clamping device will comply with the requirements of Code Case –523-2 with the exception that it will be located on system piping that is considered a containment boundary. Entergy understands that the basis for the scope limitation is to prevent temporary repair of containment boundaries, which could depressurize and have the potential for communicating with the post-accident environment inside containment.
>
> The Main Steam System containment isolation design utilizes a closed system inside containment and isolation valves outside containment. The mechanical clamping device will be located on a small pipe outside containment; the closed system will continue to provide a passive containment isolation barrier. The normal operating pressure at the location of the mechanical clamping device is in the range of 800 - 1000 psig. As such, positive verification of the leak-tight

integrity of the mechanical clamping device will be detected by visual observations performed once per shift.

The use of a mechanical clamping device on a portion of a system which is considered a containment boundary is acceptable based on the fact that the system will be continuously pressurized at pressures significantly greater than containment post-accident conditions, as well as ambient atmospheric pressure. Because this is the case, leakage during operation would be readily detected by visual observation.

4.5 Staff Evaluation

The licensee is proposing to use a mechanical clamping device that will comply with all ASME Code requirements with the exception that it will be located on a portion of system piping that is considered a containment pressure boundary. The clamping device has been designed in full compliance with the requirements of ASME Code, Section XI, Article IX-3000, and materials have been specified in accordance with Article IX-4000. The design of the clamping device also meets or exceeds the design rating of the associated piping. Because the clamping device meets all design and materials requirements of ASME Code, Section XI, the licensee concluded that the use of the clamp is an acceptable temporary leak repair method, and that the clamp is suitable for the intended application and capable of performing its specified design functions.

The staff has reviewed the licensee's conclusion that the clamping device is suitable for the intended application because the clamping device meets the requirements of ASME Code, Section XI, and finds it acceptable. Compliance with the requirements of ASME Code, Section XI, provides an acceptable level of quality and safety.

The licensee is proposing to install the clamping device on piping that is a part of the containment pressure boundary. The Code prohibits the use of clamping devices on containment pressure boundary piping because of concerns that temporary clamp devices may not be able to prevent interactions between the affected line and containment atmosphere during accident conditions. The licensee has addressed this concern by showing that the Main Steam System containment isolation design utilizes a closed system inside containment and isolation valves outside containment. The mechanical clamping device will be located on a small pipe outside containment and, thus, the closed system will continue to provide a passive containment isolation barrier. The normal operating pressure at the location of the mechanical clamping device is in the range of 800 - 1000 psig. As such, positive verification of the leak-tight integrity of the mechanical clamping device will be performed by visual observations performed once per shift. The licensee has committed to perform this inspection.

The NRC staff finds that the use of a mechanical clamping device on a portion of a system considered part of the containment boundary is acceptable in this case because the system will be continuously pressurized at pressures significantly greater than ambient atmospheric pressure. Therefore, leakage during operation would be readily detected by visual observation.

The staff finds the licensee's reasoning in support of its request to install a clamping device on containment pressure boundary (drain line 2MS2-123) acceptable. The licensee has adequately demonstrated that the containment environment during accident conditions would remain unchanged as a result of installation of the clamping device because the system will be

continuously pressurized at pressures significantly greater than containment and, thus, prevent any interaction between the clamped line and the containment environment.

Further, the staff finds that requiring the licensee to perform a permanent ASME Code repair would impose a hardship because the affected piping cannot be isolated and, therefore, the plant would need to be shut down in order to perform the permanent Code repair. Requiring the plant to be shut down for repair, in this case, would not provide a compensatory increase in the level of quality and safety particularly because the shutdown and subsequent restart would unnecessarily cycle plant systems and components.

5.0 CONCLUSION

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of ASME Code, Section XI. Furthermore, the staff finds that performance of an immediate Code repair would constitute a hardship upon the licensee without a compensating increase in the level of quality or safety, since it would result in the shutdown of the plant. In this case, plant shutdown is not in the best interest of public safety, given the magnitude of the flaw and the licensee's temporary repair and monitoring provisions. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the alternative is authorized for Waterford 3 until the next scheduled outage exceeding 30 days, but not beyond the next refueling outage. At that time, a Code repair will be performed.

In view of the immediate need during the restart of the plant after Hurricane Katrina, the NRC staff gave the licensee a verbal authorization to use the alternative on September 16, 2005.

All other ASME Code, Section XI requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Georgiev

Date: February 9, 2006

Waterford Steam Electric Station, Unit 3

cc:

Mr. Michael E. Henry, State Liaison Officer
Department of Environmental Quality
Permits Division
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313

Vice President Operations Support
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Director
Nuclear Safety Assurance
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, MS 39205

General Manager Plant Operations
Waterford 3 SES
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

Licensing Manager
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

Winston & Strawn
1700 K Street, N.W.
Washington, DC 20006-3817

Resident Inspector/Waterford NPS
P. O. Box 822
Killona, LA 70066-0751

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

Parish President Council
St. Charles Parish
P. O. Box 302
Hahnville, LA 70057

Executive Vice President
& Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Chairman
Louisiana Public Services Commission
P. O. Box 91154
Baton Rouge, LA 70825-1697