April 28, 2004

Mr. Paul D. Hinnenkamp
Vice President - Operations
Entergy Operations, Inc.
River Bend Station
P. O. Box 220
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 -RE: REQUEST FOR RELIEF FROM THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE (CODE), SECTION XI, CONCERNING CHECK VALVE INSERVICE TESTING PROGRAM (TAC NO. MC1032)

Dear Mr. Hinnenkamp:

By letter dated October 13, 2003, as supplemented by letter dated March 4, 2004, Entergy Operations, Inc. (the licensee) submitted Relief Request RBS-VRR-008 seeking relief from certain inservice testing (IST) requirements for the check valve E51-VF030 at River Bend Station, Unit 1 (RBS). In Relief Request RBS-VRR-008, you proposed an alternative testing frequency for performing IST for the check valve E51-VF030. The check valve will be tested using a disassembly-and-inspection method on a frequency of at least once during each operating cycle in lieu of once during each refueling outage as currently required by paragraphs 4.3.2.2(e) and 4.3.2.4(c) in Part 10 of the ASME/American National Standards Institute Operations and Maintenance Standards (ASME/ANSI OM-10).

Based on the Nuclear Regulatory Commission (NRC) staff's review of the information you provided in Relief Request RBS-VRR-008, as supplemented, the NRC staff concludes that your proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, the NRC staff authorizes the proposed alternative stated in Relief Request RBS-VRR-008, as supplemented, for RBS, for the second 10-year IST program interval.

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation. Should you have any questions regarding this safety evaluation, please contact Mr. Michael Webb at (301) 415-1347.

Sincerely,

/RA/

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

Docket No. 50-458

Enclosure: Safety Evaluation

cc w/encl: See next page

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Docket No. 50-458
Enclosure: Safety Evaluation
cc w/encl: See next page
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST RBS-VRR-008

ENTERGY OPERATIONS, INC.

RIVER BEND STATION, UNIT 1 (RBS)

DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated October 13, 2003, as supplemented by letter dated March 4, 2004, Entergy Operations, Inc. (Entergy, the licensee) submitted Relief Request RBS-VRR-008 seeking relief from certain inservice testing (IST) requirements for the check valve E51-VF031 at RBS. In Relief Request RBS-VRR-008, the licensee proposed an alternative testing frequency for performing IST for the check valve E51-VF030. In response to the Nuclear Regulatory Commission (NRC) staff's request for additional information (RAI), the licensee submitted a response in a letter dated March 4, 2004. The check valve will be tested using a disassembly-and-inspection method on a frequency of at least once during each operating cycle in lieu of once during each refueling outage as currently required by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), ASME/American National Standards Institute (ANSI) Operations and Maintenance Standards (OM-10), paragraphs 4.3.2.2 (e) and 4.3.2.4(c). This relief request is applicable to the second 10-year interval IST program for the RBS. The RBS's second 10-year IST program interval began on December 1, 1997, and ends on November 30, 2007.

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a (Reference 1), require that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of IST programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995 (Reference 2). Also see NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants" (Reference 3), and NUREG/CR-6396, "Examples, Clarifications, and Guidance on

Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements" (Reference 4).

The 1989 Edition of the ASME Code is the applicable Code of record for the second 10-year interval IST program at RBS. Subsection IWV of the 1989 Edition specifies the requirements for IST of valves and references ASME/ANSI OM-10 (Reference 5) as the rules for IST of valves.

3.0 EVALUATION OF RELIEF REQUEST

RELIEF FROM CERTAIN IST REQUIREMENTS FOR THE CHECK VALVE E51-VF030

3.1 The Item for which Relief is Requested:

SYSTEM 209 - ICS - Reactor Core Isolation Cooling (RCIC)

Component Identification	Code Class	Size (Inches)	Code Category	Component Function
E51-VF030	2	6	C	RCIC PUMP SUCTION LINE CHECK VALVE

Component Function

The valve E51-VF030 is a check valve located in the RCIC pump suction line from the Suppression Pool. In the “open” position, the valve has a safety function to allow water flow to the suction of the RCIC pump from the Suppression Pool. This check valve must be capable of passing at least 616 gallons per minute (gpm) for the RCIC system to perform its design safety function (600 gpm injection flow rate plus 16 gpm cooling water from the pump discharge). The Suppression Pool is the Seismic Class 1, safety-related source for the RCIC pump suction. In the “closed” position, the valve also has a safety function to prevent the diversion of flow from the RCIC keep-fill pump and to prevent draining the Condensate Storage Tank (CST) into the Suppression Pool via reverse flow during a transfer of the suction source. Otherwise, it could potentially result in an unacceptably high level in the Suppression Pool.

The “close” function is verified quarterly by verifying little or no sustained flow from an upstream test connection. As permitted by paragraph 4.3.2.4(c) of ASME/ANSI OM-10, the “open” function of E51-VF030 is verified by valve disassembly during each refueling outage.

3.2 Code Requirement:

ASME/ANSI OM-10 paragraph 4.3.2.2 addresses exercising requirements for valves. Paragraph 4.3.2.2(e) states, "If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages."

ASME/ANSI OM-10 paragraph 4.3.2.4 addresses methods that may be used to perform IST activities for valves. Paragraph 4.3.2.4(c) states, "As an alternative to the testing in (a) or (b) above disassembly every refueling outage to verify operability of check valves may be used."

3.3 Licensee's Proposed Alternative (as stated):

Pursuant to 10 CFR 50.55a(a)(3)(i), Entergy proposes an alternative testing frequency for performing inservice testing of valve E51-VF030. The valve will be tested on a frequency of at least once during each operating cycle in lieu of once during each refueling outage as currently allowed by ASME/ANSI OM-10 paragraphs 4.3.2.2(e) and 4.3.2.4(c).

3.4 Licensee's Basis for Relief:

Background (as stated)

[The valve] E51-VF030 is a check valve with no external means for exercising and no external position indication mechanism. Disassembly of E51-VF030 is the most feasible method to verify OPERABILITY. Although ASME/ANSI OM-10 Paragraphs 4.3.2.2(e) and 4.3.2.4(c) identify disassembly and testing to be performed during refueling outages, these activities can be conducted during system outages while the plant is on-line.

[The regulation in] 10 CFR 50.65(a)(4) [(Reference 6)] requires licensees to assess and manage the increase in risk that may result from proposed maintenance activities. Entergy complies with the requirements of §50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. This program dictates the requirements for risk evaluations as well as the necessary levels of action required for risk management in each case. The program also controls operation of the on-line risk monitoring system, which is based on the RBS probabilistic risk assessment (PRA). In addition, this program provides methods for assessing risk of maintenance activities for components not directly in the RBS PRA model. With the use of risk evaluation for various aspects of plant operations, Entergy has initiated efforts to perform additional maintenance, surveillance, and testing activities during normal operation. Planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins. Individual system components, a system train, or a complete system may be planned to be out of service to allow maintenance, or other activities, during normal operation.

Basis (as stated)

As more system outages are performed on-line, it is evident that selected refueling outage inservice testing activities (e.g., valve exercising and disassembly) could be performed during these system outages without sacrificing the level of quality or safety. Incorporation of valve disassembly into the system work window for other planned maintenance will not result in any additional net risk increase for the inservice test activity. Entergy proposes the alternative Inservice testing frequency for the associated check valve based on the following:

1. Inservice testing performed on a refueling outage frequency is currently acceptable in accordance with ASME/ANSI OM-10. By specifying testing activities on a frequency commensurate with each refueling outage, ASME/ANSI

OM-10 recognizes and establishes an acceptable time period between testing. Historically, the refueling outage has provided a convenient and defined time period in which testing activities could be safely and efficiently performed. However, an acceptable testing frequency can be maintained separately without being tied directly to a refueling outage. Inservice testing performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of ASME/ANSI OM-10.

2. As discussed above, Entergy complies with the requirements of §50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. Disassembly and testing of valve E51-VF030 would be performed during a scheduled system outage window.

   Disassembly and testing of E51-VF030 will involve a system breach. During such activities, the valve is isolated and the associated section of piping is drained. Therefore, the system breach does not increase the risk due to internal flooding or internal system LOCA [loss-of-coolant accident].

   The risk resulting from these activities would be bounded within the risk experienced due to the system outage; therefore, disassembly and testing of this valve during scheduled system outages while on-line would have no additional impact on core damage frequency.

   Entergy believes using risk assessment to plan and schedule system/train outages for maintenance work and incorporating check valve disassembly into the planned work windows during normal operation provides an acceptable level of quality and safety.

3. Over time, approximately the same number of tests will be performed using the proposed operating cycle test frequency as would be performed using the current refueling outage frequency. Thus, inservice testing activities performed during the proposed operating cycle test frequency provide an equivalent level of quality and safety as inservice testing performed at a refueling outage frequency.

In approving similar relief requests for Arkansas Nuclear One, Unit 1 (Reference 7), the NRC staff stated, "Verifying closure of each valve once per refueling [operating] cycle using non-intrusive techniques provides reasonable assurance of the valves' operational readiness, considering the Code allows deferrals to once per refueling outage." In approving similar relief requests for RBS (Reference 8) and for Grand Gulf Nuclear Station (Reference 9), the NRC staff concluded that the proposed alternative testing frequency of at least once per operating cycle in lieu of once during each refueling outage would provide an acceptable level of quality and safety.

Additional Information

In response to the NRC staff's RAI, the licensee in its response on March 4, 2004, provided the following additional information:

1. RBS performs on-line maintenance on the RCIC system, which includes tasks such as pump and turbine inspections/minor maintenance, and inspection of the governor valve and its linkage. The system outage window for the basic inspections conducted on an 18-months frequency is approximately 72 hours. For more extensive maintenance activities, which occur on a less frequent basis, the window is longer. Based on the review of maintenance history of the check valve E51-VF030, disassembly, inspection, and reassembly takes between 6 and 12 hours. This IST activity would be conducted simultaneously with other maintenance activities planned into the maintenance window. Based on maintenance history, scheduling experience, and work execution in past on-line maintenance windows on the RCIC system, this additional work would neither extend the maintenance window nor increase the overall system unavailability. Therefore, performing this IST activity on-line would not change the duration of the on-line maintenance activity or the CDP associated with the RCIC on-line maintenance activities. For these reasons, the risk/CDP over the entire operating/shutdown spectrum would remain unchanged.

2. The valves that are used to establish the isolation boundary for disassembly and inspection of E51-VF030 have an excellent history of providing adequate isolation during IST. The pressure upstream of the isolation valve (E51-F031) is a result of the head developed from the water volume in the suppression pool. Because of this head pressure, the pressure upstream of the isolation valve varies only slightly between on-line and shutdown conditions. The piping downstream of E51-VF030 has two check valves (E51-VF011 and E51-V3004) and two motor operated isolation valves (E51-F013 and F51-F010) protecting it from system operating pressure. The Valves E51-VF011, -V3004, and -F013 isolate E51-VF030 from system pressure while E51-F010 provides isolation from the condensate storage tank inventory. Check valves E51-VF011 and -V3004 are tested for their ability to close in accordance with the IST program, and have excellent IST history. The valve E51-F013 also has an excellent IST history. It has been leakage tested as a pressure isolation valve with excellent success. Although the downstream system pressure varies between on-line and shutdown conditions, the redundancy and reliability of these valves minimizes any risk of loss of isolation capability.

3. Risk associated with on-line maintenance activities is controlled through the RBS work control process. The preventive measures included in the process for maintaining safety and minimizing risk while performing on-line maintenance are :

   a. Assessing work activities by multiple independent personnel to ensure that the work activities in one system do not affect the ability of redundant systems or trains to perform their safety functions.

   b. Establishing redundant systems or trains as “protected”, so that these systems are less likely to be inadvertently made INOPERABLE while they are being credited to operate during the period that another safety system is out of service.

   c. Providing additional management oversight for significant maintenance activities being conducted while in TS LCO REQUIRED ACTION statements.

d. Conducting shift briefing to ensure that personnel are aware of active TS LCO REQUIRED ACTION statements.

e. Using human performance tools including pre-job briefings, self checking, and peer-checking to reduce or eliminate human errors.

4. Work on check valve E51-VF030 and other periodic work planned for the RCIC system will cause RCIC to become INOPERABLE in accordance with the TS. In accordance with TS 3.5.3, operation with RCIC INOPERABLE is permitted for up to 14 days; the REQUIRED ACTION is entered as the work window begins. Only 50% of the TS allowed outage time is required to perform the scheduled work. In addition, spare parts that may be necessary for rework are identified and made available in case rework becomes necessary.

3.5 Evaluation:

ASME/ANSI OM-10, paragraph 4.3.2 requires check valves to be exercised to their safety position(s) quarterly, if practical, otherwise at cold shutdowns. If this, too, is impracticable, the Code allows testing to be deferred to refueling outages. The licensee proposes as an alternative to perform the disassembly and inspection IST activities once every operating cycle in lieu of during the refueling outage. Paragraphs 4.3.2.2(e) and 4.3.2.4(c) of OM-10 and GL 89-04 Position 2 limit the performance of check valve IST activities (including disassembly) to refueling outages.

The valve E51-VF030 is a check valve located in the RCIC pump suction line from the Suppression Pool. In the “open” position, the valve has a safety function to allow water flow to the suction of the RCIC pump from the Suppression Pool. This check valve must be capable of passing at least 616 gpm for the RCIC system to perform its design safety function (600 gpm injection flow rate plus 16 gpm cooling water from the pump discharge). The Suppression Pool is the Seismic Class 1, safety-related source for the RCIC pump suction. In the “closed” position, the valve also has a safety function to prevent the diversion of flow from the RCIC keep-fill pump and to prevent draining the CST into the Suppression Pool via reverse flow during a transfer of the suction source. Otherwise, it could potentially result in an unacceptably high level in the Suppression Pool.

The check valve E51-VF030 has no external means for exercising and no external position indication mechanism. Disassembly of E51-VF030 is the most feasible method to verify operability. Although ASME/ANSI OM-10 paragraph 4.3.2.2(e) and 4.3.2.4(c) identify disassembly and testing to be performed during refueling outages, these activities can be conducted during system outages while the plant is on-line.

The NRC staff finds that disassembly and inspection of the RCIC check valve E51-VF030 can be safely accomplished during system outages when the plant is on-line. The NRC staff’s finding is based on the following considerations:

1. Over time, approximately the same number of inservice service tests will be performed using the proposed operating cycle test frequency as would be performed using the Code refueling outage frequency. IST performed on a frequency (18 months) that maintains the acceptable time period between testing activities during the operating

cycle (i.e., 18 months) is consistent with the intent of the ASME/ANSI OM-10 and GL 89-04.

2. During IST of check valve E51-VF030, the licensee will perform on-line testing within the boundaries normally established for on-line maintenance of the RCIC system. The conditions of isolation of this valve during on-line maintenance are similar to the conditions during plant shutdowns or refueling outages.

3. There are no technical barriers to performing these IST activities during either the refueling outage or the operating cycle.

4. The risk resulting from these IST activities would be bounded within the risk experienced due to the system outage. Therefore, disassembly and testing of this valve during scheduled system outages, while on-line, would have no additional impact on core damage frequency.

5. During check valve E51-VF030 disassembly and inspection, RBS will isolate this valve by the upstream isolation valve E51-F031 and the downstream valves E51-VF011, E51-V3004, and two motor-operated valves E51-F013 and E51-F010. The licensee states that valves E51-VF011, -V3004, and -F013 isolate E51-VF030 from system pressure while E51-F010 provides isolation from the condensate storage inventory. The licensee states that when breaching a pressure boundary, standard maintenance practice is to monitor the component being disassembled to ensure there is no unexpected leakage during disassembly. The licensee's procedure provides adequate measures to ensure that the check valve will be properly isolated during disassembly and inspection activities.

6. The licensee states that IST activities for valve E51-VF030 typically take from 6 to 12 hours, which would typically be accomplished within a 72-hour work window. The on-line RCIC system outages for this valve and the other work planned are scheduled utilizing only 50 percent of the allowable LCO time limit of 14 days. Therefore, based on historical performance of E51-VF030 and related IST activity, the RCIC system maintenance activities would not exceed the LCO. This provides an adequate margin to complete disassembly and inspection activities in an orderly manner.

7. The licensee states that spare parts that may be necessary for rework are identified and made available in case the rework becomes necessary.

8. The license states that performing this IST activity on-line would change neither the duration of the on-line maintenance activity nor the CDP associated with the RCIC on-line maintenance activity. For these reasons, the risk/CDP over the entire operating/shutdown spectrum would remain unchanged with this valve IST activity on-line.

On the basis of these considerations, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

4.0 CONCLUSIONS

Based on the NRC staff's review of the information provided in Relief Request RBS-VRR-008, as supplemented, the NRC staff concludes that licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the proposed alternative stated in Relief Request RBS-VRR-008, as supplemented, for RBS, for the second 10-year IST program interval.

5.0 REFERENCES

1. *U.S. Code of Federal Regulations*, Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.55a, Codes and standards.

2. U.S. Nuclear Regulatory Commission, "Guidance on Developing Acceptable Inservice Testing Program, " Generic Letter 89-04, through Supplement 1, April 4, 1995.
3. U.S. Nuclear Regulatory Commission, "Guidance for Inservice Testing at Nuclear Power Plants," NUREG-1482, April 1995.
4. U.S. Nuclear Regulatory Commission, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements," NUREG/CR-6396,
5. ASME/ANSI OMa-1988, Part 10, *Inservice Testing of Valves in Light-Water Reactor Power Plants*.
6. *U.S. Code of Federal Regulations*, Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.65, Requirements for monitoring the effectiveness of maintenance at nuclear power plants.
7. Letter from the NRC to Entergy Operations, Inc., "Arkansas Nuclear One, Unit 1 - Inservice Testing Program Third Ten-Year Interval for Pumps and Valves (TAC No. MA0275)," dated October 9, 1998.
8. Letter from the NRC to Entergy Operations, Inc., "River Bend Station, Unit 1 - Re: Relief from the Requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Concerning Check Valve Inservice Testing Program (TAC No. MB5834)," dated January 29, 2003.
9. Letter from the NRC to Entergy Operations, Inc., '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 the Use of Alternative Testing Frequency for Performing Inservice Testing (IST) (TAC No. MB6900)," dated April 23, 2003.

Principal Contributor: G. Bedi

Date: