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

January 29, 2003

SUBJECT: 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)

Dear Mr. Hinnenkamp:

By letter dated June 24, 2002, Entergy Operations, Inc. (EOI) submitted Relief Requests RBS-VRR-005, RBS-VRR-006, and RBS-VRR-007 seeking relief from certain inservice testing (IST) requirements for several check valves at River Bend Station, Unit 1 (RBS). In response to discussions with U. S. Nuclear Regulatory Commission (NRC) staff, EOI submitted revised relief requests on November 22, 2002. In Relief Request RBS-VRR-005, EOI proposed an alternative testing frequency for performing IST of various check valves. The check valves 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 allowed by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code). Similarly, in Relief Requests RBS-VRR-006 and RBS-VRR-007, EOI proposed an alternative testing frequency for performing IST of various check valves. The check valves will be tested using a non-intrusive method (radiography) on a frequency of at least once during each operating cycle in lieu of once during each refueling outage as currently allowed by ASME Code.

The EOI basis for Relief Request RBS-VRR-005 was that exercising the identified check valves is impractical because opening them during power operation or cold shutdown would need to be accomplished using system flow. Disassembly of the valves is the most feasible method to verify operability and can be accomplished during system outages when the plant is on-line. The EOI basis for Relief Requests RBS-VRR-006 and RBS-VRR-007 was that the specified check valves have no external means for exercising and no external position indication mechanism, and in Section 4.1.2 of NUREG-1482, “Guidelines for Inservice Testing at Nuclear Power Plants,” the NRC staff has determined that non-intrusive techniques meet the Code requirements for verifying disk movement for the full-stoke exercising of check valves for both opening and closing.

Based on the NRC staff’s review of the information provided in Relief Request RBS-VRR-005, the staff concludes that licensee’s proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative to disassemble and inspect the check valves once per operating cycle in lieu of once during refueling outage is authorized pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR) for the remainder of the second 10-year IST interval at RBS.

Based on the NRC staff's review of the information provided in Relief Requests RBS-VRR-006 and RBS-VRR-007, the staff concludes that EOI's proposed alternative provides an acceptable level of quality and safety. Therefore, the proposed alternative to test the check valves in the close direction using radiography once per operating cycle in lieu of once per refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the remainder of the second 10-year IST interval at RBS.

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

January 29, 2003

Based on the NRC staff's review of the information provided in Relief Requests RBS-VRR-006 and RBS-VRR-007, the staff concludes that EOI's proposed alternative provides an acceptable level of quality and safety. Therefore, the proposed alternative to test the check valves in the close direction using radiography once per operating cycle in lieu of once per refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the remainder of the second 10-year IST interval at RBS.

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,

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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 REQUESTS RBS-VRR-005, RBS-VRR-006, AND RBS-VRR-007

ENTERGY OPERATIONS, INC.

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated June 24, 2002, Entergy Operations, Inc. (EOI or the licensee) submitted Relief Requests RBS-VRR-005, RBS-VRR-006, and RBS-VRR-007 seeking relief from certain inservice testing (IST) requirements for several valves at River Bend Station, Unit 1 (RBS). As a result of discussions with the U.S. Nuclear Regulatory Commission (NRC) staff, the licensee submitted Revised Relief Requests RBS-VRR-005, RBS-VRR-006, and RBS-VRR-007 by letter dated November 22, 2002. The revised relief requests replaced the previously submitted requests in their entirely. These relief requests are applicable to the second 10-year interval IST program for RBS, which began on December 1, 1997, and ends on November 30, 2007. The RBS IST program plan for the second 10-year interval is based on the requirements in Section XI of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code). For IST of valves, the ASME Code Section XI, Subsection IWV, references the 1987 Edition through the 1988 Addenda of the Operations and Maintenance (OM) Standard, Part 10 (OM-10), “Inservice Testing of Valves in Light-Water Reactor Power Plants.”

In Relief Request RBS-VRR-005, the licensee proposed an alternative testing frequency for performing IST of various check valves (See Tables 1A and 1B). The check valves would 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 allowed by ASME/American National Standards Institute (ANSI) OM-10 paragraphs 4.3.2.2(e) and 4.3.2.4(c).

Similarly, in Relief Requests RBS-VRR-006 and RBS-VRR-007, the licensee proposed an alternative testing frequency for performing IST of various check valves (See Tables 2A, 2B, 2C, 2D, 2E, 3A, 3B, and 3C). The check valves would be tested using a non-intrusive method (radiography) 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 paragraph 4.3.2.2(e).

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations*, 10 CFR 50.55a, "Codes and standards," requires 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. Also see NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements."

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 Part 10 of the ASME/ANSI OM-10 as the rules for IST of valves.

The NRC’s findings with respect to authorizing alternatives and granting or denying the IST program relief requests are discussed below.

3.0 TECHNICAL EVALUATION

The licensee’s regulatory and technical analyses in support of its requests for relief from ASME Code IST requirements are described in Enclosures 1, 2, and 3 of the licensee’s submittal dated November 22, 2002. A description of the relief request and the staff evaluation follows.

3.1 Relief Request RBS-VRR-005

The licensee has requested relief for the check valves listed in Table-1A and 1B from the ASME Code ISTs that are required to be performed every refueling outage as specified in ASME/ANSI OM-10, Paragraph 4.3.2.2(e). 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 outage.”

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.”

Position 2 of GL 89-04 and its supplement 1 provide an alternative to full-stroking a check valve or for verifying closure capability through the use of sample disassembly and inspection requirements that are performed at a refueling outage frequency.

3.1.1 Licensee’s Basis for Relief:

The check valves listed in Tables 1A and 1B have no external means for exercising and no external position indication mechanism. Exercising the HVK check valves is impractical because opening them during power operation or cold shutdown would need to be accomplished using system flow. Disassembly of the HVK and DFR valves is the most feasible method to verify operability and can be accomplished during system outages when the plant is on-line. Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with the requirements of 10 CFR 50.65(a)(4), “Requirements for monitoring the effectiveness of maintenance at nuclear power plants.”

EOI complies with the requirements of 10 CFR 50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. This program dictates the requirements of 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 monitor 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 models. With the use of risk evaluation for various aspects of plant operations, EOI 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 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.

Paragraph 4.3.2.4(c) of OM-10 allows check valve disassembly every refueling outage to verify operability in lieu of the methodologies described in paragraph 4.3.2.4(a) or (b). Additionally, GL 89-04, Position 2 allows disassembly to verify operability of check valves at refueling outage frequencies.

Table-1A, System 410 - HVK - HVAC - Chilled Water (Control Building)

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
HVK-V48	3	2	C	Control Building chilled water surge tank 1A alternate makeup header check valve
HVK-V97	3	2	C	Control Building chilled water surge tank 1B alternate makeup header check valve

Table-1B, System 609 - DFR- Floor Drains (Reactor Building)

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
DFR-V78	3	4	C	Auxiliary Building floor drain sump pumps 3A & 3G discharge header upstream check valve
DFR-V79	3	4	C	Auxiliary Building floor drain sump pumps 3A & 3G discharge header downstream check valve

DFR-V87	3	4	C	Auxiliary Building floor drain sump pumps 3B & 3H discharge header upstream check valve
DFR-V88	3	4	C	Auxiliary Building floor drain sump pumps 3B & 3H discharge header downstream check valve
DFR-V97	3	4	C	Auxiliary Building floor drain sump pumps 3C & 3J discharge header upstream check valve
DFR-V98	3	4	C	Auxiliary Building floor drain sump pumps 3C & 3J discharge header downstream check valve
DFR-V107	3	4	C	Auxiliary Building floor drain sump pumps 3D & 3K discharge header upstream check valve
DFR-V108	3	4	C	Auxiliary Building floor drain sump pumps 3D & 3K discharge header downstream check valve
DFR-V117	3	4	C	Auxiliary Building floor drain sump pumps 3E & 3L discharge header upstream check valve
DFR-V118	3	4	C	Auxiliary Building floor drain sump pumps 3E & 3L discharge header downstream check valve
DFR-V127	3	4	C	Auxiliary Building floor drain sump pumps 3F & 3M discharge header upstream check valve
DFR-V128	3	4	C	Auxiliary Building floor drain sump pumps 3F & 3M discharge header downstream check valve

The licensee states as more system outages are performed on-line, it is evident that selected refueling outage IST activities (e.g., valve exercising and disassembly) could be performed during these system outages without sacrificing the level of quality and safety. EOI proposed the alternative IST frequency for the associated check valves based on the following:

1. IST performed on a refueling outage frequency is currently acceptable in accordance with ASME/ANSI OM-10 and GL 89-04. By specifying testing activities on a frequency commensurate with each refueling outage, OM-10 recognizes and establishes an acceptable time period between testing. Historically, the refueling outages have 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. IST performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of OM-10 and GL 89-04.

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

3. As discussed above, EOI complies with the requirements of 10 CFR 50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. Provided below is a discussion of disassembly and testing of the HVK and DFR valves.

<u>HVK Valves</u>

The check valves HVK-V48 and HVK-V97 (Table 1A) provide alternate makeup water to the Chilled Water Loop A and B compression tanks. These valves have a safety function to open, which allows standby service water (SSW) makeup water flow into the tanks to maintain chilled water inventory. They have no safety function to close.

With these check valves disassembled, the impact would be a loss of alternate makeup capability to the compression tanks in the event normal makeup from the Makeup Water System is lost. As a result of such an event, one division of the HVK chiller system would be lost resulting in an automatic start of the standby HVK chiller system to provide cooling to the control room, standby switchgear, and equipment room handling units. From a risk perspective, the primary function of interest is maintaining design temperature in the standby switchgear and battery rooms. Analysis has shown that even if cooling is lost to these rooms, room temperature would not increase enough to cause a failure of the switchgear. Consequently, if the capability of the switchgear is maintained, emergency power would remain available to systems and components necessary to mitigate core damage.

In summary, disassembly or testing of check valves HVK-V48 and HVK-V97 while on-line has an insignificant impact on core damage frequency.

<u>DFR Valves</u>

The DFR valves identified in the Table 1B are components in the plant drainage system. The drain system is not a system that is credited or used to mitigate core damage in the event of an accident. Consequently, the DFR check valves do not play a part in mitigating core damage. Therefore, disassembly or testing of these drain system check valves while on-line would not impact core damage frequency nor the ability of the plant to respond to accident conditions.

3.1.2 Licensee Proposed Alternative Testing:

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative testing method and testing frequency for performing IST of check valves identified in Tables 1A and 1B. The valves would 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 the OM-10, Paragraph 4.3.2.2(e) and 4.3.2.4(c), and GL 89-04 Position 2.

3.1.3 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 proposed 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 licensee states that the check valves listed in Tables 1A and 1B have no external means for exercising and no external position indication mechanism. Exercising the HVK check valves (Table 1A) is impractical because opening them during power operation or cold shutdown would need to be accomplished using system flow. This method would introduce impurities from SSW into the Ventilation Chilled Water System. This is undesirable and would require unnecessary operator actions to restore water purity. Verifying closure of the DFR check valves (Table 1B) quarterly or during cold shutdown is impractical as these valves are installed back-to-back with no test connections available to verify the closure functions. In addition, non-intrusive techniques have been unsuccessful for verifying the closed position due to valve size.

The staff finds that disassembly of the HVK and DFR valves in Tables 1A and 1B is the most feasible method to verify operability and can be accomplished during system outages when the plant is on-line with minimal impact on risk. The staff's finding is based on the following considerations: (1) the check valves listed in Tables 1A and 1B are with no external means for exercising and no external position indication mechanism; (2) exercising the HVK check valves (Table 1A) is impractical because opening them during power operation or cold shutdown would need be accomplished only by using system flow; (3) verifying closure of the DFR check valves (Table 1B) quarterly or during cold shutdown is impractical as these valves are installed back-to-back with no test connections available to verify the closure functions; (4) non-intrusive techniques have been unsuccessful for verifying the closed position due to valve size; (5) the potential risk impact in performing disassembly and inspection of these check valves while the plant is on-line is insignificant; (6) there are no technical barriers to performing these IST activities during either the refueling outage or the operating cycle; and (7) approximately the same number of ISTs would be performed using the proposed operating cycle test frequency as would be performed using the Code refueling outage frequency. On the basis of these considerations, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

3.1.4 Conclusion

Based on the NRC staff's review of the information provided in the relief request, the staff concludes that licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative to disassemble and inspect the check valves listed in Tables 1A and 1B once per operating cycle in lieu of once during refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.2 Relief Request RBS-VRR-006

The licensee has requested relief for the check valves listed in Table-2A, 2B, 2C, 2D, and 2E from the ASME Code ISTs that are required to be performed every refueling outage as specified in ASME/ANSI OM-10, Paragraph 4.3.2.2.

Table-2A, System 106 - CNS-Condensate Makeup, Storage, and Transfer

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
CNS-V86	2	4	AC	Reactor Containment Building condensate supply header containment inboard check valve.

Table-2B, System 201 - SLS - Standby Liquid Control (SLC), GE Code: C41

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
C41-VF033A	2	1.5	C	Standby Liquid Control Pump 1A discharge header check valve
C41-VF033B	2	1.5	C	Standby Liquid Control Pump 1B discharge header check valve

Table-2C, System 256 - SWP-Service Water -Standby (SSW)

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
SWP-V135	3	8	C	HPCS [high pressure core spray] Diesel Generator Engine water heat exchanger service water supply header check valve
SWP-V136	3	8	C	HPCS Diesel Generator Engine water heat exchanger service water supply header check valve
SWP-V143	3	8	C	HPCS Diesel Generator Engine water heat exchanger service water return header check valve
SWP-V144	3	8	C	HPCS Diesel Generator Engine water heat exchanger service water return header check valve
SWP-V437	3	4	C	Auxiliary Building Unit Cooler 5 service water supply header check valve

SWP-V516	3	4	C	Auxiliary Building Unit Cooler 5 service water supply header check valve

Table-2D, System 410 - HVK- HVAC- Chilled Water (Control Building)

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
HVK-V49	3	2	C	Control Building Chilled Water surge tank 1A normal makeup header check valve
HVK-V98	3	2	C	Control Building Chilled Water surge tank 1B normal makeup header check valve
HVN-V1316	2	0.75	AC	Reactor Building containment unit coolers return header bypass check valve for HVN-MOV102

Table-2E, System 602 - SFC- Fuel Pool Cooling

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
SFC-V350	2	0.75	AC	Containment pools to purification system header inboard containment isolation valve bypass check valve.
SFC-V351	2	0.75	AC	Containment pools to purification system header inboard containment isolation valve bypass check valve.

3.2.1 Licensee's Basis for Relief:

The check valves listed in Tables 2A, 2B, 2C, 2D and 2E have no external means for exercising and no external position indication mechanism. In Section 4.1.2 of NUREG-1482, the staff has determined that non-intrusive techniques meet the Code requirements for verifying disk movement for the full-stoke exercising of check valves for both opening and closing.

CNS-V86 is the reactor building condensate supply header inboard containment isolation valve. This check valve has an active safety function in the closed direction to provide containment isolation and in the open direction to provide thermal overpressure protection for the containment penetration due to thermally expanded liquid within the penetration. CNS-V86 is subject to Category "A" seat leakage test requirements and Category "C" exercise test requirements in accordance with ASME/ANSI OM-10 Subsections 4.2.2 and 4.3, respectively. It is currently tested in accordance with 10 CFR Part 50, Appendix J, Option B.

The open function is verified quarterly by verifying that pressurized flow passes through the valve. The closure function is verified quarterly by performing non-intrusive testing (i.e., radiography). This valve is also leak-rate tested in accordance with the Appendix J program. There is no other comparably clean pressurized water source within the area to facilitate back-flow testing to verify the closed position. This valve has no external exercising mechanism or position indication instrumentation.

C41-VF033A and C41-VF033B are the standby liquid control pump discharge header check valves. These check valves have an active safety function to open to inject borated water into the reactor vessel. These valves also have an active safety function in the close direction to prevent diversion of flow from the other division in the event of a failure of the relief valve on the pump discharge line.

The open function is verified quarterly by passing design flow through each valve. The closure function is verified quarterly by performing radiography testing. There are no test connections available to facilitate back-flow testing which could be used to verify the closed position. These valves have no external exercising mechanism or position indication instrumentation.

SWP-V135, SWP-V136, SWP-V143, and SWP-V144 are the Division I and II service water supply and return check valves to the HPCS diesel generator jacket water cooler. These valves have safety function in the open direction to allow SSW flow to and from the HPCS diesel generator cooler. They have an active safety function in the close direction to isolate and prevent diversion of SSW flow for the HPCS diesel generator jacket water cooler to the opposite division supply and return headers.

The open function is verified quarterly by passing design flow through each valve. The closure function is verified quarterly by performing radiography testing during cold shutdown due to the size of the valves. The closure test requires the use of specialized radiography equipment. There are no test connections available to facilitate back-flow testing which could be used to verify the closed position of SWP-V135 and SWP-V136. Due to system configuration and isolation valve design, it is difficult to establish test conditions that permit accurate closure verification of SWP-V143 and SWP-V144 using a back-flow test methodology. These valves have no external exercising mechanism or position indication instrumentation.

SWP-V437 and SWP-V516 are the Division I and II SSW to HPCS pump room unit cooler supply check valves. These valves have a safety function in the open direction to allow service water flow to the HPCS pump room unit cooler. They have an active safety function in the close direction to isolate the SSW supply header from the opposite division supply header.

The open function is verified quarterly by passing design flow through each valve. The closure function is verified quarterly by performing radiography testing. There are no test connections available to facilitate back-flow testing which could be used to verify the closed position. These valves have no external exercising mechanism or position indication instrumentation.

HVK-V49 and HVK-V98 are the Chilled Water Loop A and B compression tank normal makeup water supply check valves. These valves have an active safety function in the close direction to prevent diversion from SSW makeup flow to the Chilled Water Compression Tank into the Makeup Water System. These valves are not credited with an open safety function.

The closure function is verified quarterly by performing radiography testing. There are no test connections available to facilitate back-flow testing which could be used to verify the closed position. These valves have no external exercising mechanism or position indication instrumentation.

HVN-V1316 is a chilled water-to-containment unit cooler return header inboard containment isolation check valve. This valve has an active safety function in the close direction to provide containment isolation. It has an active safety function in the open direction to provide thermal overpressure protection for the containment penetration. HVN-V1316 is subject to Category “A” seat leakage test requirements and Category “C” exercise test requirements in accordance with ASME/ANSI OM-10 Subsections 4.2.2 and 4.3, respectively. It is currently tested in accordance with 10 CFR Part 50, Appendix J, Option B.

The open function is verified during cold shutdown by verifying that pressurized flow passes through the valve. The closure function is verified quarterly by radiography testing. This valve is also leak-rate tested in accordance with the Appendix J program. Performance of the closure test using installed test connections requires isolation of containment cooling flow in order to determine leakage through valve. Isolation of cooling flow would cause an increase in containment temperatures and, eventually, an automatic isolation of the Reactor Water Cleanup System (RWCU) due to area temperature sensors in the RWCU heat exchanger room or other RWCU equipment areas inside the containment. This valve has no external exercising mechanism or position indication instrumentation.

SFC-V350 and SFC-V351 are containment pool-to-spent fuel cooling containment penetration thermal relief check valves. These normally closed check valves have an active function in open direction to provide thermal overpressure protection for the associated containment penetration. The valves have an active safety function in the close direction to provide containment isolation. SFC-V350 and SFC-V351 are subject to Category “A” seat leak test requirements and Category “C” exercise test requirements in accordance with ASME/ANSI OM-10 Subsections 4.2.2 and 4.3, respectively. These are currently tested in accordance with 10 CFR Part 50, Appendix J, Option B.

The open function is verified quarterly by verifying that pressurized flow passes through each valve. The closure function is verified quarterly by performing radiography testing. These valves are also leak-rate tested in accordance with the Appendix J program. There are no local test connections available to facilitate back-flow testing to verify the closed position. This valve has no external exercising mechanism or position indication instrumentation.

Based on the above discussions, closure verification for the identified check valve is most appropriately performed utilizing a non-intrusive technique such as radiography due to the absence of test connections or the inability to align the system to permit closure verification. Radiography for these valves has provided conclusive results.

The licensee has determined that closure verification utilizing the non-intrusive radiography technique is the most feasible testing methodology for check valves identified in Tables 2A, 2B, 2C, 2D, and 2E. This is based on the following:

1. There is no other comparably clean pressurized water source within the area to facilitate back-flow testing of CNS-V86 to verify closed position.

2. The piping systems including check valves C41-VF033A and B, SWP-V135, SWP-V136, SWP-V437, SWP-V516, HVK-V49, HVK-V98, SFC-V350, and SFC-V351 contain no test connections to allow back-flow testing, which could be used to verify the closed position.

3. Due to SSW system configuration and isolation valve design, establishing test conditions that permit accurate closure verification using a back-flow test methodology for valves SWP-V143 and SWP-V144 is not feasible.

4. The closure verification for HVN-V1316 using installed test connections requires isolation of containment cooling flow in order to determine leakage through the valve. Isolation of cooling flow would cause an increase in containment temperatures and eventually an automatic isolation of RWCU due to area temperature sensors in the RWCU heat exchanger room or other RWCU equipment areas inside containment.

OM-10, paragraph 4.3.2.2(e) allows valve testing to be performed during refueling outage if it is not practicable to be performed quarterly or during cold shutdown. The licensee has determined that radiography testing is not practicable on a quarterly basis during power operation due to increased personnel radiation exposure, large manpower requirements, and the extensive test set-up required. The licensee states that in Section 4.1.4 of NUREG-1482, the staff notes that the need to set up test equipment provides adequate justification to defer testing to a refueling outage frequency based on the impracticality of testing quarterly or at cold shutdown.

The licensee states that as more maintenance activities are performed on-line, it is evident that selected refueling outage IST activities could be performed during system outages on-line without sacrificing level of quality or safety. Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with the requirements of 10 CFR 50.65(a)(4). Appropriate controls are implemented based on this evaluation.

EOI complies with the requirements of 10 CFR 50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. This program dictates the requirements of 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 monitor system, which is based on the RBS PRA. In addition, this program provides methods for assessing risk of maintenance activities for components not directly in the RBS PRA models. With the use of risk evaluation for various aspects of plant operations, EOI 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 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.

The licensee proposed an alternative to radiography testing during each refueling outage for the valves identified above. The proposed alternative would permit radiography on an operating cycle frequency in lieu of a refueling outage frequency. The following provides justification for performing radiography testing at a frequency of at least once each operating cycle:

1. Radiography testing not only satisfies the requirements of the Code to demonstrate valve closure position, it also aids in evaluating the health of valve internals.

2. IST performed on a refueling outage frequency is currently acceptable in accordance with ASME/ANSI OM-10 and GL 89-04. By specifying testing activities on a frequency commensurate with each refueling outage, 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. IST performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of OM-10.

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

4. The non-intrusive radiography is used to verify valve disc movement. Because the testing is non-intrusive, there is no impact on the ability of the valves to perform their safety functions. Therefore, radiographic testing of these valves while on-line would have insignificant impact on core damage frequency.

In addition, performing radiography during refueling outages would increase the risk of radiation exposure due to an increased number of personnel in the plant. Conversely, testing once each operating cycle would reduce the risk of radiation exposure because fewer people would be subject to possible exposure.

3.2.2 Licensee Proposed Alternative Testing:

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative testing frequency for performing IST of the check valves (Tables 2A, 2B, 2C, 2D, and 2E) in the close direction. The valves would 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 the OM-10, Paragraph 4.3.2.2(e).

3.2.3 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 is also impracticable, testing may be deferred to refueling outages. The licensee proposed as an alternative to perform inservice inspection (radiography) once every operating cycle in lieu of testing during the refueling outage.

Paragraph 4.3.2.2(e) of OM-10 states, “If check valve exercising is not practical during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages.”

The licensee proposed an alternative frequency for performing closure testing of the check valves identified in Tables 2A, 2B, 2C, 2D, and 2E. The proposed alternative would permit radiography on an operating cycle frequency in lieu of a refueling outage frequency based on the following:

1. IST performed on a refueling outages frequency is currently acceptable in accordance with ASME/ANSI OM-10 and GL 89-04. By specifying testing activities on a frequency commensurate with each refueling outage, OM-10 recognizes and establishes an acceptable time period between testing. Historically, the refueling outages have 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. IST performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of OM-10 and GL 89-04.

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

3. A non-intrusive, radiographic examination is used to verify valve disc movement. Because the testing is non-intrusive, there is no impact on the ability of the valves to perform their safety functions. Therefore, radiographic testing of these valves while on-line would have insignificant impact on core damage frequency.

The staff has determined that closure verification utilizing the non-intrusive radiographic technique is the most feasible testing methodology for these check valves and can be performed without decreasing the level of quality and safety. The staff's finding is based on the the following considerations. (1) The check valves listed in Tables 2A, 2B, 2C, 2D, and 2E have no external means for exercising and no external position indication mechanism. The licensee proposed to test the closure function of these check valves using a non-intrusive technique without sacrificing the level of quality and safety which the staff recommends in Section 4.1.2 of NUREG-1482; (2) the open function of check valves would still be verified quarterly by verifying that pressurized flow passes through the valve; (3) check valve CNS-V86 is a Category “A” and Category “C” valve and, as such, its Category “A” seat leakage test requirement is met in accordance with the Appendix J program, and the open function is verified quarterly by verifying that pressurized flow passes through the valve; (4) approximately the same number of ISTs would be performed using the proposed operating cycle test frequency as would be performed using the Code refueling outage frequency; (5) non-intrusive (radiography) examination is not practicable on a quarterly basis during power operation due to increased personnel radiation exposure, large manpower, and the extensive test set-up required; (6) there are no technical barriers to performing these IST activities during either the refueling outage or the operating cycle; (7) prior to performing IST with a system outage on-line, the licensee is required to evaluate its effect on risk pursuant to 10 CFR 50.65(a)(4); and (8) non-intrusive (radiography) examination to verify valve disc movement does not impact the ability of the valves to perform their safety functions and, thus, would have insignificant impact on core damage frequency.

Based on its evaluation of the proposed alternative and considerations, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

3.2.4 Conclusion

On the basis of its review of the information provided in the relief request, the staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, the proposed alternative to test the check valves (Tables 2A, 2B, 2C, 2D, and 2E) in the close direction using radiography once per operating cycle in lieu of once per refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.3 Relief Request RBS-VRR-007

The licensee has requested relief for the check valves listed in Table-3A, 3B, and 3C from the ASME Code ISTs that are required to be performed every refueling outage as specified in ASME/ANSI OM-10, Paragraph 4.3.2.2.

Table-3A, System 202 - SVV - SVV Compressors/Dryers

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
SVV-V122	2	1.5	C	Main Steam Line pressure relief valve operator supply line from dryer skid A check valve
SVV-V123	2	1.5	C	Main Steam Line pressure relief valve operator supply line from dryer skid A check valve
SVV-V129	2	1.5	C	Main Steam Line pressure relief valve operator supply line from dryer skid B check valve
SVV-V130	2	1.5	C	Main Steam Line pressure relief valve operator supply line from dryer skid B check valve

Table-3B, System 255 - LSV - Penetration Valve Leakage Control (PVLC) System

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
LSV-V114	2	1	C	Penetration valve leakage control compressor A discharge check valve
LSV-V120	2	1	C	Penetration valve leakage control compressor B discharge check valve

Table-3C, System 309 - EGA - Diesel Generator Starting Air

Check Valve Identification	Code Class	Size (Inches)	Code Category	Function
EGA-V147	3	6	C	Standby Diesel Generator A air start supply line {from air compressor 2A] inlet check valve
EGA-V148	3	6	C	Standby Diesel Generator A air start supply line {from air compressor 1A] inlet check valve
EGA-V151	3	6	C	Standby Diesel Generator B air start supply line {from air compressor 2B] inlet check valve
EGA-V152	3	6	C	Standby Diesel Generator B air start supply line {from air compressor 1B] inlet check valve

3.3.1 Licensee's Basis for Relief:

The check valves listed in Tables 3A, 3B, and 3C have no external means for exercising and no external position indication mechanism. In Section 4.1.2 of NUREG-1482, the staff had determined that non-intrusive technique met the Code requirements for verifying disk movement for full-stoke exercising of check valves in both open and close directions.

The licensee has determined that closure verification utilizing a non-intrusive (radiography) technique is the most feasible testing methodology for check valves identified in Tables 3A, 3B, and 3C, above, since they have no test connections to facilitate backflow testing, which could be used to verify the closed position.

Paragraph 4.3.2.2(e) of ASME/ANSI OM-10 allows valve testing to be performed during refueling outages if it is not practicable to be performed quarterly or during cold shutdown. The licensee has determined that performing radiography is not practicable on a quarterly basis during power operation due to increased personnel radiation exposure, large manpower requirements, and the extensive test set-up required. As discussed in Section 4.1.4 of NUREG-1482, the staff noted that the need to set up test equipment is adequate justification to defer testing to a refueling outage frequency based on the impracticality of testing quarterly or at cold shutdown.

SVV-V122, SVV-V123, SVV-V129, and SVV-V130 are normal air supply line header check valves to the main steam safety/relief valve pneumatic operator accumulators. These valves have an active safety function in the close direction to prevent diversion of flow from the safety-related backup air supply provided by the PVLC System. These valves are not credited with an open safety function.

The closure function is verified quarterly by performing non-intrusive testing (i. e., radiography). These valves are installed back-to-back, with no test connections available to facilitate back-flow testing that could be used to verify the closed position. Additionally, they have no external exercising mechanisms or position indication instrumentation.

LSV-V114 and LSV-V120 are the PVLC System Division I and II accumulator inlet check valves. These valves have an active safety function in the open direction to allow air into the Division I and II PVLCS accumulators from the safety-related air compressors. These valves have an active safety function in the close direction to prevent loss of air pressure from the accumulators.

The open function is verified quarterly by verifying proper operation of the PVLC System compressors. The closure function is verified quarterly by radiography testing. There are no test connections to facilitate back-flow testing that could be used to verify the close position. These valves have no external exercising mechanisms or position indication instrumentation.

EGA-V147, EGA-V148, EGA-V151, and EGA-V152 are Emergency Diesel Generator (EDG) starting air supply check valves. These normally closed valves have an active safety function to open to admit starting air to EDG. The valves are credited with an active safety function in the close direction to maintain sub-system train separation in the EDG air start system to prevent blowdown from the pressurized air bank to a de-pressurized out-of-service air bank.

The open function is verified quarterly by verifying the associated EDG properly starts while performing an air bank start. The closure function is verified quarterly by radiography testing. There are no test connections to facilitate back-flow testing that could be used to verify the close position. These valves have no external exercising mechanisms or position indication instrumentation.

The licensee states that as more system outages are performed on-line, it is evident that selected refueling outage IST activities could be performed during system outages on-line without sacrificing level of quality or safety. Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with the requirements of 10 CFR 50.65(a)(4). Per 10 CFR 50.65(a)(4), “Before performing maintenance activities (including but not limited to surveillance...), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities....” Appropriate controls are implemented based on this evaluation.

EOI complies with the requirements of 10 CFR 50.65(a)(4) at RBS via the application of a program governing maintenance scheduling. This program dictates the requirements of 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 monitor system, which is based on the RBS PRA. In addition, this program provides methods for assessing risk of maintenance activities for components not directly in the RBS PRA models. With the use of risk evaluation for various aspects of plant operations, EOI 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 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.

The licensee proposed an alternative frequency for the radiography testing for the check valves identified in Tables 3A, 3B, and 3C. The proposed alternative would permit radiography on an operating cycle frequency in lieu of a refueling outage frequency, based on the following:

1. Radiography testing not only satisfies the requirements of the Code to demonstrate valve closure position, it also aids in evaluating the health of valve internals.

2. IST performed on a refueling outage frequency is currently acceptable in accordance with ASME/ANSI OM-10 and GL 89-04. By specifying testing activities on a frequency commensurate with each refueling outage, 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. IST performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of OM-10.

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

4. The non-intrusive radiography is used to verify valve disc movement. Because the testing is non-intrusive, there is no impact on the ability of the valves to perform their safety functions. Therefore, radiographic testing of these valves while on-line would have insignificant impact on core damage frequency.

In addition to these four points, performing radiography during refueling outage would increase the risk of radiation exposure due to an increased number of personnel in the plant. Conversely, testing once each operating cycle would reduce the risk of radiation exposure as fewer people would be subject to possible exposure.

3.3.2 Licensee's Proposed Alternative Testing:

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative testing frequency for performing IST of the check valves (Tables 3A, 3B, and 3C) in the close direction. The valves would 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 the OM-10, Paragraph 4.3.2.2(e).

3.3.3 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 is also impracticable, testing may be deferred to refueling outages. The licensee proposed, as an alternative, to perform the non-destructive (radiography) testing once each operating cycle in lieu of during the refueling outage.

Paragraph 4.3.2.2(e) of OM-10 states, "If check valve exercising is not practical during plant operation or cold shutdown, it may be limited to full-stroke during refueling outages."

The licensee has proposed an alternative IST frequency for the associated check valves whereby the valves would be tested on a frequency of at least once during each operating cycle in lieu of once during each refueling outage based on the following:

1. IST performed on a refueling outages frequency is currently acceptable in accordance with ASME/ANSI OM-10 and GL 89-04. By specifying testing activities on a frequency commensurate with each refueling outage, OM-10 recognizes and establishes an acceptable time period between testing. Historically, the refueling outages have 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. IST performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of OM-10 and GL 89-04.

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

3. A non-intrusive radiographic examination is used to verify valve disc movement. Because the testing is non-intrusive, there is no impact on the ability of the valves to perform their safety functions. Therefore, radiographic testing of these valves while on-line would have insignificant impact on core damage frequency.

The staff finds that closure verification utilizing the non-intrusive (radiography) technique is the most feasible testing methodology for these check valves and can be performed without decreasing the level of quality and safety. The staff's finding is based on the following considerations: (1) The check valves listed in Tables 3A, 3B, and 3C have no external means for exercising and no external position indication mechanism. The licensee proposed to test the closure function of these check valves with a non-intrusive technique without sacrificing the level of quality and safety, which the staff recommends in Section 4.1.2 of NUREG-1482; (2) the open function of check valves would be still verified quarterly; (3) approximately the same number of ISTs would be performed using the proposed operating cycle test frequency as would be performed using the Code refueling outage frequency; (4) non-intrusive (radiography) testing is not practicable on a quarterly basis during power operation due to increased personnel radiation exposure, large manpower, and the extensive test set-up required; (5) there are no technical barriers to performing these IST activities during either the refueling outage or the operating cycle; (6) prior to performing IST with a system outage on-line, the licensee is required to evaluate its effect on risk in accordance with the requirements of 10 CFR 50.65(a)(4); and (7) the non-intrusive radiography used to verify valve disc movement has no impact on the ability of the valves to perform their safety functions, and, thus, would have insignificant impact on core damage frequency. On these bases, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

3.3.4 Conclusion

Based on the NRC staff's review of the information provided in the relief request, the staff concludes that licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative to closure test the check valves in Tables 3A, 3B, and 3C using radiography once per operating cycle in lieu of once per refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

4.0 CONCLUSIONS

Based on the above evaluation, the NRC staff finds that the licensee's proposed alternatives for Relief Requests RBS-VRR-005, RBS-VRR-006, and RBS-VRR-007 provide an acceptable level of quality and safety. On this basis, the staff concludes that licensee's proposed alternatives are authorized pursuant to 10 CFR 50.55(a)(3)(i) for the remainder of the second 10-year IST interval at RBS.

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