



River Bend Station  
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St. Francisville, LA 70775  
Tel 225-381-4177

Joseph A Clark  
Manager, Licensing

RBG-47386

August 19, 2013

U. S. Nuclear Regulatory Commission  
Attn.: Document Control Desk  
Washington, DC 20555-0001

SUBJECT: River Bend Station, Unit 1 - Requests for Relief  
Request for Relief from ASME Boiler & Pressure Vessel Code  
Section III  
Docket No. 50-458  
License No. NPF-47

RBF1-13-0103

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (3)(i), Entergy requests relief from American Society of Mechanical Engineers (ASME) Section III requirements. Specifically, Entergy proposes an alternative to the postweld heat treatment exemption of Table ND-4622.7 that will provide an acceptable level of quality and safety.

Attachment 1 contains the relief request. Attachment 2 contains Structural Integrity Report No. 1300615.401, this report was developed to address the conditions at River Bend Station and provides a technical basis that demonstrates the valves in question are capable of satisfactory performance without the application of elevated preheat or postweld heat treatment.

This letter contains no new regulatory commitments.

As identified in Attachment 1, a hardship request was approved by the NRC to require replacement of the Division II valves during RF-18. To support this action construction of the replacement valves is currently estimated as 52 weeks. Your review is requested by the end of 2013 to avoid the cost of ordering the replacement valves.

A047  
LRR

If you have any questions regarding this request or require additional information, please contact me at (225) 381-4177.

Respectfully,



JAC/bmb

LAR 2013-16

Attachments:

1. Request for Alternative
2. Structural Integrity Report No. 1300615.401

cc: U. S. Nuclear Regulatory Commission  
Region IV  
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NRC Sr. Resident Inspector  
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Office of Environmental Compliance  
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U.S. Nuclear Regulatory Commission  
Attn: Mr. Alan Wang  
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Washington, DC 20555-0001

**RBG-47386**

**Attachment 1**

**Request for Alternative**

**RBS-R&R-2013-001**

**ENTERGY OPERATIONS, INC.  
RIVER BEND STATION  
REQUEST NO. RBS-R&R-2013-001**

**I. COMPONENTS**

Component Number and Description:	Various Size ASME Class 3 Valves: E12-MOVF068A, Residual Heat Removal Heat Exchanger Service Water Return E12-MOVF068B, Residual Heat Removal Heat Exchanger Service Water Return SWP-MOV506A, High Pressure Core Spray Diesel Generator Engine Water Heat Exchange Service Water Header Isolation SWP-MOV506B, High Pressure Core Spray Diesel Generator Engine Water Heat Exchange Service Water Header Isolation SWP-MOV501A, Reactor Closed Cooling Water Heat Exchanger Service Water Supply Header Isolation Valve SWP-MOV501B, Reactor Closed Cooling Water Heat Exchanger Service Water Supply Header Isolation Valve SWP-MOV511A, Normal Service Water Return Isolation SWP-MOV511B, Normal Service Water Return Isolation SWP-MOV55A, Standby Service Water Cooling Tower 1 Inlet SWP-MOV55B, Standby Service Water Cooling Tower 1 Inlet
Code Class:	3
References:	1. ASME Section XI, 2001 Edition through 2003 Addenda 2. ASME Section III, 1974 Edition / Summer 1975 Addenda 3. ASME Section III, 1992 Edition / No Addenda 4. ASME Section III, Code Case N-804, <i>Alternative Preheat Temperature for Austenitic Welds in P-No. 1 Material without PWHT</i>
Unit:	River Bend Station (RBS)
Inspection Interval:	Third (3 <sup>rd</sup> ) 10-Year Interval

## II. CODE REQUIREMENTS

IWA-4221(b)(1) states, "When replacing an existing item, the new item shall meet the Construction Code to which the original item was constructed."

IWA-4221(c) states in part, "As an alternative to (b), the item may meet all or portions of the requirements of different Editions and Addenda of the Construction Code, or Section III when the Construction Code was not Section III... Construction Code Cases may also be used."

ND-4600 of ASME Section III, 1992 Edition contains the following requirements regarding postweld heat treatment of ASME Class 3 welds:

- ND-4622.1 states that all welds, including repair welds, shall be postweld heat treated within the temperature ranges and holding times of Table ND-4622.1-1 except as otherwise permitted in ND-4622.7.
- ND-4622.7 states that postweld heat treatment is not required for nonferrous materials and welds exempted in Table ND-4622.7(b)-1.
- Table ND-4622.7(b)-1, *Exemptions to Mandatory PWHT*, states that all welds in P-Number 1 material over 1 ½ inch thick with a nominal thickness of ¾" or less are exempt from postweld heat treatment provided a minimum preheat of 200°F is applied.

## III. PROPOSED ALTERNATIVE

### Background

Entergy River Bend Station (RBS) purchased sixteen (16) ASME Class 3 valves from Weir Valves and Controls Company USA, Inc. All 16 valves, were stamped and certified to be in compliance with ASME Section III. Ten of these valves, listed in Section I, have been installed at RBS. Of the remaining 6 valves, 5 are in warehouse storage at RBS, and 1 was sacrificed for destructive testing to support this request. Only the installed valves are applicable to this request..

On 8/2/2011, a letter was received from Weir Valves and Controls Company USA. The letter indicated that, during fabrication, the welding process used to install stainless steel (P-Number 8) seats to carbon steel (P-Number 1) bodies of the subject valves did not fully comply with Table ND-4622.7(b)-1 of the ASME Code.

The condition noted was that the base material was not preheated to 200°F (minimum) as required by Table ND-4622.7(b)-1 for exemption from post weld heat treatment. The Weir welding procedure required a minimum preheat of 60°F instead of 200°F. These seat rings are attached to the valve body wall by a 3/16 or 1/4 inch fillet weld on both sides of the ring using GTAW or SMAW process.

Weir indicated in the letter they performed testing and submitted a proposed code case (N-804) to the ASME committee based on these findings. The testing Weir conducted was performed on wrought material only, both plate and production valves. The proposal was approved by the ASME committee however, was not approved for use by the NRC. Entergy submitted relief request in December 2011, based on this Code Case and the Weir test results but subsequently withdrew it June 2012.

Entergy considered several options to address the above condition including replacement of the subject valves and performance of postweld heat treatment of the valve seat ring welds. With regard to postweld heat treatment, this option is not practical since a postweld heat treatment at 1100° - 1250°F, as required by Table ND-4622.1-1, would adversely affect the metallurgical properties (sensitize) of the austenitic stainless steel.

To replace the Standby Service Water (SSW) valves on-line, the affected piping section would require the divisional loop of SSW to be secured and drained. While the RBS Technical Specifications (TS) provides 72 hours to effect repairs to the system, doing so would result in the loss of an entire train of emergency core cooling components during the repair window. In addition, isolation and draining of a Service Water (SW) loop during power operation is complex and would expend a significant portion of the 72-hour allowed outage period.

Replacing the valves during a refueling outage requires draining a divisional loop of SSW which typically extends the system outage window making emergency core cooling system components unavailable for longer periods of time. It also removes a source of cooling for other systems and components.

RBS has previously requested relief to allow the replacement of the Division II valves (5) during RF18 and the remaining Division I valves (5) in RF19. This request was approved by the NRC Staff on February 20, 2013.

#### Proposed Alternative

As a result of additional evaluation this request was developed. It is important to note this request is based on testing and evaluation performed on a cast carbon steel product form and is not taking any credit from information developed on wrought material. Although not the basis for this request, a connection has been made between the similar Chemical compositions of wrought and cast material and the material properties produced. As described in Attachment 2 the omission of an elevated pre-heat or postweld heat treatment (PWHT) of the valve seat welds will not hinder the valves from performing their Safety Function.

Pursuant to 10CFR50.55a(3)(i), Entergy proposes an alternative to the postweld heat treatment exemption of Table ND-4622.7 applicable to fillet and partial penetration welds in base materials over 1-1/2" and with nominal thicknesses 3/4" or less. Structural Integrity Report No. 1300615.401, Attachment 2, this report was developed to address the conditions at River Bend Station and provides a technical basis that demonstrates the valves installed at RBS are capable of satisfactory performance without the application of elevated preheat or postweld heat treatment.

#### **IV. BASIS FOR ALTERNATIVE**

As discussed in Attachment 2 the basis for relief features metallography and test results measured on samples removed from a production valve of the same lot and welded using the same weld procedure. The testing included metallography, hardness mapping, and Automated Ball Indenter (ABI) testing.

In addition to the as-received condition, additional test welds were prepared to examine effects of preheating and for multiple pass welding. All testing focused on E-309-L fillet welds joining the SA240 Type 316-L stainless steel seat ring to the SA-216 Grade WCB

casting valve body material so that the test weld data would be directly applicable to the valves installed at RBS.

The Electric Power Research Institute (EPRI) performed the required welding, metallography and hardness mapping evaluations and provided technical support on the findings. The ABI testing was performed by ABI Services, LLC

The attached study examined applicable characteristics of the material including;

- chemistries,
- likelihood for forming brittle transformation products,
- weld heat affected zone metallurgy,
- stress analysis of the valves,
- welding procedure and techniques,
- hardness mapping, and
- ABI testing for mechanical properties plus estimates of fracture toughness of the Heat Affected Zone (HAZ) material.

The results of the study support the position that the valve body HAZs provide sufficient ductility and toughness to perform satisfactorily without PWHT without the application of the welding preheat requirement.

## V. CONCLUSION

10 CFR 50.55a(a)(3) states:

“Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that:

- (i) The proposed alternatives would provide an acceptable level of quality and safety,

Entergy believes that the proposed alternative of this request will provide an acceptable level of quality and safety. The studies and tests conducted in support of this request, coupled with the findings discussed in Attachment 2, show that the expected HAZ (Heat Affected Zone) properties would be more than adequate to meet the requirements for the installed valves; thus proving their continued use an acceptable alternative. Therefore, Entergy requests that the NRC staff authorize the proposed alternative, and allow continued use of all installed valves in accordance with 10 CFR 50.55a(a)(3)(i).

Augmented Inspection of the valve internals is not proposed due to the hardship of implementation and the low level of impact and unlikelihood a crack under the seat ring will occur. External inspections would serve no value as there is no viable failure path to the outer surface.