



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 7, 2018

Vice President, Operations
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 – REQUEST FOR RELIEF RBS-ISI-016 FROM
THE REQUIREMENTS OF THE ASME CODE FOR PRESSURE RETAINING
WELDS IN CONTROL ROD HOUSINGS (EPID L-2018-LLR-0042)

Dear Sir or Madam:

By letter dated March 5, 2018, Entergy Operations, Inc. (the licensee) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for the inservice inspection (ISI) of Class 1 components at the River Bend Station, Unit 1 (RBS) in Relief Request RBS-ISI-016.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(g)(6)(i), the licensee requested relief and to use alternative requirements for ISI items, on the basis that the code requirements are impractical.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the ASME Code examination coverage requirements are impractical for the lower control rod drive housing-to-flange welds listed in Relief Request RBS-ISI-016. Furthermore, imposition of these ASME Code requirements would create a burden on the licensee.

Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). The NRC staff has further determined that granting Relief Request RBS-ISI-016 pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Therefore, the NRC grants relief for the subject examinations of the components contained in Relief Request RBS-ISI-016 at RBS for the third 10-year ISI interval.

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

If you have any questions, please contact the RBS Project Manager, Lisa Regner, at 301-415-1906 or via e-mail at Lisa.Regner@nrc.gov.

Sincerely,



Robert J. Pascarelli, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosure:
Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST RBS-ISI-016

ENTERGY OPERATIONS, INC

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated March 5, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18064A302), Entergy Operations, Inc. (Entergy, the licensee) submitted Relief Request RBS-ISI-016, which requested relief from performing the essentially 100 percent inspection requirements specified in Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the inservice inspection (ISI) of Class 1 components at the River Bend Station, Unit 1 (RBS).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(g)(6)(i), "Actions by the Commission for evaluating impractical and augmented ISI Code requirements," the licensee requested relief and to use alternative requirements for ISI items, on the basis that the code requirements are impractical.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), "Inservice inspection standards requirement for operating plants," ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulation requires that inservice examinations of components and system pressure tests conducted during the first 10-year interval, and subsequent intervals, comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(a), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

The ISI of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR Section 50.55a(g), "Preservice and inservice inspection requirements," except where

Enclosure

specific relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i).

As stated, in part, in 10 CFR 50.55a(g)(5)(iii), "ISI program update: Notification of impractical ISI Code requirements," licensees may determine that conformance with certain code requirements is impractical and that the licensee shall notify the Commission and submit information in support of the determination. Determination of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the ISI interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

Pursuant to 10 CFR 50.55a(g)(6)(i), the Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request relief and the NRC to grant the relief.

3.0 TECHNICAL EVALUATION

3.1 Relief Requested by the Licensee

Components for which Relief Is Requested

ASME Code, Class 1, Pressure Retaining Welds in Control Rod Housings, as listed in Table 3.1.1 below.

TABLE 3.1.1 ASME Code, Class 1, Pressure Retaining Welds in Control Rod Housings

RIVER BEND STATION - UNIT 1 THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM REQUEST FOR RELIEF RBS-ISI-016 AFFECTED COMPONENTS			
COMPONENT NO	ASME CODE CATEGORY	ASME CODE ITEM NUMBER	DESCRIPTION
B13-D008-04/17-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/17-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-04/21-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/21-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-04/25-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/25-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-04/29-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/29-WELD-2	B-O	B14.10	Welds in CRD Housing

RIVER BEND STATION - UNIT 1 THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM REQUEST FOR RELIEF RBS-ISI-016 AFFECTED COMPONENTS			
COMPONENT NO	ASME CODE CATEGORY	ASME CODE ITEM NUMBER	DESCRIPTION
B13-D008-04/33-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/33-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-04/41-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-04/41-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-08/13-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-08/13-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-08/45-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-08/45-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-12/09-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-12/09-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-12/49-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-12/49-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-16/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-16/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-16/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-16/53-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-20/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-20/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-20/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-20/53-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-24/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-24/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-24/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-24/53-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-28/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-28/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-28/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-28/53-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-32/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-32/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-32/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-32/53-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-36/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-36/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-36/53-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-36/53-WELD-2	B-O	B14.10	Welds in CRD Housing

RIVER BEND STATION - UNIT 1 THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM REQUEST FOR RELIEF RBS-ISI-016 AFFECTED COMPONENTS			
COMPONENT NO	ASME CODE CATEGORY	ASME CODE ITEM NUMBER	DESCRIPTION
B13-D008-40/05-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-40/05-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-40/53-WELD-1	B-O	B14,10	Welds in CRD Housing
B13-D008-40/53-WELD-2	B-O	B14,10	Welds in CRD Housing
B13-D008-44/09-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-44/09-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-44/49-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-44/49-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-48/13-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-48/13-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-48/45-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-48/45-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/17-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/17-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/21-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/21-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/25-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/25-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/29-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/29-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/33-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/33-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/37-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/37-WELD-2	B-O	B14.10	Welds in CRD Housing
B13-D008-52/41-WELD-1	B-O	B14.10	Welds in CRD Housing
B13-D008-52/41-WELD-2	B-O	B14.10	Welds in CRD Housing

Applicable ASME Code Edition and Addenda

The ASME Code of record for RBS for the third 10-year ISI interval was the ASME Code Section XI, 2001 Edition through the 2003 Addenda. The third 10-year ISI interval began May 31, 2008, and ended on November 30, 2017.

Applicable Code Requirement

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-O, Pressure Retaining Welds in Control Rod Housings, Item B14.10 requires volumetric or surface examination of

10 percent of peripheral control rod drive (CRD) housing welds. The licensee elected to perform surface examinations on the selected CRD housing welds.

Essentially 100 percent, as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 was approved for use by the NRC in Revision 17 of Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (ADAMS Accession No. ML13339A689).

Licensee's Proposed Alternative and Basis for Impracticality

The licensee stated that "[p]eriodic system pressure tests and VT-2 visual examinations will continue to be performed in accordance with ASME Section XI, Examination Category B-P, for the Class 1 pressure retaining welds each refueling outage in accordance with Table IWB-2500-1, which includes the CRD housing welds."

The licensee also stated that based on the second 10-year ISI Interval, Relief Request RBS-ISI-016 and the NRC safety evaluation for that request (found at ADAMS Accession No. ML12235A308), Entergy made the following commitment to the NRC:

Entergy will continue to investigate and evaluate for suitability alternative inspection methods, such as the remote camera suggested by the NRC, for the third and subsequent ISI intervals as long as the impracticality remains.

The licensee also stated that because of this commitment, a surface examination technique using a liquid penetrant (PT) method was developed for the upper (Weld #2) during the third 10-Year ISI Interval and the required surface examination of this weld was performed on the four scheduled CRD housings during Refueling Outage 19; no indications were identified. Thus, inspection of upper (Weld #2) has now met the ASME Code requirements for the third 10-year ISI Interval and no longer requires relief for impracticality.

Further, the licensee stated that the as-installed configuration of the 36 peripheral CRD housings makes performance of the 4 required weld examinations on the lower (Weld #1) in the required 10 percent (4 of the 36) peripheral CRD housings impractical for the following reasons:

1. The housings are laterally proximate to the reactor vessel support pedestal, which limits access to the lower welds on the outer circumference of the housings.
2. The subject welds are below the lower reactor insulation support structure where the housings pass through a series of closely spaced CRD housing support beams and associated hanger rods, which further limit access to the welds of the lower portion of the housings.
3. Access to the lower welds from below is limited by a series of CRD housing support bars, grid plates and grid clamps.
4. Access to the lower welds from the housing inside diameter requires removal of the CRD mechanisms and sleeves.

5. Earlier attempts to examine these lower welds from the inside diameter when the CRDs were disassembled for maintenance during the first, second, and now the third 10-year ISI Intervals have proven to be impractical.

Burden Caused by Compliance

As stated, in part, by the licensee in its letter dated March 8, 2018:

To comply with the code required examination volume or surface area for obtaining essentially 100% coverage for the lower (Weld #1) [See Table 3.1.1]..., the welds, adjacent housing supports and their structures would have to be physically modified and/or disassembled beyond their current design.

3.2 NRC Staff Evaluation

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-O, Pressure Retaining Welds in Control Rod Housings, Item B14.10, requires volumetric or surface examination of 10 percent of peripheral CRD housing welds. In addition, the ASME Code requires 100 percent volumetric or surface examination of 10 percent of the peripheral CRD housing welds. However, for the CRD housing-to-flange welds located in the inaccessible lower section of the CRD housing, the required inspection surface could not be obtained due to physical obstructions imposed by design, geometry, and materials of construction including vessel appurtenances, insulation support rings, structural and component supports, adjacent CRD housing flanges, and neutron monitoring instrumentation and associated cabling. Therefore, obtaining 100 percent of the ASME Code-required surface examinations is not practical for the lower CRD housing-to-flange welds. The NRC staff further determined that for the licensee to perform the ASME Code-required examinations, the subject components would have to be modified, redesigned, or replaced, which would place a burden on the licensee. The drawings and descriptions provided by the licensee support the fact that the area under the reactor pressure vessel is highly congested and shows that examinations of the subject welds have been performed to the extent practical. No unacceptable indications, or evidence of degradation mechanisms were found during these examinations.

The licensee inspected four housing tube-to-tube welds located in the accessible upper section of the CRD housing to account for the limited examinations and to ensure that an equivalent 100 percent inspection of 10 percent of the peripheral housings were obtained. A VT-2 visual examination was also performed on these components during system pressure tests for each refueling outage. No evidence of leakage was identified for these components based on the past inspection. Reactor coolant system leak rate limitations and atmospheric particulate radioactivity monitoring also ensure that any leakage would be detected prior to gross failure.

The licensee has shown that it is impractical to examine 100 percent of the ASME Code required surface examinations on 10 percent of peripheral CRD housing-to-flange welds. Based on the coverage obtained, the licensee's alternative to examine additional CRD housing tube-to-tube welds, and the VT-2 visual examinations performed on these components during system pressure tests for each refueling outage, the NRC staff has concluded that if significant service-induced degradation occurs, there is reasonable assurance that evidence of it will be detected. Therefore, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest

giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination coverage requirements are impractical for the lower CRD housing-to-flange welds listed in Relief Request RBS-ISI-016. Furthermore, imposition of these ASME Code requirements would create a burden on the licensee. The NRC staff also determined that based on the visual examination obtained of the CRD housing welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the NRC staff concludes that examinations performed to the extent practical on the upper CRD housing tube-to-tube welds provide reasonable assurance of structural integrity of the subject welds, because both the upper and lower CRD housing welds are subject to similar degradation mechanisms.

Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). The NRC staff has further determined that granting Relief Request RBS-ISI-016 pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Therefore, the NRC grants relief for the subject examinations of the components contained in Relief Request RBS-ISI-016 at the RBS for the third 10-year ISI interval.

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

Principal Contributors: B. Fu,
 S. Cumblidge

Date: November 7, 2018

SUBJECT: RIVER BEND STATION, UNIT 1 – REQUEST FOR RELIEF RBS-ISI-016 FROM THE REQUIREMENTS OF THE ASME CODE FOR PRESSURE RETAINING WELDS IN CONTROL ROD HOUSINGS (EPID L-2018-LLR-0042) DATED NOVEMBER 7, 2018

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