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William F. Maguire  
Site Vice President  
River Bend Station

RBG-47842

March 22, 2018

Attn: Document Control Desk  
U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2738

SUBJECT: Response to License Renewal Application NRC Request for Additional Information  
Set 5 Supplement  
River Bend Station, Unit 1  
Docket No. 50-458  
License No. NPF-47

References: 1) Entergy Letter: License Renewal Application (RBG-47735 dated May 25, 2017)

2) NRC email: River Bend Station, Unit 1, Request for Additional Information, Set 5 – RBS License Renewal Application – dated December 13, 2017 (ADAMS Accession No. ML17347B432)

3) Entergy Letter: Response to Request for Additional Information Set 5 – dated January 24, 2018 (ADAMS Accession No. ML18025B750)

4) Public Phone Call – Discuss RAI B.1.41-1, Structures Monitoring – dated March 7, 2018 (ADAMS Accession No ML 18057A453)

Dear Sir or Madam:

In Reference 1, Entergy Operations, Inc (Entergy) submitted an application for renewal of the operating license for River Bend Station (RBS) for an additional 20 years beyond the current expiration date. In an email dated December 13, 2017, (Reference 2) the NRC staff made a Request for Additional Information (RAI), needed to complete the license renewal application review. On January 24, 2018, Entergy responded to the RAI Set 5 request (Reference 3). On February 20, 2018, (Reference 4) during a public phone call, the NRC staff requested additional information on the Entergy response to RAI B.1.41-1 that was provided in Reference 3. Enclosure 1 provides a revised response to this RAI that includes the additional information requested. Enclosure 2 identifies a commitment noted in Enclosure 1.

If you require additional information, please contact Mr. Tim Schenk at (225)-381-4177 or [tschenk@entergy.com](mailto:tschenk@entergy.com).

In accordance with 10 CFR 50.91(b)(1), Entergy is notifying the State of Louisiana and the State of Texas by transmitting a copy of this letter to the designated State Official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 22, 2018.

Sincerely,



WFM/RMC/alc

Enclosure 1: Set 5 Supplement RAI Response – River Bend Station

Enclosure 2: Set 5 Supplement Commitment – River Bend Station

cc: (with Enclosure)  
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RB1-18-0048

**RBG-47842**

**Enclosure 1**

**Response to Request for Additional Information**

**Set 5 Supplement**

**REQUEST FOR ADDITIONAL INFORMATION  
LICENSE RENEWAL APPLICATION  
RIVER BEND STATION, UNIT 1 – SET 5 SUPPLEMENT  
DOCKET NO.: 50-458  
CAC NO.: MF9757  
Office of Nuclear Reactor Regulation  
Division of Materials and License Renewal**

**Question**

RAI B.1.41-1 (Structures Monitoring)

**Background**

The “parameters monitored or inspected,” and “detection of aging effects” program elements of GALL Report AMP XI.S3, “ASME Section XI, Subsection IWF,” and GALL Report AMP XI.S6, “Structures Monitoring,” recommends that high strength (actual measured yield strength greater than or equal to 150 ksi) structural bolts in sizes greater than 1 inch in diameter be monitored for stress corrosion cracking (SCC). The GALL Report also recommends that visual inspections be supplemented with volumetric or surface examinations to detect cracking for this type of bolt.

LRA Section B.1.41, “Structures Monitoring,” and LRA Section B.1.23, “Inservice Inspection – IWF” state that the ISI-IWF and Structures Monitoring Program are existing programs, with enhancements, that will be consistent with GALL Report AMPs XI.S3 and XI.S6 respectively. The staff notes that LRA Sections B.1.23 and B.1.41 do not provide an enhancement to the “parameters monitored or inspected,” and/or “detection of aging effects” program elements to address the aging effects of SCC in high strength structural bolts. LRA Table 3.5.1, item 69, states, in part, that RBS “does not have high strength bolts that are subject to sustained high tensile stress in a corrosive environment,” and that “[the] listed aging effects do not require management.”

During the AMP audit, the staff reviewed the applicant’s document RBS-EP-15-00008, “Aging Management Program Evaluation Results - Civil/Structural” (AMPER), and associated implementing procedures and structural specifications and drawings, and noted the following:

- RBS specifications for structural steel and miscellaneous steel (e.g. Specifications Nos. 210.330, 210.311) allow the use of high strength bolts with diameters greater than 1 inch.
- The applicant excluded the use of supplemental examinations in high strength structural bolts and stated, in part, “since thread lubricants recommended in plant procedures do not contain molybdenum disulfide, SCC is not plausible, inspections are not supplemented with volumetric or surface examinations.” (Reference AMPER Section 3.4.B.4.b)

**Issue**

It is not clear to the staff if “parameters monitored or inspected,” and “detection of aging effects” program elements of the Structures Monitoring Program is consistent with the GALL Report recommendation because:

1. The applicant’s ISI-IWF and Structures Monitoring Program and associated AMPERs do not provide sufficient justification for not managing the aging effects of SCC in high strength

structural bolting since the GALL Report does not credit the molybdenum disulfide thread lubricants as the only contributor to SCC in high strength bolts.

2. It is not clear to the staff (1) whether high strength structural bolts (exempt for ASTM A325, F1852, and A490 under the Structures Monitoring Program, but applicable to the ISI-IWF program) greater than 1 inch in diameter are used or not in structural applications, or (2) how supplemental examinations are performed for these bolts because the plant's structural specifications do not preclude the use of high strength structural bolts with diameter greater than 1 inch.

#### Request

1. State whether or not there are high-strength structural bolts (ASTM A325, F1852, and A490 are exempt for SMP applications, but are not exempt for ISI-IWF applications) in sizes greater than 1 inch diameter used in structural applications or component supports at RBS.
2. If high-strength structural bolts (ASTM A325, F1852, and A490 are exempt for SMP applications, but are not exempt for ISI-IWF applications) in sizes greater than 1 inch diameter are used in structural applications or component supports:
  - a. State whether and how the GALL Report recommendations for managing degradation of high-strength bolts due to SCC described in the "parameters monitored or inspected," and "detection of aging effects" of the GALL Report AMP XI.S6 will be implemented for the Structures Monitoring Program. Otherwise, provide adequate technical justification for the exception taken to the GALL Report AMP recommendation.
  - b. If the SCC aging effect is determined to be not applicable, as discussed in LRA Table 3.5.1, item 3.5.1-68, and Table 3.5.1, item 3.5.1-69, describe how the environment is monitored to ensure that the aging effect of cracking due to SCC remains not applicable for high-strength structural bolting.
3. Update the LRA and FSAR supplement, as appropriate, to be consistent with the response to the above requests.

#### Response

River Bend Station (RBS) responded to RAI B.1.41-1 by letter dated January 24, 2018 (RBG-47813). The response to RAI B.1.41-1 is revised to include additional information requested by the NRC during a public telephone conference call held on February 20, 2018. The revised response below supersedes the response provided with the responses to RAI Set 5 dated January 24, 2018.

1. River Bend Station (RBS) has determined through review of site documentation (e.g. specifications, drawings, certified material test reports) that there are no structural bolts with actual measured yield strength greater than or equal to 150 ksi in sizes greater than 1 inch diameter that are subject to aging management review for license renewal. The recommendations in the "preventive actions" program element of NUREG-1801 AMP XI.S3 will be implemented for high-strength bolts in the RBS Inservice Inspection – IWF Program. LRA Section B.1.41 includes an enhancement to the preventive actions program element in order to implement the Inservice Inspection – IWF Program consistent with NUREG-1801 AMP XI.S3. An additional enhancement will be added to the LRA Section B.1.41 preventive actions to specify

that procurement of high-strength bolting greater than one inch in diameter is limited to bolting material with actual measured yield strength less than 150 ksi. The purpose of this enhancement is to prevent future applications of material with actual measured yield strength greater than 150 ksi in high-strength bolts greater than one inch in diameter.

2. a. For structural applications and component supports subject to aging management review, RBS does not use structural bolts with actual measured yield strength greater than or equal to 150 ksi in sizes greater than 1 inch diameter. See response to Item 1 above. Therefore, cracking of high-strength bolts due to SCC described in the "parameters monitored or inspected," and "detection of aging effects" of NUREG-1801 Section XI.S3 and Section XI.S6 is not an aging effect requiring management.
- b. The reason that cracking due to SCC is not an aging effect requiring management at RBS is that there is no high-strength bolting that is prone to SCC. The reason is not related to the operating environment. Therefore, monitoring of the environment is not necessary to demonstrate that cracking due to SCC remains not applicable.
3. For clarification, license renewal application (LRA) Table 3.5.1 Item 69, Sections A.1.41, B.1.41 and A.4 are revised to be consistent with the above response. The changes to LRA Table 3.5.1, Sections A.1.41, B.1.41 and A.4 follow with additions underlined and deletions lined through.

**Table 3.5.1: Structures and Component Supports**

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-69	High-strength structural bolting	Cracking due to stress corrosion cracking	Structures Monitoring Program Note: ASTM A 325, F 1852, and ASTM A 490 bolts used in civil structures have not shown to be prone to SCC. SCC potential need not be evaluated for these bolts.	High-strength structural bolting	<p>Listed aging effects do not require management at RBS. RBS does not have high strength bolts that are subject to sustained high tensile stress in a corrosive environment. As defined in this line item, ASTM A 325, F 1852, and ASTM A 490 bolts used in civil structures have not shown to be prone to SCC. Therefore, the listed aging effect is not applicable for RBS high strength bolting.</p> <p><u>RBS does not use structural bolts with actual measured yield strength greater than or equal to 150 ksi in sizes greater than 1 inch diameter for structural applications or component supports that are subject to aging management review for license renewal. Therefore, the listed aging effect is not an aging effect requiring management for RBS high-strength structural bolting.</u></p>

**A.1.41 Structures Monitoring**

The Structures Monitoring Program will be enhanced as follows.

- Revise plant procedures for procuring bolting greater than one inch in diameter to only procure bolting material with actual measured yield strength less than 150 ksi.

**B.1.41 Structures Monitoring**

**Enhancements**

The following enhancements will be implemented prior to the period of extended operation.

Element Affected	Enhancement
2. Preventive Actions	a) Revise plant procedures to include the preventive actions for storage of ASTM A325, ASTM F1852, and ASTM A490 bolting from Section 2 of Research Council on Structural Connections publication, "Specification for Structural Joints Using ASTM A325 or A490 Bolts."  b) <u>Revise plant procedures for procuring bolting greater than one inch in diameter to only procure bolting material with actual measured yield strength less than 150 ksi.</u>

**A.4 LICENSE RENEWAL COMMITMENT LIST**

<u>No.</u>	<u>Program or Activity</u>	<u>Commitment</u>	<u>Implementation Schedule</u>	<u>Source (Letter Number)</u>
28	Structures Monitoring	Enhance the Structures Monitoring Program as described in LRA Section A.1.41.	Prior to February 28, 2025, or the end of the last refueling outage prior to August 29, 2025, whichever is later.	RBG-47735 <u>RBG-47842</u>



**RBG-47842**

**Enclosure 2**

**Commitment**

This table identifies actions discussed in this letter that Entergy commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are **not** commitments. Changes to LRA Section A.4 follow with additions underlined.

**A.4 LICENSE RENEWAL COMMITMENT LIST**

<b><u>No.</u></b>	<b><u>Program or Activity</u></b>	<b><u>Commitment</u></b>	<b><u>Implementation Schedule</u></b>	<b><u>Source (Letter Number)</u></b>
28	Structures Monitoring	Enhance the Structures Monitoring Program as described in LRA Section A.1.41.	Prior to February 28, 2025, or the end of the last refueling outage prior to August 29, 2025, whichever is later.	RBG-47735 <u>RBG-47842</u>