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William F. Maguire
Site Vice President
River Bend Station

RBG-47805

December 12, 2017

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

SUBJECT: Response to License Renewal Application (LRA) NRC Request for Additional Information (RAI) Set 2.
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 2 – RBS License Renewal Application – dated November 16, 2017. (ADAMS Accession No. ML17320B099).

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 November 16, 2017, (Reference 2) the NRC staff made a Request for Additional Information (RAI), needed to complete the License Renewal application review. Enclosure 1 provides the responses to the Set 2 RAIs.

There is one regulatory commitment described in Enclosure 2 in this submittal. If you require additional information, please contact Mr. Tim Schenk at (225) 381-4177 or 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 and attachment to the designated State Official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 12, 2017.

Sincerely,

WFM/RMC/alc

Enclosure 1: Set 2 RAI Responses – River Bend Station
Enclosure 2: List of Commitments

cc: (with Enclosure)

U. S. Nuclear Regulatory Commission
Attn: Emmanuel Sayoc
11555 Rockville Pike
Rockville, MD 20852

cc: (w/o Enclosure)

U. S. Nuclear Regulatory Commission
Attn: Lisa Regner
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U.S. Nuclear Regulatory Commission
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1600 East Lamar Blvd.
Arlington, TX 76011-4511

NRC Resident Inspector
PO Box 1050
St. Francisville, LA 70775

Central Records Clerk
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
Ji Young Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

RBF1-17-0166

RBG-47805

Enclosure 1

Responses to Request for Additional Information

Set 2

FINAL REQUESTS FOR ADDITIONAL INFORMATION FOR THE SAFETY REVIEW OF THE RIVER BEND STATION – SET 2 LICENSE RENEWAL APPLICATION RIVER BEND STATION, UNIT 1 (CAC NO.: MF9757)

Question
RAI B.1.11-1

Background
LRA Table 3.3.2-3, "Service Water System," states that loss of coating integrity and loss of material will be managed by the Coating Integrity program for carbon steel with internal lining strainer housings exposed to raw water.

LRA Section B.1.11 states that the environments associated with the Coating Integrity program are treated water, waste water, or lubricating oil.

Issue
The LRA is not internally consistent. The inconsistency is an error trap that could lead to not managing loss of coating integrity for the strainer housings.

Request
Reconcile the discrepancy in the LRA by revising either LRA Table 3.3.2-3 or LRA Section B.1.11.

Response
Strainer housings exposed internally to raw water credit the Coating Integrity Program to manage loss of coating integrity and loss of material in LRA Table 3.3.2-3, "Service Water System." The LRA is revised to include raw water as an applicable environment for components within the Coating Integrity Program. The revisions to LRA Section A.1.11 and B.1.11 to include raw water as an applicable environment are included in the response to RAI 3.3.2.1.1-1 described below.

Question
RAI 3.3.2.1.1-1

Background
LRA Table 3.3.1, item 3.3.1-140 states, "[t]his item was not used. There are no gray cast iron components with internal coating or linings in the auxiliary systems in the scope of license renewal."

Table 3.3.2-7 cites a gray cast iron valve body with internal coating exposed to raw water being managed for loss of coating integrity and loss of material by the Fire Water System program.

SRP-LR Table 3.3.1, item 3.3.1-140 recommends managing loss of material due to selective leaching for gray cast iron piping components with internal coatings/linings exposed to closed-cycle cooling water, raw water, or treated water with AMP XI.M42, "Internal Coatings/Linings for In-scope Piping, Piping Components, Heat Exchangers, and Tanks."

Issue
The LRA is not internally consistent. The inconsistency is an error trap that could lead to not managing

loss of coating integrity for the valve body. If there are internally coated gray cast iron valves in the fire water system, a line entry should be added to LRA Table 3.3.2-7 citing LRA Table 3.3.1, item 3.3.1-140. In addition, the Fire Water System program does not have activities to manage loss of material due to selective leaching.

Request

Reconcile the discrepancy in the LRA by revising one or more of the following: (a) LRA Table 3.3.2-7; (b) LRA Table 3.3-1, item 3.3.1-140; (c) the Fire Water System program, or (d) the Coating Integrity program.

Response

Gray cast iron valves and piping in the Fire Protection – Water System are internally coated. In addition, some components included in LRA Table 3.3.2-7 indicate that the Fire Water System Program manages the aging effect loss of coating integrity. The Coating Integrity Program should be credited to manage loss of coating integrity and loss of material for components in the fire water system, with the exception of the fire water tanks. Consequently, the LRA is revised to indicate that the Coating Integrity Program manages loss of coating integrity and loss of material for gray cast iron piping components with internal coatings or linings exposed to raw water. Additions are underlined and deletions are lined through.

Table 3.3.1
Summary of Aging Management Programs for the Auxiliary Systems
Evaluated in Chapter VII of NUREG-1801

Table 3.3.1: Auxiliary Systems					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-138	Metallic piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, treated water, treated borated water, waste water, lubricating oil, or fuel oil	Loss of coating or lining integrity due to blistering, cracking, flaking, peeling, delamination, rusting, or physical damage, and spalling for cementitious coatings/linings	Chapter XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-1801 for most components. Loss of coating or lining integrity for metallic components with internal coating or linings is managed by the Coating Integrity Program. Loss of coating integrity for fire protection – water system ~~components~~tanks is managed by the Fire Water System Program.
3.3.1-139	Metallic piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, treated water, treated borated water, or lubricating oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion; fouling that leads to corrosion	Chapter XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-1801 for most components. Loss of material for metallic components with internal coating or linings is managed by the Coating Integrity Program. Loss of material for fire protection – water system ~~components~~tanks is managed by the Fire Water System Program.

Table 3.3.1: Auxiliary Systems					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-140	Gray cast iron piping components with internal coatings/linings exposed to closed-cycle cooling water, raw water, or treated water	Loss of material due to selective leaching	Chapter XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	~~This item was not used. There are no gray cast iron components with internal coating or linings in the auxiliary systems in the scope of license renewal.~~ Consistent with NUREG-1801. The Coating Integrity Program manages loss of material due to selective leaching for gray cast iron piping components with internal coating/linings exposed to raw water.

Table 3.3.2-7
Fire Protection – Water System
Summary of Aging Management Evaluation

Table 3.3.2-7: Fire Protection – Water System								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Piping	Pressure boundary	Carbon steel with internal coating	Raw water (int)	Loss of coating integrity	~~Fire Water System~~ Coating Integrity	VII.G.A-416	3.3.1-138	~~E~~A
Piping	Pressure boundary	Gray cast iron with internal coating	Raw water (int)	Loss of material	Coating Integrity	VII.G.A-415	3.3.1-140	A
Piping	Pressure boundary	Carbon steel with internal coating	Raw water (int)	Loss of material	~~Fire Water System~~ Coating Integrity	VII.G.A-414	3.3.1-139	~~E~~A
Strainer housing	Pressure boundary	Carbon steel with internal coating	Raw water (int)	Loss of coating integrity	~~Fire Water System~~ Coating Integrity	VII.G.A-416	3.3.1-138	~~E~~A
Strainer housing	Pressure boundary	Carbon steel with internal coating	Raw water (int)	Loss of material	~~Fire Water System~~ Coating Integrity	VII.G.A-414	3.3.1-139	~~E~~A
Valve body	Pressure boundary	Gray cast iron with internal coating	Raw water (int)	Loss of coating integrity	~~Fire Water System~~ Coating Integrity	VII.G.A-416	3.3.1-138	~~E~~A
Valve body	Pressure boundary	Gray cast iron with internal coating	Raw water (int)	Loss of material	Coating Integrity	VII.G.A-415	3.3.1-140	A
Valve body	Pressure boundary	Gray cast iron with internal coating	Raw water (int)	Loss of material	~~Fire Water System~~ Coating Integrity	VII.G.A-414	3.3.1-139	~~E~~A

Table 3.3.2-7: Fire Protection – Water System								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Vortex breaker	Flow control	Carbon steel with internal coating	Raw water (ext)	Loss of coating integrity	~~Fire Water System~~ Coating Integrity	VII.G.A-416	3.3.1-138	~~E~~A
Vortex breaker	Flow control	Carbon steel with internal coating	Raw water (ext)	Loss of material	~~Fire Water System~~ Coating Integrity	VII.G.A-416	3.3.1-138	~~E~~A

3.3.2.1.7Fire Protection – Water system
Aging Management Programs

The following aging management programs manage the aging effects for the fire protection – water system components.

- Bolting Integrity
- Buried and Underground Piping and Tanks Inspection
- Coating Integrity
- Diesel Fuel Monitoring
- External Surfaces Monitoring
- Fire Water System
- Internal Surfaces in Miscellaneous Piping and Ducting Components
- One-Time Inspection
- Selective Leaching
- Water Chemistry Control – Closed Treated Water Systems

A.1.11 Coating Integrity
The Coating Integrity Program entails periodic visual inspections of coatings applied to the internal surfaces of in-scope components in an environment of treated water, raw water, waste water, or lubricating oil where loss of coating or lining integrity could impact the component's or downstream component's current licensing basis intended function(s). For coated surfaces that do not meet the acceptance criteria, coating repair or replacement is accompanied by physical testing where possible. The training and qualification of individuals involved in coating inspections of noncementitious coatings are in accordance with ASTM standards endorsed in Regulatory Guide (RG) 1.54, including limitations, if any, identified in RG 1.54 for those standards. For cementitious coatings or linings, inspectors should have a minimum of five years of experience inspecting or testing concrete structures or cementitious coatings or linings or a degree in the civil/structural discipline and a minimum of one year of experience.

B.1.11 COATING INTEGRITY

Program Description
The Coating Integrity Program is a new program that will entail periodic visual inspections of coatings applied to the internal surfaces of in-scope components in an environment of treated water, raw water, waste water, or lubricating oil where loss of coating or lining integrity could impact the component's or downstream component's current licensing basis intended function(s). For coated surfaces that do not meet the acceptance criteria, coating repair or replacement is accompanied by physical testing where possible. The training and qualification of individuals involved in coating inspections of noncementitious coatings are in accordance with ASTM standards endorsed in Regulatory Guide (RG) 1.54, including limitations, if any, identified in RG 1.54 for those standards. For cementitious coatings or linings, inspectors should have a minimum of five years of experience inspecting or testing concrete structures or cementitious coatings or linings or a degree in the civil/structural discipline and a minimum of one year of experience.

A.1.20 Fire Water System
The Fire Water System Program manages loss of material, ~~loss of coating integrity,~~ and flow blockage due to fouling for in-scope, long-lived, passive, water-based fire suppression system components using periodic flow testing and visual inspections in accordance with NFPA 25 (2011 Edition). In addition, the fire water system pressure is monitored such that a loss of system pressure is immediately detected and corrective action initiated. When visual inspections are used to detect loss of material and fouling, the inspection technique is capable of detecting surface irregularities that could indicate wall loss due to

corrosion, corrosion product deposition, and flow blockage due to fouling. The program also manages loss of coating integrity for the fire water tanks.

B.1.20 FIRE WATER SYSTEM

Program Description

The Fire Water System Program manages loss of material, ~~loss of coating integrity,~~ and flow blockage due to fouling for in-scope, long-lived, passive, water-based fire suppression system components using periodic flow testing and visual inspections in accordance with NFPA 25 (2011 Edition). In addition, the fire water system pressure is monitored such that a loss of system pressure is immediately detected and corrective action initiated. When visual inspections are used to detect loss of material and fouling, the inspection technique is capable of detecting surface irregularities that could indicate wall loss due to corrosion, corrosion product deposition, and flow blockage due to fouling. The program also manages loss of coating integrity for the fire water tanks.

Question
RAI B.1.11-2

Background
During the audit, the staff reviewed a report, which documented the basis for excluding six in-scope components from the scope of the coating integrity program based on loss of coating integrity not being an aging effect requiring management. The staff found the basis for excluding three of these components acceptable.

Issue
For the other three components, the staff lacks sufficient information to complete its review as follows:

- For lined piping located in the F tunnel: the piping is isolated on one end by a blind flange and on the other end there is a normally closed air operated valve (AOV) upstream of the condensate storage tank (CST). As stated in the report, the line is pressurized to 200 psig. As a result, if the AOV were to open, potential coating debris could be admitted to the CST through a flow restriction orifice. Although the orifice would potentially block large coating debris, it is not clear whether smaller coating debris could impact the intended function of components downstream of the CST. In addition, the report states that there is, "no safety-related equipment of piping near [the] line." The term "near" lacks sufficient specificity. A leak from the pipe as a result of through-wall corrosion subsequent to loss of coating integrity could impact safety-related components that are not "near" the piping as a result of spray effects or flooding.

- For the recovery sample tank system discharge to CST header drain valve: the report states that there is no safety-related equipment or piping located near the valve. As described above, the term "near" lacks sufficient specificity.

- For the precoat tank level transmitter root valve: the report states that there is no safety-related equipment or piping located near the valve. As described above, the term "near" lacks sufficient specificity.

Request
Respond to the following:

a. For the lined piping located in the F tunnel, state the basis for why coating debris would not impact the intended function of components downstream of the CST, or include the piping in the scope of the Coating Integrity program.

b. For the above three components, state why a leak from the component as a result of through-wall corrosion subsequent to a loss of coating integrity will not impact safety-related components that are not "near" the component as a result of spray effects or flooding, or include the piping in the scope of the Coating Integrity program.

Response
a. The lined piping described in the first bullet item is designated LWS-004-588-4 and is shown on LRA drawing LRA-PID-31-01G, location G5–6. This piping ties into line LWS-004-594-4 upstream of valve AOV-529A, which isolates line LWS-004-594-4 from the nonsafety-related condensate storage tank (CST). The other end of LWS-004-588-4 terminates at valve AOV-529B, which continues through line LWS-004-586-4 to a blind flange.

Piping line LWS-004-588-4 has been identified as meeting the scoping and screening criteria based on 10 CFR 54.4(a)(2) because safety-related equipment is located in the tunnel. Therefore, this piping line should have been included in the Coating Integrity Program.

LRA Table 3.3.2-18-21, Radwaste – Liquid System, is revised to add rows for piping with internal coatings that credit the Coating Integrity Program to manage loss of coating integrity and loss of material. See changes below.

b. The report reviewed during the audit identified three components as not being located "near" safety-related equipment. Use of the term *near* is not consistent with the spaces approach applied for nonsafety-related component interactions with safety-related structures or components based on 10 CFR 54.4(a)(2), as discussed in LRA Sections 2.1.1.2 and 2.1.2.1.2. Therefore, the evaluation of these three components is revised as follows:
   - The lined piping in the flow path to the CST has aging effects to be managed by the Coating Integrity Program as discussed in the response to Item a. The LRA is revised as discussed above.
   - The recovery sample tank system discharge to CST header drain valve (lined valve LWS-V772 located in the tunnel as shown on LRA-PID-31-01G, location H5) has been identified as meeting the scoping and screening criteria based on 10 CFR 54.4(a)(2) because safety-related equipment is located in the same tunnel. Therefore, LRA Table 3.3.2-18-21 is revised to add rows for valve body with internal coatings that credit the Coating Integrity Program to manage loss of coating integrity and loss of material. See changes below.
   - The precoat tank level transmitter root valve, lined component WCS-V179 (LRA-PID-26-03B, location C19), has been identified as meeting the scoping and screening criteria based on 10 CFR 54.4(a)(2) because safety-related equipment is located in the reactor building. Therefore, LRA Table 3.3.2-18-19 is revised to add rows for valve body with internal coatings that credit the Coating Integrity Program to manage loss of coating integrity and loss of material. See changes below.

The LRA is revised to indicate that these components credit the Coating Integrity Program to manage the effects of aging. Additions are underlined.

During the preparation of this RAI response, it was noted that further review of lined components not otherwise within the scope of license renewal is necessary to determine whether internal lining failure debris could be transported into and adversely affect safety-related systems or components. This condition has been entered into the RBS corrective action program. LRA changes, if any, resulting from review of this condition will be provided no later than March 1, 2018.

Table 3.3.2-18-19
Reactor Water Cleanup System
Nonsafety-Related Components Affecting Safety-Related Systems
Summary of Aging Management Evaluation

Table 3.3.2-18-19: Reactor Water Cleanup System, Nonsafety-Related Components Affecting Safety-Related Systems								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Valve body	Pressure boundary	Carbon steel with internal coating	Treated water (int)	Loss of coating integrity	Coating Integrity	VII.E3.A-416	3.3.1-138	A
Valve body	Pressure boundary	Carbon steel with internal coating	Treated water (int)	Loss of material	Coating Integrity	VII.E3.A-414	3.3.1-139	A

Table 3.3.2-18-21
Radwaste – Liquid System
Nonsafety-Related Components Affecting Safety-Related Systems
Summary of Aging Management Evaluation

Table 3.3.2-18-21: Radwaste – Liquid System, Nonsafety-Related Components Affecting Safety-Related Systems								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Piping	Pressure boundary	Carbon steel with internal coating	Waste water (int)	Loss of coating integrity	Coating Integrity	VII.E5.A-416	3.3.1-138	A
Piping	Pressure boundary	Carbon steel with internal coating	Waste water (int)	Loss of material	Coating Integrity	VII.E5.A-414	3.3.1-139	A
Valve body	Pressure boundary	Carbon steel with internal coating	Waste water (int)	Loss of coating integrity	Coating Integrity	VII.E5.A-416	3.3.1-138	A

Table 3.3.2-18-21: Radwaste – Liquid System, Nonsafety-Related Components Affecting Safety-Related Systems								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Valve body	Pressure boundary	Carbon steel with internal coating	Waste water (int)	Loss of material	Coating Integrity	VII.E5.A-414	3.3.1-139	A

Question
RAI B.1.11-3

Background
The staff noted that as documented in a condition report, during an inspection of the control building chiller condenser service water side, several loose pieces of what appears to be epoxy coating were detected. The condition report states: (a) the pieces of epoxy are small and will not prevent cooling water flow through the heat exchanger; (b) operation of the chiller before the inspection was within the expected bands for the monitored parameters; and (c) an apparent cause was not required for the condition adverse to quality.

Issue
Based on the staff's review of the corrective action entries for this condition report, it is not clear that the source of the epoxy debris was identified. As a result, it is not clear to the staff whether the debris is associated with a coating material or some other foreign material. Although the debris did not result in degraded chiller condenser performance at the time of discovery, future degradation could result in a larger load of debris or larger debris particles that could affect performance. If the debris is associated with a coating material, the staff lacks sufficient information to determine: (a) the potential extent of debris during the period of extended operation; and (b) whether the Coating Integrity program can adequately manage loss of coating integrity for this coating.

Request
Respond to the following:

a. State the source of the epoxy debris identified in this condition report.

b. If the debris was coating material, or if the debris has not been identified and there is upstream coating material that could have been the source, state the basis for why the Coating Integrity program will be effective at managing loss of coating integrity for this debris source.

Response

a. The source of the coating debris identified in the condition report was epoxy coating that had been applied to the control building chiller condenser service water side.

b. This event occurred in 2009 and there have been no additional issues identified with coatings in this chiller condenser. The chiller condenser was inspected in 2014 during a periodic preventive maintenance task. Task documentation did not indicate that coating debris had been found in the condenser.

   The Coating Integrity Program is a new program that will be consistent with NUREG-1801 XI.M42 as described in LR-ISG-2013-01. In accordance with program requirements, a qualified coating specialist will perform a baseline inspection of the chiller condenser in the 10 years prior to the PEO. This inspection will determine if the coating requires remediation and determine an inspection frequency in accordance with LR-ISG-2013-01. Implementation of the Coating Integrity Program will provide assurance that loss of coating integrity is adequately managed during the period of extended operation.

Question

RAI B.1.34-1

Background

The "scope of program" program element of the Periodic Surveillance and Preventive Maintenance (PSPM) program states that:

a) Loss of material for flexible hoses in the process radiation monitoring system will be managed by the PSPM program; however, LRA Table 3.3.2-18-17 does not cite any AMR items for flexible hoses.

b) Loss of material for stainless steel piping, pump casings, sight glasses, tubing, heat exchanger and valve bodies exposed to waste water located in the process radiation monitoring system will be managed by the PSPM program. Cracking is not managed for these components; however, cracking is managed for other stainless steel components (i.e., pump casing, piping) exposed to waste water in the plant drains system by the PSPM program (LRA Table 3.3.2-16).

Issue

The LRA is not internally consistent. The inconsistency is an error trap that could lead to not managing all applicable aging effects for these components.

Request

a) Reconcile the discrepancy in the LRA by revising either LRA Table 3.3.2-18-17 or LRA Section B.1.34.

b) State the basis for not managing cracking for stainless steel components exposed to waste water located in the process radiation monitoring system. Alternatively, revise LRA Section B.1-34 and LRA Table 3.3.2-18-17 to include cracking as an aging effect requiring management.

Response

a) Flex hose was inadvertently included in the LRA Section B.1.34 list of process radiation monitoring system abandoned components.

   LRA Section B.1.34 is revised to delete flex hose.

b) LRA Section B.1.34 indicates that the PSPM Program manages internals of radiation monitoring system abandoned components. Abandoned stainless steel components in the radiation monitoring system (LRA Table 3.3.2-18-17) have internal waste water environment with temperatures of less than 140 degrees; therefore, cracking is not identified.

   LRA Table 3.3.2-16 identifies stainless steel components in a waste water environment with a temperature of greater than 140 degrees; therefore, cracking is identified.

   LRA Section B.1.34 is revised as shown. The deletion is lined through.

B.1.34 PERIODIC SURVEILLANCE AND PREVENTIVE MAINTENANCE

Nonsafety-related systems affecting safety-related systems	Visually inspect the internal surfaces of process radiation monitoring system (system code 511) abandoned components (~~flex hose,~~ heat exchanger, piping, pump casing, sight glass, tubing, and valve body) to manage loss of material.

Question

RAI B.1.34-2

Background

The "detection of aging effects" program element of the PSPM program:

a) States that the inspection of elastomeric materials is conducted to detect change in material properties; however, LRA Table 3.5.2-3 cites loss of sealing for the inflatable seals for the spent fuel storage and upper containment pool gates and change in material properties is not cited. Item 3.5.1-26 states that, loss of sealing is a consequence of the aging effects cracking and change in material properties. Therefore, the AMP and Table 2 entries are not consistent.

b) Does not state the percent of the elastomeric surface that will be physically manipulated.

c) States that the sample size is dependent on the component's material and environment and takes into consideration industry and plant-specific operating experience.

Issue

a) The LRA is not internally consistent. The inconsistency is an error trap that could lead to not managing all applicable aging effects for these components.

b) GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," recommends that, "[t]he sample size for manipulation [of elastomeric components] is at least 10 percent of accessible surface area, including visually identified suspect areas." Although the PSPM program is a plant-specific program, there is no basis for the AMP not being consistent with the recommendations in other GALL Report sampling-based programs.

c) Although the program evaluation report for the PSPM program, reviewed by the staff during the audit, states the minimum sample size for each activity that refers to a representative sample, LRA Section B.1.34 does not. GALL Report AMP XI.M38, as modified by LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," recommends that: (a) a representative sample of 20 percent of the population (defined as components having the same material, environment, and aging effect combination) or a maximum of 25 components per population is inspected; and (b) where practical, the inspection includes a representative sample of the system population and focuses on the bounding or lead components most susceptible to aging because of time in service and severity of operating conditions.

Request

a) Reconcile the discrepancy in the LRA by revising either LRA Table 3.5.2-3 or LRA Section B.1.34, or both.

b) State the percentage and if not consistent with GALL Report AMP XI.M38, the basis for the percentage of surface area of elastomeric components that will be physically manipulated during inspection.

c) Where program activities are sampling-based, state the minimum sample size for each material, environment, and aging effect combination of components within the scope of the PSPM program. State the criteria for selecting inspection locations. Where different than that recommended in GALL Report AMP XI.M38, as modified by LR-ISG-2012-02, state and justify the exception.

Response

a) As described in LRA Table item 3.5.1-26, loss of sealing is a consequence of the aging effects cracking and change in material properties. LRA Section B.1.34, "Periodic Surveillance and Preventive Maintenance," is revised to include cracking as an applicable aging effect managed by the program for the inflatable seals associated with the spent fuel storage pool and upper containment pool gates. LRA table item 3.5.1-26 is also revised to clarify that the Periodic Surveillance and Preventive Maintenance (PSPM) Program manages the aging effects of cracking and change in material properties to prevent loss of sealing.

b) Consistent with the recommendations for flexible polymeric components in NUREG-1801 Section XI.M38, as modified by LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," the percentage of surface area of elastomeric components within the PSPM Program that will be physically manipulated during inspection is at least 10 percent of available surface area, including visually identified suspect areas. LRA Section B.1.34 element 4 is revised accordingly.

c) Consistent with the recommendations of NUREG-1801 Section XI.M38, as modified by LR-ISG-2012-02, a minimum sample size for sampling components within the PSPM Program is established. Revisions to LRA Sections A.1.34 and B.1.34 to include minimum sample size and selection criteria are provided in the response to RAI B.1.34-3.

The changes to LRA Table 3.5.1,and Section B.1.34 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
3.5.1-26	Moisture barriers (caulking, flashing, and other sealants)	Loss of sealing due to wear, damage, erosion, tear, surface cracks, or other defects	ISI (IWE)	No	The ISI (IWE) program is not used to manage moisture barriers because RBS primary containment design does not utilize moisture barriers. However, loss of sealing is a consequence of the aging effects cracking and change in material properties, ~~and~~ The Periodic Surveillance and Preventive Maintenance Program manages ~~the listed aging effect for similar~~ cracking and change in material properties to prevent loss of sealing for elastomer commodities.

B.1.34 PERIODIC SURVEILLANCE AND PREVENTIVE MAINTENANCE

Evaluation

4. Detection of Aging Effects

Periodic surveillances and preventive maintenance activities provide for component inspections to detect aging effects. Inspection intervals are established such that they provide timely detection of degradation prior to loss of intended functions. Inspection intervals, sample sizes, and data collection methods are dependent on component material and environment and take into consideration industry and plant-specific operating experience and manufacturers' recommendations. Established inspection methods to detect aging effects of loss of material and cracking include visual inspections for metallic components. Inspection of elastomeric materials to detect cracking and change in material properties includes visual inspections while manually flexing the component. Manipulation of any specific elastomeric component includes at least 10 percent of available surface area, including visually identified suspect areas.

Question
RAI B.1.34-3

Background
LR-ISG-2012-02, Table 3.0-1, "FSAR Supplement for Aging Management of Applicable Systems," for AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," recommends that the USAR supplement include: (a) the periodicity, sample size, and criteria for selecting inspection locations; and (b) that physical manipulation of elastomers be conducted in addition to visual inspections. LRA Section A.1.34 does not include the recommended text.

Issue
Although the PSPM program is a plant-specific program, there is no basis for the USAR not being consistent with the recommendations for the USAR supplement in other GALL Report sampling-based programs.

Request
Revise LRA Section A.1.34 to incorporate the above cited recommendations or state the basis for why the current licensing basis for the PSPM program will be adequate during the period of extended operation without this information.

Response
The PSPM Program is revised to be consistent with the recommendations for sample size, periodicity, and sample selection criteria of LR-ISG-2012-02, AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components".

LRA Sections A.1.34 and B.1.34 are revised to specify program sample size, periodicity, and selection criteria for inspection locations, and to specify physical manipulation of elastomers in addition to visual inspections. Additions are underlined and deletions are lined through.

A.1.34 PERIODIC SURVEILLANCE AND PREVENTIVE MAINTENANCE

The Periodic Surveillance and Preventive Maintenance (PSPM) Program includes periodic inspections and tests to manage aging effects including cracking, loss of material, reduction of heat transfer, and change in material properties, in cases where no NUREG-1801 program was found appropriate to manage the particular aging effects for specific components. At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections will focus on the bounding or leading components most susceptible to aging because of time in service and severity of operating conditions. Physical manipulation of elastomers is conducted in conjunction with visual inspections. Indications or relevant conditions of degradation detected are evaluated. ~~Inspections occur at least once every six years during the period of extended operation, except as noted below.~~

Credit for program activities has been taken in the aging management review for the following components.

B.1.34 PERIODIC SURVEILLANCE AND PREVENTIVE MAINTENANCE

Program Description
There is no corresponding NUREG-1801 program.

The Periodic Surveillance and Preventive Maintenance (PSPM) Program includes periodic inspections and tests to manage aging effects including cracking, loss of material, reduction of heat transfer, and change in material properties, in cases where no NUREG-1801 program was found appropriate to manage the particular aging effects for specific components. At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections will focus on the bounding or leading components most susceptible to aging because of time in service and severity of operating conditions. Physical manipulation of elastomers is conducted in conjunction with visual inspections. Indications or relevant conditions of degradation detected are evaluated. ~~Inspections occur at least once every six years during the period of extended operation, except as noted below.~~

Credit for program activities has been taken in the aging management review for the following systems and structures.

Evaluation

4. Detection of Aging Effects

Periodic surveillances and preventive maintenance activities provide for component inspections to detect aging effects. Inspection intervals ~~are established such that they~~ provide for timely detection of degradation prior to loss of intended functions. ~~Inspection intervals, sample sizes, and data collection methods are dependent on component material and environment and take into consideration industry and plant-specific operating experience and manufacturers' recommendations.~~ Established inspection methods to detect aging effects of loss of material and

cracking include visual inspections for metallic components. Inspection of elastomeric materials to detect change in material properties includes visual inspections while manually flexing the component.

~~Each inspection occurs at least once every six years, except for diesel component inspections which are performed at least once every eight years.~~ At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections will focus on the bounding or leading components most susceptible to aging because of time in service and severity of operating conditions. Inspections are performed by personnel qualified to perform the selected technique.

This program is credited with managing cracking, loss of material, reduction of heat transfer, and change in material properties for components fabricated from aluminum, stainless steel, carbon steel, copper alloy, and elastomers in environments of exhaust gas, lube oil, raw water, and waste water.

Question
RAI 3.3.2.3.16-1

Background
LRA Table 2.0-1, "Component Intended Functions: Abbreviations and Definitions," states that the filtration function is, "[p]rovide removal of unwanted material." LRA Table 2.0-1 states that the mechanical pressure boundary function is, "[p]rovide pressure boundary integrity such that adequate flow and pressure can be delivered…"

LRA Section 2.3.3.16 states:

> The auxiliary building crescent area sumps have the ability to pump to the suppression pool via the HPCS minimum flow line using the associated sump pumps, referred to as suppression pool pumpback. After a LOCA with subsequent passive failure of an ECCS pump or valve seal, water inventory collected by sumps can be directed back to the suppression pool. A normally closed isolation valve aligns the discharge of these sump pumps to the suppression pool, thus helping to maintain suppression pool inventory for use following a LOCA.

This function is cited in USAR Section 9.3.7. In addition, USAR Section 9.2.6.3 credits the function of the sump pumps to remove water accumulating as a result of a crack in the RCIC suction line, "[t]he crack in the RCIC suction piping does not result in flooding since the sump pump capacities are greater than the calculated leakage flow rate of 82 gpm."
LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," added a new term, "flow blockage," defined as:

> Flow blockage is the reduction of flow or pressure, or both, in a component due to fouling, which can occur from an accumulation of debris such as particulate fouling (e.g., eroded coatings, corrosion products), biofouling, or macro fouling. Flow blockage can result in a reduction of heat transfer or the inability of a system to meet its intended safety function, or both. This definition is consistent with the definition of the term "pressure boundary" as found in SRP-LR Table 2.1-4(b), "Typical 'Passive' Component-Intended Functions.

In addition, the term "fouling" was revised in LR-ISG-2012-02 to state in part, "[f]ouling can result in a reduction of heat transfer, flow or pressure, or a loss of material."

SRP-LR, Section A.1.2.1, Applicable Aging Effects states, in part, that the effects of aging on the intended functions of components should be considered. In the case of components with an intended function of "filtration," flow blockage due to fouling would appear to be an applicable aging effect to be considered.

Issue
LRA Table 3.3.2-16, "Plant Drains," cites a strainer with a filtration function. There is no entry citing flow blockage due to fouling as an aging effect requiring management (AERM).

As evidenced in USAR Sections 9.3.7 and 9.2.6.3, the current licensing basis for the above sump pumps, the pressure boundary function of the pumps and piping downstream of the suction

strainers could be challenged due to accumulated debris on the strainer. The staff lacks sufficient information to conclude that the pressure boundary function of downstream components would be met if flow blockage due to fouling is not managed.

Request

For strainers associated with the sump pumps located in the crescent areas and RCIC pump room, state the basis for why flow blockage due to fouling will not be managed as an AERM. Alternatively, revise LRA Table 3.3.2-16 to cite the AMP(s) that will be used to manage this AERM, and revise the applicable AMP(s) to address this AERM.

Response

Flow blockage as discussed in LR-ISG-2012-02 is applicable to the internal surfaces of piping and piping components, such as nozzles, that are not designed to collect particulates, such as degraded coatings, corrosion products, and biological fouling. Unlike such piping and piping components, strainers and filters are designed to collect debris from a fluid and allow its removal to prevent damage and maintain function of downstream components such as pump impellers and heat exchangers. Therefore, debris collection, whether from aging effects or other causes, is anticipated to occur and provisions are incorporated into the system design and operation as necessary, to manage the collection of debris on the strainer or filter such that the active function of providing system flow can continue to be accomplished. Though strainers and filters are passive components, they also protect the active function of providing flow. They have minimal, if any, impact on the pressure boundary function because the pressure boundary is maintained even if the strainers become fouled. Strainers and filters are designed such that fouling is detected through various means, such as, monitoring differential pressure across the component or monitoring system flow during testing or normal operation. They can then be cleaned to maintain the active function of providing flow. Fouling of strainers or filters is not an aging effect, but is an effect of system operation that is managed, both during the original license term and during the period of extended operation, through operational features and monitoring activities.

The strainers associated with the sump pumps in the crescent areas and RCIC pump room are flat slotted plates bolted to the bases of the pumps to protect the impellers from large debris. Only debris larger than the 0.28 inch wide slots would be trapped by the strainer. Debris from aging effects would normally consist of smaller particles such as corrosion products that would easily pass through the strainers of the sump pumps. The liquid that flows in to these sumps comes from various locations in the plant and is collected in the closed sump which has a fiberglass liner and no coating. . As a result, it is highly unlikely that any large debris > ¼ inch would be collected in the sumps that could affect pump performance. More importantly, and consistent with the discussion in the first paragraph above, periodic testing in accordance with Technical Surveillance Requirement 3.5.4.1 provides assurance that flow blockage due to fouling of sump pumps will not preclude the pumps from continuing to fulfill their active function of providing adequate flow.

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Enclosure 2

Responses to Request for Additional Information

Set 2

Commitment

This table identifies actions discussed in this letter for which Entergy commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are **not** commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
RAI B.11-2 Further review of lined components not otherwise within the scope of license renewal is necessary to determine whether internal lining failure debris could be transported into and adversely affect safety-related systems or components. LRA changes, if any, resulting from review of this condition will be provided.	X		March 1, 2018