TOPICS FOR THE APRIL 10, 2018 PUBLIC CALL WITH THE ENTERGY RIVER BEND STATION, UNIT 1

1. **Fuel Oil Chemistry** Supplement (received from RBS on March 27, 2018) - The supplemental response dated March 27th, 2018 does not provide a technical justification, why using ASTM 1796-97 in lieu of ASTM D2709. If the applicant states they are consistent with the GALL, but using a different testing method than what is recommended by the GALL REPORT is an EXCEPTION. A technical justification for the exception must be submitted so that the staff can evaluate this exception. Staff understands that the applicant has been using a method for many years however this is not a technical justification for the deviation from the GALL Report.

2. **External Surfaces Monitoring (TRP 037)** –

   RAI B.1.17-1a

   Background:
   NRC Standard Review Plan for License Renewal Applications (SRP-LR), Sections 3.2.2.2.3.2, 3.2.2.2.6, 3.3.2.2.3, 3.3.2.2.5, 3.4.2.2.2, and 3.4.2.2.3 discuss the possibility of aging effects extending to stainless steel components exposed to air "which has recently been introduced into buildings (i.e., components near intake vents)." The corresponding LRA Sections state that there are no indoor stainless steel components located near unducted air intakes in engineered safety features, auxiliary, or steam and power conversion systems. However, the RAI response for Request 1 states that external surfaces of stainless steel components within the diesel generator building (which include auxiliary system components), are exposed to air recently introduced into the building.

   In lieu of providing the requested information that establishes there are no indoor stainless steel components located near air intakes, River Bend provided alternative operating experience information. The March 8, 2018, response states that cracking due to contaminants in outdoor air has not been observed in the associated components after being in service for over 30 years. Also, although most of the criteria cited in the SRP-LR do not apply to River Bend Station, the response states that sufficient data is not available to determine if cracking will not occur during the period of extended operation.

   Consequently, the response states that a surface examination will be performed in accordance with the One-Time Inspection program on stainless steel components exposed to outdoor air to verify cracking is not occurring. The response also states that the inspections will verify that cracking is either not occurring or is occurring so slowly that the aging effect will not affect the component intended function during the period of extended operation. In addition, the response revises LRA Sections 3.3.2.2.3 and 3.4.2.2.2 to reflect the above information.

The 'Issue' section of RAI B.1.17-1 notes that some materials exposed to air-indoor will have no aging effects requiring management whereas these materials will have aging effects requiring management (e.g., loss of material for aluminum) for exposure to air which has recently been introduced into buildings

Issue:

(1) The staff notes that the approach of using plant-specific operating experience and a one-time inspection to manage cracking of stainless steel components exposed to air is established in NUREG-2192, "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants." However, the staff noted the following during its review of the RAI response:

   a. Cracking of stainless steel was not addressed in engineered safety features (i.e., SRP-LR Section 3.2.2.2.6).

   b. Loss of material due to pitting and crevice corrosion in stainless steel components was not addressed in engineered safety features, auxiliary, or steam and power conversion systems (i.e., SRP-LR Sections 3.2.2.2.3.2, 3.3.2.2.5, and 3.4.2.2.3).

   c. LRA Tables were not revised to cite the One-Time Inspection program for stainless steel components exposed to indoor air.

   d. The revised LRA Section 3.4.2.2.2 deleted the statement "[t]here are no stainless steel steam and power conversion system components in the scope of license renewal that are located indoors near unducted air intakes." However, the revised LRA Section 3.3.2.2.3 did not delete this statement for stainless steel auxiliary system components. It is unclear to the staff why this statement was deleted from LRA Section 3.4.2.2.2, while remaining in LRA Section 3.3.2.2.3.

   e. The RAI response states that the One-Time Inspection Program verifies cracking is not occurring **or is occurring so slowly that the aging effect will not affect the component intended function during the period of extended operation** [emphasis added by staff]. However, the use of one-time inspections to address this issue, as established in NUREG-2192, only states that the one-time inspection demonstrates that cracking is not occurring.

(2) It is unclear to the staff why the external surfaces of components (other than stainless steel components which are being addressed in part 1 of the 'Issue' section above) within the diesel generator building are not being managed for aging effects associated with "air-outdoor." Other than being protected from exposure to weather, components in the diesel generator building appear to be exposed to an environment where condensation can occur frequently, consistent with the GALL Report definition of "air-outdoor".

Request:

1. Provide additional information to address the staff's concerns described in part 1 of the 'Issue' section above to establish that stainless steel components exposed to indoor air can be effectively managed for cracking using a one-time inspection of stainless steel components exposed to outdoor air.

2. State the basis for why the external surfaces of components (other than stainless steel components which are being addressed in part 1 of the 'Request' section above) within the diesel generator building are not being managed for aging effects associated with "air-outdoor."

3. **Internal Surfaces (TRP 039)** –
RAI B.1.25-1a
Background:
By letter dated March 8, 2018, the response to RAI B.1.17-2 deleted the aging management review (AMR) item from LRA Table 3.3.2-12, "Control Building HVAC System," associated with stainless steel manifolds exposed to air-outdoor, being managed for cracking using the Internal Surfaces in Miscellaneous Piping and Ducting Components program. By letter dated March 26, 2018, the response to RAI B.1.25-1 apparently reinstated and revised this AMR item to cite the Periodic Surveillance and Preventive Maintenance program instead of the Internal Surfaces in Miscellaneous Piping and Ducting Components program. However, the change indications did not show that this item was being added.
Issue:
It is unclear to the staff whether the subject AMR item was revised in the March 26, 2018, letter given that it was deleted in the March 8, 2018, letter.
Request:
State the basis for how the subject AMR item was revised in the March 26, 2018, letter given that it was deleted in the March 8, 2018, letter.

4. **Flow-Accelerated Corrosion (TRP 018)** –

RAI B.1.21-1a Follow-up
Background. The RAI response dated March 8, 2018, clarified that the Flow-Accelerated Corrosion program will use Revision 4 of NSAC-202L, "Recommendations for an Effective Flow-Accelerated Corrosion Program." As a result, River Bend modified license renewal application (LRA) Section B.1.21 to take an exception for the program, because GALL Report Revision 2, Section XI.M17, "Flow-Accelerated Corrosion," only discusses NSAC-202L Revision 3 for the associated aging management program. However, as noted in the initial RAI, the associated implementing procedures, SEP-FAC-RBS-001 and EN-DC-315, cite NSAC-202L, Revision 3.

Issue. By modifying the LRA to take an exception to the GALL Report, the applicant addressed the inconsistency between the program basis documentation (report RPS-EP-15-00007, Revision 0, Section 4.8, Flow-Accelerated Corrosion,") and LRA Section B.1.21. However, as noted above, the current implementing procedures for the program have inconsistencies with these documents.

Request. Provide information regarding how the inconsistency will be resolved between LRA Section B.1.21, the associated program basis documentation in report RPB-EP-15-00007, and the current implementing procedures SEP-FAC-RBS-001 and EN-DC-315.

RAI B.1.21-2a Follow-up
Background. The RAI response dated March 8, 2018, confirmed that CHECWORKS and FAC Manager are classified as Level C software and do not require validation or verification. For safety-related components, the response states:

Evaluation of wear rates, predicted thickness, and remaining service life is documented and reviewed by qualified FAC personnel or designated personnel qualified in accordance with the engineering calculation process. Therefore, appropriate quality assurance is applied to the calculated wear rates used in the determination of the schedule for inspection of safety-related components.

Issue. It is not clear how some of the wear values were calculated on the FAC Manager results sheets and what reviews are conducted by the FAC personnel to ensure that wear values were appropriately calculated. As an example, for component 174-FWS010037L1 from document EC0000058296, Rev 0, "RBS RF 18 Flow Accelerated Corrosion Program Outage Report," 06/19/2015, which was provided during the aging management program audit.

Tnom – Tmeas = Wear?

0.85 – 0.489 = 0.361 (same as calculated wear value…OK)

0.85 – 0.577 = 0.273 (calculated wear value is 0.253…how calculated?)

0.85 – 0.468 = 0.382 (calculated wear value is 0.371…how calculated?)

Request. Since software does not require validation or verification, provide information to show that appropriate quality assurance is being applied to the wear values calculated by the FAC Manager software through the reviews by FAC personnel to ensure that wear values are being appropriately calculated.

5. **Open Cycle Cooling Water System (TRP 021) –**

RAI B.1.40-2a Follow-Up

Background. The RAI response dated March 8, 2018, discussed the configurational change of the service water system in the early 1990s from an open-loop system using raw water to a closed-loop system using demineralized water with chemistry controls, which include corrosion inhibitors. This change included a service water surge tank with a nitrogen overpressure to prevent oxygen ingress. The response states that the rust in the strainer debris may have been formed during operation prior to the system configuration modification, and that debris buildup is gradual enough such that strainer cleaning can be scheduled based on differential pressures. The response concludes that the cited operating experience does not represent a concern with water chemistry control that warranted periodic flushing of infrequently used cooling loops.

The staff notes that, as documented in the Operating Experience Audit Report (ML17347A383), in addition to strainer plugging issues discussed in the initial RAI there have been multiple condition reports documenting drain valve plugging and pipe clogging in the system. Based on discussions with the NRC inspectors conducting the IP-71002 License Renewal Inspection, the staff notes that the closed-loop service water system is operated as an open-loop system during each outage as part of routine surveillance activities. These surveillance activities result in raw water from the standby service water basin being used, along with some volume of air being injected or drawn

into the service water system through several vacuum breaker features (see discussion for RAI B.1.43-2). In addition, the surveillance activities cause corrosion products that have been generated in several air-to-water interface locations (see discussion for RAI B.1.40-4) to be introduced.

Issue. Although the normal closed-loop service water system is in service during plant operation, routinely scheduled surveillances result in the system being operated as an open-loop system. This results in chemistry excursions and potential corrosion product introduction that are not typical for a close-loop system. The GALL Report states that if one of its aging management programs (AMPs) is credited, then the conditions and operating experience at the plant are to be bounded by the conditions and operating experience for which the GALL Report was evaluated. The GALL Report continues "[i]f these bounding conditions are not met, it is incumbent on the applicant to address the additional effects of aging and augment the GALL Report AMPs as appropriate." Based on its review, it is not clear to the staff that River Bend's operating experience and operating conditions are bounded by those for which the GALL Report AMP XI.M21A, "Closed Treated Water Systems," program were evaluated.

Request. Provide information to establish that the conditions and operating experience at the plant are bounded by those for which the GALL Report program was evaluated. Specifically, show that regularly operating the system with raw water where corrosion products from corrosion at air-to-water interfaces is introduced is bounded by the conditions evaluated by GALL Report AMP XI.M21A.

RAI B.1.40-5a Follow-Up

Background. The staff's initial RAI stated that during the aging management program audit, River Bend personnel indicated that the circulating water cooling tower fill material is similar to the standby cooling tower fill material in LRA Table 3.5.2-2. The RAI response dated March 8, 2018, did not provide any information related to the potentially applicable aging effects demonstrated by CR-RBS-2008-05043 other than to state that the CR is associated with the circulating water cooling towers, which are not subject to aging management review.

In addition, the RAI response stated that the failure of the service water cooling (SWC) cooling towers was not from the effects of aging, but was a less than adequate design of the associated fill support structure. Nevertheless, River Bend revised the aging management review (AMR) items of both the ceramic and clay tile fill in the standby service water and the polyvinyl chloride fill in the SWC cooling towers. The aging effect requiring management was changed from "None" to "Fouling" and indicated that the Structures Monitoring program will manage this new aging effect.

Issue. Although the fill material degradation occurred in the cooling tower that is not within the scope of license renewal (circulating water system), it is the staff's understanding that similar fill material is used in the cooling tower within the scope of license renewal (standby cooling water system). However, the RAI response did not provide any bases to establish that the age-related degradation identified in the

circulating water cooling tower fill does not need to be considered for the similar fill material in the standby service water cooling tower.

With regard to the fill material fouling, it is not clear that the increase in weight has been adequately considered. The plant-specific operating experience demonstrates the need to ensure that the increase in weight due to fouling of the fill material is within the design capacity of the fill support structure. Although the RAI response modified the AMR items to manage fouling, based on the accessibility limitations, it is not clear how the visual inspections being conducted by the Structures Monitoring program will adequately manage the ongoing fouling of the fill material. The GALL Report states that if one of its AMPs is credited, then the conditions and operating experience at the plant are to be bounded by the conditions and operating experience for which the GALL Report was evaluated. The GALL Report continues "[i]f these bounding conditions are not met, it is incumbent on the applicant to address the additional effects of aging and augment the GALL Report AMPs as appropriate." Based on its review, it is not clear to the staff that River Bend's operating experience and operating conditions are bounded by those for which the GALL Report AMP XI.S7 "Structures Monitoring," program were evaluated.

Request.
1) Provide information to establish that the aging effects identified for the fill material in the circulating water cooling tower fill are not applicable to the fill material in the standby service water cooling tower.
2) Clarify how the visual inspections conducted by the Structures Monitoring program will adequately manage the increase in weight due to fouling of the cooling tower fill material. Include information to establish that the related conditions and operating experience at the plant are bounded by the conditions and operating experience for which the Structures Monitoring program were evaluated.

6. **Closed Treated Water System (TRP 022) –**
Background. The RAI response dated March 8, 2018, added aging management review items for the operational configuration associated with solenoid operated valves (SOVs) 522A, B, C, and D in the containment building. The associated carbon steel components exposed to condensation are being managed for loss of material by the Compressed Air Monitoring program. However, for operational configuration associated with SOVs 523A, B, C, and D, in the auxiliary building, the internal environment will be indoor air, or conservatively condensation, but it is not supplied by the compressed air system.

Issue. For the internal portion of the vacuum breaker piping in the auxiliary building, there are no piping AMR items in LRA Table 3.3.2-3 citing an internal environment of indoor air. Also all AMR items citing condensation for carbon steel piping or valves use the Compressed Air Monitoring program to manage the effects of aging. The staff notes that carbon steel components internally exposed to indoor air in other systems are being managed for loss of material and it is unclear which AMR item addresses the piping associated with the internal air environment for SOVs 523A, B, C, and D.

Request. Clarify which AMR item addresses the aging effects associated with the piping and valve bodies internally exposed to air for SOVs 523A, B, C, and D, or explain how the Compressed Air Monitoring program will adequately manage the associated aging effects for these components.