PIC000003

# Safety Evaluation Report

## Related to the License Renewal of Prairie Island Nuclear Generating Plant Units 1 and 2

Docket Nos. 50-282 and 50-306

Northern States Power Company, a Minnesota Corporation (NSPM)

**United States Nuclear Regulatory Commission**

Office of Nuclear Reactor Regulation

**October 2009**

Based on this review, the staff determines that UFSAR supplement Section A2.37 provides an acceptable UFSAR supplement summary description of the applicant's Steam Generator Tube Integrity Program because it is consistent with those UFSAR supplement summary description in the SRP-LR for Steam Generator Tube Integrity Program. The staff determines that the information in the UFSAR supplement is an adequate summary description of the program as required by 10 CFR54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Steam Generator Tube Integrity Program, the staff determines that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exception and determines that the AMP, with the exception, is adequate to manage the aging effects for which the LRA credits it. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.17 Structures Monitoring

Summary of Technical Information in the Application. LRA Section B2.1.38 describes the existing Structures Monitoring Program as consistent, with enhancements, with the GALL AMP XI.S6, "Structures Monitoring Program." In the LRA, the applicant stated that the program will manage aging effects such that loss of material, cracking, and increase in porosity and permeability, among others are detected by visual inspection prior to the loss of the structure's or component's intended function(s). The applicant also stated that the program incorporates inspection guidance based on recommendations contained in ACI 349.3R, "Evaluation of Existing Nuclear Safety-Related Concrete Structures."

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancements in Commitment No. 30 to determine whether the AMP, with the enhancements, is adequate to manage the aging effects for which it is credited in the LRA.

During its audit, the staff audited the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL Report. The staff interviewed the applicant's technical staff and reviewed the documents related to the Structures Monitoring Program, including the license renewal program evaluation report in which the applicant assessed whether the program elements are consistent with the GALL AMP XI.S6.

Enhancement 1. LRA Section B2.1.38 states an enhancement to the "scope of program" program element in that the Structures Monitoring Program will be enhanced to include additional structures, components, and component supports for inspections requiring aging management.

The staff reviewed the applicant's Structures Monitoring Program, and its AERMs under the scope of the Structures Monitoring Program. The staff noted that the Structures Monitoring Program satisfies the monitoring requirements for plant structures that are within the scope of

the NRC Maintenance Rule, 10 CFR 50.65. PINGP structures, components, and component supports to be included within the enhanced scope of the Structures Monitoring Program include the following:

- Approach Canal;
- Fuel Oil Transfer House;
- Old Administration Building and Administration Building Addition;
- Component supports for cable tray, conduit, cable, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping, mirror insulation, non-ASME valves, cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, diesel equipment, housings for HVAC fans, louvers, and dampers, HVAC ducts, vibration isolation elements for diesel equipment, and miscellaneous electrical and mechanical equipment items;
- Miscellaneous electrical equipment and instrumentation enclosures including cable tray, conduit, wireway, tube tray, cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and metal bus enclosure assemblies;
- Miscellaneous mechanical equipment enclosures including housings for HVAC fans, louvers and dampers;
- SBO Yard Structures and components including SBO cable vault and bus duct enclosures;
- Fire Protection System hydrant houses;
- Caulking, sealant, and elastomer materials; and
- Nonsafety-related masonry walls that support equipment relied upon to perform a function that demonstrates compliance with a regulated event(s)

The staff found this enhancement acceptable because when the enhancement is implemented, PINGP AMP B2.1.38, “Structures Monitoring Program,” will be consistent with the GALL AMP XI.S6 and provide additional assurance that the effects of aging will be adequately managed.

Enhancement 2. LRA Section B2.1.38 states an enhancement to the “parameters monitored or inspected” program element to include additional inspection parameters.

The staff reviewed the applicant’s License Renewal AMP Basis Document - Structures Monitoring Program (LR-AMP-428) Revision 2, dated August 15, 2008 Table 8.1 “Managed Aging Effects” against the “parameters monitored or inspected” program element criterion in SRP-LR Section A.1.2.3.3 which essentially states that the parameters to be monitored or inspected should be identified and linked to the degradation of the particular structure and component intended function(s). The staff found that the program identifies 60 items as listed in Table 8.1 “Managed Aging Effects” to be monitored or inspected and linked them to the degradation of the particular SCs intended functions.

The staff found this enhancement acceptable because when the enhancement is implemented, PINGP AMP B2.1.38, “Structures Monitoring Program,” will be consistent with the GALL AMP XI.S6 and provide additional assurance that the effects of aging will be adequately managed.

Enhancement 3. LRA Section B2.1.38 states an enhancement to the “detection of aging effects” program element of the Structures Monitoring Program in that the procedure will be enhanced to require an inspection frequency of once every five (5) years for the inspection of structures, supports, and structural components within the scope of this program. The applicant also stated that the frequency of inspections can be adjusted, if necessary, to allow for early detection and timely correction of negative trends. The applicant further stated that the program will be enhanced to require periodic sampling of groundwater and river water chemistries to ensure they remain non-aggressive during the period of extended operation.

The staff reviewed the applicant’s License Renewal AMP Basis Document - Structures Monitoring Program and found the visual inspection frequency, the periodic sampling of groundwater, and river water chemistries will be once in every five years during the period of extended operation. However, it was not clear to the staff where the groundwater test samples were/are taken related to the safety-related and important-to-safety embedded concrete foundations; and the technical basis for concluding that periodic sampling will ensure that safety-related and important-to-safety embedded concrete foundations will not be exposed to aggressive groundwater. Therefore, the staff issued RAI B2.1.38-1, dated November 5, 2008. In the letter dated December 5, 2008, the applicant responded that the water samples are taken from the plant’s two deep wells and from the Mississippi River adjacent to the Intake Screenhouse. The deep wells are located approximately 295 yards and 350 yards west of the safety-related and important-to-safety concrete foundations. The river water sampling location is the Mississippi River just east of the Intake Screenhouse, approximately 210 yards from the safety-related and important-to-safety concrete foundations. The applicant also stated that the test results from well and river water sampling points have continuously shown that pH, chlorides, and sulfates concentrations are within the threshold of the GALL Report (pH > 5.5, chlorides < 500ppm, and sulfates < 1500ppm). Test results include a preconstruction report in 1965 and reports spanning a 22-year period (from 1984 to 2006) which indicate that the maximum sulfates and chlorides levels recorded are 119 ppm and 89.4 ppm respectively, and pH obtained over the same time period ranges from 7.6 to 8.5. Therefore, the applicant concluded that groundwater is not aggressive. The staff finds the location of the wells appropriate, and this enhancement is acceptable because when the enhancement is implemented, PINGP AMP B2.1.38, “Structures Monitoring Program,” will be consistent with GALL AMP XI.S6 and provide additional assurance that the effects of aging will be adequately managed.

Operating Experience. The staff also reviewed the OE described in LRA Section B2.1.38 and the applicant’s Operation Experience Review Report, and interviewed the applicant’s technical staff to confirm that the plant-specific OE has been reviewed by the applicant and is evaluated in the GALL Report. During its audit, the staff conducted a field walkdown with the applicant’s technical staff to the fuel oil transfer house, screenhouse, turbine building, intake canal, approach canal, diesel generator building, administration building addition, SBO structures, and the yard. In general, the staff noticed some degradation. However, all of the observations are minor and acceptable per the applicant’s inspection procedures and within the guidance of the ACI 201.1R (Guide for Making a Condition Survey of Concrete in Service) and ACI 349-3R

(Evaluation of Existing Nuclear Safety-Related Concrete Structures) as recommended in the GALL Report).

During its audit and review, the staff noticed that PINGP has identified the leakage of borated water (CAP 01064513) from the Unit 1 and Unit 2 refueling cavities and through the concrete backing the liners since 1998. Leakage was fairly consistent throughout the duration of the flooding of the refueling cavity pool (average 1 gallon per hour). However, the leakage path has not been specifically identified. Therefore, the staff requested the applicant to provide the results of any root cause analyses, as well as corrective and preventive actions taken to address or correct this issue in RAI B2.1.38-2, dated November 5, 2008. In a letter dated December 5, 2008, the applicant stated that the condition was detected by the ASME Section XI, Subsection IWE Program while examining the Class MC pressure retaining vessel. Both programs took corrective action to address the leakage. The staff reviewed the applicant's responses to the RAI B2.1.38-2. The staff found that:

- The leakage inside containment was first documented in 1998 during the Unit 2 refueling outage with water observed entering sump B from cracks in the grout around the RHR suction penetration sleeves at elevation 694 feet10 inches. This area is grouted from the floor of the sump to the ceiling of the sump back to the containment vessel wall.
- The chemical analysis of the fluid determined it to be similar to refueling water with a boron concentration of 2700 ppm, chloride concentration of 7 ppm, sulfate concentration of 0.2 ppm, and pH of 7.8. The boron content of the refueling pool water was measured at 2700 ppm with a pH of 5.2. (The increase in pH from the refueling cavity water to that found at the leaks was attributed to the acidity being neutralized by the carbonates and other minerals in the concrete.)
- The grout at sump B was removed to inspect the containment vessel wall revealing no degradation of the containment vessel.
- Other potential sources of leakage such as the Reactor Coolant (RC), Safety Injection (SI), and Residual Heat Removal (RH) systems were investigated and no other feasible source of leakage was identified.
- During the Unit 2 outage in 2008, the plant performed over 150 ultrasonic (UT) thickness readings of the containment vessel from its exterior surface in the vicinity of the fuel transfer tube and at the sump B location. All readings were found to exceed the nominal vessel plate thicknesses of 1 ½ inches and 3 ½ inches.

The staff also found that the diagram on page four of Enclosure 3 to the letter dated December 5, 2008, indicates that the potential leakage path follows the bottom of the containment liner. It appears to the staff that water could accumulate at the bottom of the liner and the area could remain wetted after refueling outages. Therefore, the staff did not agree with the applicant's conclusion that the steel liner was not constantly wetted for long periods of time by the boric acid solution to cause any deterioration of the steel surface. The staff requested the applicant to explain in greater detail the increase in pH from the borated refueling water (pH 5.2) to the leakage found in sump B (pH 7.8), the chemical properties of the "white deposit" found on the concrete surfaces and the possibility of calcium hydroxide $Ca(OH)_2$ leaching from the concrete, and why this leakage was omitted from the IWE Operating Experience discussion in the LRA.

The staff also requested an explanation of whether or not the liner and concrete remain wetted after refueling outages, and if so how this will be managed by the AMP in the period of extended operation.

The applicant provided information related to this issue during a public meeting on March 2, 2009. The applicant explained that a root cause evaluation determined that the leakage occurs at the reactor internals stand and the change fixture anchors, and that the applicant planned to permanently fix the leakage for both units during the upcoming outages (1R26 and 2R26). The applicant also explained that neither the containment vessel, nor the reinforcement should have experienced any significant corrosion. This conclusion was based, in part, on the assumed "buffering" effect of the concrete on the leakage, which would raise the pH of the leakage to a level that inhibits corrosion (i.e. greater than 12). The applicant also explained that the lack of evidence of washout or significant leaching of material from the concrete supported a conclusion that the leakage had not degraded the strength of the concrete.

The staff reviewed the information provided in the RAI response and during the public meeting and by letter dated March 31, 2009, the staff issued follow-up RAI B2.1.38 asking the applicant to discuss its plan for assessing the current condition of the steel containment vessel and to explain how the IWE program, or a plant specific program, will manage aging of the containment vessel. By letter dated April 6, 2009, the applicant responded to follow-up RAI B2.1.38. In the response, the applicant reiterated their proposed actions for permanently fixing the leakage during the upcoming outages (1R26 and 2R26) and for ensuring the adequacy of the containment vessel. The response included two new commitments. The applicant committed to remove concrete from a low point in containment (Sump C) to UT and visually inspect the containment vessel bottom head and to assess the condition of the concrete and rebar. This would be done during the first refueling outage following the repairs. The applicant also committed to perform visual inspections of the areas where refueling cavity leakage has been observed. The inspections would be conducted during the two consecutive refueling outages after the repairs were implemented (Commitments 41 & 42). Any degradation or continued leakage would be entered into the Corrective Action Program and evaluated for impact on structural integrity. The response also explained that a task had been entered into the site Corrective Action Program to collect and analyze deposits in areas showing signs of leakage.

While reviewing the April 6, 2009 response, the staff also conducted an audit on May 28, 2009, to review related on-site documentation. In response to the information reviewed while on-site, as well as the information provided in the April 6, 2009, response, the staff issued an additional follow-up RAI B2.1.38, by letter dated June 10, 2009. The additional RAI included nine parts and focused on clarifying information provided during the audit, including estimated upper bound corrosion projections and corrosion rates and the possible structural impacts of the projections. The staff also requested additional information on how the applicant concluded that the water between the containment vessel and the concrete would have a high pH value (greater than 12.5).

By letter dated June 24, 2009, the applicant responded to the follow-up RAI. The response explained the applicant's estimates and assumptions, but did not clearly explain how the applicant would meet the design basis if the estimates were correct, or how the applicant was going to ensure that the estimated upper bound level of degradation had not occurred at the plant. To clarify these issues a conference call was held with the applicant on July 22, 2009. As

a result of the conference call, the applicant submitted a supplemental response by letter dated August 7, 2009. The following discussion summarizes the supplemental response and then addresses each of the nine points in the RAI dated June 10, 2009, including a summary of the staff's request, the applicant's response and the staff's basis for finding the response acceptable. The discussion of the nine points is followed by an explanation of the staff's assessment of issues regarding the reactor cavity leakage, and the basis for finding the Structures Monitoring Program and the ASME Section XI, Subsection IWE Program adequate to manage aging due to the refueling cavity leakage during the period of extended operation.

The response indicated that no containment wall thinning due to corrosion has been found at PINGP and recent UT measurements in known wetted areas have shown no corrosion. The response further stated that any future indications of degradation would be entered into the Corrective Action Program and evaluated in accordance with ASME Section XI, Subsection IWE. The response also included a new commitment and a revision to existing Commitment 41. Commitment 41 was revised to include petrographic examination of the concrete removed from Sump C, if the removal method provides pieces suitable for examination. Commitment 44 was added to include one concrete sample per Unit from a location known to have been wetted by borated water leakage. The samples will be taken during the first refueling outage following the repairs and will be tested for compression strength and subjected to petrographic examination. Any degradation identified from the samples will be entered into the Corrective Action Program. The applicant also stated that visual examination and vacuum box testing of the refueling cavity liner would be performed to look for any indications of grout washout behind the liner or weld failure in the liner seams. The inspections would occur during the repairs scheduled for the upcoming outages (1R26 and 2R26). The following discussion addresses each part of the June 10, 2009 RAI.

(A) The staff requested a schedule for performing a test to ensure that the water contacting the containment vessel would have a pH greater than 12.5. This test was recommended in a PINGP Report.

The applicant's response described a simple laboratory test which involved adding chemicals representative of those in concrete to an open beaker of deionized water and then measuring the resulting pH. The test had already been conducted and the results were provided in the response.

The staff reviewed the test procedure and the results and concluded that the test was oversimplified and did not accurately represent the conditions present in the field. Therefore, the staff does not agree that the applicant conclusively demonstrated that the water in contact with the containment vessel and the reinforcement would have a pH greater than 12.5. However, based on the commitments to inspect the concrete, reinforcement, and vessel, as well as the fact that current operating experience does not indicate significant concrete or vessel degradation, the staff concludes that a more detailed test or measurement is unnecessary. The inspections will indicate the condition of the containment structures, regardless of the pH value of the leakage.

(B) The staff requested an explanation of why Sump C was the only location planned for concrete removal, when a PINGP report recommend removal at Sump C and at elevation 695' near the transfer tube.

The applicant's response explained that they did not plan to remove concrete from the 695' elevation because it is not known whether or not that area is wetted by the leakage. Instead the applicant explained that they had previously removed grout along the vessel in the RHR suction sump (Sump B). This location is at a lower elevation and consistently shows wetting when refueling cavity leakage occurs. Visual and UT inspections of the vessel at Sump B showed no signs of degradation.

The staff reviewed the response and found that removal of concrete at the 695' elevation was unnecessary. Since there is no guarantee that leaking water is contacting the vessel at the 695' elevation, the location has a low potential for corrosion. Sumps B and C are more likely to experience corrosion due to the possibility of trapped water at Sump C, and repeated wetting and relatively close ambient oxygen at Sump B. Therefore, these locations are better candidates for vessel inspections and concrete does not need to be removed at the 695' elevation.

(C) The staff requested an explanation of the upper bound containment loss estimate of 0.25" over a 36 year period and how this loss would impact the stresses in the vessel.

The applicant's response explained that the predicted 0.25" value assumes continuous wetting with aerated, concentrated boric acid over a 36 year period. However, it did not clearly explain how this estimate is related to the actual degradation, or how the design basis was being met if some or all of the estimated degradation had occurred. To address this, the applicant supplemented their response. The supplement explained that the 0.25" was a theoretical upper bound estimate that was not based on observed degradation at PINGP. The response further explained that currently there is no known containment wall thinning at PINGP. The applicant explained that if thinning is identified in the future, the issue will be entered into the Corrective Action Program and any required ASME Section XI, Subsection IWE actions would be performed and if necessary the resulting containment stresses would be analyzed.

The staff reviewed the response and concludes that the applicant has adequately addressed the corrosion estimate and the possible impacts on the containment. The absence of degradation at PINGP indicates that the 0.25" estimate is not representative of what is actually occurring in the field. In addition, the inspections committed to by the applicant provide assurance that degradation has either not occurred, or will be detected and addressed prior to the period of extended operation. Any degradation discovered in the future will be reviewed per the requirements of ASME Section XI, Subsection IWE, and the structural impact on the containment vessel will be evaluated.

(D) To account for concrete aggregate differences, the applicant assumed a concrete degradation rate twice that was used previously for Salem and Connecticut Yankee plants. The staff asked the applicant to explain whether or not any tests had been performed to confirm the assumption.

The applicant's response explained that degradation in the concrete when exposed to boric acid is directly related to the amount of cement and soluble aggregate present in the concrete. The concrete at both the Salem and Connecticut Yankee plants did not

contain soluble aggregates. The response further explained that PINGP concrete has about five percent soluble aggregate. Concrete normally contains 10 to 15 % cement for an average value of 12.5 % cement. Adding the five percent soluble aggregate at PINGP to the 12.5 % cement value generally present in concrete, including at Salem and Connecticut Yankee, results in an increase of soluble material from a base value of 12.5 to PINGP specific value of 17.5 %. The response explained that published data indicates that an increase in soluble material from 12.5 to 17.5 % correlates to a weight loss increase of a factor of 1.49. Therefore, the applicant concluded that a degradation rate of twice that used for Salem and Connecticut Yankee was appropriate.

The staff reviewed the applicant's response and concludes that the applicant's approach for determining the degradation rate appears credible. However, regardless of the degradation rate, the applicant has committed to take concrete samples to inspect for signs of degradation (Commitment 44). Therefore, the staff agrees that additional tests to verify the concrete degradation rate are unnecessary.

(E) The staff requested the applicant to explain how the formation of cracks in concrete due to borated water leakage would affect the shear capacity of concrete slabs and walls.

The applicant's response explained that the shear strength of reinforced concrete depends on the strength provided by the concrete and the reinforcement. If a crack formed in the concrete along the shear plane, the reinforcement would have to carry the shear force. The applicant further stated that there is no indication that such a crack exists at PINGP. The observed leakage "seeps" from the cracks at an estimated rate of 1 – 2 gallons per hour and no evidence of significant washout has been identified. In the supplemental response, the applicant added a new commitment to test concrete samples from areas known to be wetted by refueling cavity leakage.

The staff reviewed the response and concludes that the applicant has adequately addressed the possibility of reduced concrete capacity. The applicant has not identified any large concrete cracks or observed any indications of large cracks, such as material washout. In addition, the testing of concrete core samples will provide assurance that any concrete degradation will be detected and addressed prior to the period of extended operation.

(F) The staff requested the applicant explain how the possibility of corrosion of concrete reinforcement would be considered in determining the structural integrity of concrete walls and slabs.

The applicant's response referenced tests performed for other plants and tests described in open literature which indicate that corrosion of reinforcement has been negligible, even when the borated water reaching the reinforcement is regularly refreshed. The response further explained that the most relevant tests referenced by the applicant lasted two years and resulted in no significant reinforcement degradation. The applicant estimated the exposure time of the reinforcement at PINGP over the last 36 years to be approximately one year and therefore concluded that the corrosion and resulting effect on structural integrity would be insignificant. The applicant also committed to inspect all exposed reinforcement during concrete coring and the

excavation of Sump C, and enter any observed degradation into the Corrective Action Program.

The staff reviewed the response and disagrees with the applicant's estimate of reinforcement exposure time as one year. Reinforcement located near the bottom of the vessel may have been continuously exposed to borated water since refueling cavity leakage began. However, the reinforcement inspections committed to by the applicant will provide assurance that degradation has either not occurred, or will be detected and addressed prior to the period of extended operation. Therefore, the staff concludes that the applicant has adequately addressed the possibility of reinforcement corrosion.

(G) An applicant document estimated the upper bound loss of concrete depth behind the refueling cavity liner as 0.31 inches. The staff requested the applicant to address how this loss of concrete behind the liner would affect the load carrying capacity of the liner.

The applicant's response explained that the liner is effectively a membrane backed by concrete which is generally four to five feet thick. Therefore, the impact on the capacity would be negligible. The response further stated that large areas of washout are unlikely, but if they did occur behind the liner, the liner would not be expected to fail due to the ductile nature of stainless steel. In the supplemental response, the applicant stated that visual inspections and vacuum box testing of the liner plate seams will be performed in the refueling cavity to look for depressions in the liner and for signs of washout due to the cavity leakage. These inspections will be performed during the next refueling outage for both Units.

The staff reviewed the response and finds that any loss of load carrying capacity of the concrete would be negligible since the concrete sections are four to five feet thick. The staff does not agree that the possible deformation of the liner would not be an issue due to the ductility of stainless steel; however, the visual inspections of the liner plate and vacuum box testing of the liner plate seams will provide assurance that any deformation will be detected and addressed prior to the period of extended operation.

(H) The applicant committed to inspecting areas where reactor cavity leakage has been observed in the two refueling outages after implementing the proposed fix. The staff requested the applicant to explain which AMP would be used to address these inspections.

The applicant's response explained that the inspections are special inspections assigned within the Corrective Action Program, which will use the methodology, documentation and acceptance criteria of the Structures Monitoring Program. After the special inspections, general monitoring within containment will continue in accordance with the Structures Monitoring Program and the ASME Section XI, Subsection IWE Program.

The staff reviewed the response and finds it acceptable. The Structures Monitoring Program is the appropriate AMP for internal containment structures according to the GALL Report. Additionally, the GALL Report calls out the IWE AMP for inspections of the containment vessel and its integral attachments during the period of extended operation.

(I) The staff requested the applicant provide the action plan and schedule for completing the five repair recommendations identified in the refueling cavity root cause evaluation.

The applicant's response listed the five steps of the repair plan and explained that the intent of the plan is to permanently repair the refueling cavity leakage. The applicant further stated that the plan will be completed during the next refueling outage for each Unit. Step four of the repair plan was a recommendation to vacuum box or dye penetrant test the refueling cavity liner weld seams to ensure no leakage. The applicant performed testing of accessible seams in 1998 with no indications of cracking. The response explained that the exams during the next outage will confirm whether or not cracking of the welds has occurred since the last inspection. The supplemental response explained that approximately 100 linear feet of accessible floor and wall seams will be inspected, which will encompass the majority of the accessible floor seams of the lower refueling cavity near the reactor internals stands.

The staff reviewed the response and found it acceptable because it outlines a plan to stop the refueling cavity leakage, and verify the effectiveness of the repair, prior to the period of extended operation.

As discussed above, the staff reviewed the additional information provided in the letters dated June 24 and August 7, 2009. The staff had three issuesrelated to the refueling cavity leakage: (1) the leaking borated water may contact the containment vessel and remain in contact with the vessel between outages, (2) the leaking borated water may contact the concrete reinforcement and cause degradation, and (3) the leaking borated water may react with the concrete and cause degradation.

In response to the staff's first issue of vessel degradation, the applicant has committed to removing concrete from Sump C and inspecting the containment vessel (Commitment 41). Sump C is a low point in containment which is likely to remain continuously wetted. This inspection will provide assurance that either the vessel has not experienced significant degradation, or any existing degradation will be documented and reviewed for structural impacts prior to the period of extended operation. The fact that in 2008, 150 UT measurements were taken of the containment vessel in the area of the expected leak path and grout was removed from Sump B to inspect the containment vessel, and neither inspection revealed signs of degradation, provides assurance that the implementation schedule of the containment vessel inspection commitments is adequate.

In response to the staff's second issue, the possibility of concrete reinforcement degradation, the applicant has committed to inspect the exposed reinforcement during the excavation of Sump C. Any degradation will be entered into the Corrective Action Program and reviewed for its structural impact.

In response to the staff's third issue, the possibility of concrete degradation, the applicant has committed to obtain concrete samples from locations known to have been wetted by borated water and to test them for compressive strength and perform a petrographic examination (Commitment 44). The applicant has also committed to performing petrographic examinations on any sample pieces removed from Sump C which are suitable for examination (Commitment

41). These tests will provide assurance that the borated water leakage has not caused significant degradation of the concrete. The petrographic examinations will also indicate the presence of any interaction between the borated water and the cementitious materials in the concrete that might lead to degradation. If any of the concrete tests or examinations indicates degradation, the results will be entered into the Corrective Action Program and reviewed for structural impacts prior to the period of extended operation. In addition, the observed white deposits, which could be signs of possible concrete interaction with the leakage, are minimal and only indicate a possibility of negligible concrete material loss. No indications of significant washout or dissolution of the concrete have been observed.

Based on the applicant's existing repair plan and commitments, the staff concludes there is reasonable assurance the Structures Monitoring Program and the ASME Section XI, Subsection IWE Program will adequately manage the aging effects of the interior containment structures and the containment vessel during the period of extended operation.

On the basis of its review, including the information provided during the public meeting and RAI responses, as well as the new commitments, the staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable, and OI 3.0.3.2.17-1 is closed.

UFSAR Supplement. In LRA Section A2.38, the applicant provided the UFSAR supplement for the Structures Monitoring Program. The staff reviewed this section and determines that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Structures Monitoring Program, including review of the RAIs discussed above and the new Commitments 41, 42, and 44, the staff determines that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the enhancements and confirmed that their implementation through Commitment 30 prior to the period of extended operation would make the existing AMP consistent with the GALL AMP to which it was compared. Based on the resolution of OI 3.0.3.2.17-1, the staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.18 Water Chemistry Control Program

Summary of Technical Information in the Application. LRA Section B2.1.40 describes the existing Water Chemistry Program as consistent, with exceptions and enhancement, with the GALL AMP XI.M2, "Water Chemistry." The applicant stated that the Water Chemistry Program manages aging effects by controlling the internal environment of systems and components and that the Water Chemistry Program mitigates corrosion, SCC, and heat transfer degradation due to fouling in the primary, auxiliary (borated), and secondary water systems included within the scope of the program. The applicant further stated that the program manages aging effects by controlling concentrations of known detrimental chemical species below the levels known to

# APPENDIX A

# PINGP UNIT 1 AND UNIT 2 LICENSE RENEWAL COMMITMENTS

During the review of the Prairie Island Nuclear Generating Plant (PINGP) Unit 1 and Unit 2, license renewal application (LRA) by the staff of the United States (US) Nuclear Regulatory Commission (NRC) (the staff), the applicant made commitments related to aging management programs (AMPs) to manage aging effects for structures and components.

The following table lists these commitments along with the implementation schedules and sources for each commitment.

**Table 1.1 PINGP License Renewal Commitments**

| APPENDIX A: PINGP LICENSE RENEWAL COMMITMENTS | | | |
|---|---|---|---|
| **Commitment Number** | **Commitment** | **FSAR Supplement Section/ LRA Section** | **Enhancement or Implementation Schedule** |
| 1 | Each year, following the submittal of the PINGP License Renewal Application and at least three months before the scheduled completion of the NRC review, NMC will submit amendments to the PINGP application pursuant to 10 CFR 54.21(b). These revisions will identify any changes to the Current Licensing Basis that materially affect the contents of the License Renewal Application, including the UFSAR supplements. | 1.4 | 12 months after LRA submittal date and at least 3 months before completion of NRC review<br>Annual Update submitted by letter dated 4/13/09 |
| 2 | Following the issuance of the renewed operating license, the summary descriptions of aging management programs and TLAAs provided in Appendix A, and the final list of License Renewal commitments, will be incorporated into the PINGP UFSAR as part of a periodic UFSAR update in accordance with 10 CFR 50.71(e). Other changes to specific sections of the PINGP UFSAR necessary to reflect a renewed operating license will also be addressed at that time. | A1.0 | First UFSAR update in accordance with 10 CFR 50.71(e) following issuance of renewed operating licenses |
| 3 | An Aboveground Steel Tanks Program will be implemented. Program features will be as described in LRA Section B2.1.2. | B2.1.2 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 4 | Procedures for the conduct of inspections in the External Surfaces Monitoring Program, Structures Monitoring Program, Buried Piping and Tanks Inspection Program, and the RG 1.127 Inspection of Water-Control Structures Associated with Nuclear Power Plants Program will be enhanced to include guidance for visual inspections of installed bolting. | B2.1.6 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 5 | A Buried Piping and Tanks Inspection Program will be implemented. Program features will be as described in LRA Section B2.1.8. | B2.1.8 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 6 | The Closed-Cycle Cooling Water System Program will be enhanced to include periodic inspection of accessible surfaces of components serviced by closed-cycle cooling water when the systems or components are opened during scheduled maintenance or surveillance activities. Inspections are performed to identify the presence of aging effects and to confirm the effectiveness of the chemistry controls. Visual inspection of component internals will be used to detect loss of material and heat transfer degradation. Enhanced visual or volumetric examination techniques will be used to detect cracking.<br>[Revised in letter dated 1/20/2009 in response to RAI 3.3.2-13-01] | B2.1.9 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 7 | The Compressed Air Monitoring Program will be enhanced as follows:<br><br>· Station and Instrument Air System air quality will be monitored and maintained in accordance with the instrument air quality guidance provided in ISA S7.0.01-1996. Particulate testing will be revised to use a particle size methodology as specified in ISA S7.0.01.<br>· The program will incorporate on-line dew point monitoring.<br>[Revised in letter dated 2/6/2009 in response to Region III License Renewal Inspection] | B2.1.10 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 8 | An Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will be completed. Program features will be as described in LRA Section B2.1.11. | B2.1.11 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 9 | An Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will be implemented. Program features will be as described in LRA Section B2.1.12. | B2.1.12 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 10 | An Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program will be implemented. Program features will be as described in LRA Section B2.1.13. | B2.1.13 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 11 | The External Surfaces Monitoring Program will be enhanced as follows:<br><br>· The scope of the program will be expanded as necessary to include all metallic and non-metallic components within the scope of License Renewal that require aging management in accordance with this program.<br>· The program will ensure that surfaces that are inaccessible or not readily visible during plant operations will be inspected during refueling outages.<br>· The program will ensure that surfaces that are inaccessible or not readily visible during both plant operations and refueling outages will be inspected at intervals that provide reasonable assurance that aging effects are managed such that the applicable components will perform their intended function during the period of extended operation.<br>· The program will apply physical manipulation techniques, in addition to visual inspection, to detect aging effects in elastomers and plastics.<br>· The program will include acceptance criteria (e.g., threshold values for identified aging effects) to ensure that the need for corrective actions will be identified before a loss of intended functions.<br>· The program will ensure that program documentation such as walkdown records, inspection results, and other records of monitoring and trending activities are auditable and retrievable.<br>[Revised in letter dated 2/6/2009 in response to RAI B2.1.14-1 Follow up question] | B2.1.14 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 12 | The Fire Protection Program will be enhanced to require periodic visual inspection of the fire barrier walls, ceilings, and floors to be performed during walkdowns at least once every refueling cycle.<br>[Revised in letter dated 12/5/2008 in response to RAI B2.1.15-3] | B2.1.15 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 13 | The Fire Water System Program will be enhanced as follows:<br><br>· The program will be expanded to include eight additional yard fire hydrants in the scope of the annual visual inspection and flushing activities.<br>· The program will require that sprinkler heads that have been in place for 50 years will be replaced or a representative sample of sprinkler heads will be tested using the guidance of NFPA 25, "Inspection, Testing and Maintenance of Water-Based Fire Protection Systems" (2002 Edition, Section 5.3.1.1.1). Sample testing, if performed, will continue at a 10-year interval following the initial testing. | B2.1.16 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 14 | The Flux Thimble Tube Inspection Program will be enhanced as follows:<br><br>- The program will require that the interval between inspections be established such that no flux thimble tube is predicted to incur wear that exceeds the established acceptance criteria before the next inspection.<br>- The program will require that re-baselining of the examination frequency be justified using plant-specific wear rate data unless prior plant-specific NRC acceptance for the re-baselining was received. If design changes are made to use more wear-resistant thimble tube materials, sufficient inspections will be conducted at an adequate inspection frequency for the new materials.<br>- The program will require that flux thimble tubes that cannot be inspected must be removed from service. | B2.1.18 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 15 | The Fuel Oil Chemistry Program will be enhanced as follows:<br><br>· Particulate contamination testing of fuel oil in the eleven fuel oil storage tanks in-scope of License Renewal will be performed, in accordance with ASTM D 6217, on an annual basis.<br>· One-time ultrasonic thickness measurements will be performed at selected tank bottom and piping locations prior to the period of extended operation. | B2.1.19 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 16 | A Fuse Holders Program will be implemented. Program features will be as described in LRA Section B2.1.20. | B2.1.20 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 17 | An Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will be implemented. Program features will be as described in LRA Section B2.1.21 | B2.1.21 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 18 | An Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be implemented. Program features will be as described in LRA section B2.1.22. Inspections for stress corrosion cracking will be performed by visual examination with a magnified resolution as described in 10 CFR 50.55a(b)(2)(xxi)(A) or with ultrasonic methods. [Revised in letter dated 2/6/2009 in response to RAI B2.1.22-1 Follow Up question] | B2.1.22 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 19 | The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program will be enhanced as follows:<br><br>· Program implementing procedures will be revised to ensure the components and structures subject to inspection are clearly identified.<br>· Program inspection procedures will be enhanced to include the parameters corrosion and wear where omitted. | B2.1.23 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 20 | A Metal-Enclosed Bus Program will be implemented. Program features will be as described in LRA Section B2.1.26. | B2.1.26 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 21 | Number Not Used<br>[Deleted by Applicant in a letter Dated 3/27/2009] | | |
| 22 | Number Not Used<br>[Deleted by Applicant in a letter Dated 4/13/2009] | | |
| 23 | A One-Time Inspection Program will be completed. Program features will be as described in LRA Section B2.1.29. | B2.1.29 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 24 | A One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program will be completed. Program features will be as described in LRA Section B2.1.30. | B2.1.30 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 25 | For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components:<br><br>A PWR Vessel Internals Program will be implemented. Program features will be as described in LRA Section B2.1.32.<br><br>An inspection plan for reactor internals will be submitted for NRC review and approval at least twenty-four months prior to the period of extended operation. In addition, the submittal will include any necessary revisions to the PINGP PWR Vessel Internals Program, as well as any related changes to the PINGP scoping, screening and aging management review results for reactor internals, to conform to the NRC-approved Inspection and Evaluation Guidelines.<br><br>[Revised in letter dated 5/12/2009]<br>[Revised in letter dated 6/24/09 in response to Follow-up RAI B2.1.38] | B2.1.32 | U1 - 8/9/2011<br><br>U2 - 10/29/2012 |
| 26 | The Reactor Head Closure Studs Program will be enhanced to incorporate controls that ensure that any future procurement of reactor head closure studs will be in accordance with the material and inspection guidance provided in NRC Regulatory Guide 1.65. | B2.1.33 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 27 | The Reactor Vessel Surveillance Program will be enhanced as follows:<br><br>· A requirement will be added to ensure that all withdrawn and tested surveillance capsules, not discarded as of August 31, 2000, are placed in storage for possible future reconstitution and use.<br>· A requirement will be added to ensure that in the event spare capsules are withdrawn, the untested capsules are placed in storage and maintained for future insertion. | B2.1.34 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 28 | The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program will be enhanced as follows:<br><br>· The program will include inspections of concrete and steel components that are below the water line at the Screenhouse and Intake Canal. The scope will also require inspections of the Approach Canal, Intake Canal, Emergency Cooling Water Intake, and Screenhouse immediately following extreme environmental conditions or natural phenomena including an earthquake, flood, tornado, severe thunderstorm, or high winds.<br>· The program parameters to be inspected will include an inspection of water-control concrete components that are below the water line for cavitation and erosion degradation.<br>· The program will visually inspect for damage such as cracking, settlement, movement, broken bolted and welded connections, buckling, and other degraded conditions following extreme environmental conditions or natural phenomena. | B2.1.35 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 29 | A Selective Leaching of Materials Program will be completed. Program features will be as described in LRA B2.1.36. | B2.1.36 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 30 | The Structures Monitoring Program will be enhanced as follows:<br><br>· The following structures, components, and component supports will be added to the scope of the inspections:<br>- Approach Canal<br>- Fuel Oil Transfer House<br>- Old Administration Building and Administration Building Addition<br>- Component supports for cable tray, conduit, cable, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping, mirror insulation, non-ASME valves, cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, diesel equipment, housings for HVAC fans, louvers, and dampers, HVAC ducts, vibration isolation elements for diesel equipment, and miscellaneous electrical and mechanical equipment items<br>- Miscellaneous electrical equipment and instrumentation enclosures including cable tray, conduit, wireway, tube tray, cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and metal bus enclosure assemblies<br>- Miscellaneous mechanical equipment enclosures including housings for HVAC fans, louvers, and dampers<br>- SBO Yard Structures and components including SBO cable vault and bus duct enclosures.<br>- Fire Protection System hydrant houses<br>- Caulking, sealant and elastomer materials<br>- Nonsafety-related masonry walls that support equipment relied upon to perform a function that demonstrates compliance with a regulated event(s).<br><br>· The program will be enhanced to include additional inspection parameters.<br>· The program will require an inspection frequency of once every five (5) years for structures and structural components within the scope of the program. The frequency of inspections can be adjusted, if necessary, to allow for early detection and timely correction of negative trends.<br>· The program will require periodic sampling of groundwater and river water chemistries to ensure they remain non-aggressive. | B2.1.38 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 31 | A Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program will be implemented. Program features will be as described in LRA Section B2.1.39. | B2.1.39 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 32 | The Water Chemistry Program will be enhanced as follows:<br><br>· The program will require increased sampling to be performed as needed to confirm the effectiveness of corrective actions taken to address an abnormal chemistry condition.<br>· The program will require Reactor Coolant System dissolved oxygen Action Level limits to be consistent with the limits established in the EPRI PWR Primary Water Chemistry Guidelines.<br>[Revised in letter dated 12/5/2008 in response to RAI B2.1.40-3] | B2.1.40 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 33 | The Metal Fatigue of Reactor Coolant Pressure Boundary Program will be enhanced as follows:<br><br>· The program will monitor the six component locations identified in NUREG/CR-6260 for older vintage Westinghouse plants, either by tracking the cumulative number of imposed stress cycles using cycle counting, or by tracking the cumulative fatigue usage, including the effects of coolant environment. The following locations will be monitored:<br><br>- Reactor Vessel Inlet and Outlet Nozzles<br>- Reactor Pressure Vessel Shell to Lower Head<br>- RCS Hot Leg Surge Line Nozzle<br>- RCS Cold Leg Charging Nozzle<br>- RCS Cold Leg Charging Nozzle<br>- RCS Cold Leg Safety Injection Accumulator Nozzle<br>- RHR-to-Accumulator Piping Tee<br><br>· Program acceptance criteria will be clarified to require corrective action to be taken before a cumulative fatigue usage factor exceeds 1.0 or a design basis transient cycle limit is exceeded.<br>[Revised in letter dated 1/9/2009 in response to RAI 4.3.1.1-1] | B3.2 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 34 | Reactor internals baffle bolt fatigue transient limits of 1835 cycles of plant loading at 5% per minute and 1835 cycles of plant unloading at 5% per minute will be incorporated into the Metal Fatigue of Reactor Coolant Pressure Boundary Program and UFSAR Table 4.1-8. | B3.2 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 35 | NSPM will perform an ASME Section III fatigue evaluation of the lower head of the pressurizer to account for effects of insurge/outsurge transients. The evaluation will determine the cumulative fatigue usage of limiting pressurizer component(s) through the period of extended operation. The analyses will account for periods of both “Water Solid” and “Standard Steam Bubble” operating strategies. Analysis results will be incorporated, as applicable, into the Metal Fatigue of Reactor Coolant Pressure Boundary Program.<br>[Revised in letter dated 1/9/2009 in response to RAI 4.3.1.1-1] | 4.3.1.3 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 36 | NSPM will complete fatigue calculations for the pressurizer surge line hot leg nozzle and the charging nozzle using the methodology of the ASME Code (Subsection NB) and will report the revised CUFs and CUFs adjusted for environmental effects at these locations as an amendment to the PINGP LRA. Conforming changes to LRA Section 4.3.3, "PINGP EAF Results," will also be included in that amendment to reflect analysis results and remove references to stress-based fatigue monitoring.<br>[Added in letter dated 1/9/2009 in response to RAI 4.3.1.1-1] | 4.3.3 | 4/30/2009<br><br>Letter dated 4/28/2009 from the applicant to NRC completes this commitment, see ML091190418 |
| 37 | NSPM will revise procedures for excavation and trenching controls and archaeological, cultural and historic resource protection to identify sensitive areas and provide guidance for ground-disturbing activities. The procedures will be revised to include drawings and illustrations to assist users in identifying culturally sensitive areas, and pictures of artifacts that are prevalent in the area of the Plant site. The revised procedures will also require training of the Site Environmental Coordinator and other personnel responsible for proper execution of excavation or other ground-disturbing activities.<br>[Added in ER revision submitted in letter dated 3/4/2009] | ER 4.16.1 | 8/9/2013 |
| 38 | NSPM will conduct a Phase I Reconnaissance Field Survey of the disturbed areas within the Plant's boundaries. In addition, NSPM will conduct Phase I field surveys of areas of known archaeological sites to precisely determine their boundaries. NSPM will use the results of these surveys to designate areas for archaeological protection.<br>[Added in ER revision submitted in letter dated 3/4/2009] | ER 4.16.2 | 8/9/2013 |
| 39 | NSPM will prepare, maintain and implement a Cultural Resources Management Plan (CRMP) to protect significant historical, archaeological, and cultural resources that may currently exist on the Plant site. In connection with the preparation of the CRMP, NSPM will conduct botanical surveys to identify culturally and medicinally important species on the Plant site, and incorporate provisions to protect such plants into the CRMP.<br>[Added in ER revision submitted in letter dated 3/4/2009] | ER 4.16.2 | 8/9/2013 |
| 40 | NSPM will consult with a qualified archaeologist prior to conducting any ground-disturbing activity in any area designated as undisturbed and in any disturbed area that is described as potentially containing archaeological resources (as determined by the Phase I Reconnaissance Field Survey discussed in Commitment Number 38).<br>[Added in ER revision submitted in letter dated 3/4/2009] | ER 4.16.2 | 8/9/2013 |

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| 41 | During the first refueling outage following refueling cavity leak repairs in each Unit (scheduled for refueling outages 1R26 and 2R26), concrete will be removed from the Sump C pit to expose an area of the containment vessel bottom head. Visual examination and ultrasonic thickness measurement will be performed on the portions of the containment vessels exposed by the excavations. An assessment of the condition of exposed concrete and rebar will also be performed. Petrographic examination will be performed on sample pieces of the removed concrete if the removal method provides pieces suitable for examination. Degradation observed in the exposed containment vessel, concrete or rebar, or as a result of petrographic examination of concrete samples, will be entered into the Corrective Action Program, and evaluated for impact on structural integrity and identification of additional actions that may be warranted.<br><br>[Added in letter dated 4/6/09 in response to Follow Up RAI B2.1.38] [Revised in letter dated 8/7/09 in response to a follow-up question from a conference call on 7/22/09] | B2.1.38 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 42 | During the two consecutive refueling outages following refueling cavity leak repairs in each Unit (scheduled for refueling outages 1R26 and 2R26), visual inspections will be performed of the areas where reactor cavity leakage had been observed previously to confirm that leakage has been resolved. The inspection results will be documented. If refueling cavity leakage is again identified, the issue will be entered into the Corrective Action Program and evaluated for identification of additional actions to mitigate leakage and monitor the condition of the containment vessel and internal structures.<br><br>[Added in letter dated 4/6/09 in response to Follow Up RAI B2.1.38] | B2.1.38 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |
| 43 | Preventive maintenance requirements will be implemented to require periodic replacement of rubber flexible hoses in the Diesel Generators and Support System and in the 122 Diesel Driven Fire Pump that are exposed to fuel oil or lubricating oil internal environments.<br><br>[Added in letter dated 4/6/09 in response to RAI 3.3.2-8-1]<br>[Revised in letter dated 6/5/09] | Table 3.3.2-8 | U1 - 8/9/2013<br><br>U2 - 10/29/2014 |

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| 44 | During the first refueling outage following refueling cavity leak repairs in each Unit (scheduled for refueling outages 1R26 and 2R26), a concrete sample will be obtained from a location known to have been wetted by borated water leakage from the refueling cavity. These concrete samples (one per Unit) will be tested for compression strength and will be subjected to petrographic examination to assess the degradation, if any, resulting from borated water exposure. Degradation identified as a result of the testing and examination of the concrete samples will be entered into the Corrective Action Program, and evaluated for impact on structural integrity and identification of additional actions that may be warranted.<br><br>[Added in letter dated 8/7/09 in response to a follow-up question from a conference call on 7/22/09.] | U1 - 8/9/2013<br>U2 - 10/29/2014 | B2.1.38 |