PA-LR

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Subject: Another round of AMR Questions and TLAA Questions

Here is another set of questions.

Jim

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The following are questions for PNPS as a result of the review of the LRA Section 3.3, Table 3.3.1, and for consistent with GALL Report line items on Tables 3.3.2-1 thru 3.3.2.14-35.

Generic Questions:

G.3.3.1.1. Tables 3.3.2.14-1 thru 3.3.2.14-35 address non-safety related components affecting safety related systems. However, these tables address all such systems in section 3.3, Auxiliary Systems, even though some of these systems belong to section 3.2, ESF Systems, and section 3.4, Steam and Power Conversion (S&PC) Systems. Tables 3.3.14-7, 14-16, 14-25, and 14-28 are for systems that belong to Section 3.2; and tables 3.3.14-1, 14-3, 14-5, 14-9, 14-10, 14-11, 14-17, and 14-18 are for systems that belong to Section 3.4. The Table 1 item reference also specifies Tables 3.2.1 and 3.4.1. The audit report and the SER are based on systems as defined in GALL Report sections of ESF, Auxiliary, and S&PC systems. As written in the LRA, it will make the audit report and SER confusing because the ESF systems section 3.2 write-up will include Tables from section 3.3, and the S&PC systems section 3.4 write-up will include Tables from section 3.3. Different reviewers write these sections.

Please justify why the non-safety systems associated with ESF and S&PC systems were included in the Auxiliary system section.

G.3.3.1.2. Discrepancy between Table 3.3.1 line items and Tables 3.3.2-X for those line items that credit water chemistry or oil analysis program and a verification program such as one-time inspection (OTI) program. The Table 1 item is consistent with the GALL report and correctly credits the chemistry program and the OTI program or for plant-specific program also credits chemistry and OTI programs. However, the Table 2 line items that reference these Table 1 line items do not credit the OTI program. These Table 2 line items however have a footnote 'A', or 'C' which states that it is consistent with the MEAP combination in the GALL Report.

Please justify why the OTI program is not credited in Table 2, even though it is credited in Table 1 and footnote 'A' implies total consistency with GALL for MEAP combination.

G.3.3.1.3. PNPS does not include Bolting Integrity Program in the LRA, however credits other programs as alternate to the bolting integrity program. The GALL Report AMP XI.M18, Bolting Integrity Program provides several recommendations in the 10-element evaluation, specifically recommendations associated with preventive actions such as selection of bolting material, use of lubricants and sealants and additional recommendations of NUREG-1339. Some of the alternate programs may be acceptable for inspection, however, they do not address the preventive actions.

Please clarify how PNPS meets these recommendations when using alternate programs or please credit a Bolting Integrity Program for the various Table 2 line items as appropriate. For section 3.3, this applies to Table 3.3.1, line items 3.3.1-19, 3.3.1-27, 3.3.1-42, 3.3.1-43, 3.3.1-58, and 3.3.1-78.

Table 3.3.1 related questions:

T.3.3.1.1 Table 3.3.1, item 3.3.1-1, for steel cranes with an aging effect of cumulative fatigue damage, the GALL recommends TLAA to be evaluated for structural girders of cranes. The discussion section states that this line item was not used in section 3.3, however steel cranes are evaluated in section 3.5. Tables 3.5.2-2 and 3.5.2-4 address cranes but for an aging effect of loss of materials. Cumulative fatigue damage of cranes is not addressed in section 3.5 or in the TLAA section 4.7 (plant specific TLAA). Also see TLAA question.

Please explain where this line item is addressed in the LRA.

T.3.3.1.2 Table 3.3.1, item 3.3.1-5, for heat exchanger exposed to treated water > 60^0C (>140^0F), discussion states that OTI will be used as verification program for water chemistry. However, for those line items in Table 3.3.2-3 where item 3.3.1-5 is referenced, OTI program is not credited. See question G.3.3.1.2 above.

T.3.3.1.3 Table 3.3.1, item 3.3.1-14 for steel components exposed to lubricating oil, GALL report recommends lubricating oil analysis program and OTI as a verification program. However, in the discussion section only the oil analysis program is credited. Section 3.3.2.2.7, item 1 states that operating experience at PNPS has confirmed the effectiveness of this program in maintaining contaminants within limits such that corrosion has not and will not affect the intended functions of these components.

Please explain how PNPS can make this statement if inspection has not been performed.

T.3.3.1.4 Table 3.3.1, item 3.3.1-17 for steel elements exposed treated water discussion states that OTI will be used as verification program for water chemistry. Refer to question T.3.3.1.2 and G.3.3.1.2. This applies to several line items in various Table 2's that reference item 3.3.1-17.

T.3.3.1.5 Table 3.3.1, item 3.3.1-18 for steel and SS diesel engine exhaust piping, in the discussion column references section 3.3.2.2.7 item 3 for further evaluation. Section 3.3.2.2.7 item 3 states that the carbon steel diesel exhaust piping and components in the fire protection system is managed by the Fire Protection Program. The Fire Protection Program uses visual inspections of diesel exhaust piping and components to manage loss of material. However, Appendix B.1.13.1 program description which identifies the system/commodities in scope for inspection does not include the inspection of the diesel exhaust piping and components. There is no enhancement identified in the program write-up to include this inspection during the period of extended operation.

Please explain this discrepancy between section 3.3.2.2.7 item 3 and the AMP B.1.13.1 program description or include this inspection in the AMP as an enhancement.

T.3.3.1.6 Table 3.3.1, item 3.3.1-21 for steel components exposed to lubricating oil. This is the same issue as in question T.3.3.1.3 above, except the section is 3.3.2.2.9, item 2.

T.3.3.1.7 Table 3.3.1, item 3.3.1-23 for SS heat exchanger components exposed to treated water. This is the same issue as in question T.3.3.1.2 above, except the section is 3.3.2.2.10, item 2.

T.3.3.1.8 Table 3.3.1, item 3.3.1-24 for SS and aluminum components exposed to treated water. This is the same issue as in question T.3.3.1.2 above, except the section is 3.3.2.2.10, item 2. There are over 80 line items associated with this in different table 2's.

T.3.3.1.9 Table 3.3.1, item 3.3.1-26 for copper alloy components exposed to lubricating oil. This is the same issue as in question T.3.3.1.3 above, except the section is 3.3.2.2.10, item 4.

T.3.3.1.10 Table 3.3.1, item 3.3.1-30 for SS components exposed to sodium pentaborate solution. This is the same issue as in question T.3.3.1.2 above, except the section is 3.3.2.2.10, item 8.

T.3.3.1.11 Table 3.3.1, item 3.3.1.33 for SS components exposed to lubricating oil. This is the same issue as in question T.3.3.1.3 above, except the section is 3.3.2.2.12, item 2.

T.3.3.1.12.1 Table 3.3.1, item 3.3.1-37 for SS components exposed to treated water >60^0C (>140^0F). This line item applies to RWCU system and GALL Report recommends AMP XI.M25, BWR Reactor Water Cleanup System. The applicant states "Supplement 1 to GL 88-01 states that IGSCC inspection of RWCU piping outside of the containment isolation valves is recommended only until actions associated with GL 89-10 on motor operated valves are completed. Since PNPS has satisfactorily completed all actions requested in NRC GL 89-10, the Water Chemistry Control - BWR Program is used in lieu of the BWR Reactor Water Cleanup System Program to manage this potential aging effect." However, the AMP also states that in addition to meeting this criterion, piping is made of material that is resistant to IGSCC.

Please confirm what grade of stainless material is used and justify that it is resistant to IGSCC.

T.3.3.1.12.2 Same issue as question T.3.3.1.2 above also applies here where OTI is not credited in Table 2 line items where 3.3.1-37 is referenced.

T.3.3.1.13 Table 3.3.1, item 3.3.1-38 for SS components exposed to treated water >60^0C (>140^0F).
This is the same issue as in question T.3.3.1.2 above.

T.3.3.1.14 Table 3.3.1, item 3.3.1-40 for steel tank in diesel fuel oil system exposed to air-outdoor external environment. The GALL Report recommends AMP XI.M29 Aboveground Steel Tanks, however PNPS is crediting a different program, System Walkdown Program. This program is consistent with GALL Report AMP XI.M36, External Surfaces Monitoring. While the System Walkdown Program is an acceptable alternate for Aboveground Steel Tanks AMP for inspection, however, the Aboveground Steel Tanks AMP has some preventive actions associated with it that are not addressed in the System Walkdown Program. Furthermore, the GALL AMP specifies wall thickness measurement of tank bottom if it is supported on earthen or concrete foundations.

Please clarify if the steel tanks are coated with protective paint or coating in accordance with industry practice, and whether sealant or caulking is applied at the interface edge between the tank and the foundation as per the GALL AMP XI.M29. Please state how the tank is supported.

T.3.3.1.15 Table 3.3.1, item 3.3.1-43, for steel bolting and closure bolting exposed to air – indoor uncontrolled (external) or air – outdoor (External). The GALL Report recommends AMP XI.M18,Bolting Integrity program, however PNPS is crediting a different program, System Walkdown Program. PNPS indicates that the system walkdown program is similar to XI.M36, External Surfaces Monitoring Program. However, the XI.M36 AMP does not have any preventive actions, whereas the Bolting Integrity Program considers preventive action. Please justify how the preventive actions of GALL AMP XI.M18 are addressed in the system walkdown program.

T.3.3.1.16 Table 3.3.1, item 3.3.1-58, for steel external surfaces exposed to air – indoor uncontrolled (external), air - outdoor (external), and condensation (external). For those line items in Table 2's where this Table 1 line item is referenced for bolting, same issue as question T.3.3.1.15 should be addressed.

In Table 3.3.2-10, LRA page 3.3.-123, for tank in Halon system, which references line item 3.3.1-58, Fire Protection Program is credited. Please justify why the Fire Protection Program was not identified in the discussion column of Table 3.3.1, item 3.3.1-58 or supplement the LRA to include this program.

T.3.3.1.17 Table 3.3..1, item 3.3.1-61, for elastomer fire barrier penetration seals exposed to air – outdoor or air - indoor uncontrolled. PNPS credits Fire Protection Program and states in the discussion column that this line item was not used in the auxiliary systems tables. Fire barrier seals are evaluated as structural components in Section 3.5. Cracking and the change in material properties of elastomer seals are managed by the Fire Protection Program.

However, in section 3.5, Table 3.5.2-6, Bulk Commodities, on pages 3.5-82, and 3.5-83, where line item 3.3.1-61 is referenced, PNPS credits the Fire Protection Program and the Structures Monitoring program. However, line item 3.3.1-61 does not credit structures monitoring program. As a matter of fact, the Structures Monitoring Program is enhanced to add guidance for inspection of elastomer seals, etc. Please clarify if both programs are credited for managing aging effects for penetration seals as stated in Table 3.5.2-6, and if so, please supplement the LRA to include the Structures Monitoring program in Table 3.3.1, item 3.3.1-61.

T.3.3.1.18 Table 3.3.1, item 3.3.1-64 for steel piping, piping components, and piping elements exposed to fuel oil. The intent of this line is to address the diesel-driven fire pump, which is why the Fire Protection Program is recommended by the GALL Report. PNPS states that this line item was not used. Loss of material of steel components exposed to fuel oil was addressed by other items including line Items 3.3.1-20 and 3.3.1-32. The Fire Protection program specifies that the diesel-driven fire pump be periodically tested to ensure that the fuel supply line can perform its intended function. PNPS B.1.13.1 has not taken any exception to this test and is identified as being consistent with the GALL program. However, B.1.13.1, Fire Protection program is not credited in line item 3.3.1-20.

Please clarify if PNPS has a diesel driven fire pump and if not, should an exception be taken to the GALL Report AMP. If PNPS does have a diesel driven fire pump, where in the LRA section 3.3 is it addressed and is the Fire Protection program credited?

T.3.3.1.19 Table 3.3.1, item 3.3.1-72 for steel HVAC ducting and components internal surfaces exposed to condensation (Internal). However, there is only one line in Table 2 where this Table 1 line item is referenced. This line item is in Table 3.3.2-3, RBCCW system and the component is heat exchanger housing. PNPS states in the discussion column of line 3.3.1-72 that loss of material of steel component internal surfaces exposed to condensation is managed by the System Walkdown Program. The System Walkdown Program manages loss of material for external carbon steel components by visual inspection of external surfaces. For systems where internal carbon steel surfaces are exposed to the same environment as external surfaces, external surfaces condition will be representative of internal surfaces. Thus, loss of material on internal carbon steel surfaces is also managed by the System Walkdown Program.

Please clarify how PNPS concluded that the internal surface of the heat exchanger is the same as the external surface in the RBCCW system.

Table 3.3.2-X related questions

T.3.3.2.1 Component types filter housing and turbo charger in Table 3.3.2-9, Fire Protection - Water system and piping in Table 3.3.2-10, Fire Protection - Halon system reference Table 3.2.1, item 3.2.1-32. This Table 1 line item addresses steel piping and ducting components and internal surfaces exposed to air-indoor uncontrolled (internal) environment. Discussion column of item 3.2.1-32 credits System Walkdown, Periodic Surveillance and Preventive Maintenance, and One-Time Inspection programs. However, the Table 3.3.2-9 and Table 3.3.2-10 components identified above credit Fire Protection Program, which is not credited in the discussion column of item 3.2.1-32. Furthermore, the program description of LRA Appendix B.1.13.1, Fire Protection Program does not include inspection of the above identified components.

Please clarify the discrepancy between the credited programs in item 3.2.1-32 and the program credited for the above identified component types. Also, please justify why the Fire Protection program description does not address inspection of these component types in these two systems or enhance the program to include these inspections.

T.3.3.2.2 Component types heat exchanger tubes in Table 3.3.2-4, Emergency Diesel Generator system and Table 3.3.2-9, Fire Protection - Water system are made from copper alloy and exposed to lubricating oil environment, which reference Table 3.2.1, item 3.2.1-9. PNPS only credits the Oil Analysis program. This issue is the same as in question T.3.3.1.3.

T.3.3.2.3 Component types heat exchanger tubes in Table 3.3.2-5, Station Blackout diesel Generator system, and Table 3.3.2-6, Security Diesel Generator system are made from steel and exposed to an external environment of fuel oil with an aging effect of reduction of heat transfer due to fouling, which reference Table 3.4.1, item 3.4.1-10. PNPS only credits the Oil Analysis program. This issue is the same as in question T.3.3.1.3.

Also, please clarify why one of the above component type identifies footnote 'D', whereas the other identifies footnote 'E', even though they have the same MEAP combination.

T.3.3.2.4 Steel component types thermowell, tubing and valve body in Table 3.3.2-14-19, Off-Gas system reference Table 3.4.1, item 3.4.1-13, which credits water chemistry and one-time inspection program for verification. However the table 2 line items do not credit the verification program. This is the same issue as questions G.3.3.1.2 and T.3.3.1.2.

T.3.3.2.5 Stainless steel component types thermowell, tubing and valve body in Table 3.3.2-14-19, Off-Gas system reference Table 3.4.1, item 3.4.1-14, which credits water chemistry and one-time inspection program for verification. However the table 2 line items do not credit the verification program. This is the same issue as questions G.3.3.1.2 and T.3.3.1.2.

T.3.3.2.6 Steel component types ejector, heat exchanger shell, orifice, piping, pump casing, thermowell, and valve body in Table 3.3.2-14-19, Off-Gas system reference Table 3.4.1, item 3.4.1-2, which credits water chemistry and one-time inspection program for verification. However the table 2 line items do not credit the verification program. This is the same issue as questions G.3.3.1.2 and T.3.3.1.2.

T.3.3.2.7 Table 3.3.2-14-27, RWCU system, steel component type heat exchanger shell, in treated water environment with an aging effect of loss of material, PNPS credits Water Chemistry Control - Closed Cooling Water program and references Table 3.3.1, line item 3.3.1-17. However, line item 3.3.1-17 addresses Water Chemistry Control - BWR program.

Should line item 3.3.1-47 be referenced, which addresses the Water Chemistry Control - Closed Cooling Water for the same MEAP combination? Please supplement the LRA accordingly.

T.3.3.2.8 Table 3.3.2-14-27, RWCU system, stainless steel component type orifice, in treated water environment with an aging effect of loss of material, references Table 3.3.1, line item 3.3.1-17. However, this line item is for steel components.

Should line item 3.3.1-24 be referenced, which addresses stainless steel components for the same EAP? Please supplement the LRA accordingly.

T.3.3.2.9 Table 3.3.2-4, EDG System, page 3-78, for carbon steel expansion joints, in an internal environment of exhaust gas credits TLAA-fatigue to manage the aging effect of cracking due to fatigue.

Please confirm if TLAA Section 4.3.2, Non-Class 1 Fatigue, includes these expansion joints. Also, see TLAA question 8.

T.3.3.2.10 For aging effect of cracking due to fatigue, PNPS has credited TLAA - metal fatigue as an aging management program for components in an internal environment of exhaust gas in Table 3.3.2-4, EDG Systems; however in Table 3.3.2-5, SBDG System and Table 3.3.2-6, SDG System, the Periodic Surveillance and Preventive Maintenance (PSPM) Program is credited, which includes visual or other NDE techniques to inspect exhaust system components to manage cracking.

Please justify why the PSPM program is not credited for the EDG system components for managing aging effect of cracking. It is only credited for loss of material and fouling.

T.3.3.2-11 Table 3.3.2-9, Fire Protection - Water System, for piping, silencer and turbocharger in an internal exhaust gas environment with an aging effect of cracking due to fatigue, PNPS has credited the Fire Protection Program to manage this aging effect. The program element 6, Acceptance Criteria, is enhanced to to verify that the diesel engine did not exhibit signs of degradation while it was running; such as exhaust gas leakage.

Please justify how the aging effect of cracking is managed by verifying for exhaust gas leakage. If there is leakage, it implies a through-wall crack has occurred. Verifying for leakage is not an adequate aging management program for managing cracking.

T.3.3.2.12 In LRA Section 3.3.2.2.7.3, PNPS states that the carbon steel diesel exhaust piping and components in the fire protection system is managed by the Fire Protection Program. The Fire Protection Program uses visual inspections of diesel exhaust piping and components to manage loss of material.

If Fire Protection Program (LRA B.1.13.1) is credited for managing aging of these components, please explain why these system components are not included in the program description of the Fire Protection Program. Furthermore, no enhancement is addressed that would include these components in the Fire Protection Program.

T.3.3.2.13 Subsequent to question T.3.3.2.1, the applicant has credited Fire Protection Program in lieu of GALL AMP XI.M38, Inspection of Internal Surfaces of Miscellaneous Piping and Ducting Components as recommended for GALL item V.D2-16, which is referenced by the applicant for these line items. The GALL AMP XI.M38 states that visual inspection of internal surfaces of plant components is performed during maintenance or surveillance activities for visible evidence of corrosion to indicate possible loss of material.

Since PNPS is using the Fire Protection Program in lieu of GALL AMP XI.M38, please explain how the Fire Protection Program performs this visual inspection. As written in the LRA, the Fire Protection Program is not adequate to manage loss of material for these components.

TLAA Questions:

1. In Table 4.1-1 of the LRA, the applicant did not identify a crane load cycle limit as a TLAA for the cranes within the scope of license renewal. Normally, based on the design code of the crane, a load cycle limit is specified at rated capacity over the crane's projected life. Therefore, it is generally necessary to perform a TLAA relating to crane load cycles estimated to occur up to the end of the extended period of operation.

   Please explain why the crane load cycle limit was not included as a TLAA.

2. In Table 4.3-1, Maximum CUFs for Class 1 Components, note 2 addresses exclusion rules for ASME Code. Please explain what these rules are.

3. Section 4.3.1.3, Class 1 piping and components states all remaining RCS pressure boundary piping is designed and analyzed in accordance with ANSI B31.1. However, in section 4.3.3, on page 4.3-8, it implies that fatigue analysis exists for feedwater piping (which is part of the RCS pressure boundary piping designed and analyzed IAW B31.1.). Please clarify this discrepancy, since B31.1 does not require a fatigue analysis calculation.

4. Section 4.3.1.3, Class 1 piping and components second paragraph states that the design transients are tracked and evaluated to ensure that cycle limits are not exceeded, thereby assuring that CUFs do not exceed 1.0. It further states that continuation of this program, therefore, will ensure that the allowed number of transient cycles is not exceeded. Consequently, the TLAA (fatigue analyses) for Class 1 piping and components will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i) or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(iii). This by itself could be a true statement, however, cycle counting does not address the effects of environmental fatigue, which is not included here. Acknowledging that section 4.3.3. addresses environmental fatigue, please clarify how that section is tied into the conclusion made in section 4.3.1.3.

5. Section 4.3.1.4, Feedwater Nozzle Fatigue states that this extrapolated usage factor for the feedwater nozzles, considering both the currently analyzed system design transients and rapid cycling through the period of extended operation, is thus < 0.899. This number does not appear to be correct. Please explain how this number was calculated.

6. Section 4.3.3, Effects of Reactor Water Environment on Fatigue Life.

   Please provide more details on your implementation plan:

   a. How will the further refinement of the fatigue analyses be performed? Will it consider finite element analyses?
   b. If an aging management program is used, please include a commitment to issue for NRC approval 24 months prior to entering period of extended operation.

c. Will replacement be of the same material type?

7. Table 4.3-3, Note 1 states "No PNPS-specific value was available; used generic value from NUREG/CR-6220."

   a. Wrong NUREG identified - should be NUREG-6260

   b. The NUREG-6260 CUF is based on the specific plant used in that NUREG and is dependent on that plant's piping configuration. That value cannot be used for PNPS calculation. Please justify how this value applies to PNPS unless the PNPS piping configurations are same as the NUREG-6260 plant or provide a PNPS specific CUF value.

8. Table 3.3.2-4, Emergency Diesel Generator System, for carbon steel expansion joints in an internal environment of exhaust gases credits the TLAA – fatigue for managing cracking due to fatigue. TLAA section 4.3.2, Non-Class 1 Fatigue, assumes, in general 7000 thermal cycles for piping systems, allowing a stress reduction factor of 1.0 in the stress analysis. This is a good assumption for pipe, fittings, etc., however, may not be a good assumption for expansion joints.

   Please confirm if the expansion joints are included in section 4.3.2, and justify that the assumption of 7000 cycles is appropriate.

9. As part of the Thermal Power Optimization Project, GE performed another fatigue analysis. GE issued a report, GE-NE-0000-0000-1892-02, Rev.0, March 2002, Thermal Power Optimization, Task–302 – RPV – Stress Evaluation. This report calculated new CUFs, which in some cases are different than what is shown in the LRA, Table 4.3-1, Maximum CUFs for Class 1 Components. The GE Report, Section 3.3, Results, states that feedwater nozzle CUF recalculation indicate a CUF that went from <0.8 to <1.0. Similarly, Table 3.3.1.3 fatigue summary, last column, indicates CLTP/TLTP values. Again, specific values are provided for 3 line items, however, for feedwater nozzle, only <1.0 is specified.

   Please justify what <1.0 means. Please provide a specific calculated value. Also, please justify why the revised TPOP CUF values were not identified in the LRA Table 4.3-1, instead of old values calculated by ALTRAN Corporation in 1994.

   Are there other LRA TLAA sections affected by the TPO project, such as Section 4.2, RPV Neutron Embrittlement Analysis?