

**From:** Michael Morgan  
**To:** Johnny Eads; Jonathan Rowley  
**Date:** 4/6/2006 10:20:04 AM  
**Subject:** VYNPS Audit Plan and Initial Set of Questions

Johnny and Jonathan,

Attached to this mailing is the VYNPS Audit Plan and the initial set of audit questions for the applicant...

You can go ahead and forward the Audit Plan on to the applicant for their perusal.... The plan has been reviewed by the staff and it appears "good to go"...

Please wait on forwarding the questions - Ken would like to give them one final review before forwarding them on to the applicant..... When I receive Ken's "thumbs-up", I'll give you the "go-ahead"....

Mike

**CC:** Duc Nguyen; James Davis; Kaihwa Hsu; Kenneth Chang ; Mark Lintz; Maurice Heath; [Mkennedy@islinc.com](mailto:Mkennedy@islinc.com); Peter Wen; Roy Mathew

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**From:** Michael Morgan  
**Created By:** MJM2@nrc.gov

**Recipients**  
islinc.com  
Mkennedy CC (Mkennedy@islinc.com)

nrc.gov  
OWGWPO01.HQGWDO01  
JAD CC (James Davis)  
KXC2 CC (Kenneth Chang )

nrc.gov  
OWGWPO02.HQGWDO01  
JHE (Johnny Eads)  
KRH2 CC (Kaihwa Hsu)  
MLH5 CC (Maurice Heath)

nrc.gov  
TWGWPO01.HQGWDO01  
DTN1 CC (Duc Nguyen)  
JGR (Jonathan Rowley)  
MPL2 CC (Mark Lintz)  
RKM CC (Roy Mathew)

nrc.gov  
TWGWPO02.HQGWDO01  
PXW CC (Peter Wen)

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## Initial Questions for VYNPS

Question No.	Question
<b>AMPs</b>	
A-K-01	Please explain where the commitments for the various AMP enhancements to bring the particular AMP in conformance to the GALL Report recommendations are made? How are these commitments tracked to closure?
B.1.1-L-01	Program Description Item - The GALL states, "Buried piping and tanks are inspected when they are excavated during maintenance and when a pipe is dug up and inspected for any reason." The LRA states, "Buried components are inspected when excavated during maintenance". Are buried components inspected when dug up for "any reason"?
B.1.1-L-02	Program Description Item - The LRA states, "Buried components are inspected when excavated during maintenance". What is the maintenance frequency of buried piping?
B.1.1-L-03	Program Description Item - The GALL states, "Gray cast iron, which is included under the definition of steel, is also subject to a loss of material due to selective leaching, which is an aging effect managed under Chapter XI.M33, 'Selective Leaching of Materials'." The LRA states, "This program includes (a) preventive measures to mitigate corrosion and (b) inspections to manage effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and gray cast iron components." Are gray cast iron components included in the VYNPS selective leaching program?
B.1.1-L-04	Program Description Item - The LRA states, "A focused inspection will be performed within the first 10 years of the period of extended operation...." What is the extent of the focused inspection at the start of the period of extended operation?
B.1.1-L-05	Program Description Item - What is the proposed maintenance frequency of buried piping during the period of extended operation?

Question No.	Question
B.1.1-L-06	Scope of Program Element - The GALL Report states, "The program relies on preventive measures such as coating, wrapping and periodic inspection for loss of material caused by corrosion of the external surface of buried steel piping and tanks." The LRA states, "The VYNPS program does not inspect tanks. There are no buried steel tanks subject to aging management review." Are there any buried steel tanks at VYNPS?
B.1.1-L-07	Parameters Monitored/Inspected Element - The GALL Report states, "Coatings and wrappings are inspected by visual techniques." The LRA states, "Guidance for performing examinations of buried piping will be enhanced to specify that coating degradation and corrosion are attributes to be evaluated." Is there a VYNPS commitment associated with this enhancement?
B.1.1-L-08	Detection of Aging Effects Element - The GALL Report states, "Inspections performed to confirm that coating and wrapping are intact are an effective method to ensure that corrosion of external surfaces has not occurred and the intended function is maintained." The LRA states, "Inspections via methods that allow assessment of pipe condition without excavation may be substituted for inspections requiring excavation solely for the purpose of inspection. Methods such as phased array UT technology provide indication of wall thickness for buried piping without excavation. Use of such methods to identify the effects of aging is preferable to excavation for visual inspection, which could result in damage to coatings or wrappings." How are buried components that cannot be examined by UT, due to, e.g., either material or size, examined?
B.1.7-H-01	Please clarify the exceptions for not fully implementing BWRVIP report by VYNPS. BWRVIP Utilities have made a commitment that the NRC will be notified by a BWRVIP licensee of their decision to not fully implement a BWRVIP report, as approved by the NRC staff, within 45 days of the report approval.
B.1.7-H-02	P. B-28 & C-5, BWRVIP-25 - UT & Enhanced VT-1 examinations are used to detect cracking and verify the integrity of a critical number of rim hold-down bolts. VT-3 examination is used to detect general condition. Please provide further justification for the aging management of the cracking, since VT-3 cannot detect cracking. If EVT-1 cannot be performed, please provide alternative for review and approval. P. B-29 of VY LRA - The applicant identified a baseline VT-3 examination. The baseline inspection described in BWRVIP is the first inspection that satisfies the guidelines in BWRVIP. Since VT-3 is not satisfied guidelines in BWRVIP, the baseline inspection shall not be used or provide justification.
B.1.7-H-03	P. B-27, BWRVIP-76 - The latest LER related to Plant Hatch indicated that partial-through inside diameter cracks are detected. Provide justification to ensure that VY's core shroud welds H1, H2 & H3 are not going to have crack initiated from the inside surface.

Question No.	Question
B.1.7-H-04	P. B-28, BWRVIP-18, BWRVIP-41 - BWRVIP-18 stated that inspection technique development need for the thermal sleeve welds is being addressed by the BWRVIP inspection committee as a high priority item since 1996. Final License Renewal SER for BWRVIP-41 - This item stated that aging management review of the nozzle thermal sleeve (jet pump inaccessible welds) will be provided by individual applicants. If the inspection technique is not available, please provide plant-specific justification/commitment used to demonstrate these inaccessible welds will be managed during the PEO.
B.1.7-H-05	P. B-28, BWRVIP-41 - VYNPS LRA states that flaws were identified through UT examinations. Please provide detailed inspection evaluation, scope expansion and corrective action information.
B.1.7-H-06	P B-31, BWRVIP-26 - VYNPS LRA states that an inspection will be performed for the first 12 years of the period of extended operation (PEO). Please clarify what inspections (if any) will be performed for the remaining PEO.
B.1.8-L-01	Program Description Item - The GALL Report states, "Because the LRT program is repeated throughout the operating license period, the entire pressure boundary is monitored over time. The frequency of these tests depends on which option (A or B) is selected. With Option A, testing is performed on a regular fixed time interval as defined in 10 CFR Part 50, Appendix J." The LRA states, "The first Type A test after the April 1995 Type A test shall be performed no later than April 2010. This is a one-time extension of the NEI 94-01, 10 year Type A test interval to 15 years. NRC approved Amendment 227 to Facility Operating License DPR-28 for VYNPS to extend the primary containment integrated leak rate testing interval from 10 years to no longer than 15 years on a one-time basis." Will Amendment 227 to DPR-28 be available for review during the AMP audit?
B.1.8-L-02	Operating Experience Element - The LRA states, "A QA audit in 2001 revealed latent noncompliance with station administrative and Appendix J implementing procedures." Does "latent" mean "present but not noticeable" or not present but possible?"
B.1.8-L-03	The LRA states, "These issues could impact effectiveness of the program." What are "these issues?"
B.1.8-L-04	The LRA states, "...however, actions to preclude recurrence of the identified conditions were established and have been implemented under the corrective action program." What actions were taken?
B.1.9-K-01	Please demonstrate that the guidelines provided in D2276 are consistent with the guidelines provided in D6217 to justify the use of D2276 only.

Question No.	Question
B.1.9-K-02	Are the guidelines provided in D4057 addressed in this program? If not please justify excluding this standard as an exception to the GALL Report recommendations.
B.1.9-K-03	Please indicate what additives are provided by the fuel oil supplier. Please provide a copy of a recent fuel oil procurement specification or supplier declaration which indicates what fuel oil additives are included as well as any tests that may be performed by the fuel oil supplier.
B.1.9-K-04	Please provide the technical justification for not adding fuel oil additives.
B.1.9-K-05	How often are the fuel oil tanks drained and cleaned and what is the basis for this frequency?
B.1.9-K-06	Please provide a copy of a representative plant procedure which is used to control the draining and cleaning of the fuel oil tanks.
B.1.9-K-07	Are any protective coatings used in the fuel oil tanks?
B.1.9-K-08	Please describe what parameters are monitored or inspected and indicate what guidance is used for fuel oil sampling. Please provide a copy of a representative plant procedure for fuel oil sampling.
B.1.9-K-09	Is multi-level sampling used to detect the presence of contaminants in the fuel oil and, if not, please provide the technical justification for the approach used at the plant?
B.1.9-K-10	Are the interior surfaces of the fuel oil tanks visually inspected and, if so, provide a copy of a representative plant procedure used for the tank inspection?
B.1.9-K-11	Are UT measurements conducted on the fuel oil tank bottoms? How often are these measurements taken and provide a copy of a representative plant procedure which governs these measurements?
B.1.9-K-12	How often is the fuel oil in the tanks sampled? Is this data trended and what criteria is used to initiate corrective actions?
B.1.9-K-13	What is the basis for the acceptance criteria and does this acceptance criteria take into consideration the usage of a filter with a pore size of 0.8 microns?

Question No.	Question
B.1.9-K-14	Please indicate the typical corrective actions that would be taken if the fuel oil samples do not meet the acceptance criteria.
B.1.9-K-15	Have there been any QA Surveillances or program self-assessments performed on the Diesel Fuel Monitoring Program? If so, please provide the most recent of these documents.
B.1.9-K-16	Have there been any component failures related to the quality of the fuel oil which led to the loss of intended function?
B.1.10-N-01	The results of the EQ of electrical equipment in LRA Section 4.4. indicate that the aging effects of the EQ of electrical equipment identified in the TLAA will be managed during the extended period of operation under 10 CFR 54.21(c)(1)(iii). However, no information is provided on the attribute of a re-analysis of an aging evaluation to extend the qualification life of electrical equipment identified in the TLAA. The important attributes of a re-analysis are the analytical methods, the data collection, the reduction methods, the underlying assumptions, the acceptance criteria, and corrective actions. Provide information on these important attributes of re-analysis of an aging evaluation of electrical equipment identified in the TLAA to extend the qualification under 10 CFR 50.49(e).
B.1.10-N-02	GALL X.E1, Environment Qualification (EQ) of Electric Components, under "Parameter Monitored/Inspected" states that EQ component qualified life is not based on condition or performance monitoring. However, pursuant to Regulatory Guide 1.89, Rev. 1; such monitoring programs are an acceptable basis to modify a qualified life through analysis. Monitoring or inspection of certain environmental conditions or component parameters may be used to ensure that the component is within the bounds of its qualified basis, or as a means to modify the qualified life. Provide a detailed description of a monitoring program to modify the qualified life of EQ components through re-analysis and how the actual operating environment is determined.
B.1.10-N-03	Discuss operating experience of the existing EQ program. Show where an existing program has succeeded and where it has failed in intercepting aging degradation in a timely manner.
B.1.12.1-L-01	Program Description Item - The GALL states, "The AMP also includes periodic inspection and testing of the halon/carbon dioxide (CO <sub>2</sub> ) fire suppression system." The LRA does not address the halon/carbon dioxide (CO <sub>2</sub> ) fire suppression system. Does the applicant, via the LRA, intend to address the halon/carbon dioxide (CO <sub>2</sub> ) fire suppression system?

Question No.	Question
B.1.12.1-L-02	Scope of Program Element - The GALL states, "The AMP also includes management of the aging effects on the intended function of the halon/CO <sub>2</sub> fire suppression system." The LRA states, "This program is not necessary to manage aging effects for halon fire protection system components. The Halon 1301 suppression system is not subject to aging management review. Aging effects for components in the CO <sub>2</sub> system are managed by the System Walkdown Program." Explain rational for why the Halon 1301 suppression system is not subject to review.
B.1.12.1-L-03	Parameters Monitored/Inspected Element - The GALL states, "Visual inspection of the fire barrier walls, ceilings, and floors examines any sign of degradation such as cracking, spalling, and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates." The LRA states, "Procedures will be enhanced to specify that fire damper frames in fire barriers shall be inspected for corrosion." What is the material and environment of the damper frames? What examination technique will be used?
B.1.12.1-L-04	Parameters Monitored/Inspected Element - The GALL Report states, "The diesel-driven fire pump is under observation during performance tests such as flow and discharge tests, sequential starting capability tests, and controller function tests for detection of any degradation of the fuel supply line." The LRA states, "Procedures will be enhanced to state that the diesel engine sub-systems (including the fuel supply line) shall be observed while the pump is running." Is there a VYNPS commitment associated with this enhancement?
B.1.12.1-L-05	Detection of Aging Effects Element - The GALL Report states, "Visual inspection by fire protection qualified inspectors of approximately 10% of each type of seal in walkdowns is performed at least once every refueling cycle." The LRA states, "The NUREG-1801 program states that 10% of each type of penetration seal should be visually inspected at least once every refueling outage. The VYNPS program specifies inspection of approximately 25% of the seals (regardless of seal type) each operating cycle, with all accessible fire barrier penetration seals being inspected at least once every four (4) operating cycles. Since aging effects are typically manifested over several years, this variation in inspection frequency is insignificant." What is "insignificant" about the variation in inspection frequency?
B.1.12.1-L-06	Acceptance Criteria Element - The GALL states, "Inspection results are acceptable if there are no visual indications (outside those allowed by approved penetration seal configurations) of cracking, separation of seals from walls and components, separation of layers of material, or ruptures or punctures of seals; no visual indications of concrete cracking, spalling and loss of material of fire barrier walls, ceilings, and floors; no visual indications of missing parts, holes, and wear and no deficiencies in the functional tests of fire doors." The LRA states, "Acceptance criteria will be enhanced to verify no significant corrosion." How much corrosion is considered "significant?" What actions are taken, either with or without "significant corrosion"? Is there a VYNPS commitment associated with this enhancement?

Question No.	Question
B.1.12.1-L-07	<p><b>Acceptance Criteria Element</b> - The GALL states, "No corrosion is acceptable in the fuel supply line for the diesel-driven fire pump." The LRA states, "Acceptance criteria will be enhanced to verify that the diesel engine did not exhibit signs of degradation while it was running; such as fuel oil, lube oil, coolant, or exhaust gas leakage." Does the enhancement include corrosion in the fuel supply line of the diesel-driven fire pump? Is there a VYNPS commitment associated with this enhancement?</p>
B.1.12.2-L-01	<p><b>Program Description Item</b> - The GALL states, "This aging management program (AMP) applies to water-based fire protection systems that consist of sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, water storage tanks, and aboveground and underground piping and components that are tested in accordance with the applicable National Fire Protection Association (NFPA) codes and standards." The LRA states, "This aging management program applies to water-based fire protection systems that consist of sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, and aboveground and underground piping and components that are tested in accordance with applicable National Fire Protection Association (NFPA) codes and standards." Does VYNPS have water storage tanks?</p>
B.1.12.2-L-02	<p><b>Program Description Item</b> - The GALL states, "Such testing assures the minimum functionality of the systems" The LRA states, "Such testing assures functionality of systems." Are these two (2) statements considered "identical" to VYNPS?</p>
B.1.12.2-L-03	<p><b>Program Description Item</b> - The GALL states, "Also, these systems are normally maintained at required operating pressure and monitored such that loss of system pressure is immediately detected and corrective actions initiated." The LRA states, "Also, many of these systems are normally maintained at required operating pressure and monitored such that leakage resulting in loss of system pressure is immediately detected and corrective actions initiated." Are these two (2) statements considered "identical" to VYNPS?</p>
B.1.12.2-L-04	<p><b>Program Description Item</b> - The GALL states, "The fire protection system piping is to be subjected to required flow testing in accordance with guidance in NFPA 25 to verify design pressure or evaluated for wall thickness (e.g., non-intrusive volumetric testing or plant maintenance visual inspections) to ensure that aging effects are managed and that wall thickness is within acceptable limits. These inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation. The plant-specific inspection intervals are to be determined by engineering evaluation of the fire protection piping to ensure that degradation will be detected before the loss of intended function. The purpose of the full flow testing and wall thickness evaluations is to ensure that corrosion, MIC, or biofouling is managed such that the system function is maintained." The LRA does not address this item. Does VYNPS intend to address these NFPA and GALL recommendations?</p>

Question No.	Question
B.1.12.2-L-05	Detection of Aging Effects Element - The GALL Report states, "Fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur." The LRA states, "NUREG-1801 specifies annual fire hydrant hose hydrostatic tests. Under the VYNPS program, hydrostatic test of outside hoses occurs once per 24 months; and hydrostatic test of inside hoses occurs once per 3 years." What is the justification of extending the test frequency?
B.1.12.2-L-06	Detection of Aging Effects Element - The GALL states, "Fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur." The LRA states, "NUREG-1801 specifies annual gasket inspections. Under the VYNPS program, visual inspection, re-racking and replacement of gaskets in couplings is to occur at least once per 18 months." What is the justification of extending the test frequency?
B.1.12.2-L-07	Detection of Aging Effects Element - The GALL states, "Fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur." The LRA states, "NUREG-1801 specifies annual fire hydrant flow tests. Under the VYNPS program, verification of operability and no flow blockage occurs at least once every 3 years." What is the justification of extending the test frequency?
B.1.12.2-L-08	Detection of Aging Effects Element -The GALL states, "These inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation." The LRA states, "NUREG-1801 specifies sprinkler systems inspections once every refueling outage. Under the VYNPS program, visual inspection of deluge and pre-action system piping to verify their integrity occurs at least once per 24 months. Since aging effects are typically manifested over several years, differences in inspection and testing frequencies are insignificant." What is the fueling cycle at VYNPS?
B.1.12.2-L-09	Detection of Aging Effects Element - The GALL states, "Sprinkler heads are inspected before the end of the 50-year sprinkler head service life and at 10-year intervals thereafter during the extended period of operation to ensure that signs of degradation, such as corrosion, are detected in a timely manner." The LRA says "A sample of sprinkler heads will be inspected using guidance of NFPA 25 (2002 Edition) Section 5.3.1.1.1. NFPA 25 also contains guidance to repeat this sampling every 10 years after initial field service testing." Is there a VYNPS commitment associated with this enhancement?

Question No.	Question
B.1.12.2-L-10	<p>Detection of Aging Effects Element - The GALL Report states, "Fire protection system testing is performed to assure that the system functions by maintaining required operating pressures. Wall thickness evaluations of fire protection piping are performed on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion. These inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation." The LRA states, "Wall thickness evaluations of fire protection piping will be performed on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion: These inspections will be performed before the end of the current operating term and at intervals thereafter during the period of extended operation. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function." Is there a VYNPS commitment associated with this enhancement?</p>
B.1.13-L-01	<p>Program Description Item - The GALL states, "The program includes performing, (a) an analysis to determine critical locations, (b) limited baseline inspections to determine the extent of thinning at these locations, and (c) follow-up inspections to confirm the predictions, or repairing or replacing components as necessary." The LRS states "This program includes (a) an evaluation to determine critical locations, (b) initial operational inspections to determine the extent of thinning at these locations, and (c) follow-up inspections to confirm predictions, or repair or replace components as necessary." How were the critical locations at VYNPS determined?</p>
B.1.14-K-01	<p>What parameters are monitored for the aging effects managed by this AMP? In reviewing the AMRs which invoke this AMP, there are no heat transfer degradation aging effects mentioned, where is this aging effect managed for the components within the program scope of the Heat Exchanger Monitoring AMP? If this aging effect does not need to be managed for these components, please explain why not.</p>
B.1.14-K-02	<p>Please explain why visual inspection is sufficient to manage the loss of material from heat exchanger heads, cover and tube sheets before the loss of intended function?</p>
B.1.14-K-03	<p>What is the frequency of inspections of the components within the scope of this program? What is the basis for this inspection frequency?</p>
B.1.14-K-04	<p>What is the basis for determining the sample population for the inspections? Are there criteria for adjusting the sample population?</p>
B.1.14-K-05	<p>What is the basis for the wall thickness acceptance criteria?</p>

Question No.	Question
B.1.15.1-W-01	Provide drawings for the sand pocket region of the Drywell. Provide drawings for the refueling bellows detailing how they are stored, installed, connected and sealed. Provide procedures for how the refueling bellows are used. Provide drawings of the Drywell showing the gap and fill material between the secondary concrete shield wall from the refueling bellows/cavity seal connection down to the sand pocket region. Provide the VYNPS response to Generic Letter 87-05.
B.1.15.1-W-02	It is stated in the VYNPS UFSAR that all interior and exterior drywell surfaces which are exposed to the atmosphere are protected from corrosion by application of a corrosion resistant coating material. However, in the VYNPS LRA it is stated that VYNPS does not rely on protective coating to manage the effects of aging. The VYNPS LRA Appendix B does not have a Protective Coating Monitoring and Maintenance Program section. However, there is a GALL AMP XI.S8 called Protective Coating Monitoring and Maintenance Program which states the following: Proper maintenance of protective coatings inside containment (defined as Service Level I) is essential to ensure operability of post-accident safety systems that rely on water recycled through the containment sump/drain system. Explain why VYNPS does not have a Service Level I Protective Coating Monitoring and Maintenance Program to prevent coating failure that could adversely affect the operation of post-accident fluid systems and thereby impair safe shutdown. Provide a copy of the VYNPS response to GL 98-04 and discuss if VYNPS considers the maintenance programs described acceptable coatings AMPs for license renewal.
B.1.15.1-W-03	Explain why the Containment Inservice Inspection Program is a plant-specific program instead of a ASME Section XI, subsection IWE program with exceptions. Since VYNPS states the Containment Inservice Inspection Program is plant specific and not a ASME Section XI, subsection IWE program, explain if any proposed alternatives have been authorized by the NRC Director of the Office of Nuclear Reactor Regulation and if so, provide the authorization. Explain why the scope of the Containment Inservice Inspection Program does not include containment seals, gaskets and pressure retaining bolts. Explain under what VYNPS AMPs the inspection of these components are performed. It is stated in the VYNPS LRA that the Containment Inservice Inspection Program is an existing program. Explain if this program has been in compliance with ASME Section XI, subsection IWE since the final rulemaking to require IWE inspections was made by the NRC in 1996. Provide a copy of the VYNPS notification of commitment to IWE inspections sent to the Director of the Office of Nuclear Reactor Regulation.
B.1.15.1-W-04	Provide the VYNPS procedure which implements the inservice inspection of the containment in accordance with ASME Section XI, subsection IWE.

Question No.	Question
B.1.15.1-W-05	<p>Explain how inspections are performed in the torus suppression pool above and below the waterline. Explain historically what inspection findings have lead to the need for augmented inspections. Explain if any augmented inspections are currently being performed. The LRA states that VYNPS uses inspection program B for containment inservice inspection. Provide the inspection interval dates through the current license and also through a possible license extension period.</p>
B.1.15.1-W-06	<p>VYNPS lists several Containment Inservice Inspection findings under operating experience for AMP B.1.15.1 in the LRA. Provide the documentation for these findings from RFO 21, 22, and 24 showing when, where and how they were discovered. Also, provide the documentation on how they were evaluated and resolved with a discussion on the need for any augmented inspections. Explain why the operating experience discusses the drywell moisture barrier when the inspection of it does not appear to be in the scope of the VYNPS Containment Inservice Inspection Program. Provide the documentation for any containment inspection findings from the most recent RFO if beyond 24. Explain if water leakage has ever been discovered between the drywell and concrete secondary shield wall or in the sand pocket area. Explain what VYNPS does to inspect for water leakage in these two areas or to verify that loss of material is not occurring on the backside of the Drywell. Provide the documentation for the RFO 24 issues identified by QA surveillance that are discussed in the operating experience. Provide the latest engineering system health report for the containment inservice inspection program.</p>
B.1.17-N-01	<p>GALL XI.E3 under "Detection of Aging Effects" recommends that the inspection for water collection should be performed based on actual plant experience with water accumulation in the manhole. However, the inspection frequency should be at least once every two years. VYNPS AMP B.1.17 under the same attribute requires inspection for water collection in cable manholes and conduit occur at least once every two years. Explain how actual plant experience is considered in the manhole inspection frequency to be consistent with GALL's XI.E3.</p>
B.1.17-N-02	<p>In AMP B.1.17 under the "Operating Experience" element, you have stated that the "Non-EQ Inaccessible Medium-Voltage Cable Program" at VYNPS is a new program for which there is no operating experience. GALL XI.E3 under the same element states that operating experience has shown that cross linked polyethylene (XLPE) or high molecular weight polyethylene (HMWPE) insulation materials are most susceptible to water tree formation. The formation and growth of water trees varies directly with operating voltage. Water treeing is much less prevalent in 4kV cables than those operated at 13 or 33kV. Also, minimizing exposure to moisture minimizes the potential for the development of water treeing. As additional operating experience is obtained, lessons learned can be used to adjust the program, as needed. NUREG-1800, Rev. 1, Appendix A, Branch Technical Position RLSB-1 states that an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. Describe how operating experience is captured at VYNPS to confirm program effectiveness or how it is to be used to adjust the program as needed.</p>

Question No.	Question
B.1.17-N-03	As stated in FSAR Section 8.3.3 (Page 8.3-5 of 8), the underground power lines - which run from the adjacent Vernon Hydroelectric Station to station switchgear - have been designated as the Station Backout alternate ac source. Thus; they are used to meet Station Blackout requirements 10 CFR 50.63. Are these cables included in the scope of AMP B.1.17? If not, provide an explanation.
B.1.18-N-01	In AMP B.1.18, you have stated that for neutron flux monitoring system cables that are disconnected during instrument calibration, testing is performed at least once every 10 years . GALL XI.E2 recommends that the test frequency shall be determined by the applicant based on engineering evaluation, but the test frequency shall be at least once every ten years. Explain how engineering evaluation is considered in the test frequency; in order to be consistent with GALL XI.E2.
B.1.18-N-02	Confirm that the test includes both cables and connections.
B.1.19-N-01	In AMP B.1.19 you have stated that the a representative sample of accessible insulated cables and connections, within the scope of license renewal, will be visually inspected for cable and connection jacket surface anomalies such as embrittlement, discoloration, cracking or surface contamination. The technical basis for sampling will be determined using EPRI document TR-109619, "Guideline for the Management of Adverse Localized Equipment Environments". Explain the technical basis for cable sampling.
B.1.19-N-02	In AMP B.1.19 under the "Operating Experience" element, you have stated that the Non-EQ Insulated Cables and Connection Program at VYNPS is a new program for which there is no operating experience. GALL XI.E1 under same element states that operating experience has shown that adverse localized environments caused by heat or radiation for electrical cables and connections may exist next to or above (within three feet of) steam generators, pressurizers or hot process pipes, such as feedwater lines. These adverse localized environments have been found to cause degradation of the insulating materials on electrical cables and connections that is visually observable, such as color changes or surface cracking. NUREG-1800, Rev. 1, Appendix A, Branch Technical Position RLSB-1 under operating experience states that an applicant may have to commit to providing operating experience in the future for a new program to confirm its effectiveness. Describe how operating experience will be captured by VYNPS.
B.1.20-K-01	How is the lubricating oil sampled and what is the frequency of sampling? Provide a representative procedure used to sample the lubricating oil.
B.1.20-K-02	What is the technical basis for the sampling frequency?

Question No.	Question
B.1.20-K-03	How are the limits for the oil sample contaminants established? Are the same limits applied to all components? Provide at least one example of a test procedure including the acceptance criteria.
B.1.20-K-04	Using the components within the scope of license renewal, roughly what fraction of the components are in systems which undergo periodic oil changes?
B.1.20-K-05	What criteria are used to determine when the oil is to be changed?
B.1.20-K-06	For those components that do not have regular oil changes, please provide the engineering justification for not determining the flash point for the sampled oil in order to verify that the oil is suitable for continued use.
B.1.20-K-07	Please identify the typical sampling frequency and provide the basis for establishing the sampling frequency.
B.1.20-K-08	Provide a representative plant procedure which is used to sample the oil including the parameters monitored and the acceptance criteria.
B.1.20-K-09	How are the alert levels or action limits established? What plant department evaluates the trending of the data and what criteria are used to determine if the trends are unusual?
B.1.20-K-10	What method or industry standard is used to determine the particle concentration in the oil sample? What is the basis for the limits on water and particle concentration?
B.1.20-K-11	If a limit is reached or exceeded as the result of the oil sample test, what is the nature of the corrective actions that are taken?
B.1.20-K-12	Have there been any instances of component failures attributed to lubricating oil contamination? If so what changes, if any were made to the Oil Analysis Program?
B.1.20-K-13	Provide the last two QA Surveillance or Self-Assessment Reports on the Oil Analysis Program.
B.1.21-K-01	What are the required qualifications for personnel performing the inspections?

Question No.	Question
B.1.21-K-02	How is the representative sample size developed for the inspection program?
B.1.21-K-03	Please provide a table outlining the inspection methods used for each aging effect and parameter monitored or inspected. This should be consistent with the table provided in GALL Report AMP XI.M32. If not, provide a justification for any exceptions to this table.
B.1.21-K-04	What subsequent actions are taken in the event that aging effects are detected? This should include a discussion of how the sample size and or locations are adjusted.
B.1.21-K-05	What acceptance criteria are established to evaluate the conditions detected during the inspections?
B.1.22-M-01	As stated by the applicant, "...prior to the period of extended operation, program activity implementing documents will be enhanced as necessary to assure that the effects of aging will be managed..". The applicant is asked to provide a listing of which specific PSPM plant implementing documents will be enhanced and why such an enhancement is necessary for each implementing document.
B.1.22-M-02	In the statement for the "operating experience" element of the AMP, the applicant, notes that "...the material condition of cranes was consistent with inspection acceptance criteria..", and "...ECCS corner room recirculation units had no significant corrosion..". By the appearance of these statements in the "operating experience" of the PSPM, is the staff to understand that the applicant intends to use the applicant's PSPM AMP in lieu of the GALL-recommended programs - XI.M23, "Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems", and XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"- during the period of extended operation?
B.1.23-K-01	The table provided in the program description in section B.1.21 indicates that the one-time inspection activity will confirm that the loss of fracture toughness is not occurring or is so insignificant that an aging management program is not warranted. What inspection method is used to detect this aging effect and what parameter is monitored?
B.1.23-K-02	What actions are to be taken if evidence of aging is detected in Class 1 small bore piping?
B.1.23-K-03	What acceptance criteria are used to initiate corrective actions?

Question No.	Question
B.1.23-K-04	What, if any, inspections have been conducted under this program? If available provide representative inspection results.
B.1.23-K-05	What is Vermont Yankee's operating experience with Class 1 piping less than 4 inches NPS in terms of cracking?
B.1.23-M-01	As noted in the GALL, [Section XI.M3, Element Number four (4) - "Detection of Aging Effects"]; GALL-recommended programs use visual, surface, and volumetric examinations, to indicate the presence of surface discontinuities/flaws and other discontinuities/flaws <u>throughout the volume of material</u> . The applicant's proposed exception states that cracking initiates on the outside surfaces of the bolts/studs, and by meeting acceptance standards of IWB-3515, this "surface-type" examination will "...provide at least the sensitivity of flaw detection that an end shot ultrasonic examination provides on bolts/studs...". The applicant is asked to provide further evidence that such a "qualified surface examination" provides the stated level of sensitivity with the thoroughness of other GALL-recommended programs.
B.1.23-M-02	Replacement stud bolts at Yankee Rowe used a manganese phosphate surface treatment in combination MoS2 to prevent bolt degradation due to corrosion or hydrogen embrittlement. The applicant's AMP notes that Vermont Yankee's existing program includes preventive measures, such as "appropriate materials", to mitigate cracking and loss of material. GALL Section XI.M2, [Element Number two (2) - "Preventive Actions"] states that the use of this type of surface treatment is acceptable and effective. Does the applicant use similar bolting with a similar type of surface treatment?
B.1.23-M-03	As noted in GALL, Section XI.M3, [Element Number ten (10) - "Operating Experience"]; GALL-recommended programs should have provisions regarding inspection techniques and evaluation. The applicant states, in its explanation of their existing program, that "...recent (2002 and 2004) visual and ultrasonic inspections...revealed no recordable indications..". The applicant is asked to compare examinations performed in 2002 and 2004 with the "exception-stated" examination technique proposed for future examinations and to provide to the staff the results of this comparison.
B.1.25-P-01	Please confirm that in each case where "Material" is identified as copper alloy >15% or <15% Zn, an appropriate accommodation for manufacturing tolerances is made.

Question No.	Question
B.1.26-W-01	Provide a copy of the documentation sent to the NRC associated with the VYNPS response to GL 89-13 that forms the basis for the Service Water Integrity AMP, including any commitments for inspection and testing. Provide examples of VYNPS plant procedures used to implement the requirements of GL 89-13/Service Water Integrity AMP for routine inspection and maintenance of the service water systems. Include examples of actual visual and NDE testing. Explain any differences between the GL 89-13 program scope and the Service Water Integrity Program scope for license renewal.
B.1.26-W-02	Provide the original (or current if pipe has been replaced) material and lining specification for the buried piping which is part of the service water system, including the alternate cooling system.
B.1.26-W-03	VYNPS takes exception to GALL AMP XI.M20 element 2 by stating that not all VYNPS service water system components are lined or coated. Components are lined or coated only where necessary to protect the underlying metal surfaces. Provide an itemized list of the piping in the service water system where it is lined or coated to protect the underlying metal surfaces. Provide the type of lining or coating for each item on the list.
B.1.26-W-04	Explain if there any portions of the service water system that are infrequently used and are periodically flushed. If so, describe these portions and how often they are flushed. Explain the criteria used to initiate the flushing. Explain if any other flushing of the system is done and how the strainers are cleaned. Discuss the historic inspection results of the gravity portion of the ACS piping coming from the deep water basin and if this has been a problem area with flow blockage.
B.1.26-W-05	VYNPS takes exception to GALL AMP XI.M20 element 5 by stating that the VYNPS program requires tests and inspections each refueling outage, but not annually. Provide documentation that this frequency is in agreement with the commitments made by VYNPS under GL 89-13. Provide the frequency of heat transfer testing for each heat exchanger in the service water system. The applicant is requested to state which VYNPS group is responsible for reviewing the test data and to provide through a plant procedure an example of how this process is implemented. Explain the type of heat transfer testing which is done on the service water system heat exchangers.

Question No.	Question
B.1.26-W-06	Provide the NRC inspection report written in 2002 for the service water system. Characterize the 20 service water system leaks and how they were repaired under the VYNPS corrective action program. Provide the VYNPS self-assessment and independent evaluation which was completed on 12/20/2002. Provide an example of the documents which provide the protocols for the use of biocides to mitigate MIC and any other procedure changes made after the self-assessment. Provide a sampling of the different performance testing and inspection results for 2004 that are discussed in the LRA operating experience with acceptance criteria. If more recent performance testing and inspection results are available, provide a sampling of them.
B.1.26-W-07	Explain how plant specific and industry operating experience along with previous inspection results influence the determination of what parameters are monitored, inspected or tested in the future.
B.1.27.1-W-01	Provide the NRC SER for VYNPS's response to IEB 80-11.
B.1.27.1-W-02	Provide a masonry wall inspection report for an unreinforced masonry wall.
B.1.27.1-W-03	Explain how often masonry walls are inspected for cracking. Explain if the inspection frequency varies from wall to wall. If the frequency does vary, explain the basis for the differences in frequency. Explain the qualification and training that is required of the inspection personnel. Explain if inspectors use crack maps during the inspections to help in the detection of changes.
B.1.27.1-W-04	Explain if Masonry Wall crack changes are turned over to engineering for evaluation and documentation by procedure. Provide the procedure for performing the Masonry Wall crack inspections. What engineering procedures are used to control and evaluate the attachment of new components to masonry walls evaluated under NRC IEB 80-11? Explain if there is a masonry wall log book or data base to track new attachments to block walls and evaluate the effects on the existing evaluations performed under 80-11?
B.1.27.1-W-05	Provide examples of reports from the two most recent Masonry Wall inspections. Also, provide the last four inspection reports for one unreinforced Masonry Wall without bracing, one reinforced Masonry Wall without bracing and one steel braced Masonry Wall.
B.1.27.2-W-01	Provide access to NUMARC 93-01.

Question No.	Question
B.1.27.2-W-02	Four enhancements are planned to bring the Structures Monitoring Program into conformance with the GALL Section XI.S6 program description. How are these enhancements tracked to make sure the enhancements will be incorporated into the program?
B.1.27.2-W-03	The program description in the LRA for the Structures Monitoring Program (B.1.27.2) makes no reference to GALL, Section XI.S7, RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants. GALL XI.S7 states that for plants not committed to RG 1.127, Revision 1, aging management of water-control structures may be included in the Structures Monitoring Program. However, details pertaining to water-control structures are to incorporate the attributes of GALL XI.S7. Explain if VYNPS is committed to RG 1.127 Revision 1 for inspection of its water control structures (such as Intake Structure). If VYNPS is not committed to RG 1.127 Revision 1, explain how the 10 element attributes of GALL XI.S7 are incorporated into the VYNPS Structures Monitoring Program.
B.1.27.2-W-04	Explain why the drywell floor liner seal and other components are not part of the ASME Section XI subsection IWE inspection program. Justify this exclusion. Explain why the inspection of crane rails and girders are not under an Inspection of Overhead Heavy Load and Light Load Handling Systems AMP. Explain if all the structures and components being added to the Scope of Program for this AMP by enhancement are currently inspected by another program, since the SMP is an existing program.
B.1.27.2-W-05	What specific structures/buildings/components are under the scope of the Structures Monitoring AMP for License Renewal?
B.1.27.2-W-06	Provide verification that VYNPS uses ACI 349.3R-96 and ANSI/ASCE 11-90 as a basis for developing acceptance criteria for concrete and steel elements.
B.1.27.2-W-07	Explain if VYNPS has any porous concrete subfoundations and a site dewatering system. Explain if the Structures Monitoring Program requires periodic sampling and testing of groundwater to determine and confirm that the below grade water chemistry/soil is non-aggressive to concrete structures below grade. Provide the results for the two most recent tests and provide the scheduled frequency of groundwater monitoring. Explain if there is any seasonal consideration for groundwater monitoring.

Question No.	Question
B.1.27.2-W-08	Will VYNPS take advantage of inspection opportunities for structures required for license renewal and identified as inaccessible? As inaccessible areas become accessible by such means as excavation or other reason, will additional inspections of those areas be performed?
B.1.27.2-W-09	Provide the VYNPS procedure for the Structures Monitoring Program that specifies aging effects to inspect for, inspection methods, the inspection schedule and inspector qualifications. Explain the qualifications and training requirements needed for an individual to perform crane rail/girder and containment seals, gaskets and moisture barrier inspections at VYNPS. Explain the examination method for the seals, gaskets and moisture barrier.
B.1.27.2-W-10	Provide drawings of the Cooling Towers that show where wood structural members are utilized in their construction. Provide drawings that show PVC Cooling Tower fill.
B.1.27.2-W-11	Explain how the frequency of inspection for the structures, buildings and components within the scope of this program are affected when aging effects are discovered.
B.1.27.2-W-12	Explain if the inspection acceptance criteria for the Structures Monitoring Program is based on ACI 349.3R-96, and if not, provide the industry codes, standards and guidelines that the acceptance criteria is based on. Explain the basis of the acceptance criteria for crane rail/girder inspections and drywell floor liner seal.
B.1.27.2-W-13	<p>VYNPS lists the following structure issues under operating experience for this AMP.</p> <ul style="list-style-type: none"> <li>• Concrete pad above JD diesel generator day tank sinking and cracking</li> <li>• Degradation of Cooling Tower structural column</li> </ul> <p>Provide the documentation for these issues showing when, where and how they were discovered. Also, provide the documentation on how these issues were evaluated and resolved with a discussion on the need for any followup inspections.</p> <p>Provide the most recent inspection results for the reactor building overhead crane rails/girders, reactor building (a few examples of areas where aging has been discovered), cooling towers, and intake structure (a few examples of areas where aging has been discovered). Provide the last three inspection reports for the drywell floor liner seal.</p>

Question No.	Question
B.1.27.3-W-01	<p>Explain which VYNPS individual is responsible for the coordination of Vernon Dam FERC inspections. Explain the process of VYNPS interfacing with FERC with respect to Vernon Dam and if there are any plant procedures for the interface. If there are plant procedures for dealing with FERC, provide a current copy. Explain if VYNPS has any influence on what and when repairs are made on Vernon Dam from a management or economic standpoint. Provide the most recent Vernon Dam assessment performed by FERC. Explain how VYNPS receives the report and if the report is independently reviewed by any VYNPS personnel such as in systems or design engineering.</p>
B.1.27.3-W-02	<p>The operating experience for this AMP states that daily inspections are made of Vernon Dam and periodic underwater inspections are made on the Dam. Explain what organization makes the daily inspections and the underwater inspections. Explain how often the underwater inspections are performed and what determines the frequency. Explain if VYNPS has ever independently inspected Vernon Dam. Explain if any flooding has occurred which required additional FERC inspections beyond the normal 5 year. The operating experience states that areas of degradation were found on Vernon Dam during the 2002 FERC inspection and will continue to be monitored. Explain if the continued monitoring is by FERC on a five year cycle or by VYNPS personnel on a more frequent basis. Explain the type and number of staff that work at Vernon Dam on a daily basis to maintain it. Explain if and how any personnel at Vernon Dam have the ability to communicate immediately with responsible individuals at VYNPS should a problem develop at the Dam which could affect the availability of plant cooling water.</p>
B.1.28-L-01	<p>Program Description Item -The GALL states, "The External Surfaces Monitoring program is based on system inspections and walkthroughs. This program consists of periodic visual inspections of steel components such as piping, piping components, ducting, and other components within the scope of license renewal and subject to AMR in order to manage aging effects. The program manages aging effects through visual inspection of external surfaces for evidence of material loss. Loss of material due to boric acid corrosion is managed by the Boric Acid Corrosion Program." The LRA states, "This program entails inspections of external surfaces of components subject to aging management review. The program is also credited with managing loss of material from internal surfaces, for situations in which internal and external material and environment combinations are the same such that external surface condition is representative of internal surface condition." What materials are within the scope of this AMP? What examination methods are used?</p>

Question No.	Question
B.1.30.1-M-01	<p>The applicant's AMP notes that Vermont Yankee's existing program will be enhanced in order to "...flush the John Deere diesel cooling water system..."; however there is no mention of any periodic monitoring or sampling of the system, as recommended by GALL [Section XI.M2, Element Number five (5) - "Monitoring and Trending"]. Since the applicant is currently and periodically sampling and analyzing the cooling water of the other systems "controlled" by this program - the stator cooling water and plant heating boiler systems - is it intent of the applicant to also periodically sample and analyze the John Deere Diesel cooling water system?</p>
B.1.30.2-M-01	<p>The applicant's AMP refers to BWRVIP-130, "BWR Water Chemistry Guidelines, Electric Power Research Institute, Palo Alto, CA, October 2000", as the "document of record" for the BWR water chemistry control program at Vermont Yankee. However, the document is not listed as one of the LRA Appendix C documents. Do you intend to list and address BWRVIP-130 as one of the "Response to BWRVIP Applicant Action Items"?</p>
B.1.30.2-M-02	<p>Section XI.M2 of the GALL notes that a "water chemistry only" program may not be fully effective for verification of corrosion or SCC in slow flow or stagnant flow areas. The GALL further suggests that for some of these "susceptible locations" a one-time inspection verification program may be appropriate. Do you intend to implement a "one-time inspection (or some other program) to verify existence of corrosion or SCC in these "susceptible locations"?</p>
B.1.30.2-M-03	<p>Section XI.M2 - Element Number four (4) - of the GALL notes that the staff considers a BWR water chemistry program as a "...mitigation program and (that it) does not provide detection of any aging effects...". The GALL further states that "...inspection of select components (should) be undertaken to verify the effectiveness of the program...". The applicant's AMP does not present any other program - other than the indirect results of their existing water chemistry program - to verify effectiveness of the chemistry control program. Do you intend to perform "other" inspections, as suggested by the GALL, "...to ensure that significant degradation is not occurring and that intended functions of system components will be maintained during the extended period of operation..."?</p>
B.1.30.3-M-01	<p>The applicant's exception for this AMP states that "...monitoring pump performance parameters is of little value in managing effects of aging on long-lived, passive CCW system components...". The associated GALL for this AMP (XI.M21; Element 4) states that "...control of water chemistry does not preclude corrosion or SCC at locations of stagnant flow conditions or crevices...". How does this AMP ensure that a stagnant flow condition or crevice will not be periodically present in system piping during the period of extended operation?</p>

Question No.	Question
B.1.30.3-M-02	The applicant's exception for this AMP also states that "...in most cases, functional and performance testing verifies that the component active functions can be accomplished and as such would be included as part of the maintenance rule...". Does this AMP reference or refer to "maintenance rule activities" as part of planned aging management actions; i.e., actions which address GALL XI.M21 "parameters monitored/inspected"?
B.1.30.3-M-03	In the applicant's "operating experience" section of the AMP description, the following statement is presented; "...QA auditors also confirmed implementation of improvements recommended during previous program audits...". Could you provide the NRC audit team (the staff) with a listing of these 2003 recommended improvements?
<b>AMRs</b>	
A-P-01	Please clarify the rationale for the unusual numbering system used for auxiliary systems after the first 12. (Note: This question is arbitrarily linked to the first item of Table 3.3.1-13-1)
3.1.1-14-P-01	"Support" is not listed as an intended function Please clarify which IF (SNS, SRE, and/or SSR) is intended.
3.6.2.2-N-01	In LRA, Table 3.6.2-1, under Cable connections (metallic parts), you have stated that no aging effects requiring management and no AMP is required. Further, in LRA, Table 3.6.1 under discussion of cable connection metallic parts, you have stated that cable connections outside of active devices are taped or sleeved for protection and operating experience with metallic parts of electrical cable connections at VYNPS indicated no aging effects requiring management. Electrical cable connections (metallic parts) are subject to the following aging stressors: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. NUREG-1801, Revision 1, AMP XI.E6, "Electrical Cable Connection not Subject to 10 CFR 50.49 Environmental Qualification Requirements," specifies that connections associated with cables within the scope of license renewal are part of this program, regardless of their association with active or passive components. Also, refer to pages 107, 256, and 257 of NUREG-1833, "Technical Bases for Revision to the License Renewal Guidance Documents," for additional information regarding AMP XI.E6. Provide a basis document including an AMP with the ten elements for cable connections or provide a justification for why an AMP is not necessary.

Question No.	Question
3.6.2.2-N-02	<p>In LRA, Table 3.6.2-1, under switchyard bus (switchyard bus for SBO) and connections you have stated no aging effects requiring management and no AMP is required. NUREG 1800, Rev. 1, Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants, Section 3.6.2.2.3 identifies loss of preload is an aging effect for switchyard bus connections. Torque relaxation for bolted connection is a concern for switchyard bus connections. An electrical connection must be designed to remain tight and maintain good conductivity through a large temperature range. Meeting this design requirement is difficult if the material specified for the bolt and the conductor are different and have different rates of thermal expansion. For example, copper or aluminum bus/conductor materials expand faster than most bolting materials. If thermal stress is added to stresses inherent at assembly, the joint members or fasteners can yield. If plastic deformation occurs during thermal loading (i.e., heatup) when the connection cools, the joint will be loose. EPRI document TR-104213, "Bolted Joint Maintenance &amp; Application Guide," recommends inspection of bolted joints for evidence of overheating, signs of burning or discoloration, and indication of loose bolts. Provide a discussion why torque relaxation for bolted connections of switchyard bus is not a concern for VYNPS.</p>
3.6.2.2-N-03	<p>Provide AMR line item for transmission conductor connections in Table 3.6.2-1. Address any aging effects requiring management.</p>
3.6.2.2-N-04	<p>In LRA, Table 3.6.2-1, under Transmission conductors, you have stated that no aging effects requiring management and no AMP is required. NUREG 1800, Rev. 1, Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants, Section 3.6.2.2.3 identifies loss of conductor strength due to corrosion is the aging effect of high voltage transmission conductor. The most prevalent mechanism contributing to loss of conductor strength of aluminum core steel reinforce (ACSR) transmission conductor is corrosion which includes corrosion of steel core and aluminum strand pitting. Degradation begins as a loss of zinc from the galvanized steel core wires. Corrosion rate depend largely on air quality, which includes suspended particles chemistry, sulfur dioxide concentration in air, precipitation, fog chemistry and meteorological conditions. Explain why loss of conductor strength due to corrosion is not an aging effect requirement management for transmission conductors at VYNPS.</p>
3.6.2.2-N-05	<p>In LRA, Table 3.6.2-1, under high voltage insulators, you have indicated that no aging effects requiring management and no AMP is required. In LRA, Section 3.6.2.2 .2, you have also stated that at VYNPS surface contamination build-up on insulator is not a concern. NUREG 1800, Rev. 1, Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants, Section 3.6.2.2.3 identifies surface contamination is the aging effect of high voltage insulators. Various airborne materials such as dust and industrial effluent can contaminate insulator surfaces. The buildup of surface contamination is gradual and in most areas such contamination is washed away by rain; the glazed insulator surface aids this contamination removal. However, a large buildup of contamination enables the conductor voltage to track along the surface more easily and can lead to insulator flashover. Surface contamination can be a problem in areas where there are greater concentration of</p>

Question No.	Question
	airborne particles such as near facilities that discharge soot. Explain why surface contamination is not a concern at VYNPS.
3.6.2.2-N-06	Are all electrical and I&C containment penetrations EQ? If not, provide AMRs and AMPs for non-EQ electrical and I&C containment penetrations. The AMRs should include both organic ( XLPE, XLPO, and SR internal conductor/pigtail insulation, etc.) as well as inorganic material (such as cable fillers, epoxies, potting compounds, connector pins, plugs, and facial grommets).
3.6.2.2-N-07	<p>In LRA, Table 3.6.1 under metal enclosed bus, you have stated that an evaluation of metal enclosed bus for VYNPS determined that VYNPS does not have any phase bus that support a license renewal function. 10 CFR 54.4 (a)(3) requires, in part, that all systems, structures, and components relied on in safety analyses or plant evaluation to perform a function that demonstrates compliance with the commission's regulations for station black out (10 CFR 50.63) are within the scope of license renewal. VYNPS FSAR Section 8.3.3 states that electric power supplied from the transmission network to the on-site electric distribution system by two independent circuits, one immediate access and one delayed access. The immediate access circuit is supplied from the 345 kV transmission system through 345 kV/115 kV auto-transformer. It feeds the on-site electric distribution system through the two 115 kV to 4160 V start up transformers and is available immediately following a loss of generating capability. The delay access circuit is available by opening the generator no-load disconnect switch and establish a feed from the 345 kV switchyard through the main generator step-up transformer and unit auxiliary transformer to the 4160 V safety buses. Answer the following questions and support them with a main one line diagram:</p> <p><b><u>3.6.2.2-7(a).</u></b> In regard to the above, are non-segregated phase buses used to connect the start up transformers (T-3A and T-3B) (lower sides) to 4.16 kV safety buses?</p> <p><b><u>3.6.2.2-7(b).</u></b> In regard to the above, are iso phase buses used to connect the delay access circuit from the 345 kV switchyard through the main generator step-up transformer and unit auxiliary transformer?</p> <p><b><u>3.6.2.2-7(c).</u></b> In regard to the above, are non-segregated phase buses used to connect the unit auxiliary transformer (lower sides) to 4.16 kV safety buses?</p> <p>If the answer to a, b, or c is yes, explain why metal enclosed buses (iso phase and/or non-segregated phase buses) are not in scope of license renewal and not require an AMP.</p>

Question No.	Question
3.6.2.2-N-08	<p>10 CFR 54.4 (a)(3) requires, in part, that all systems, structures, and components (SSCs) relied on in safety analyses or plant evaluation to perform a function that demonstrates compliance with the commission's regulations for station black out (10 CFR 50.63) are within the scope of license renewal. Vernon Hydroelectric Station has been designated as the Station Blackout (SBO) alternate ac (AAC) source and is used to meet SBO requirements 10 CFR 50.63. Are all SSCs (including electrical components) associated with Vernon Hydroelectric Station included in the scope of licensee renewal? If they are not, explain why not. If they are, provide an AMR for long-lived, passive SSCs associated with the hydro station.</p>

**Audit and Review Plan for  
Plant Aging Management Programs  
and Reviews**

**Vermont Yankee Nuclear Power Station  
Docket No.: 50-271**

April 5, 2006

Revision 0

Prepared by  
Information Systems Laboratories, Inc.  
11140 Rockville Pike  
Rockville, MD 20852

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License Renewal Branch C  
Division of License Renewal  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
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## **Audit and Review Plan for Plant Aging Management Programs and Reviews Vermont Yankee Nuclear Power Stations**

### **1. Introduction**

By letter dated January 27, 2006 (Agencywide Documents Access and Management System [ADAMS] Accession Number ML060300082), Entergy Nuclear Vermont Yankee, LLC (Entergy VY), the applicant, submitted to the U.S. Nuclear Regulatory Commission (NRC) its application for renewal of Operating License DPR-28 for Vermont Yankee Nuclear Power Station (VYNPS) (ML060300085). The applicant requested renewal of its operating license for an additional 20 years beyond the 40-year current license term.

In support of the staff's safety review of the license renewal application (LRA) for VYNPS, the Division of License Renewal (DLR), License Renewal Branch C (RLRC), will lead a project team that will audit and review aging management reviews (AMRs), aging management programs (AMPs), and time-limited aging analyses (TLAAs) developed by the applicant to support its LRA for VYNPS. The project team will include NRC staff and contractor personnel provided by Information Systems Laboratories, Inc. (ISL), RLRC's technical contractor. Appendix A, "Project Team Members," lists the project team members. This document is the RLRC plan for auditing and reviewing of assigned aging management reviews, aging management programs, and time-limited aging analysis for VYNPS.

The project team will audit and review its assigned AMRs, AMPs and TLAAs against the requirements of Title 10 of the *Code of Federal Regulations*, Part 54 (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants;" the guidance provided in Revision 1 of NUREG-1800, "Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants" (SRP-LR); the guidance provided in Revision 1 of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," and this audit and review plan. In the following sections of this document, references to NUREG-1800 and NUREG-1801 will be to the Revision 1 versions of these documents. For the scope of work defined in this audit and review plan, the project team will determine that the applicant's aging management activities and programs will adequately manage the effects of aging on structures and components, so that their intended functions will be maintained consistent with the VYNPS current licensing basis (CLB) for the period of extended operation.

The project team will perform its work at NRC Headquarters, Rockville, Maryland; at ISL's offices in Rockville, Maryland; and at the VYNPS site near Brattleboro, Vermont. The project team will perform its work in accordance with the schedule shown in Appendix B, "RLRC Schedule for LRA Safety Review." The project team will conduct a public exit meeting at the applicant's offices in Brattleboro, Vermont, after it completes its on-site work.

This plan includes the following information:

- **Introduction and Background.** Summary of the license renewal requirements, as stated in the *Code of Federal Regulations*, and a summary of the documents that the project team will use to conduct the audit and review process described in this plan.

- **Objectives.** The objectives of the audits and reviews addressed by this audit and review plan.
- **Summary of Information Provided in License Renewal Application.** Description of the information contained in the license renewal application for VYNPS that is applicable to this plan.
- **Overview of the Audit, Review, and Documentation Procedure.** Summary of the process that the project team will follow to conduct its audit and review of the VYNPS LRA.
- **Planning, Audit, Review, and Documentation Procedure.** The procedure that the project team will use to plan and schedule its work, to audit and review the VYNPS LRA information that is within its scope of review, and to document the results of its work.
- **Appendices.** Supporting information. The project team members are shown in Appendix A and the schedule is shown in Appendix B. The project team's work assignments are shown in Appendices C, D and E. Appendices F, G and H are the worksheets that the individual project team members use to document the results of their audit and review audit work. The application of these worksheets is discussed in Section 6 of this audit and review plan. Appendix I is a list of the abbreviations and acronyms used in this audit and review plan.

## 2. Background

In 10 CFR 54.4, the scope of license renewal is defined as those systems, structures and components (SSCs) (1) that are safety-related, (2) whose failure could affect safety-related functions, and (3) that are relied on to demonstrate compliance with the NRC's regulations for fire protection, environmental qualification, pressurized thermal shock, anticipated transients without scram, and station blackout. An applicant for a renewed license must review all SSCs within the scope of license renewal to identify those structures and components (SCs) subject to an AMR. SCs subject to an AMR are those that perform an intended function without moving parts or without a change in configuration or properties (passive), and that are not subject to replacement based on qualified life or specified time period (long-lived). Pursuant to 10 CFR 54.21(a)(3), an applicant for a renewed license must demonstrate that the effects of aging will be managed in such a way that the intended function or functions of those SCs will be maintained, consistent with the CLB, for the period of extended operation.

License renewal also requires the identification and updating of the TLAs. During the design phase for a plant, certain assumptions are made about the length of time the plant can operate. These assumptions are incorporated into design calculations for several of the plant's SSCs. In accordance with 10 CFR 54.21(c)(1)(i), (ii), and (iii), the applicant must either (i) show that these calculations will remain valid for the period of extended operation, (ii) project the analyses to the end of the period of extended operation, or (iii) demonstrate that the effects of aging on these SSCs can be adequately managed for the period of extended operation.

In addition, 10 CFR 54.21(d) requires that the applicant submit a supplement (docketed letter submitted under oath and affirmation) to the final safety analysis report (FSAR) that contains a summary description of the programs and activities that it credited to manage the effects of aging and the evaluation of time-limited aging analyses for the extended period of operation.

The SRP-LR provides staff guidance for reviewing applications for license renewal. The GALL Report is a technical basis document. It summarizes staff-approved AMPs for the aging management of a large number of SCs that are subject to an AMR. It also summarizes the aging management evaluations, programs, and activities credited for managing aging of most of the SCs used by commercial nuclear power plants, and serves as a reference for both the applicant and staff-reviewers to quickly identify those AMPs and activities that the staff has determined will provide adequate aging management during the period of extended operation. If an applicant commits to implementing these staff-approved AMPs, the time, effort, and resources used to review an applicant's LRA will be greatly reduced, thereby improving the efficiency and effectiveness of the license renewal review process. The GALL Report identifies (1) SSCs, (2) component materials, (3) environments to which the components are exposed, (4) the aging effects/aging mechanisms associated with the materials and environments, (5) AMPs that are credited with managing the aging effects, and (6) recommendations for further applicant evaluations of aging effects and their management for certain component types.

The GALL Report is treated in the same manner as an NRC-approved topical report that is generically applicable. An applicant may reference the GALL Report in its LRA to demonstrate that its programs correspond to those that the staff reviewed and approved in the GALL Report. If the material presented in the LRA is consistent with the GALL Report and is applicable to the applicant's facility, the staff will accept the applicant's reference to the GALL Report. In making this determination, the staff considers whether the applicant has identified specific programs described and evaluated in the GALL Report but does not conduct a re-review of the substance of the matters described in the GALL Report. Rather, the staff determines that the applicant established that the approvals set forth in the GALL Report apply to its programs.

If an applicant takes credit for a GALL Report program, it is incumbent on the applicant to ensure that its plant program addresses all ten program elements of the referenced GALL Report program. These elements are described in the SRP-LR, Appendix A.1, "Aging Management Review - Generic (Branch Technical Position RLSB-1)." In addition, the conditions at the plant must be bounded by the conditions for which the GALL Report program was evaluated. The applicant must certify in its LRA that it completed the appropriate verifications and that those verifications are documented and retained by the applicant in an auditable form.

The SRP-LR also provides staff guidance for reviewing time-limited aging analyses. Pursuant to 10 CFR 54.21(c)(1), a license renewal application is required to provide a list of TLAs, as defined in 10 CFR 54.3. In addition, the applicant must provide a list of plant-specific exemptions granted under 10 CFR 50.12 that are based on TLAs. The number and type of TLAs vary depending on the plant-specific CLB.

All six criteria set forth in 10 CFR 54.3 must be satisfied to conclude that a calculation or analysis is a TLA. Pursuant to 10 CFR 54.3, TLAs are those licensee calculations and analyses that:

1. Involve systems, structures, and components within the scope of license renewal, as delineated in 10 CFR 54.4(a);
2. Consider the effects of aging;
3. Involve time-limited assumptions defined by the current operating term, for example, 40 years;
4. Were determined to be relevant by the licensee in making a safety determination;
5. Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, or component to perform its intended function(s), as delineated in 10 CFR 54.4(b); and
6. Are contained or incorporated by reference in the CLB.

Finally, the applicant must demonstrate that the TLAAs remain valid for the period of extended operation; the TLAAs have been projected to the end of the period of extended operation; or the aging effects of aging on the intended function(s) will be adequately managed for the period of extended operation. The staff performs a technical review as well as reviews the area relating to the identification of TLAAs. The staff also confirms that the applicant did not omit any TLAAs, as defined in 10 CFR 54.3.

### **3. Objectives**

The overall objective of the audit and review described in this audit and review plan is to determine compliance with 10 CFR 54.21(a)(3) and 10 CFR 54.21(c)(1). Therefore, the audit and review process helps ensure that for each structure and component within the scope of the project team's review, 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.

The audit and review procedure for VYNPS is described in Sections 5 and 6 of this audit and review plan. It is intended to accomplish the following objectives:

- For VYNPS AMPs that the applicant claims are consistent with GALL Report AMPs, determine that the plant AMPs contain the program elements of the referenced GALL Report AMP and that the conditions at the plant are bounded by the conditions for which the GALL Report AMPs were evaluated.
- For VYNPS AMPs that the applicant claims are consistent with GALL Report AMPs with exceptions, determine that the plant AMPs contain the program elements of the referenced GALL Report AMPs and that the conditions at the plant are bounded by the conditions for which the GALL Report AMPs were evaluated. In addition, determine and evaluate that the applicant has documented an acceptable technical basis for each exception.

- For VYNPS AMPs that the applicant claims will be consistent with GALL Report AMPs after specified enhancements are implemented, determine that the plant AMPs, with the enhancements, will be consistent with the referenced GALL Report AMPs. In addition, determine that the applicant identified the enhancements as commitments in the Updated Final Safety Analysis Report (UFSAR) or other docketed correspondence.
- For plant-specific VYNPS AMPs determine that these AMPs are acceptable on the basis of a technical review.
- For AMR line items that the applicant claims are consistent with the GALL Report, determine that these AMR line items are consistent with the recommendation of the GALL Report.
- For AMR line items (Table 1s) that the applicant claims are not applicable with the GALL Report, determine that these AMR line items are acceptable on the basis of a technical review.
- For AMR line items that the applicant claims consistent with AMR line items that the staff has previously approved for another plant, determine that these AMR line items are acceptable on the basis of a technical review.
- For AMR line items for which the GALL Report recommends further evaluation, determine that the applicant has addressed the further evaluation, and evaluating the AMRs in accordance with the SRP-LR.
- For TLAAs, determine that the applicant has properly identified the TLAAs. TLAAs are certain plant-specific safety analyses that are based on an explicitly assumed 40-year plant life (for example, aspects of the reactor vessel design). Pursuant to 10 CFR 54.21(c)(1), a license renewal applicant is required to provide a list of TLAAs, as defined in 10 CFR 54.3. The area relating to the identification of TLAAs is reviewed. TLAAs may have developed since issuance of a plant's operating license. As indicated in 10 CFR 54.30, the adequacy of the plant's CLB, which includes TLAAs, is not an area within the scope of the license renewal review. Any question regarding the adequacy of the CLB must be addressed under the backfit rule (10 CFR 50.109) and is separate from the license renewal process.
- Determine that the applicant has demonstrated that (1) the TLAAs remain valid for the period of extended operation; (2) the TLAAs have been projected to the end of the period of extended operation; or (3) the aging effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

#### **4. Summary of Information Provided in the License Renewal Application**

##### **4.1 Aging Management Review Results**

The VYNPS LRA closely follows the standard LRA format presented in Revision 6 of Nuclear Energy Institute (NEI) 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule." Section 3 of the VYNPS LRA provides the results of the aging management review for structures and components that the applicant identified as being subject to aging management review. Section 4 VYNPS LRA addressed time-limited aging analyses.

VYNPS LRA Table 3.0-1, Table 3.0-2, and Table 3.0-3 provide descriptions of the subject(s) for these table(s) - environments used in the AMRs to determine the aging effects requiring management. Results of the AMRs are presented in two different types of tables. The applicant refers to the two types of tables as Table 1 and Table 2.

The first table type is a series of six tables labeled Table 3.X.1, where "X" is the system/component group number (see table below), and "1" indicates it is a Table 1 type. For example, in the reactor coolant system subsection of the VYNPS LRA Section 3, this is Table 3.1.1, and in the engineered safety features subsection of VYNPS LRA Section 3, this is Table 3.2.1. For ease of discussion, these table types will hereafter be referred to as "Table 1." These tables are derived from the corresponding tables in NUREG-1801, Volume 1, and present summary information from the AMRs.

X	Definition
1	Reactor Vessel, Internals and Reactor Coolant System
2	Engineered Safety Features
3	Auxiliary Systems
4	Steam and Power Conversion Systems
5	Structures and Component Supports
6	Electrical and Instrumentation and Controls

The second table type is a series of tables labeled Table 3.X.2-Y, where "X" is the system/component group number, "2" indicates it is a Table 2 type, and "Y" indicates the subgroup number within group "X". For example, within the reactor coolant system, the AMR results for the reactor vessel are presented in VYNPS LRA Table 3.1.2-1, and the results for the reactor vessel internals are presented in VYNPS LRA Table 3.1.2-2. In the engineered safety features, the residual heat removal system results are presented in Table 3.2.2-1 of the VYNPS LRA, and the core spray system is in Table 3.2.2-2 of the VYNPS LRA. For ease of discussion, these table types will hereafter be referred to as "Table 2." These tables present the results of the AMRs.

VYNPS LRA Tables 3.1.1 through 3.6.1 (Table 1 types) provide a summary comparison of how the VYNPS AMR results align with Tables 1 through 6 of the GALL Report, Volume 1. These VYNPS LRA tables are essentially the same as Tables 1 through 6 of the GALL Report, Volume 1, except that the "Type" column has been replaced by an "Item Number" column, the GALL Volume 2 Item Number column has been deleted, and a "Discussion" column has been added. The "Item Number" column provides a means to cross-reference between VYNPS LRA

Table 3.X.2-Y (Table 2 type) and VYNPS LRA Table 3.X.1 (Table 1 type). The "Discussion" column includes further information. The following are examples of information that might be contained within the "Discussion" column:

- Any "Further Evaluation Recommended" information or reference to the location of that information
- The name of a plant-specific program being used
- Exceptions to the GALL Report recommendations
- A discussion of how the line item is consistent with the corresponding line item in the GALL Report, when it may not be intuitively obvious
- A discussion of how the line item differs from the corresponding line item in the GALL Report, when it may appear to be consistent.

VYNPS LRA Table 2 types provide the detailed results of the AMRs for those SCs that are subject to an aging management review. There is a Table 2 for each subgroup within the six system/component groups. For example, the engineered safety features system group contains tables specific to residual heat removal, core spray, automatic depressurization, high pressure coolant injection, reactor core isolation cooling, standby gas treatment, and primary containment penetrations. Table 2 of the VYNPS LRA consists of the following nine columns.

- *Component Type.* Column 1 identifies the component types that are subject to an AMR. The component types are listed in alphabetical order. In the structural tables, component types are sub-grouped by material.
- *Intended Function.* Column 2 identifies the license renewal intended functions for the listed component types. Definitions and abbreviations of intended functions are listed in Table 2.0-1 in Section 2 of the VYNPS LRA.
- *Material.* Column 3 lists the particular materials of construction for the component type being evaluated.
- *Environment.* Column 4 lists the environment to which the component types are exposed. Internal and external service environments are indicated. A description of these environments is provided in VYNPS LRA Table 3.0-1, Table 3.0-2, and Table 3.0-3 for mechanical, structural, and electrical components, respectively.
- *Aging Effect Requiring Management.* Column 5 lists the aging effects identified as requiring management for the material and environment combinations of each component type.
- *Aging Management Programs.* Column 6 lists the programs used to manage the aging effects requiring management.
- *GALL Report (Vol. 2) Item.* Each combination of the following factors listed in LRA Table 2 is compared to the GALL Report to identify consistencies:

- component type, material, environment, aging effect requiring management, and aging management program. Column 7 documents identified consistencies by noting the appropriate GALL Report item number. If there is no corresponding item number in the GALL Report for a particular combination of factors, column 7 is left blank.
- *LRA Table 1 Item.* Each combination of the following that has an identified GALL Report item number also has a Table 1 line item reference number: component type, material, environment, aging effect requiring management, and aging management program. Column 8 lists the corresponding line item from Table 1. If there is no corresponding item in the GALL Report (Volume 1), column 8 is left blank.
- *Notes.* Column 9 contains notes that are used to describe the degree of consistency with the line items in the GALL Report.

#### 4.2 Time-Limited Aging Analyses

The VYNPS LRA closely follows the standard LRA format presented in Revision 6 of NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule." Section 4 of the VYNPS LRA addresses time-limited aging analyses. In Section 4.1.1, the VYNPS LRA states that the calculations and evaluations that could potentially meet the six criteria of 10 CFR 54.3 were identified by searching CLB documents including the following:

- Technical Specifications
- UFSAR
- docketed licensing correspondence
- fire protection program documents
- NRC safety evaluation reports
- BWRVIP documents

In Section 4.1, the VYNPS LRA states that as required by 10 CFR 54.21(c)(1), an evaluation of VYNPS-specific time-limited aging analyses must be performed to demonstrate that:

- (i) The analyses remain valid for the period of extended operation;
- (ii) The analyses have been projected to the end of the period of extended operation; or
- (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

In the VYNPS LRA, the applicant summarized the results of the above evaluations in Table 4.1-1. These evaluations are discussed in subsequent sections of VYNPS LRA Section 4.

Following the section identifying the TLAAs, the VYNPS LRA next includes a section identifying any exemptions. 54.21(c) also requires that the application for a renewed license includes a list of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on

time-limited aging analyses as defined in 10 CFR 54.3. The VYNPS performed this by reviewing VYNPS docketed correspondence which identified VYNPS exemptions. The results of this review determined that no VYNPS exemptions depend on time-limited aging analyses.

The VYNPS LRA next includes a separate section for each of the identified TLAs within the outline of the corresponding NUREG-1800 TLA category. The TLA categories are outlined in the next table.

TLAA Description	Resolution Option	Section
<b>Reactor Vessel Neutron Embrittlement Analyses</b>		
Pressure-temperature limits	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.2.2
Charpy upper-shelf energy	Analyses projected 10 CFR 54.21(c)(1)(ii)	4.2.3
Adjusted reference temperature	Analyses projected 10 CFR 54.21(c)(1)(ii)	4.2.4
Reactor vessel circumferential welds inspection relief	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.2.5
Reactor vessel axial welds failure probability	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.2.6
<b>Metal Fatigue Analyses</b>		
Class 1 fatigue	Analyses remain valid 10 CFR 54.21(c)(1)(i) OR Aging effect managed 10 CFR 54.21(c)(1)(iii)	4.3.1
Non-Class 1 fatigue	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.2
Effects of reactor water environment on fatigue life	Analyses remain valid 10 CFR 54.21(c)(1)(i) OR Analyses projected 10 CFR 54.21(c)(1)(ii) OR Aging effect managed 10 CFR 54.21(c)(1)(iii)	4.3.3
Environmental Qualification Analyses for Electrical Components	Aging effect managed 10 CFR 54.21(c)(1)(iii)	4.4
<b>Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses</b>		
Fatigue of the torus	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.6.1
Fatigue of safety relief valve (SRV) discharge piping	Analysis remains valid 10 CFR 54.21(c)(1)(i) AND Analysis projected 10 CFR 54.21(c)(1)(ii)	4.6.2

Fatigue of other torus-attached piping	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.6.3
<b>Other TLAA</b>		4.7
Reflood thermal shock of the reactor vessel internals	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.1
TLAA in BWRVIPs		4.7.2
BWRVIP-05, RPV circumferential welds analysis	Updated by BWRVIP-74. See BWRVIP-74 entry.	4.7.2.1
BWRVIP-25, core plate rim holddown bolts loss of preload analysis	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.7.2.2
BWRVIP-38, shroud support fatigue analysis	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.2.3
BWRVIP-47, lower plenum fatigue analysis	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.2.4
BWRVIP-48, vessel ID attachment welds fatigue analysis	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.2.5
BWRVIP-49, instrument penetrations fatigue analysis	Analysis projected 10 CFR 54.21(c)(1)(ii)	4.7.2.6
BWRVIP-74, reactor vessel P/T curves analysis Fatigue analysis CVUSE analysis Circ/Axial welds analysis	Addressed in Section 4.2.2 Addressed in Section 4.3.1 Addressed in Section 4.2.3 Addressed in Sections 4.2.5 and 4.2.6	4.7.2.7
BWRVIP-76, core shroud	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.2.8

## 5. Overview of Audit, Review, and Documentation Procedure

The project team will follow the process specified in Section 6 of this audit and review plan to perform its audits and reviews and to document the results of its work. The process is summarized below.

### 5.1 Aging Management Programs

Table 1 of this audit and review plan summarizes the ten program elements that comprise an aging management program. For the VYNPS AMPs for which the applicant claimed consistency with the AMPs included in the GALL Report, the project team will review the VYNPS AMP descriptions and compare program elements for the VYNPS AMPs to the corresponding program elements for the GALL Report AMPs. The review will be documented using the worksheet as discussed in Appendix F. The project team will determine that the VYNPS AMPs contain the program elements of the referenced GALL Report AMP and that the conditions at the plant are bounded by the conditions for which the GALL Report program was evaluated. The Division of Engineering will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspects of these program elements will be reviewed by the project team.

For VYNPS AMPs that have one or more exceptions and/or enhancements, the project team will review each exception and/or enhancement to determine whether the exception and/or

enhancement is acceptable and whether the VYNPS AMP, as modified by the exception and/or enhancement, would adequately manage the aging effects for which it is credited. The review will be documented using the worksheet as discussed in Appendix F. In some cases, the project team will identify differences that the applicant did not identify between the VYNPS AMPs credited by the applicant and the GALL Report AMPs. The review will be documented using the worksheet as discussed in Appendix F. In these cases, the project team will review the difference to determine whether or not it is acceptable and whether or not the VYNPS AMP, as modified with the difference, would adequately manage the aging effects.

For those VYNPS AMPs that are not included in the GALL Report (i.e., plant-specific AMPs, no precedent), the project team will review the VYNPS AMP against the ten program elements defined in Appendix A of the SRP-LR. The review will be documented using the worksheet shown in Appendix G. The Division of Engineering will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspect of these program elements will be reviewed by the project team. On the basis of its reviews, the project team will determine whether these AMPs will manage the aging effects for which they are credited.

## 5.2 Aging Management Reviews

The AMRs in the GALL Report fall into two broad categories: (1) those that the GALL Report concludes are adequate to manage aging of the components referenced in the GALL Report, and (2) those for which the GALL Report concludes that aging management is adequate, but further evaluation is recommended for certain aspects of the aging management process. For its AMR reviews, the project team will determine (1) whether the AMRs reported by the applicant to be consistent with the GALL Report are indeed consistent with the GALL Report, and (2) whether the plant-specific AMRs (includes formerly past precedent material) are technically acceptable and applicable based on a technical review by the project team. For component groups evaluated in the GALL Report for which the applicant claimed consistency with the GALL Report, and for which the GALL Report recommends further evaluation, the project team will review the applicant's evaluation to determine if it adequately addressed the issues for which the GALL Report recommended further evaluation.

In addition, the project team will also review the AMRs that the applicant claims that are not applicable to its plant.

## 5.3 Time-Limited Aging Analyses

The TLAs in the VYNPS LRA fall into the broad category of those that are consistent with the NUREG-1800 TLAA categories. There are no plant-specific exemptions identified in the VYNPS LRA that depend on time-limited aging analyses.

For its TLAA reviews, the project team will determine if the applicant had provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).

Further, the project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:

- (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a).

- (2) consider the effects of aging.
- (3) involve time-limited assumptions defined by the current operating term (40 years).
- (4) are determined to be relevant by the applicant in making a safety determination.
- (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b).
- (6) are contained or incorporated by reference in the CLB.

In addition, the project team will also review the TLAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation."

For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to project team expertise, past precedent, and complexity of the provided analysis. Candidates/Examples for further review by technical specialists could be such as the following:

- Reactor Vessel Neutron Embrittlement Analysis
- EQ for Electrical Equipment (unless audit team is capable)
- Intergranular separation in the Heat-Affected Zone (HAZ) of Reactor Vessel
- Low-Alloy Steel under Austenitic SS Cladding
- Silting of the Ultimate Heat Sink

#### 5.4 NRC-Approved Precedents

To help facilitate the project team staff review of its LRA, an applicant may reference NRC-approved precedents to demonstrate that its non-GALL programs correspond to reviews that the staff had approved for other plants during its review of previous applications for license renewal. When an applicant elects to provide precedent information, the project team will review and determine whether the material presented in the precedent is applicable to the applicant's facility, determine whether the plant program is bounded by the conditions for which the precedent was evaluated and approved, and determine that the plant program contains the program elements of the referenced precedent. In general, if the project team determines that these conditions are satisfied, it will use the information in the precedent to frame and focus its review of the applicant's program.

It is important to note that precedent information is not a part of the LRA; it is supplementary

information voluntarily provided by the applicant as a reviewer's aid. The existence of a precedent, in and of itself, is not a sufficient basis to accept the applicant's program. Rather, the precedent facilitates the review of the substance of the matters described in the applicant's program. As such, in its documentation of its reviews of programs that are based on precedents, the precedent information is typically implicit in the evaluation rather than explicit. If the project team determines that a precedent identified by the applicant is not applicable to the particular plant program for which it is credited, it may refer the program to the Office of Nuclear Reactor Regulation (NRR) DE for review in the traditional manner, i.e., as described in the SRP-LR, without consideration of the precedent information.

### **5.5 UFSAR Supplement Review**

In accordance with the SRP-LR, for the AMRs and associated AMPs and the TLAs that it will review, the project team will review the UFSAR supplement that summarizes the applicant's programs and activities for managing the effects of aging for the extended period of operation. The project team will also review any commitments associated with its programs and activities made by the applicant and determine that they are acceptable for the stated purpose. In

addition, the project team will determine that the applicant identified the enhancements as commitments in the Updated Final Safety Analysis Report (UFSAR) or other docketed correspondence.

### **5.6 Documents Reviewed by the Project Team**

In performing its work, the project team will rely heavily on the VYNPS LRA, the audit and review plan, the SRP-LR, and the GALL Report. The project team will also examine the applicant's precedent review documents, its AMP, AMR, and TLAAs basis documents (catalogs of the documentation used by the applicant to develop or justify its AMPs, AMRs, and TLAAs), and other applicant documents, including selected implementing documents, to determine that the applicant's activities and programs will adequately manage the effects of aging on structures and components. To review the TLAAs, the review team will also study the appropriate sections in the VYNPS UFSAR, as well as referring back to appropriate sections in the SRP-LR, GALL Report, and NEI 95-10, Revision 6.

### **5.7 Public Exit Meeting**

After it completes its audits and reviews, the project team will hold a public exit meeting to discuss the scope and results of its audits and reviews.

### **5.8 Documentation Prepared by the Project Team**

The project team will prepare an audit and review plan, worksheets, work packages, requests for additional information (RAIs), an audit and review report, and a safety evaluation report (SER) input. The project team will also prepare questions during site visits and will track the applicant's responses to these questions.

#### **5.8.1 Audit and Review Plan**

The project team leader will prepare a plant-specific audit and review plan as described herein.

#### **5.8.2 Worksheets**

Each project team member will document the results of his or her work on a variety of worksheets. The worksheets are discussed in Appendix F, "Consistent with GALL Report AMP Audit/Review Worksheet;" Appendix G, "Plant-Specific AMP Audit/Review Worksheet;" and Appendix H, "Aging Management Review Worksheets." The use of the worksheets is described in Section 6 of this audit and review plan.

#### **5.8.3 Questions**

As specified in Section 6 of this audit and review plan, the project team will ask the applicant questions, while on-site, as appropriate, to facilitate its audit and review activities. The project team will also track and review the applicant's answers to these questions. If an applicant response is necessary to support a finding made by the project team, the applicant may voluntarily submit the response to the NRC under oath and affirmation. As an alternate, the project team may use the RAI process to obtain this response under oath and affirmation.

#### **5.8.4 Work Packages**

During the audit and review process, the project team leader, in conjunction with the NRC license renewal project manager, will assemble work packages for any work that the project team will refer to the NRR DE for review. Each work package will include a work request and any applicable background information on the review item that was gathered by the project team.

#### **5.8.5 Request for Additional Information**

The audit and review process described in this audit and review plan is structured to resolve as many questions as possible during the on-site visits. As examples, the on-site visits are used to obtain clarifications about the VYNPS LRA and explanations as to where certain information may be found in the VYNPS LRA or its associated documents. Nevertheless, there may be occasions where an RAI is appropriate to obtain information to support an SER finding. The need for RAIs will be determined by the project team leader through discussions with the individual project team members. When the project team leader determines that an RAI is needed, the project team member who is responsible for the area of review will prepare the RAI. RAIs will include the technical and regulatory basis for requesting the information.

After the project team receives a response to an RAI from the applicant, the project team leader will provide the response to the project team member who prepared the RAI. The project team will review the response and determine if it resolves the issue that was the reason for the RAI. The project team will document the disposition of the RAI in the audit and review report (unless the report was issued before the RAI response was received) and in the SER input. If the audit and review report was issued before the applicant submitted its response to an RAI, the review of the project team's evaluation of the response will be documented in the SER related to the VYNPS LRA.

#### **5.8.6 Audit and Review Report**

The project team will document the results of its work in an audit and review report. The project team will prepare its report as described in Section 6.5.1 of this audit and review plan and the latest version of the *RLRC Guidelines For Preparing Audit and Review Reports*.

#### **5.8.7 Safety Evaluation Report Input**

The project team will prepare SER input, based on the audit and review report, as described in Section 6.5.2 of this plan.

### **6. Planning, Audit, Review, and Documentation Procedure**

This section of the audit and review plan contains the detailed procedures that the project team will follow to plan, conduct, and document its audit and review work.

## 6.1 Planning Activities

### 6.1.1 Schedule for Key Milestones and Activities

The project team leader will establish the schedule for the key milestones and activities, consistent with the overall schedule for making the licensing renewal decision. Key milestones and activities include, as a minimum:

- A. receiving the LRA from the applicant
- B. receiving work split tables from the NRC license renewal project manager
- C. making individual work assignments
- D. training project team members
- E. holding the project team kickoff meeting
- F. preparing the audit and review plan
- G. scheduling on-site visits
- H. scheduling in-office review periods
- I. preparing questions
- J. preparing RAIs
- K. preparing draft and final audit and review report
- L. preparing draft and final SER input

On-site visits will be scheduled on the basis of discussions between the project team leader, the NRC license renewal project manager, and the applicant.

Appendix B of this plan contains the target schedule for the key milestones and activities.

### 6.1.2 Work Assignments

The NRC technical assistance contractor will provide a proposed project team member work assignments to the NRC project team leader. The NRC project team leader will approve all work assignments. After the audit and review plan is issued, the NRC project team leader may reassign work as necessary.

The NRC technical assistance contractor will develop assignment tables that show which project team member will review each of the VYNPS AMPs and AMRs. Appendix A of this audit and review plan shows the project team members. Appendix C shows the project team member assignments for the AMPs, Appendix D of this audit and review plan shows the project team member assignments for the AMRs, and Appendix E shows the project team member assignments for TLAAs.

### 6.1.3 Training and Preparation

The training and preparation will include the following:

- A. A description of the audit and review process.
- B. An overview of audit/review-related documentation and the documentation that the project team will audit and review.

- (1) GALL Report
  - (2) SRP-LR
  - (3) Interim Staff Guidance for License Renewal (ISG-LR)
  - (4) LRA AMPs
  - (5) LRA TLAs
  - (6) LRA AMRs
  - (7) Basis documents (catalogs of information assembled by the applicant to demonstrate the bases for its programs and activities)
  - (8) Implementing procedures
  - (9) Operating experience (Licensee Event Reports)
  - (10) RAIs, audit and review reports, and SERs for other plants
  - (11) Applicant's UFSAR
- C. The protocol for interfacing with the applicant.
  - D. Administrative issues such as travel, control of documentation, work hours, etc.
  - E. Process for preparing questions, RAIs, the audit and review report, and SER input.
  - F. Process for interfacing with DE and DCI technical reviewers.

## 6.2 Aging Management Program Audits and Reviews

### 6.2.1 Types of AMPs

There are two types of AMPs: those that the applicant claims are consistent with AMPs contained in the GALL Report and those that are plant-specific. The process for auditing and reviewing both types of AMPs is presented in the following sections of this audit and review plan.

### 6.2.2 Scope of AMP Program Elements to be Audited And Reviewed

Table 1 of this plan shows the ten program elements that are used to evaluate the adequacy of each aging management program. These program elements are also presented in Branch Technical Position (BTP) RLSB-1, "Aging Management Review - Generic," in Appendix A of the SRP-LR, and are summarized in the GALL Report.

The program elements audited or reviewed is the same for both AMPs that are consistent with the GALL Report and for plant-specific AMPs. The Division of Engineering will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspects of these program elements will be reviewed by the project team.

### 6.2.3 Plant AMPs that are Consistent with the GALL Report

Figure 1, "Audit of AMPs That Are Consistent with the GALL Report," is the process flowchart that shows the activities and decisions used by the project team to audit and review each plant

AMP that the applicant claims is consistent with the GALL Report.

#### Preparation

- A. For the VYNPS AMP being reviewed, identify the corresponding GALL Report AMP.
- B. Review the associated GALL Report AMP and identify those elements that will be audited.
- C. Identify the documents needed to perform the audit. These may include, but are not limited to, the following:
  - (1) GALL Report
  - (2) SRP-LR
  - (3) ISG-LR
  - (4) RAIs, audit and review reports, and SERs for similar plants
  - (5) LRA
  - (6) basis documents
  - (7) implementation documents
  - (8) operating experience reports (plant-specific and industry)
  - (9) applicant's UFSAR

#### Audit/Review

- A. Confirm that VYNPS AMP program elements are consistent with the corresponding elements of the GALL Report AMP by answering the following questions and then following the process shown in Figure 1.
  - (1) Did the applicant identify any exceptions to the GALL Report AMP?
  - (2) Did the applicant identify any enhancements to the GALL Report AMP?
  - (3) Are the program elements consistent with the GALL Report AMP?
- B. If the above questions result in the identification of an exception/enhancement or a difference to the GALL Report AMP, determine whether it is acceptable on the basis of an adequate technical justification.
- C. If an acceptable basis exists for an exception/enhancement or difference, document the basis in the worksheet and later in the audit and review report and the SER input.
- D. Review the industry and plant-specific operating experience associated with the AMP. The review is to identify aging effects requiring management that are not identified by the industry guidance documents (such as EPRI tools) and to confirm the effectiveness of aging management programs. The project team members should consider the industry guidance when assessing operating experience and formulating questions for the applicant. The industry guidance (NEI 95-10, Revision 6) is as follows:

- (1) Plant-Specific Operating Experience with Aging Effects Requiring Management. The review should assess the operating and maintenance history. A review of the prior five to ten years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with reported industry operating experience. Differences with previously reported industry experience, such as new aging effects or lack of aging effects, allow for consideration in the plant-specific aging management requirements.
  - (2) Plant-Specific Operating Experience with Existing Aging Management Programs. The operating experience of aging management programs, including corrective actions resulting in program enhancements or additional programs, should be considered. The review should provide objective evidence to support the conclusion that the effects of aging will be managed so that the intended function(s) will be maintained during the extended period of operation. Guidance for reviewing industry operating experience is presented in BTP RLSB-1 in Appendix A.1 of the Branch Technical Positions in NUREG-1800.
  - (3) Industry Operating Experience. Industry operating experience and its applicability should be assessed to determine whether it changes plant-specific determinations. NUREG-1801 is based upon industry operating experience prior to its date of issuance. Operating experience after the issuance date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic communications such as a Bulletin or an Information Notice should be evaluated for impact upon the AMP. The evaluation should check for new aging effects or a new component or location experiencing an already identified aging effect.
- E. If it is necessary to ask the applicant a question to clarify the basis for accepting the justification, an exception, or a difference to the program element of the GALL Report, follow the logic process shown in Figure 1.
  - F. If it is necessary for the applicant to submit additional information to support the basis for accepting the justification, an exception, or a difference to a program element, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information

#### AMP Audit Worksheets

Document the audits/reviews using the worksheet provided in Appendix F, "Consistent with GALL Report AMP Audit/Review Worksheet."

#### **6.2.4 Plant-Specific AMPs**

Figure 2, "Audit of Plant-Specific AMPs," is the process flowchart that shows the activities and decisions used to audit/review each plant-specific AMP.

### Pre-Review Preparation

- A. Review Section A.1.2.3 of the SRP-LR and identify those element criteria that will be reviewed.
- B. Identify the documents needed to perform the audit. These may include, but are not limited to, the following:
  - (1) GALL Report
  - (2) SRP-LR
  - (3) ISG-LR
  - (4) RAIs, audit and review reports, and SERs for similar plants
  - (5) LRA
  - (6) basis documents
  - (7) implementation documents
  - (8) operating experience reports (plant-specific and industry)
  - (9) applicant's UFSAR
  - (10) lessons learned developed by RLRC

### Audit/Review

- A. Audit/review the VYNPS AMP program elements and determine that they are in accordance with the acceptance criteria for the corresponding program elements of Section A.1.2.3 of the SRP-LR.
- B. Review the industry and plant-specific operating experience associated with the AMP. This is an area of review emphasis. They require review to identify aging effects requiring management that are not identified by the industry guidance documents (such as EPRI tools) and to confirm the effectiveness of aging management programs. The project team members should consider the industry guidance when assessing operating experience and formulating questions for the applicant. The industry guidance (from NEI 95-10, Revision 6) is as follows:
  - (1) Plant-Specific Operating Experience with Aging Effects Requiring Management. The review should assess the operating and maintenance history. A review of the prior five to ten years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with reported industry operating experience. Differences with previously reported industry experience, such as new aging effects or lack of aging effects, allow for consideration in the plant-specific aging management requirements.
  - (2) Plant-Specific Operating Experience with Existing Aging Management Programs. The operating experience of aging management programs, including corrective actions resulting in program enhancements or additional programs, should be considered. The review should provide objective evidence to support the conclusion that the effects of aging will be managed so that the intended function(s) will be maintained during the extended period of operation. Guidance for reviewing industry operating experience is presented in BTP RLSB-1 in Appendix A.1 of the Branch

- Technical Positions in NUREG-1800.
- (3) Industry Operating Experience. Industry operating experience and its applicability should be assessed to determine whether it changes plant-specific determinations. NUREG-1801 is based upon industry operating experience prior to its date of issuance. Operating experience after the issuance date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic communications such as a Bulletin or an Information Notice should be evaluated for impact upon the AMP. The evaluation should check for new aging effects or a new component or location experiencing an already identified aging effect.
- C. If it is necessary to ask the applicant a question to clarify the basis for accepting the justification, an exception, or a difference to the program element of the GALL Report, follow the logic process shown in Figure 1.
- D. If it is necessary for the applicant to submit additional information to support the basis for accepting the justification, an exception, or a difference to a program element, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### AMP Review Worksheets

Document the audit/review using the worksheet provided in Appendix G, "Plant-Specific AMP Audit/Review Worksheet."

### **6.3 AMR Audits and Reviews**

There are two types of AMRs: those that the applicant claims are consistent with the GALL Report, and those that are plant-specific. Audit and review of both types of AMRs are discussed below.

#### **6.3.1 Plant AMRs that are Consistent with the GALL Report**

Figure 3, "Review of AMRs That Are Consistent with the GALL Report," is the process flowchart that shows the activities and decisions used to audit/review each AMR that the applicant claims is consistent with the GALL Report.

##### Preparation

- A. For the VYNPS AMRs that the applicant claims are consistent with the GALL Report, identify the corresponding AMRs in Volume 2 of the GALL Report.
- B. Review the associated GALL Report AMRs and identify those line items that will be audited/reviewed in conjunction with each of the VYNPS AMRs.

C. Identify the documents needed to perform the review. These may include, but are not limited to, the following:

- (1) GALL Report
- (2) SRP-LR
- (3) ISG-LR
- (4) RAIs, audit and review reports, and SERs for similar plants
- (5) LRA
- (6) basis documents
- (7) implementation documents
- (8) operating experience reports (plant-specific and industry)
- (9) applicant's UFSAR
- (10) lessons learned developed by RLRC

Audit/Review

- A. Each AMR line item is coded with a letter which represents a standard note designation.<sup>1</sup> The letter notes are described in Table 2 of this plan. Notes that use numeric designators are plant-specific. The note codes A through E are classified as "consistent with the GALL Report," and will be reviewed in accordance with the guidance contained in this plan.
- B. The AMR review involves determination that the applicant has satisfied the requirements of 10 CFR 54.21(a)(3). This requirement states that, for "each structure and component [within the scope of license renewal], demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the extended period of operation."
- C. Determine compliance by following the process shown in Figure 3. The process is summarized below:
  - (1) For each AMR line item, perform the review associated with the letter note (A through E) assigned to the AMR line item. Specifically, determine if the AMR is consistent with the GALL Report for the elements associated with its note.
  - (2) If Note A applies, and the applicant uses a plant-specific AMP<sup>2</sup>, determine if the component is within the scope of the cited plant AMP. If the component is within the scope of the plant AMP, the AMR line item is acceptable. If not acceptable, go to Step (7) below.
  - (3) If Note B applies, review the LRA exceptions and document the basis for acceptance in the worksheet, and later in the audit and review report. If

<sup>1</sup> The AMR line item letter notes are based on a letter from A. Nelson, NEI, to P. T. Kuo, NRC, "U.S. Nuclear Industry's Proposed Standard License Renewal Application Format Package, Request NRC Concurrence," dated January 24, 2003 (ML030290201). The staff concurred in the format of the standardized format for LRAs by letter dated April 7, 2003, from P.T. Kuo, NRC, to A. Nelson, NEI (ML030990052).

<sup>2</sup> Some GALL AMRs reference the use of a plant-specific AMP. In such cases the AMR audit requires the project team member to confirm that the plant-specific AMP is appropriate to manage the aging effects during the period of extended operation.

- not acceptable, go to Step (7) below.
- (4) If Note C or D applies, determine if the component type is acceptable for the material, environment, and aging effect. If Note D applies, also review the LRA exceptions and document the basis for acceptance in the worksheet, and later in the audit and review report. If not acceptable, go to Step (7) below.
- (5) If Note E applies, review the AMP audit report findings to determine if the scope of the alternate AMP envelopes the AMR line item being reviewed and satisfies 10 CFR 54.21(a)(3). If it does not, go to Step (7) below.
- (6) Review the corresponding LRA Table 3.X.1 entry that is referenced in LRA Table 3.X.2.Y. If applicable, determine whether the applicant's "Further Evaluation Recommended" response in LRA Section 3.X.2.2.Z is enveloped by Section 3.X.2.2.Z of the SRP-LR. If not, go to Step (7) below. If the LRA section does not meet the acceptance criteria of Appendix A of the SRP-LR, go to Step (7) below.
- (7) If during the review a difference is identified, prepare a question to the applicant, in order to obtain clarification.
- (a) Review the applicant's response to the question. If it appears acceptable, re-start the audit/review for the AMR line item from Step (1) above.
- (b) If the applicant's response does not resolve the question or issue, prepare an additional question to obtain the information needed to achieve resolution. Review the applicant's response to the second question. If it appears acceptable, re-start the audit/review for the AMR line item from Step (1) above.
- (c) If it is necessary for the applicant to submit additional information to resolve a question or an issue or to support a basis or conclusion, the applicant may submit the information as a supplement (docketed letter submitted under oath and affirmation) to the LRA or the NRC may issue an RAI to obtain the information. The team leader should be consulted if docketed information may be needed.
- (d) If the applicant's response is relied upon as the basis for a finding made by the project team, the applicant's response needs to be docketed under oath and affirmation. This may be reached through the applicant voluntarily submitting the response to the NRC under oath and affirmation, or by the staff using the RAI process.
- (8) Review LRA Table 3.X.1. For AMR line items (Table 1s) that the applicant claims are not applicable with the GALL Report, determine that these AMR line items are acceptable on the basis of a technical review.

#### AMR Audit/Review Worksheets

Document the audits/reviews of VYNPS AMRs using the worksheet provided in Appendix H, "Aging Management Review Worksheets." As an alternate, the project team reviewer may document its review electronically in the AMR spreadsheets.

#### **6.3.2 AMRs Based on NRC-Approved Precedents**

Figure 4, "AMR Review Using NRC-Approved Precedent," is the process flowchart that shows the activities and decisions used to review VYNPS AMRs that the applicant has identified as being consistent with an NRC-approved precedent.<sup>3</sup>

#### Preparation

Identify the documents needed to perform the audit/review. These may include, but are not limited to, the following:

- (1) GALL Report
- (2) SRP-LR
- (3) ISG-LR
- (4) RAIs and SERs for similar plants
- (5) LRA
- (6) basis documents
- (7) implementation documents
- (8) operating experience reports (plant-specific and industry)
- (9) applicant's UFSAR
- (10) lessons learned developed by RLRC

#### Audit/Review

- A. The AMR audit/review involves determination that the requirements of 10 CFR 54.21(a)(3) are satisfied. This criterion states that, "For each structure and component [within the scope of license renewal], demonstrate 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."
- B. For AMRs with an NRC-approved precedent, this may be achieved by answering the following questions while following the assessment process shown in Figure 4.
  - (1) Is the precedent appropriate for the VYNPS AMR being reviewed?
  - (2) Is the NRC-approved precedent sufficiently documented or understood to technically support the adequacy of the VYNPS AMR being reviewed?
  - (3) Is the VYNPS AMR within the bounds of the chosen NRC-approved precedent?
  - (4) If any of these questions results in a 'No' answer, then additional information is required to make a determination that the AMR is acceptable.
  - (5) If it is necessary to ask the applicant a question to obtain clarification on the basis for accepting the VYNPS AMR, the process shown in Figure 4 should be used.

<sup>3</sup> Applicant identified NRC-approved precedents are only to be used as an aid for performing AMR audits. The audit conclusions will be based on the technical basis of the AMR and its applicability to the plant being reviewed. It is not acceptable to simply cite the NRC-approved precedent as its basis.

- (6) If it is necessary for the applicant's response to be docketed as a basis for accepting the exception or difference, the applicant may voluntarily docket the response or the NRC may issue an RAI.

#### AMR Audit/Review Worksheets

Document the audits/reviews using the worksheet provided in Appendix H, "Aging Management Review Worksheets. As an alternate, the project team member may document its review electronically in the AMR spreadsheets.

### **6.4 Time-Limited Aging Analyses (TLAA) Audits and Reviews**

Audit and review of TLAs are discussed below. The project team will also review the TLAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). In general, the project team will review TLAs that are for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

#### **6.4.1 Identify Generic TLAA Issues**

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLA that the applicant identifies.

#### Pre-Review Preparation

- A. For the VYNPS TLAs that the applicant has identified as generic TLA issues, identify the corresponding TLAs in NUREG-1800, if appropriate.
- B. Review the corresponding TLAs in NUREG-1800 and identify those that will be audited/reviewed in conjunction with each of the VYNPS TLAs.
- C. Review the list of the VYNPS plant-specific exemptions granted pursuant to §50.12 and in effect that are based on TLAs as defined in §54.3. The application shall include an evaluation that justifies the continuation of these exemptions for the period of extended operation.
- D. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed

- TLAAs
  - GALL Report
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA
  - NEI 95-10, Section 5.1 and Table 6.2-2
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- E. In addition, the project team will also review the TLAAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis. Candidates for further review by technical specialists could be such as the following:
- Reactor Vessel Neutron Embrittlement Analysis
  - EQ for Electrical Equipment (unless audit team is capable)
  - Intergranular separation in the Heat-Affected Zone (HAZ) of Reactor Vessel
  - Low-Alloy Steel under Austenitic SS Cladding
  - Siting of the Ultimate Heat Sink

#### Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance (from NEI 95-10, Table 6.2-2) as follows:
  - The application shall include a list of time-limited aging analyses, as defined by §54.3. The application should include the identification of the

- affected systems, structures, and components, an explanation of the time dependent aspects of the calculation or analysis, and a discussion of the TLAA's impact on the associated aging effect. The identification of the results of the time-limited aging analysis review, which may be provided in tabular form, may reference the section in the Integrated Plant Assessment-Aging Management Review chapter where more details of the actual review and disposition (as required by §54.21(c)(1)(i)-(iii)) are located.
- The application shall include a demonstration that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
  - The application shall include a list of plant-specific exemptions granted pursuant to §50.12 and in effect that are based on TLAsAs as defined in §54.3. The application shall include an evaluation that justifies the continuation of these exemptions for the period of extended operation.
  - Summary descriptions of the evaluations of TLAsAs for the period of extended operation shall be included in the UFSAR supplement (Appendix A).
- D. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- E. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

#### **6.4.2 Reactor Vessel Neutron Embrittlement Analyses**

Figure 5, "Evaluation of TLAsAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAsAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLAA category of "reactor vessel neutron embrittlement" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA
  - NEI 95-10, Section 5.1 and Table 6.2-2
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLAA category of "reactor vessel neutron embrittlement" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

### Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.

- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB.
- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on reactor vessel neutron embrittlement (from NEI 95-10, Table 6.2-2) as follows:
  - Disposition chosen for each of the identified TLAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1].
- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

### 6.4.3 Metal Fatigue Analyses

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLA that the applicant identifies.

#### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLA category of "metal fatigue" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report, especially Section X.M1
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLA
  - NEI 95-10, Section 5.1 and Table 6.2-2
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLA category of "metal fatigue" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB
- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on metal fatigue (from NEI 95-10, Table 6.2-2) as follows:
  - Disposition chosen for each of the identified TLAAAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1].
- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

#### **6.4.4 Environmental Qualification Analyses for Electrical Components**

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

##### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLAA category of "environmental qualification of electric equipment" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report, especially Section X.E1
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA
  - NEI 95-10, Section 5.1 and Table 6.2-2
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLAA category of "environmental qualification of electric equipment" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation," or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader

will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB
- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on environmental qualification of electric equipment (from NEI 95-10, Table 6.2-2) as follows:
  - Disposition chosen for each of the identified TLAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1].
- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.

- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

#### **6.4.5 Concrete Containment Tendon Prestress Analysis**

The applicant states in the VYNPS LRA that this TLAA is not applicable for VYNPS. So the material in the following paragraphs is not pertinent to the project team review for this LRA.

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

#### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLAA category of "concrete containment tendon prestress" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
- Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report, especially Section X.S1
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA
  - NEI 95-10, Section 5.1 and Table 6.2-2
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLAA category of "concrete containment tendon prestress" to determine if there are emerging issues that should be further evaluated by

technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation," or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

#### Audit/Review

- A. Confirm that each VYNPS TLAAs listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAAs is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAAs meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB
- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAAs. This is an area of review emphasis. The project team members should consider the following industry guidance on "concrete containment tendon prestress" (from NEI 95-10, Table 6.2-2) as follows:
  - Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAAs evaluations in the UFSAR supplement (Appendix A). Use hypertext to link to the appropriate

location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1.

- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

#### **6.4.6 Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses**

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

#### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLAA category of "containment liner plate, metal containments, and penetrations fatigue analysis" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report, especially Section X.E1
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA
  - NEI 95-10, Section 5.1 and Table 6.2-2 basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC

- applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLAA category of "containment liner plate, metal containments, and penetrations fatigue analysis" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

#### Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB
- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should

consider the following industry guidance on "containment liner plate, metal containments, and penetrations fatigue analysis" (from NEI 95-10, Table 6.2-2) as follows:

- Disposition chosen for each of the identified TLAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1].
- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA audit worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

#### **6.4.7 Other Plant-Specific TLAs**

Figure 5, "Evaluation of TLAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

#### Pre-Review Preparation

- A. The project team will determine if the TLAs identified in the VYNPS LRA to be within the NUREG-1800 TLAA category of "other plant-specific TLAs" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).
- B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:
  - Excel database on TLAs summarizing how earlier LRAs and SERs presented and reviewed TLAs
  - GALL Report
  - SRP-LR
  - ISGs
  - RAIs, audit and review reports, and SERs for similar plants
  - LRA
  - References listed by applicant for each TLAA

- NEI 95-10, Section 5.1 and Table 6.2-2.
  - basis documents
  - implementation documents
  - operating experience reports (plant-specific and industry)
  - lessons learned developed by RLRC
  - applicant's UFSAR
- C. In addition, the project team will also review the VYNPS TLAs within the NUREG-1800 TLAA category of "other plant-specific TLAs" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

#### Audit/Review

- A. Confirm that each VYNPS TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.
- B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the VYNPS should state in this section that it does not apply.
- C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:
  - (1) involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a)
  - (2) consider the effects of aging
  - (3) involve time-limited assumptions defined by the current operating term (40 years)
  - (4) are determined to be relevant by the applicant in making a safety determination
  - (5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b)
  - (6) are contained or incorporated by reference in the CLB

- D. The project team will ascertain that the VYNPS satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be [§54.29(a)]) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
- E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on "other plant-specific TLAs" (from NEI 95-10, Table 6.2-2) as follows:
  - Identify and evaluate any plant-specific TLAs.
- F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 5 of this audit and review plan.
- G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the VYNPS LRA. If not, the NRC may issue an RAI to obtain the information.

#### TLAA Audit Worksheets

Document the audits/reviews using a worksheet which contains, as a minimum, the project team's question(s) related to the particular TLAA, the applicant's response(s) and notation of documents reviewed.

### **6.5 Audit and Safety Review Documentation**

As noted in Section 5.7 of this audit and review plan, the project team will prepare an audit and review plan, worksheets, work packages, requests for additional information, an audit and review report, and a SER input. This section of the audit and review plan addresses the preparation of the audit and review report and the SER input.

#### **6.4.1 Audit and Review Report**

Details on documentation of the audit and review report can be found in the latest version of the *RLRC Guidelines For Preparing Audit and Review Reports*.

In general, the audit and review report should include the following:

- A. Cover page
- B. Table of Contents
- C. 1. Introduction and General Information
  - 1.1 Introduction
  - 1.2 Background
- D. 2. Audit and Review Scope

- E. 3. Aging Management Review Audit and Review Results
- 3.0 Applicant's Use of Generic Aging Lesson-Learned Report
- 3.0.1 Format of the Applicant's License Renewal Application
- 3.0.1.1 Overview of Table 1
- 3.0.1.2 Overview of Table 2
- 3.0.2 Audit and Review Process
- 3.0.2.1 Review of AMPs
- 3.0.2.2 Review of AMR Results
- 3.0.2.3 NRC-Approved Precedents
- 3.0.2.4 UFSAR Supplement
- 3.0.2.5 Documentation and Documents Reviewed
- 3.0.2.6 Commitments to be Included in the Safety Evaluation Report
- 3.0.2.7 Exit Meeting
- 3.0.3 Aging Management Programs
- 3.0.3.1 AMPs That Are Consistent with the GALL Report
- 3.0.3.2 AMPs That Are Consistent with the GALL Report with Exceptions or Enhancements
- 3.0.3.3 AMPs That Are Not Consistent with or Not Addressed in the GALL Report
- 3.1 Applicant's LRA Section 3.1 - Aging Management of Reactor Coolant System
- 3.1.1 Summary of Technical Information in the Application
- 3.1.2 Project Team Evaluation
- 3.1.2.1 AMR Results That Are Consistent with the GALL Report
- 3.1.2.2 AMR Results for Which Further Evaluation is Recommended
- 3.1.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
- 3.1.3 Conclusion
- 3.2 Applicant's LRA Section 3.2 - Aging Management of Engineered Safety Features Systems
- 3.2.1 Summary of Technical Information in the Application
- 3.2.2 Project Team Evaluation
- 3.2.2.1 AMR Results That Are Consistent with the GALL Report
- 3.2.2.2 AMR Results for Which Further Evaluation is Recommended
- 3.2.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
- 3.2.3 Conclusion
- 3.3 Applicant's LRA Section 3.3 - Auxiliary Systems
- 3.3.1 Summary of Technical Information in the Application
- 3.3.2 Project Team Evaluation
- 3.3.2.1 AMR Results That Are Consistent with the GALL Report

- 3.3.2.2 AMR Results for Which Further Evaluation is Recommended
  - 3.3.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
  - 3.3.3 Conclusion
- 3.4 Applicant's LRA Section 3.4 - Aging Management of Steam and Power Conversion System
- 3.4.1 Summary of Technical Information in the Application
  - 3.4.2 Project Team Evaluation
    - 3.4.2.1 AMR Results That Are Consistent with the GALL Report
    - 3.4.2.2 AMR Results for Which Further Evaluation is Recommended
    - 3.4.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
  - 3.4.3 Conclusion
- 3.5 Applicant's LRA Section 3.5 - Aging Management of Containment, Structures and Component Supports
- 3.5.1 Summary of Technical Information in the Application
  - 3.5.2 Project Team Evaluation
    - 3.5.2.1 AMR Results That Are Consistent with the GALL Report
    - 3.5.2.2 AMR Results for Which Further Evaluation is Recommended
    - 3.5.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
  - 3.5.3 Conclusion
- 3.6 Applicant's LRA Section 3.6 - Aging Management of Electrical and Instrumentation and Controls
- 3.6.1 Summary of Technical Information in the Application
  - 3.6.2 Project Team Evaluation
    - 3.6.2.1 AMR Results That Are Consistent with the GALL Report
    - 3.6.2.2 AMR Results for Which Further Evaluation is Recommended
    - 3.6.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report
  - 3.6.3 Conclusion
- F. 4. Time-Limited Aging Analysis
- 4.1 Identification of Time-Limited Aging Analyses and Exemptions
- 4.1.1 Identification of TLAA
  - 4.1.2 Identification of Exemptions
- 4.2 Reactor Vessel Neutron Embrittlement Analyses
- 4.2.1 Reactor Vessel Fluence
  - 4.2.2 Pressure/Temperature Limits
  - 4.2.3 Charpy Upper-Shelf Energy (CVUSE)
  - 4.2.4 Adjusted Reference Temperature

- 4.2.5 Reactor Vessel Circumferential Welds
  - 4.2.6 Reactor Vessel Axial Weld Failure Probability
  - 4.2.7 References
- 4.3 Metal Fatigue Analyses
    - 4.3.1 Class 1 Fatigue
    - 4.3.2 Non-Class 1 Fatigue
    - 4.3.3 Effects of Reactor Water Environment on Fatigue Life
    - 4.3.4 References
  - 4.4 Environmental Qualification of Electrical Components
  - 4.5 Concrete Containment Tendon Prestress Analysis
  - 4.6 Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses
    - 4.6.1 Fatigue of the Torus
    - 4.6.2 Fatigue of Safety Relief Valve (SRV) Discharge Piping
    - 4.6.3 Fatigue of Other Torus-Attached Piping
  - 4.7 Other Plant-specific Time-limited Aging Analyses
    - 4.7.1 Reflood Thermal Shock of the Reactor Vessel Internals
    - 4.7.2 TLAA in BWRVIP Documents
    - 4.7.3 References

#### G. Attachments

- Attachment 1 Abbreviations and Acronyms
- Attachment 2 Project Team and Applicant Personnel
- Attachment 2A Members of the Public
- Attachment 3 Elements of an Aging Management Program for License Renewal
- Attachment 4 Disposition of Requests for Additional Information, LRA Supplements, and Open or Confirmatory Items
- Attachment 5 List of Documents Reviewed
- Attachment 6 List of Commitments

#### 6.4.2 Safety Evaluation Report Input

##### 1. General guidance

- A. The project team will prepare the SER input for the AMP and AMR audits and reviews. The technical assistance contractor shall collect, assemble, and prepare the complete SER input.
- B. In general, the data and information needed to prepare the SER input should be available in the project team's audit and review report and the project team member's worksheets.
- C. SER inputs are to be prepared for:

- (1) each VYNPS AMP that was determined to be consistent with the GALL Report, which has no exceptions or enhancements.
  - (2) each VYNPS AMP that was determined to be consistent with the GALL Report, which has exceptions (identified by either the applicant or the project team) or enhancements.
  - (3) each plant-specific AMP
  - (4) AMRs that are consistent with the GALL Report
  - (5) project team AMR review results<sup>4</sup>
- D. RLRA/RLRB will prepare an SER shell for the entire SER. The project team is to enter its SER input directly into the RLRA/RLRB shell. The SER input placed into the SER shell should typically contain the following sections. (Note: The following section numbers (3. through 3.X.3 and 4) are based on the numbering system for the SER shell. They are not a continuation of the numbering convention used throughout this plan.)
3. Aging Management Review Results
- 3.0 Applicant's Use of the Generic Aging Lessons Learned Report
    - 3.0.1 Format of the LRA
    - 3.0.2 Staff's Review Process
      - 3.0.2.1 AMRs in the GALL Report
      - 3.0.2.2 NRC-Approved Precedents
      - 3.0.2.3 UFSAR Supplement
      - 3.0.2.4 Documentation and Documents Reviewed
    - 3.0.3 Aging Management Programs
      - 3.0.3.1 AMPs that are Consistent With the GALL Report
      - 3.0.3.2 AMPs that are Consistent With GALL Report With Exceptions or Enhancements
      - 3.0.3.3 AMPs that are Plant-Specific
    - 3.0.4 Quality Assurance Program Attributes Integral to Aging Management Programs
  - 3.X.<sup>5</sup> Aging Management of \_\_\_\_\_
    - 3.X.1 Summary of Technical Information in the Application
    - 3.X.2 Staff Evaluation
      - 3.X.2.1 Aging Management Review Results that are Consistent with the GALL Report

<sup>4</sup> AMRs that are not consistent with the GALL Report.

<sup>5</sup> The LRA AMR results are broken down into six sections and address the following system/structure groups: (1) Section 3.1, reactor vessel, internals and reactor coolant system, (2) Section 3.2, engineering safety features systems; (3) Section 3.3, auxiliary systems, (4) Section 3.4, steam power and conversion systems, (5) Section 3.5, structures and component supports, (6) Section 3.6, electrical and instrumentation and controls.

- 3.X.2.2 Aging Management Review Results For Which Further Evaluation is Recommended by the GALL Report
- 3.X.2.3 Aging Management Review Results that are Not Consistent with or Not Addressed in the GALL Report

### 3.X.3 Conclusion

- 4. Time-Limited Aging Analyses
  - 4.1 Identification of Time-Limited Aging Analyses and Exemptions
    - 4.1.1 Identification of TLAA
    - 4.1.2 Identification of Exemptions
  - 4.2 Reactor Vessel Neutron Embrittlement Analysis
    - 4.2.1 Reactor Vessel Fluence
    - 4.2.2 Pressure/Temperature Limits
    - 4.2.3 Charpy Upper-Shelf Energy (CVUSE)
    - 4.2.4 Adjusted Reference Temperature
    - 4.2.5 Reactor Vessel Circumferential Welds
    - 4.2.6 Reactor Vessel Axial Weld Failure Probability
    - 4.2.7 References
  - 4.3 Metal Fatigue Analysis
    - 4.3.1 Class 1 Fatigue
    - 4.3.2 Non-Class 1 Fatigue
    - 4.3.3 Effects of Reactor Water Environment on Fatigue Life
    - 4.3.4 References
  - 4.4 Environmental Qualification of Electrical Components
  - 4.5 Concrete Containment Tendon Prestress Analysis
  - 4.6 Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses
    - 4.6.1 Fatigue of the Torus
    - 4.6.2 Fatigue of Safety Relief Valve (SRV) Discharge Piping
    - 4.6.3 Fatigue of Other Torus-Attached Piping
  - 4.7 Other Plant-specific Time-limited Aging Analyses
    - 4.7.1 Reflood Thermal Shock of the Reactor Vessel Internals
    - 4.7.2 TLAA in BWRVIP Documents
    - 4.7.3 References

- E. For each AMP audited/reviewed by the project team, the SER input shall include a discussion of the project team's review of the operating experience program element.
  - F. If the applicant submitted a supplement (docketed letter submitted under oath and affirmation) to its LRA that is associated with the project team's audit or review activities, document the submittal (include the date and ADAMS Accession Number) and explain the issue that the submittal resolved and discuss the basis for the resolution.
  - G. If an RAI was issued, identify the RAI number and briefly discuss the RAI. State if the RAI remains open or if the applicant response has been received and accepted. If the response was acceptable, identify the submittal (including the date and the ADAMS accession number) that provided the response and document the basis for its acceptance.
  - H. Issues (e.g., RAIs) that have not been resolved by the applicant at the time the SER input is prepared should be identified as open items.
2. SER input
- A. For VYNPS AMPs determined to be consistent with the GALL Report, without exceptions, include the AMP title, the plant AMP paragraph number, and a discussion of the basis for concluding that the UFSAR update (Appendix A of the VYNPS LRA) is acceptable. This SER input documents that the AMP is consistent with the GALL Report.
  - B. For VYNPS AMPs determined to be consistent with the GALL Report, with exceptions or enhancement, the SER input should include a statement that the audit found the VYNPS AMP consistent with the GALL Report and that any applicant-identified exceptions to the GALL Report were found technically acceptable to manage the aging effect during the period of extended operation. The SER input should identify the exceptions and provide the basis for acceptance. The SER input will also address the UFSAR supplement, and document the basis for concluding that it is acceptable.
  - C. For plant-specific AMPs, the SER input should document the basis for accepting each the program elements reviewed by the project team. The SER input should also include a discussion concerning the adequacy of the UFSAR supplement.
  - D. For aging management evaluations that are consistent with the GALL Report,<sup>6</sup> the SER input should include the following:

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<sup>6</sup> The audit results documented in this section address the AMRs consistent with the GALL Report for which no further evaluation is recommended.

- (1) Identify the VYNPS LRA section reviewed
  - (2) A summary of the type of information provided in the section of the VYNPS LRA reviewed, including a listing of the VYNPS AMRs reviewed.
  - (3) Identify the VYNPS LRA Tables 3.X.2-Y reviewed.
  - (4) A summary review of the AMR Notes A through E used to classify the AMR line items used in these tables.
  - (5) A brief summary of what the staff (project team) reviewed to perform the audit, i.e., LRA and applicant basis documents and other implementation documents. Reference the appendix that lists the details of the documents reviewed.
  - (6) The bases for accepting any exceptions to GALL Report AMRs that were identified by the applicant or the project team member.
  - (7) A finding that determines that:
    - (a) the applicant identified the applicable aging effects
    - (b) the applicant defined the appropriate combination of materials and environments
    - (c) the applicant specified acceptable AMRs
  - (8) A conclusion stating, if applicable, 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, and that 10 CFR 54.21(a)(3) has been satisfied.
- E. For aging management evaluations that are consistent with the GALL Report, for which further evaluation is recommended, the SER input should include the following:
- (1) The VYNPS LRA section containing the applicant's further evaluations of AMRs for which further evaluation is required.
  - (2) A list of the aging effects for which the further evaluation apply.
  - (3) For the applicant's further evaluations, provide a summary of the basis for concluding that it satisfied the criteria of Section 3.1.3.2 of the SRP-LR.
  - (4) A statement that the staff audited the applicant's further evaluations against the criteria contained in Section 3.1.3.2 of the SRP-LR.
  - (5) A statement that the audit and review report contains additional information. Also identify the issue date and the ADAMS accession number for the audit and review report.
- F. Staff AMR Review Results.<sup>7</sup> This section of the SER input documents the reviews of AMRs assigned to the project team that are not consistent with the GALL Report. The audit report should document the following, based on a precedent identified by the applicant:

<sup>7</sup> This section documents reviews of AMRs assigned to the project team that are not consistent with the GALL Report.

- (1) The VYNPS LRA section reviewed
- (2) A summary of the type of information provided in the section of the LRA, reviewed, including a listing of the AMPs reviewed for this LRA section.
- (3) Identify the VYNPS LRA Tables 3.X.2-Y documented by this audit writeup.
- (4) A brief summary of what the staff (project team) reviewed, i.e., LRA and applicant basis documents and other implementation documents.
- (5) A finding that determines, if true, that:
  - (a) The applicant identified the applicable aging effects
  - (b) The applicant listed the appropriate combination of materials and environments
  - (c) The applicant specified acceptable AMPs
- (6) Provide a conclusion stating, if applicable, 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, and that 10 CFR 54.21(a)(3) has been satisfied.

- G. Staff TLAA Review Results. For TLAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis. Candidates for further review by technical specialists could be such as the following:
- Reactor Vessel Neutron Embrittlement Analysis
  - EQ for Electrical Equipment (unless audit team is capable)
  - Intergranular separation in the Heat-Affected Zone (HAZ) of Reactor Vessel
  - Low-Alloy Steel under Austenitic SS Cladding
  - Silting of the Ultimate Heat Sink

#### **6.5 Documents Reviewed and Document Retention**

Any documents reviewed that were used to formulate the basis for resolution of an issue, such as the basis for a technical resolution, the basis for the acceptance of an exception or an enhancement, etc., should be documented as a reference in the audit and review report.

Upon issuance of the audit and review report, all worksheets that were completed by contractor and NRC personnel shall be given to the project team leader.

After the NRC has made its licensing decision, all copies of documents collected and all documents generated to complete the audit and review report, such as audit worksheets, question and answer tracking documentation, etc., are to be discarded.

**Table 1. Aging Management Program Element Descriptions**

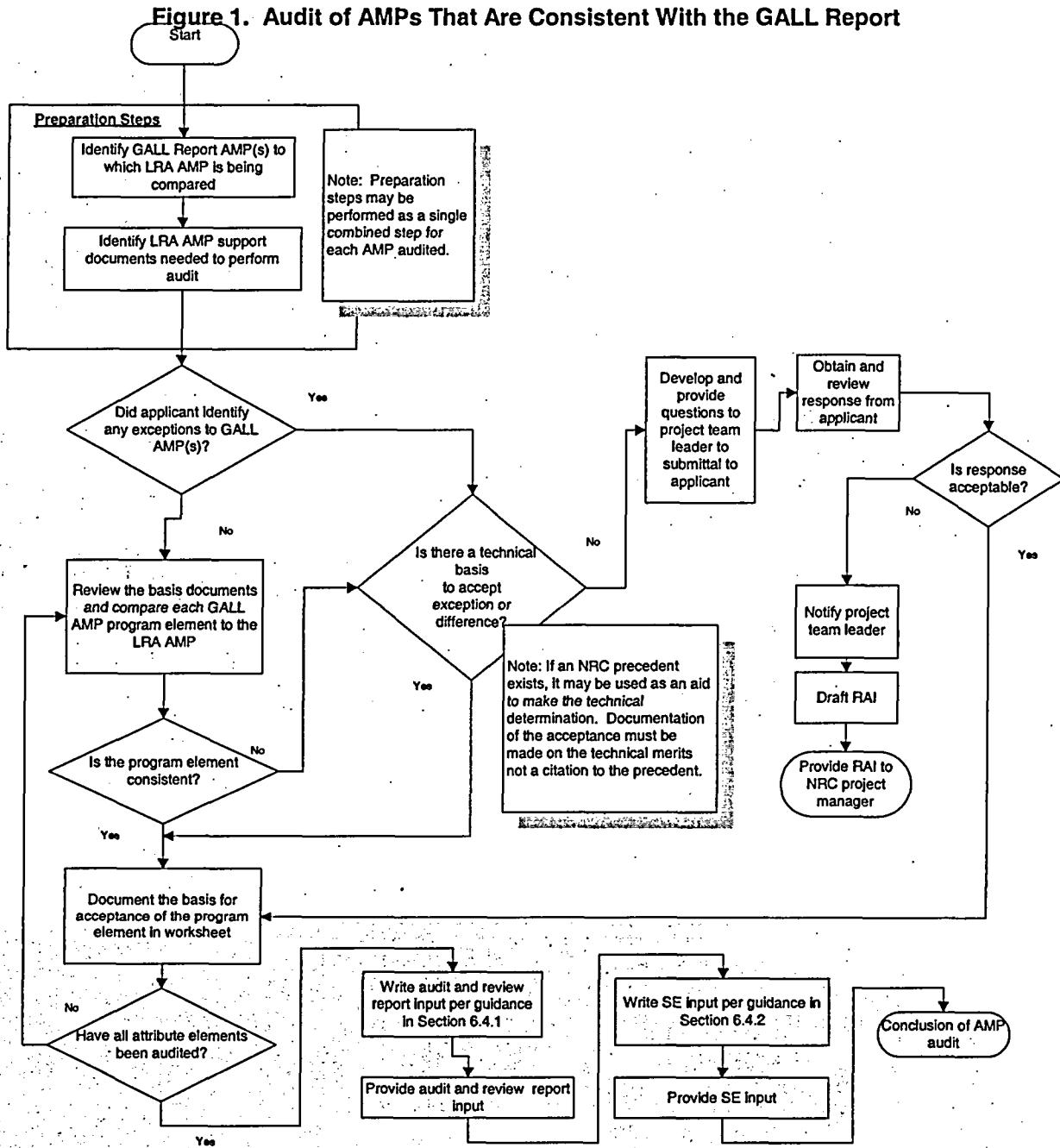
<b>Element</b>	<b>Description</b>
1 Scope of the program	The scope of the program should include the specific structures and components subject to an aging management review.
2 Preventive actions	Preventive actions should mitigate or prevent the applicable aging effects.
3 Parameters monitored or inspected	Parameters monitored or inspected should be linked to the effects of aging on the intended functions of the particular structure and component.
4 Detection of aging effects	Detection of aging effects should occur before there is loss of any structure and component intended function. This includes aspects such as method or technique (i.e., visual, volumetric, surface inspection), frequency, sample size, data collection and timing of new/one-time inspections to ensure timely detection of aging effects.
5 Monitoring and trending	Monitoring and trending should provide prediction of the extent of the effects of aging and timely corrective or mitigative actions.
6 Acceptance criteria	Acceptance criteria, against which the need for corrective action will be evaluated, should ensure that the particular structure and component intended functions are maintained under all current licensing basis design conditions during the period of extended operation.
7* Corrective actions	Corrective actions, including root cause determination and prevention of recurrence, should be timely.
8* Confirmation process	The confirmation process should ensure that preventive actions are adequate and appropriate corrective actions have been completed and are effective.
9* Administrative controls	Administrative controls should provide a formal review and approval process.
10 Operating experience	Operating experience involving the aging management program, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation.

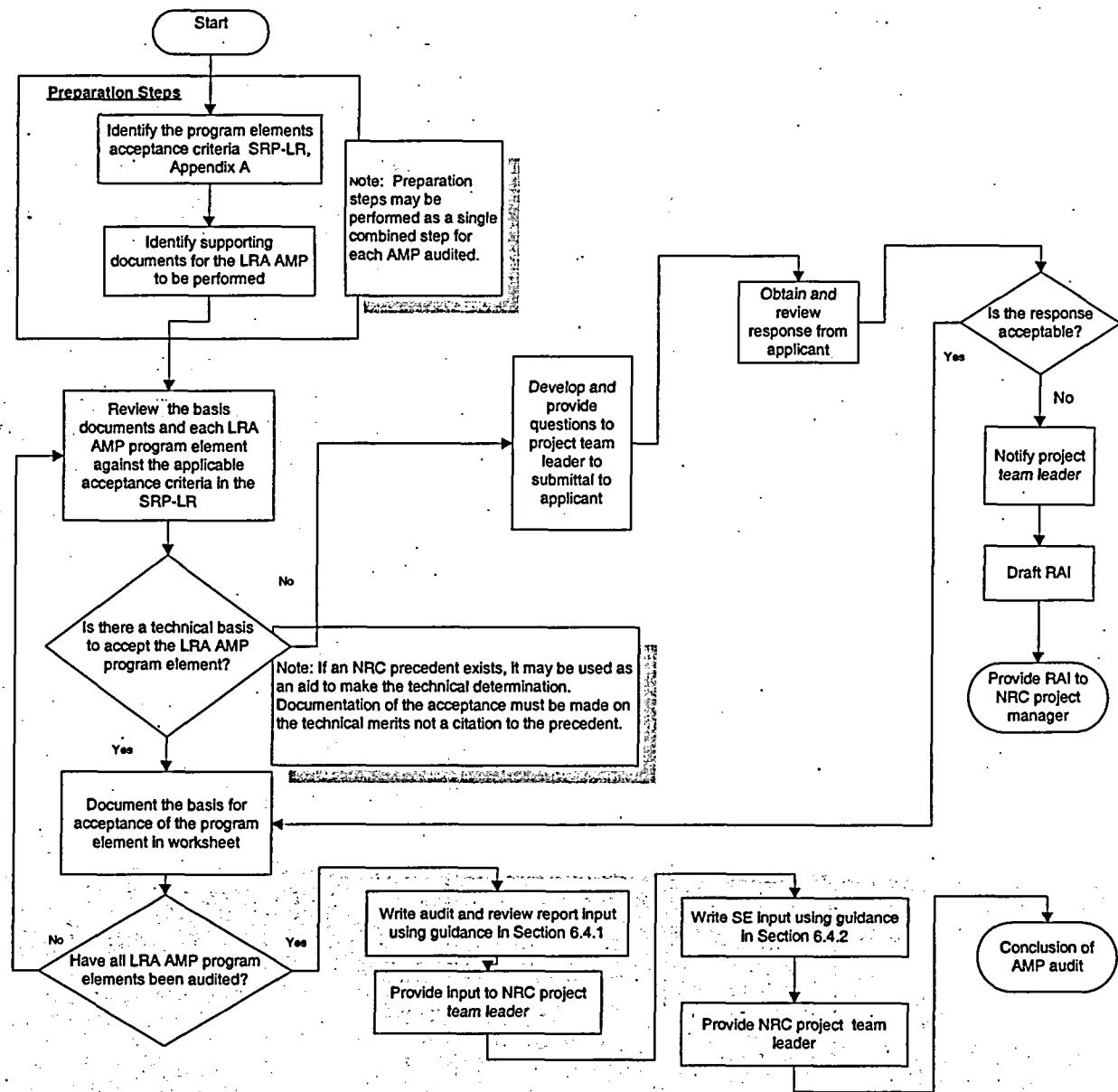
\* The adequacy of the applicant's 10 CFR 50, Appendix B Program associated with this program element is audited by the Division of Engineering.

**Table 2. Notes for License Renewal Application Tables 3.X.2-Y<sup>8</sup>**

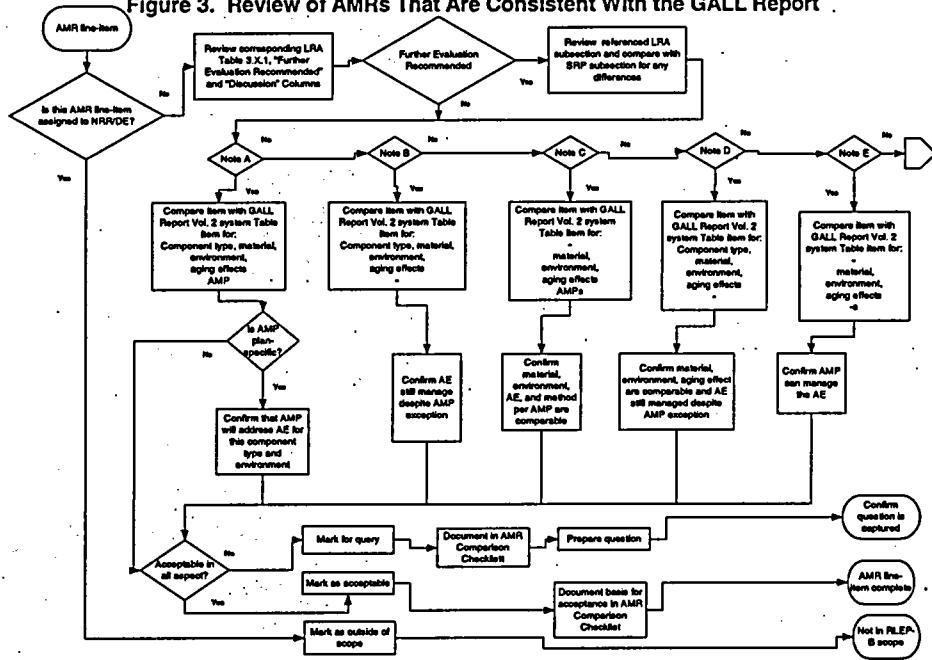
Note	Description
A	Consistent with NUREG-1801 [GALL Report] item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
B	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
C	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
D	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
E	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.
F	Material not in NUREG-1801 for this component.
G	Environment not in NUREG-1801 for this component and material.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.
I	Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.
J	Neither the component nor the material and environment combination is evaluated in NUREG-1801.

<sup>8</sup> Each AMR line item is coded with a letter which represents a standard note designation based on a letter from A. Nelson, NEI, to P.T. Kuo, NRC, "U.S. Nuclear Industry's Proposed Standard License Renewal Application Format Package, Request NRC Concurrence," dated January 24, 2003 (ML030290201). The staff concurred in the format of the standardized format for license renewal applications by letter dated April 7, 2003, from P.T. Kuo, NRC, to A. Nelson, NEI (ML030990052).

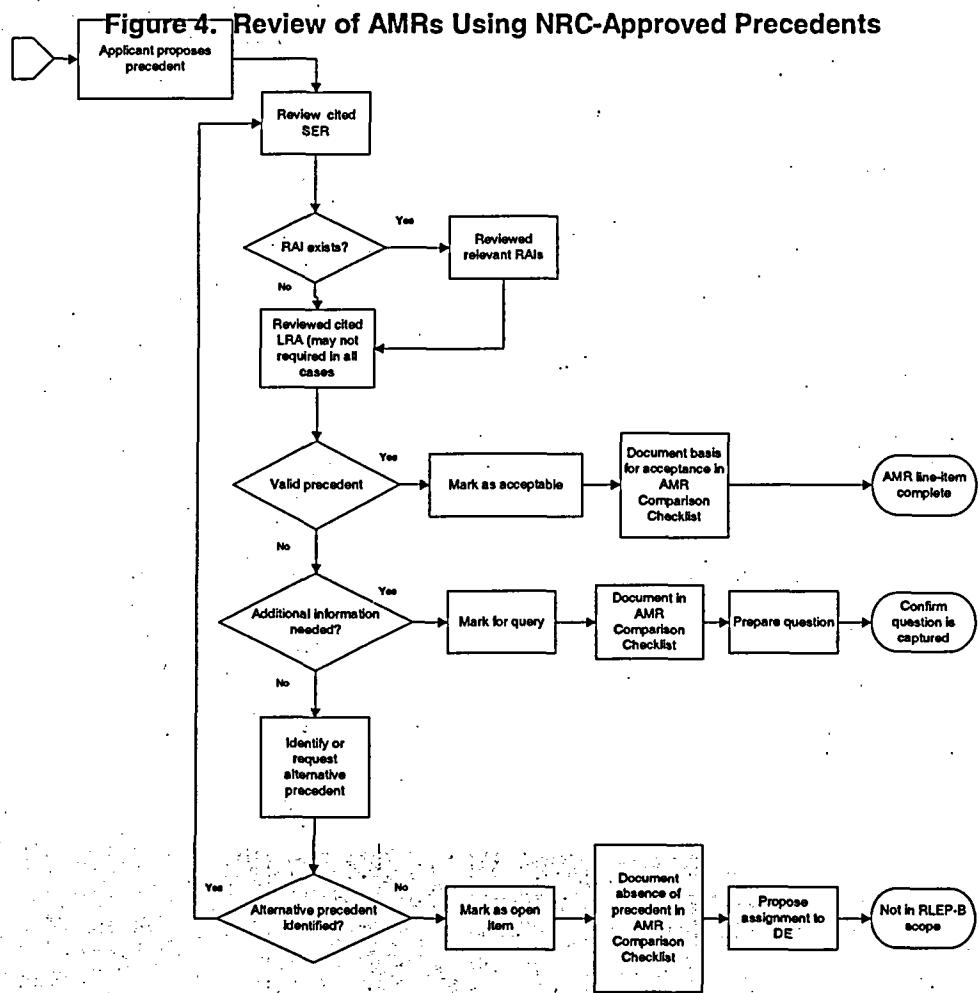
**Figure 1. Audit of AMPs That Are Consistent With the GALL Report**

**Figure 2. Audit of Plant-Specific AMPs**

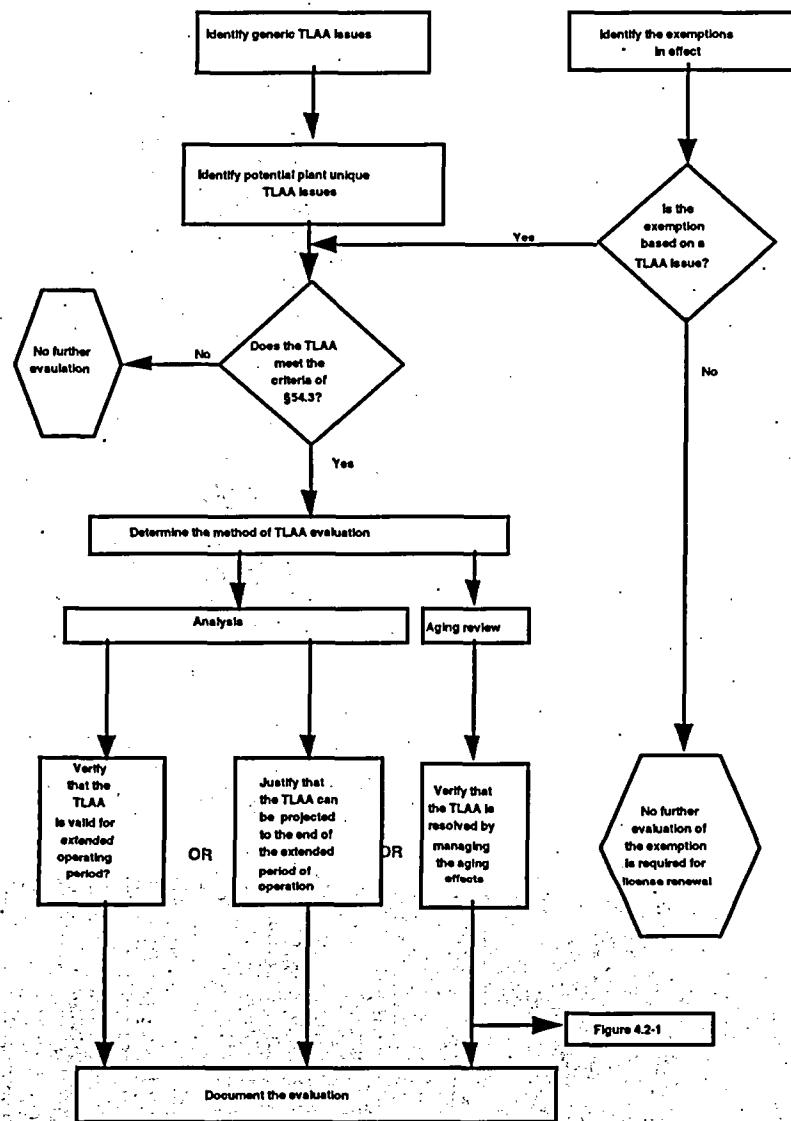
**Figure 3. Review of AMRs That Are Consistent With the GALL Report**







**Figure 5. Review of TLAs and Exemptions (from NEI 95-10, Revision 6)**



**Appendix A**  
**Project Team Members**

**Appendix A****Project Team Members**

Organization	Name	Function
NRC/NRR/DLR/RLRC	Mike Morgan	Project Team Leader
NRC/NRR/DLR/RLRC	Kaihwa (Robert) Hsu	Backup Team Leader
NRC/NRR/DLR/RLRC	Duc Nguyen	Reviewer
NRC/NRR/DLR/RLRC	Mark Lintz	Reviewer
Information Systems Laboratories, Inc.	Mike Kennedy	Contractor Lead, Reviewer
Information Systems Laboratories, Inc.	Malcolm Patterson	Reviewer
Information Systems Laboratories, Inc.	Jon Woodfield	Reviewer

**Appendix B**  
**RLRC Schedule for LRA Safety Review**

## Appendix B

### RLRC Schedule for LRA Safety Review

**Plant:** Vermont Yankee

**Team Leader:** Michael Morgan

**Backup Team Leader:** Kaihwa (Robert) Hsu

**Project Manager:** Johnny Eads

**Contractor:** Information Systems Laboratories (ISL)

**Assignments:** Mike Kennedy (ISL), Malcolm

Patterson (ISL), Jon Woodfield (ISL), Mark Lintz (NRC)

Duc Nguyen (NRC)

**TAC:** MC9668

**Scope of Work:**

AMPs/TLAAs - 36 of 37

AMRs - 2378 of 2378 line items

**RAI Target Date:** 11/01/06

**SE Input to PM:** 02/01/07

<b>ACTIVITY/MILESTONE</b>		<b>PLAN SCHEDULE</b>
1	Receive LRA	1/25/2006
2	Complete Acceptance Review	2/25/2006
3	Make Review Assignments	3/8/2006
4	Conduct Team Planning Meeting	3/21- 3/22/2006
5	Issue Audit Plan to PM	3/31/2006
6	Conduct Site Visit 1 (AMP audit and review)	4/17- 4/21/2006
7	Draft AMP Audit Report Input	5/1-5/5/2006
8	Conduct in-office AMR reviews	5/8- 5/12/2006
9	Site Visit 2 (AMR audit and review)	5/15- 5/19/2006
10	Draft AMR Audit Report Input	6/5-6/9/2006
11	Optional Site Visit 3 (resolve AMR and AMP questions)	6/26- 6/29/2006
12	Public Exit Meeting	6/29/2006
13	Cutoff for providing RAIs to PM	
14	Peer Review of Final Draft Audit and Review Report	7/24- 7/28/2006
15	Issue Final Audit and Review Report	8/4/2006
16	Draft SER input (AMPs/AMRs)	8/9- 9/11/2006
17	Issue Final Draft SER Input to PM	9/15/2006
18	ACRS Subcommittee Meeting	5/1/2007
19	ACRS Full Committee Meeting	9/1/2007

## **Appendix C**

### **Aging Management Program Assignments**

### Appendix C

#### Aging Management Program Assignments

The following AMPs have been assigned to the project team for review.

LRA AMP Number	GALL Report AMP Number	AMP Title	Consistent with GALL Report		Assigned Reviewer
			<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
B.1.1	XI.M34	Buried Piping Inspection Program		X	Mark Lintz
B.1.2	XI.M6	BWR CRD Return Line Nozzle Program		X	Malcolm Patterson
B.1.3	XI.M5	BWR Feedwater Nozzle Program		X	Malcolm Patterson
B.1.4	XI.M8	BWR Penetrations Program		X	Robert Hsu
B.1.5	XI.M7	BWR Stress Corrosion Cracking Program		X	Robert Hsu
B.1.6	XI.M4	BWR Vessel ID Attachment Welds Program		X	Robert Hsu
B.1.7	XI.M9	BWR Vessel Internals Program		X	Robert Hsu
B.1.8	XI.S4	Containment Leak Rate Program		X	Mark Lintz
B.1.9	XI.M30	Diesel Fuel Monitoring Program		X	Mike Kennedy
B.1.10	X.E1	Environmental Qualification (EQ) of Electric Components Program	Yes		Duc Nguyen
B.1.11	X.M1	Fatigue Monitoring Program		X	Malcolm Patterson
B.1.12.1	XI.M26	Fire Protection - Fire Protection Program		X	Mark Lintz
B.1.12.2	XI.M27	Fire Protection - Fire Water System Program		X	Mark Lintz
B.1.13	XI.M17	Flow-Accelerated Corrosion Program	Yes		Mark Lintz
B.1.14	NA	Heat Exchanger Monitoring Program	PS		Mike Kennedy
B.1.15.1	XI.S1	Inservice Inspection - Containment Inservice Inspection (CII) Program	PS		Jon Woodfield
B.1.15.2	XI.M1 XI.S3	Inservice Inspection - Inservice Inspection (ISI) Program	PS		Malcolm Patterson

B.1.16	NA	Instrument Air Quality Program	PS		Malcolm Patterson
B.1.17	XI.E3	Non-EQ Inaccessible Medium-Voltage Cable Program	Yes		Duc Nguyen
B.1.18	XI.E2	Non-EQ Instrumentation Circuits Test Review Program	Yes		Duc Nguyen
B.1.19	XI.E1	Non-EQ Insulated Cables and Connections Program	Yes		Duc Nguyen
B.1.20	XI.M39	Oil Analysis Program		X	Mike Kennedy
B.1.21	XI.M32 XI.M35	One-Time Inspection Program	Yes		Mike Kennedy
B.1.22	NA	Periodic Surveillance and Preventive Maintenance Program	PS		Mike Morgan
B.1.23	XI.M3	Reactor Head Closure Studs Program		X	Mike Morgan
B.1.24	XI.M31	Reactor Vessel Surveillance Program	Yes		DE
B.1.25	XI.M33	Selective Leaching Program	Yes		Malcolm Patterson
B.1.26	XI.M20	Service Water Integrity Program		X	Jon Woodfield
B.1.27.1	XI.S5	Structures Monitoring - Masonry Wall Program	Yes		Jon Woodfield
B.1.27.2	XI.S6	Structures Monitoring - Structures Monitoring Program	Yes		Jon Woodfield
B.1.27.3	NA	Structures Monitoring - Vernon Dam FERC Inspection	PS		Jon Woodfield
B.1.28	XI.M36	System Walkdown Program	Yes		Mark Lintz
B.1.29	XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program	Yes		Robert Hsu
B.1.30.1	NA	Water Chemistry Control - Auxiliary Systems Program	PS		Mike Morgan
B.1.30.2	XI.M2	Water Chemistry Control - BWR Program	Yes		Mike Morgan
B.1.30.3	XI.M21	Water Chemistry Control - Closed Cooling Water Program	Yes		Mike Morgan
DE = Division of Engineering					
PS = plant-specific					
X = with exceptions					



## **Appendix D**

### **Aging Management Review Assignments**

**Appendix D****Aging Management Review Assignments**

AMR Section	Title	Reviewer
3.1	Reactor Vessel, Internals, and Reactor Coolant System	M. Patterson
3.2	Engineering Safety Features Systems	M. Lintz
3.3	Auxiliary Systems	M. Kennedy
3.4	Steam and Power Conversion Systems	M. Morgan
3.5	Structures and Component Supports	J. Woodfield
3.6	Electrical and Instrumentation and Controls	D. Nguyen

## **Appendix E**

### **Time-Limited Aging Analyses Review Assignments**

## Appendix E

### Time-Limited Aging Analyses Review Assignments

LRA TLAA Number	GALL Report TLAA Number	TLAA Title	Assigned Reviewer
4.1	---	Identification of TLAs and Exemptions	Hsu
4.2	---	Reactor Vessel Neutron Embrittlement	DE
4.3	X.M1	Metal Fatigue	Hsu
4.4	X.E1	Environmental Qualification of Electrical Components	Nguyen
4.5	X.S1	Concrete Containment Tendon Prestress	Not applicable to VYNPS
4.6	---	Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses	DE/Hsu
4.7.1	---	Reflood Thermal Shock of the Reactor Vessel Internals	DE
4.7.2.1	---	BWRVIP-05, RPV Circumferential Welds Analysis	DE
4.7.2.2	---	BWRVIP-25, Core Plate Rim Holddown Bolts Loss of Preload Analysis	Hsu
4.7.2.3	---	BWRVIP-38, Shroud Support Fatigue Analysis	Hsu
4.7.2.4	---	BWRVIP-47, Lower Plenum Fatigue Analysis	Hsu
4.7.2.5	---	BWRVIP-48, Vessel ID Attachment Welds Fatigue Analysis	Hsu
4.7.2.6	---	BWRVIP-49, Instrument Penetrations Fatigue Analysis	Hsu
4.7.2.7	---	BWRVIP-74, Reactor Vessel P/T Curves Analysis Fatigue Analysis CVUSE Analysis Circ/Axial Welds Analysis	DE
4.7.2.8	---	BWRVIP-76, Core Shroud	Hsu

## **Appendix F**

**Consistent with GALL Report AMP Audit/Review Worksheet**

## Appendix F

### Consistent with GALL Report AMP Audit/Review Worksheet

The example worksheet provided in this appendix provides, as an aid for the reviewer, a process for documenting the basis for the assessment of the program elements contained in the GALL Report AMPs (Chapter XI of NUREG-1801, Volume 2). The worksheet provides a systematic method for recording the basis for assessments or to identify when the applicant needs to provide clarification or additional information. Information recorded in the worksheets will also be used to prepare the audit and review report and the safety evaluation report input.

The entire collection of the GALL Report AMP worksheets can be found at ADAMS Accession No. ML060950189. Table B-2 in the VYNPS LRA identifies the relationship of the VYNPS AMPs to the applicable GALL AMPs so that the appropriate worksheet can be selected by the project team reviewer.

Audit Worksheet  
GALL Report AMP

Plant: \_\_\_\_\_

LRA AMP: \_\_\_\_\_

Reviewer: \_\_\_\_\_

**GALL AMP: X.E1, Environmental Qualification (EQ) of Electric Components**

Date: \_\_\_\_\_

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
Program Description	<p>A. The reanalysis of an aging evaluation is normally performed to extend the qualification by reducing excess conservatism incorporated in the prior evaluation. Reanalysis of an aging evaluation to extend the qualification of a component is performed on a routine basis pursuant to 10 CFR 50.49(e) as part of an EQ program. While a component life limiting condition may be due to thermal, radiation, or cyclical aging, the vast majority of component aging limits are based on thermal conditions. Conservatism may exist in aging evaluation parameters, such as the assumed ambient temperature of the component, an unrealistically low activation energy, or in the application of a component (de-energized versus energized). The reanalysis of an aging evaluation is documented according to the station's quality assurance program requirements, which requires the verification of assumptions and conclusions. As already noted, important attributes of a reanalysis include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:</p>
	<p>B. All operating plants must meet the requirements of 10 CFR 50.49 for certain electrical components important to safety. 10 CFR 50.49 defines the scope of components to be included, requires the preparation and maintenance of a list of in-scope components, and requires the preparation and maintenance of a qualification file that includes component performance specifications, electrical characteristics, and the environmental conditions to which the components could be subjected.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:</p>

	C. 10 CFR 50.49(e)(5) contains provisions for aging that require, in part, consideration of all significant types of aging degradation that can affect component functional capability. 10 CFR 50.49(e) also requires replacement or refurbishment of components not qualified for the current license term prior to the end of designated life, unless additional life is established through ongoing qualification.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	D. 10 CFR 50.49(f) establishes four methods of demonstrating qualification for aging and accident conditions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	E. 10 CFR 50.49(k) and (l) permit different qualification criteria to apply based on plant and component vintage. Supplemental EQ regulatory guidance for compliance with these different qualification criteria is provided in the DOR Guidelines, Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors; NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment; and Regulatory Guide 1.89, Rev. 1, Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants. Compliance with 10 CFR 50.49 provides reasonable assurance that the component can perform its intended functions during accident conditions after experiencing the effects of inservice aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	F. EQ programs manage component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are to be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for EQ components that specify a qualification of at least 40 years are considered time-limited aging analyses (TLAAs) for license renewal.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	G. Under 10 CFR 54.21(c)(1)(iii), plant EQ programs, which implement the requirements of 10 CFR 50.49 (as further defined and clarified by the DOR Guidelines, NUREG-0588, and Regulatory Guide 1.89, Rev. 1), are viewed as aging management programs (AMPs) for license renewal. Reanalysis of an aging evaluation to extend the qualification of components under 10 CFR 50.49(e) is performed on a routine basis as part of an EQ program. Important attributes for the reanalysis of an aging evaluation include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met). These attributes are discussed in the "EQ Component Reanalysis Attributes" section.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment

	H. This reanalysis program can be applied to EQ components now qualified for the current operating term (i.e., those components now qualified for 40 years or more). As evaluated below, this is an acceptable AMP. Thus, no further evaluation is recommended for license renewal if an applicant elects this option under 10 CFR 54.21(c)(1)(iii) to evaluate the TLAA of EQ of electric equipment.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
EQ Component Reanalysis Attributes	A. The reanalysis of an aging evaluation is normally performed to extend the qualification by reducing excess conservatism incorporated in the prior evaluation. Reanalysis of an aging evaluation to extend the qualification of a component is performed on a routine basis pursuant to 10 CFR 50.49(e) as part of an EQ program. While a component life limiting condition may be due to thermal, radiation, or cyclical aging, the vast majority of component aging limits are based on thermal conditions. Conservatism may exist in aging evaluation parameters, such as the assumed ambient temperature of the component, an unrealistically low activation energy, or in the application of a component (de-energized versus energized). The reanalysis of an aging evaluation is documented according to the station's quality assurance program requirements, which requires the verification of assumptions and conclusions. As already noted, important attributes of a reanalysis include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	B. Analytical Methods: The analytical models used in the reanalysis of an aging evaluation are the same as those previously applied during the prior evaluation. The Arrhenius methodology is an acceptable thermal model for performing a thermal aging evaluation. The analytical method used for a radiation aging evaluation is to demonstrate qualification for the total integrated dose (that is, normal radiation dose for the projected installed life plus accident radiation dose). For license renewal, one acceptable method of establishing the 60-year normal radiation dose is to multiply the 40-year normal radiation dose by 1.5 (that is, 60 years/40 years). The result is added to the accident radiation dose to obtain the total integrated dose for the component. For cyclical aging, a similar approach may be used. Other models may be justified on a case-by-case basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment

	C. Data Collection and Reduction Methods: Reducing excess conservatism in the component service conditions (for example, temperature, radiation, cycles) used in the prior aging evaluation is the chief method used for a reanalysis. Temperature data used in an aging evaluation is to be conservative and based on plant design temperatures or on actual plant temperature data. When used, plant temperature data can be obtained in several ways, including monitors used for technical specification compliance, other installed monitors, measurements made by plant operators during rounds, and temperature sensors on large motors (while the motor is not running). A representative number of temperature measurements are conservatively evaluated to establish the temperatures used in an aging evaluation. Plant temperature data may be used in an aging evaluation in different ways, such as (a) directly applying the plant temperature data in the evaluation, or (b) using the plant temperature data to demonstrate conservatism when using plant design temperatures for an evaluation. Any changes to material activation energy values as part of a reanalysis are to be justified on a plant-specific basis. Similar methods of reducing excess conservatism in the component service conditions used in prior aging evaluations can be used for radiation and cyclical aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	D. Underlying Assumptions: EQ component aging evaluations contain sufficient conservatism to account for most environmental changes occurring due to plant modifications and events. When unexpected adverse conditions are identified during operational or maintenance activities that affect the normal operating environment of a qualified component, the affected EQ component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
	E. Acceptance Criteria and Corrective Actions: The reanalysis of an aging evaluation could extend the qualification of the component. If the qualification cannot be extended by reanalysis, the component is to be refurbished, replaced, or requalified prior to exceeding the period for which the current qualification remains valid. A reanalysis is to be performed in a timely manner (that is, sufficient time is available to refurbish, replace, or requalify the component if the reanalysis is unsuccessful).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment
1. Scope of Program	A. EQ programs apply to certain electrical components that are important to safety and could be exposed to harsh environment accident conditions, as defined in 10 CFR 50.49 and Regulatory Guide 1.89, Revision 1.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment

2. Preventive Actions	A. 10 CFR 50.49 does not require actions that prevent aging effects. EQ program actions that could be viewed as preventive actions include (a) establishing the component service condition tolerance and aging limits (for example, qualified life or condition limit) and (b) where applicable, requiring specific installation, inspection, monitoring or periodic maintenance actions to maintain component aging effects within the bounds of the qualification basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
3. Parameters Monitored/ Inspected	A. EQ component qualified life is not based on condition or performance monitoring. However, pursuant to Regulatory Guide 1.89, Rev. 1, such monitoring programs are an acceptable basis to modify a qualified life through reanalysis. Monitoring or inspection of certain environmental conditions or component parameters may be used to ensure that the component is within the bounds of its qualification basis, or as a means to modify the qualified life.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
4. Detection of Aging Effects	A. 10 CFR 50.49 does not require the detection of aging effects for in-service components. Monitoring or inspection of certain environmental conditions or component parameters may be used to ensure that the component is within the bounds of its qualification basis, or as a means to modify the qualified life.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
5. Monitoring and Trending	A. 10 CFR 50.49 does not require monitoring and trending of component condition or performance parameters of in-service components to manage the effects of aging. EQ program actions that could be viewed as monitoring include monitoring how long qualified components have been installed. Monitoring or inspection of certain environmental, condition, or component parameters may be used to ensure that a component is within the bounds of its qualification basis, or as a means to modify the qualification.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
6. Acceptance Criteria	A. 10 CFR 50.49 acceptance criteria are that an inservice EQ component is maintained within the bounds of its qualification basis, including (a) its established qualified life and (b) continued qualification for the projected accident conditions. 10 CFR 50.49 requires refurbishment, replacement, or requalification prior to exceeding the qualified life of each installed device.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

	B. When monitoring is used to modify a component qualified life, plant-specific acceptance criteria are established based on applicable 10 CFR 50.49(f) qualification methods.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
7. Corrective Actions	A. If an EQ component is found to be outside the bounds of its qualification basis, corrective actions are implemented in accordance with the station's corrective action program. When unexpected adverse conditions are identified during operational or maintenance activities that affect the environment of a qualified component, the affected EQ component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions. When an emerging industry aging issue is identified that affects the qualification of an EQ component, the affected component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions. Confirmatory actions, as needed, are implemented as part of the station's corrective action program, pursuant to 10 CFR 50, Appendix B. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the corrective actions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
8. Confirmation Process	A. Confirmatory actions, as needed, are implemented as part of the station's corrective action program, pursuant to 10 CFR 50, Appendix B. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the confirmation process.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
9. Administrative Controls	A. EQ programs are implemented through the use of station policy, directives, and procedures. EQ programs will continue to comply with 10 CFR 50.49 throughout the renewal period, including development and maintenance of qualification documentation demonstrating reasonable assurance that a component can perform required functions during harsh accident conditions. EQ program documents identify the applicable environmental conditions for the component locations. EQ program qualification files are maintained at the plant site in an auditable form for the duration of the installed life of the component. EQ program documentation is controlled under the station's quality assurance program. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the administrative controls.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

10. Operating Experience	A. EQ programs include consideration of operating experience to modify qualification bases and conclusions, including qualified life. Compliance with 10 CFR 50.49 provides reasonable assurance that components can perform their intended functions during accident conditions after experiencing the effects of inservice aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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Exceptions

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para. # and/or Page #)
1.				
2.				
...				

Enhancements

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Documents Reviewed During Audit

Document Number	Identifier (number)	Title	Revision and/or Date
1.			
2.			
3.			
4.			
....			

**Appendix G**  
**Plant-Specific AMP Audit/Review Worksheet**

## Appendix G

### Plant-Specific AMP Audit/Review Worksheet

The example worksheet provided in this appendix provides, as an aid for the reviewer, a process for documenting the basis for the assessments concerning individual program elements contained in Branch Technical Position RLSB-1 "Aging Management Review - Generic," in Appendix A to the SRP-LR. The worksheet provides a systematic method to record the basis for assessments or identifying when the applicant needs to provide additional information. Information recorded in these worksheets will be used when preparing the audit and review report and the safety evaluation report input.

**Audit Worksheet**  
**GALL Report AMP**

Plant: \_\_\_\_\_

LRA AMP: \_\_\_\_\_

Reviewer: \_\_\_\_\_

GALL AMP: Plant-specific Program \_\_\_\_\_

Date: \_\_\_\_\_

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
Program Description		
1. Scope of Program	A. The specific program necessary for license renewal should be identified. The scope of the program should include the specific structures and components of which the program manages the aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
2. Preventive Actions	A. The activities for prevention and mitigation programs should be described. These actions should mitigate or prevent aging degradation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	B. For condition or performance monitoring programs, they do not rely on preventive actions and thus, this information need not be provided. More than one type of aging management program may be implemented to ensure that aging effects are managed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
3. Parameters Monitored/ Inspected	A. The parameters to be monitored or inspected should be identified and linked to the degradation of the particular structure and component Intended function(s).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

	B. For a condition monitoring program, the parameter monitored or inspected should detect the presence and extent of aging effects. Some examples are measurements of wall thickness and detection and sizing of cracks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	C. For a performance monitoring program, a link should be established between the degradation of the particular structure or component intended function(s) and the parameter(s) being monitored. A performance monitoring program may not ensure the structure and component intended function(s) without linking the degradation of passive intended functions with the performance being monitored.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	D. For prevention and mitigation programs, the parameters monitored should be the specific parameters being controlled to achieve prevention or mitigation of aging effects.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
4. Detection of Aging Effects	A. The parameters to be monitored or inspected should be appropriate to ensure that the structure and component intended function(s) will be adequately maintained for license renewal under all CLB design conditions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	B. Provide information that links the parameters to be monitored or inspected to the aging effects being managed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	C. Thus, the effects of aging on a structure or component should be managed to ensure its availability to perform its intended function(s) as designed when called upon.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	D. A program based solely on detecting structure and component failure should not be considered as an effective aging management program for license renewal.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	E. This program element describes "when," "where," and "how" program data are collected (i.e., all aspects of activities to collect data as part of the program).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

	F. Provide justification, including codes and standards referenced, that the technique and frequency are adequate to detect the aging effects before a loss of SC Intended function. A program based solely on detecting SC failures is not considered an effective aging management program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	G. When sampling is used to inspect a group of SCs, provide the basis for the inspection population and sample size. The inspection population should be based on such aspects of the SCs as a similarity of materials of construction, fabrication, procurement, design, installation, operating environment, or aging effects. The sample size should be based on such aspects of the SCs as the specific aging effect, location, existing technical information, system and structure design, materials of construction, service environment, or previous failure history.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	H. The samples should be biased toward concern in the period of extended operation. Provisions should also be included on expanding the sample size when degradation is detected in the initial sample.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
5. Monitoring and Trending	A. Monitoring and trending activities should be described, and they should provide predictability of the extent of degradation and thus effect timely corrective or mitigative actions. Plant-specific and/or industry-wide operating experience may be considered in evaluating the appropriateness of the technique and frequency.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	B. This program element describes "how" the data collected are evaluated and may also include trending for a forward look. This includes an evaluation of the results against the acceptance criteria and a prediction regarding the rate of degradation in order to confirm that timing of the next scheduled inspection will occur before a loss of SC intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	C. The parameter or indicator trended should be described.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	D. The methodology for analyzing the inspection or test results against the acceptance criteria should be described.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

	E. Trending is a comparison of the current monitoring results with previous monitoring results in order to make predictions for the future.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	E. Trending is a comparison of the current monitoring results with previous monitoring results in order to make predictions for the future.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
6. Acceptance Criteria	A. The acceptance criteria of the program and its basis should be described.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	B. The acceptance criteria, against which the need for corrective actions will be evaluated, should ensure that the structure and component intended function(s) are maintained under all CLB design conditions during the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	C. The program should include a methodology for analyzing the results against applicable acceptance criteria.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	D. Corrective action is taken, such as piping replacement, before reaching this acceptance criterion.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	E. Acceptance criteria could be specific numerical values, or could consist of a discussion of the process for calculating specific numerical values of conditional acceptance criteria to ensure that the structure and component intended function(s) will be maintained under all CLB design conditions. Information from available references may be cited.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	F. It is not necessary to justify any acceptance criteria taken directly from the design basis information that is included in the UFSAR because that is a part of the CLB. Also, it is not necessary to discuss CLB design loads if the acceptance criteria do not permit degradation because a structure and component without degradation should continue to function as originally designed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

	G. Acceptance criteria, which do permit degradation, are based on maintaining the intended function under all CLB design loads.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
	H. Qualitative inspections should be performed to same predetermined criteria as quantitative inspections by personnel in accordance with ASME Code and through approved site specific programs.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
7. Corrective Actions	A. Corrective actions, including root cause determination and prevention of recurrence, should be timely.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
8. Confirmation Process	A. Confirmation process should ensure that preventive actions are adequate and that appropriate corrective actions have been completed and are effective.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
9. Administrative Controls	A. Administrative controls should provide a formal review and approval process.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
10. Operating Experience	A. Operating experience with existing programs should be discussed. The operating experience of aging management programs, including past corrective actions resulting in program enhancements or additional programs, should be considered. A past failure would not necessarily invalidate an aging management program because the feedback from operating experience should have resulted in appropriate program enhancements or new programs. This information can show where an existing program has succeeded and where it has failed (if at all) in intercepting aging degradation in a timely manner. This information should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:

Exceptions

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Enhancements

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Document Reviewed During Audit

Document Number	Identifier (number)	Title	Revision and/or Date
1.			
2.			
3.			
4.			
....			

**Appendix H**  
**Aging Management Review Worksheets**

## Appendix H

### Aging Management Review Worksheets

The project team reviewer should document its AMR reviews determination in spreadsheets of the Table 1 and Table 2 AMR line items. The documentation should contain the same information as would have been captured in the Table provided in this appendix.

The project team reviewer should use the tables provided in this appendix if the electronic spreadsheet format is not used.



<b>VYNPS AMR Component (Table 1) Worksheet</b>		Audit Date:
Unit:	Table No.:	Chapter:
Auditor Name(s) :		

The audit team verified that items in Table 3.x.1 (Table 1) correspond to items in the GALL Volume 1, Table X. All items applicable in Table 1 were reviewed and are addressed in the following table.

Item No.	Further Evaluation Recommended	Discussion

**Audit Remarks (Document all questions for the applicant here):**

No.	Question for applicant (draft per RAI guidance)	Response (with date)

**References/Documents Used:**

- 1.
- 2.
- 3.
- 4.

<b>VYNPS AMR MEAP Comparison (Table 2) Worksheet</b>						Audit Date:
Unit:	Table No.:				Chapter:	
Auditor Name(s):						

Line items to which Notes A, B, C, D, and E are applied or for which a precedent was cited (except for those assigned to DE) were reviewed for: 1) consistency with NUREG-1801, Volume 2 tables, and 2) adequacy of the aging managing programs. All items in the Table 2 of the system named above are acceptable with the exception of items in boldface type. (Reviewers need not duplicate information in the 2nd-5th columns that are reflected in the discussion/draft audit report.)

LRA Page No.	Component Type	Material	Environment	Aging Effect	Note	Discussion (draft as Audit Report Input)

**Audit Remarks (Document all questions for the applicant here):**

No.	Question for applicant (draft per RAI guidance)	Response (with date)

**References/Documents Used:**

- 5.
- 6.
- 7.

**Appendix I****Abbreviations and Acronyms**

ADAMS	Agencywide Documents Access and Management System
AMP	aging management program
AMR	aging management review
ASME	American Society of Mechanical Engineers
B&PV	boiler and pressure vessel
BTP	Branch Technical Position
BWR	boiling water reactor
CASS	cast austenitic stainless steel
CII	containment inservice inspection
CLB	current licensing basis
CVUSE	charpy upper-shelf energy
DCI	Divisions of Component Integrity
DE	Division of Engineering
DLR	Division of License Renewal
EQ	environmental qualification
FSAR	final safety analysis report
GALL	Generic Aging Lessons Learned
GL	Generic Letter
HAZ	heat affected zone
ISG	interim staff guidance
ISG-LR	Interim Staff Guidance for License Renewal
ISI	inservice inspection
ISL	Information Systems Laboratories, Inc.
LRA	license renewal application
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
RAI	request for additional information
RLRC	License Renewal Branch C
RLSB	License Renewal and Standardization Branch
SC	structures and components

SER	safety evaluation report
SRP-LR	Standard Review Plan-License Renewal
SRV	safety relief valve
SSC	systems, structures, and components
TLAA	time-limited aging analysis
UFSAR	updated final safety analysis report
VY	Vermont Yankee
VYNPS	Vermont Yankee Nuclear Power Station