From: "Hamer, Mike" <mhamer@entergy.com>
To: <jgr@nrc.gov>
Date: 6/6/2006 1:38:11 PM
Subject: VY LR D-Base

Jonathan,

This will be my 3rd attempt to e-mail you the VY LR D-Base. The first two e-mails were too large for your account to receive (9MB & 8MB), so I am breaking down the d-base responses into 4 parts that will be sent in separate e-mails. Here is the first, Items 1-97.

<<VY LR D-Base 1-97 on 06-06-2006.pdf>>

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Subject:	VY LR D-Base
Creation Date	6/6/2006 1:36:57 PM
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MESSAGE	319	6/6/2006 1:36:57 PM
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Expiration Date:	None
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Junk Mail Handling Evaluation Results
Message is eligible for Junk Mail handling
This message was not classified as Junk Mail

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Junk Mail handling disabled by User
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1 **Category** Accepted

Request 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?

Response The LRA, Appendix B identifies the commitments for AMP enhancements. Consistent with how other NRC commitments are tracked VYs will enter the commitments associated with License Renewal into PCRS corrective action database as Work Tracking (WT) items. We will do this when requested by the LR Project Manager who has a tracking item to define how all planned actions are tracked.

2 **Category** Closed

Request B.1.1-L-01
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?

Response Yes, gray cast iron components subject to aging management review are included in the VYNPS selective leaching program. Reference LRA Section B.1.25 and Table 3.3.2-8.

3 **Category** Closed

Request B.1.1-L-02
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?

Modified Question: Program Description Item -The LRA states, "A focused inspection will be performed within the first 10 years of extended operation... " On what areas will the "focused inspection" be focused?

Response If a focused inspection is required during the first 10 years of the period of extended operation, it will be conducted in accordance with the criteria of NUREG-1801, Section XI.M34, Buried Piping and Tanks Inspection.

In section 4 of XI.M34 it states that any credited inspection should be performed in areas with the highest likelihood of corrosion problems, and in areas with a history of corrosion problems. This defines the focused inspection that will be performed at VYNPS which will also include buried piping that has experienced external corrosion problems and areas that have conditions such as exposure to groundwater that could increase the likelihood of corrosion of buried piping.

4 **Category** Closed

Request B.1.1-L-03
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." What is the basis for including piping but excluding tanks?

Response The basis for exclusion of tanks from the Buried Piping Inspection Program is that none of the metal tanks subject to aging management review are buried. Therefore, aging of tanks is managed by other programs. Reference LRA Sections 3.2.2.2.9 and 3.4.2.2.5, and Section 3.3 Tables (The only buried tank in the auxiliary systems is fiberglass.) [LAP 4/12/06]

These were discussed in interview and the responses were subsequently written.

5 **Category** Closed

Request B.1.1-L-04
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." What is the VYNPS commitment number associated with this enhancement? Buried piping is visually examined for evidence of corrosion damage or coating defects." A review of PP 7030, Section 4.3, does not identify the parameters that pertain to corrosion damage or coating defects. Is this the guidance that VY intends to enhance?

This is License Renewal Commitment #1

Response Vermont Yankee will enhance PP 7030, Structures Monitoring Program Procedure, to provide additional guidelines for inspections of buried pipe and underground structures. Attributes to be considered will include:

1. Improved definition of the scope of underground piping inspections
2. define the condition of coatings to be inspected, including adhesion and discontinuities.
3. define the need to inspect piping underneath failed coatings
4. provide acceptance criteria, including removal of rust and an evaluation of remaining wall thickness against the minimum wall thickness requirements
5. provide instructions to notify Engineering for an inspection of any underground structures unearthed during excavation of piping.

(Commitment #1)

6 **Category** Closed

Request B.1.1-L-05
Detection of Aging Effects Element - The GALL Report states, "Inspections 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?

Response Buried components are inspected when excavated during maintenance. The exception merely states that alternate methods may be used to inspect buried components. Reference LRA Section B.1.1.

7 **Category** Closed

Request B.1.2-P-1
Exceptions granted under the current license are not assumed to apply to period of extended operation. Please confirm that the excepted weld is outside the scope of license renewal. Also, explain why it need not be inspected at least once in each inspection interval.

Response As indicated in LRA Tables 3.3.2-13-5 and 3.3.2-13-36, the excepted welded connection is subject to aging management review for potential spatial interaction in accordance with 10 CFR 50.54 (a)(2). As stated in LRA Section B.1.2, exception Note 1, the welded connection need not be inspected at least once in each inspection interval because it is in a section of piping that is Safety Class 0 and has no license renewal function in accordance with 10 CFR 54.4 (a)(1) or (a)(3).

8 **Category** Closed

Request B.1.7-H-01
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 reports approval. Please clarify the exceptions for not fully implementing BWRVIP report by VYNPS. Did VYNPS define any new cases of not fully implementing BWRVIP in the VYNPS LRA?

Response The BWR Vessel Internals Program includes provisions to notify the NRC if VYNPS does not implement a BWRVIP recommendation. Exceptions to the NUREG-1801 programs that invoke specific BWRVIP reports are identified in Appendix B of the LRA. Reference LRA Section B.1.7 and LRPD-02 (AMPER) Section 4.7 The IVVI program procedure is ENN-DC-135, and the current revision includes the requirements of BWRVIP 94 Revision 1. VY has prepared a technical justification to defer the jet pump beam examinations to align with the refueling outage schedule as allowed by BWRVIP-94 (Revision in place at time of deviation). The BWRVIP requirements are based on 24 month cycles while VY is on a 18 month cycle. The UT examinations of the Jet Pump beams are scheduled for the next refueling outage RFO 26 (2007). BWRVIP 94 Revision 1, Section 3.5 provides guidance on the reporting requirements. A BWRVIP letter dated 12/20/2005 requires implementation by 8/1/2006. This is also addressed in the latest revision of ENN-DC-135.

9 **Category** Accepted

Request B.1.7-H-02
In the VYNPS LRA, pages B-28 & C-5, an exception to BWRVIP-25 is taken. 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.

Response This exception came from TJ-2004-01 in PP 7027. The BWR Core Plate Inspection and Flaw Evaluation Guideline (BWRVIP-25) recommended a UT or EVT-1 examinations of core plate rim hold-down bolts for all plants that have not installed core plate wedges. These bolts are the only location in the core plate requiring inspection. Utilities have determined the EVT-1 examinations are extremely difficult to perform and are of limited value. The Inspection committee of the BWRVIP has attempted to develop a UT technique, and has had limited success. However, the UT examination can only be performed on a limited number of existing bolt configurations and delivery hardware for the inspection equipment has not been developed.

VY will either install core plate wedges or complete an analysis, including TLAA, to support continued inspection in accordance with BWRVIP- 25.

This is License Renewal Commitment # 29.

10 **Category** Closed

Request B.1.7-H-03
In the VYNPS LRA, page B-29, the applicant identified a VT-3 examination as a baseline. The baseline inspection described in BWRVIP is the first inspection that satisfies the guidelines in BWRVIP. Since VT-3 does not satisfy the BWRVIP guidelines, the inspection cited does not provide a baseline. Please explain how the BWRVIP guideline will be met.

Response The response to this question is the same as above (e.g. Question 9), i.e. the UT inspection is challenging and the BWRVIP is working developing an inspection method.

11 **Category** Closed

Request B.1.7-H-04
In the VYNPS LRA, page B-27, (BWRVIP-76) Recent industry experience indicates that partial through-wall cracks from the inside diameter are possible. (They have been detected at Plant Hatch.) How will cracking initiated from the inside surface of VYNPS's core shroud welds H1, H2, and H3 be managed?

Continuous question: Does applicant plan to revise LRA? If yes, Please provide the exact wording for LRA supplement.

Response Accessible regions of the core shroud welds H1,H2 & H3 are UT examined IAW BWRVIP-76. Portions of the total accesible regions of H1,H2 & H3 are characterized as design reliant analysis performed by the shroud repair designer determined the minimum design reliant weld lengths.

LRA Section B.1.7 will be changed as follows:
1. The exception to the BWR vessel internals program related to the core shroud (page B-27) will be deleted.
2. Exception Note #1 on page B- 29 will be deleted.

12 **Category** Closed

Request B.1.7-H-05
In the VYNPS LRA, page B-28 (BWRVIP-18 and BWRVIP-41) BWRVIP-18 states that inspection technique development needed for the thermal sleeve welds is being addressed by the BWRVIP inspection committee as a high priority item (since 1996). The Final License Renewal SER for BWRVIP-41 states that aging management review of the nozzle thermal sleeve (jet pump inaccessible welds) will be provided by individual applicants. Please provide plant-specific justification/commitment to demonstrate that these inaccessible welds (BWRVIP-18,4) will be adequately managed during,the period of extended operation.

Response The VYNPS hidden jet pump welds (TS-1&2) are far enough into the nozzle that failure at these welds would not result in the thermal sleeve disengaging from the nozzle. With the thermal sleeve still engaged, structural integrity of the rest of the jet pump is maintained. If the VYNPS jet pump thermal sleeve or riser piping severed, it would be detected through jet pump monitoring.
Once the technology is developed VY will inspect these welds IAW BWRVIP-41.

The VYNPS hidden core spray welds (CSTS-1,2&3) are far enough into the nozzle that failure at these welds would not result in the thermal sleeve disengaging from the nozzle. With the thermal sleeve still engaged, structural integrity of the rest of the core spray ring header is maintained. If the VYNPS core spray thermal sleeve or ring header piping is severed, it would be detected through the core spray sparger break detection monitoring system. Once the technology is developed VY will inspect these welds IAW BWRVIP-18.

13 **Category** Closed

Request B.1.7-H-06
In the VYNPS LRA, page B-28 (BWRVIP-41) The VYNPS LRA states that flaws were identified through UT examinations. Please provide detailed inspection evaluation, scope expansion and corrective action information for the staff's review.

Response TE-2003-0021 from Appendix C of PP 7027 will be provided during on-site audit. References used to prepare TE-2003-0021 will be available for on-site review upon request.
Flaw evaluations were performed for the jet pump (JP) diffuser welds, JP riser welds, and the core spray collar welds. The JP riser flaw evaluation calculation number is VYC-2400. The core spray collar weld flaw evaluation report number is VY-RPT-05-00015. 100% of the JP diffuser welds were inspected by UT in RFO 21 (1999). The flawed diffuser welds were re-inspected by UT in RFO 23 (2002) with little change in flaw sizes. 26 of 30 JP riser welds were UT inspected in RFO 20 (1998) and 4 welds were inspected by VT-1 with cleaning. The flawed riser welds were re-inspected by UT in RFO 22 (2001) with no crack growth on 2 welds and two previous indications were determined to be due to UT transducer lift-off. 100 % of the core spray collar welds were examined by UT in 1996. The flawed collar welds were re-inspected by UT in RFO 22 (2001) with no change in flaw sizes. The flawed JP diffuser/riser welds and the Core Spray collar welds are scheduled to be inspected by UT during RFO 26 (2007). Future re-inspections will be performed in accordance with BWRVIP requirements.

14 **Category** Accepted

Request B.1.7-H-07
In the VYNPS LRA, page B-31 (BWRVIP-26) The 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.

Need commitment for the re-inspection. Need word.

Response NUREG-1801 requires inspection of 5% of the Top Guide during the first six years of the period of extended operation, and inspection of an additional 5% during the second 6 years of the period of extended operation. VYNPS has committed to these examinations in the current LRA.

In response to the discussions relative to this question, VYNPS will inspect an additional 5% of the Top Guide during the third 6 years of the period of extended operation. (Commitment #2)

15 **Category** Closed

Request B.1.8-L-01
Operating Experience Element - The LRA states, "A QA audit in 2001 revealed latent non-compliance with station administrative and Appendix J implementing procedures." Please clarify the meaning of 'latent" in this context.

Added: Scope of Program item. Are any other examinations/tests performed, in addition to the integrated leakage rate and the local leakage rate tests?

Response No additional tests or examinations are performed under the Containment Leak Rate Testing Program.
The term latent in this context means: not currently affecting program effectiveness, but with the potential for affecting program effictiveness if not corrected. While technical details were followed, administrative processes, associated with test record retention, were implemented outside the established requirements. This procedural non-compliance, if not corrected, could have diminished the effectiveness of the program. Reference Audit Report VT-2001-26.

16 **Category** Closed

Request B.1.9-K-01
Please demonstrate that the guidelines provided in D2276 are consistent with or more stringent than the guidelines provided in D6217 to justify the use of D2276

Response ASTM D2276 provides guidance on determining particulate contamination using a field monitor. It provides for rapid assessment of changes in contamination level without the time delay required for rigorous laboratory procedures. It also provides a laboratory filtration method using a 0.8 micron filter. ASTM D6217 provides guidance on determining particulate contamination by sample filtration at an off-site laboratory. The acceptance criterion of D2276 is 10 mg/liter while that of D6217 is 24 mg/liter. Therefore, D2276 is more stringent than D6217. Since ASTM D2276 is an accepted method of determining particulates and is a method recommended by ASTM D975, to which VYNPS is committed by Technical Specifications, the D2276 method is used at VYNPS.

17 **Category** Closed

Request 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

Response As stated in the program description in LRA Section B.1.9, sampling and analysis activities are in accordance with technical specifications on fuel oil purity and the guidelines of ASTM standards D4057-88 and D975-02 (or later revisions of these standards). Reference LRA Section B.1.9, Program Description.

18 **Category** Closed

Request B.1.9-K-03
Please indicate what additives, if any, 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 have been performed by the fuel oil supplier or by VYNPS.

Response Vermont Yankee purchases un-dyed, low sulfur #2 diesel fuel for use in safety-related systems. Additives are not used by Vermont Yankee or the fuel supplier. The diesel fuel currently comes from Ultramar (a Canadian refinery) to a local supplier. The refinery blends fuel to meet a given specification and may use some additives such as cetane enhancers. Refinery use of additives is not described in their specification and is outside the control of the end user. Biocides have never been added to the onsite fuel supply.

19 **Category** Closed

Request B.1.9-K-04
Please provide the technical justification for not adding fuel oil additives.

Response As stated in LRA Section B.1.9, exception note 2, plant operating experience has not indicated a need for additives. Reference LRA Section B.1.9, exception note 2.

Fuel additives are generally required for three reasons. These are to maintain the stability of the fuel oil, change the properties of the fuel oil (e.g. increase the ignition quality) or to prevent bacterial or mold growth in the fuel oil. The addition of biocides may degrade some of the other fuel oil properties such as increasing the filterable solids loading.

For the past 10 years, VYNPS has been buying high quality fuel oil from Ultramar in Canada. Our deliveries are timed to the arrival of new rail cars in Vermont from this refinery. We specify very high quality fuel oil and ensure that it and the delivery trucks do not contain any contaminants. Monthly analyses of diesel fuel oil from the top, middle and bottom of the Main Fuel Oil Storage Tank have not produced any indications of fuel oil deterioration or the presence of water or sediment. Since mold and bacteria grow in the water fuel oil interface, we have no need for biocides.

Diesel generator performance associated with the quality of the diesel fuel oil has been excellent. Thus, there is no need for fuel oil additives.

20 **Category** Closed

Request B.1.9-K-05
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.

Response The Diesel Fuel Monitoring Program monitors fuel quality and levels of water in the fuel oil. ASTM D4057-88 (or a later revision of this standard), Standard Practice for Manual Sampling of Petroleum and Petroleum Products, is used for guidance on oil sampling. Safety-related diesel fuel oil is analyzed according to ASTM D975-02 (or a later revision of this standard). ASTM D1796 is used to check for water and sediment. Determination of particulates is according to ASTM Standard D2276. Reference LRPD-02 (AMPER) Section 4.9. Exceptions to NUREG-1801 Section XI.M30 parameters monitored/inspected are described in LRA Section B.1.9. Procedure OP-4613 is available for on-site review in the program basis document.

21 **Category** Closed

Request B.1.9-K-06
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?

Response As stated in LRA Section B.1.9, the Diesel Fuel Monitoring Program is consistent with NUREG-1801, Section XI.M30 for the detection of aging effects attribute. As described in NUREG-1801, periodic multi-level sampling is used to provide assurance that fuel oil contaminants are below unacceptable levels. Reference LRA Section B.1.9 and LRPD-02 (AMPER) Section 4.9.

22 **Category** Closed

Request B.1.9-K-07
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?

Response As stated in LRA Section B.1.9, the Diesel Fuel Monitoring Program is consistent with NUREG-1801, Section XI.M30 for the detection of aging effects attribute. As described in NUREG-1801, the fuel oil storage tank is periodically drained, cleaned and visually inspected to detect potential degradation. Reference LRA Section B.1.9 and LRPD-02 (AMPER) Section 4.9. PM Activity 3 of PM Basis M118 is available for on-site review in the program basis document.

The diesel day tanks are 800 gallon tanks located above ground and adjacent to the emergency diesels in separate rooms. The design of the tanks does not provide access for cleaning. The fuel oil for these tanks is supplied from the Main Fuel Oil Storage Tank. The suction for the transfer pumps is located 4" off of the bottom of the tank. Chemistry samples both the Main Tank and the Day Tanks from the bottom of the tanks. Water and/or sediment in the Main Storage Tank would be detected prior to it being transferred to the Day Tanks.

Each of the Emergency Diesel Generators is run for 4 hours monthly with each diesel using approximately 200 gallons of fuel oil per hour. This ensures that the fuel oil is turned over every month and that there are no stability issues. There have been no indications of water and sediment in the quarterly analyses from these tanks. Since VYNPS is sampling from the bottom of these tanks and has not detected problems with the fuel oil, there is no reason to drain and clean the tanks.

The John Deere Diesel Generator (JDDG) is run under load monthly for 1 hour. This diesel uses 10 gallons per hour and the surveillance requires verification of auto feed. The fire pump diesel is operated during monthly and quarterly surveillance tests. Thus, the fuel in the metal tanks associated with the JDDG and fire pump diesels is turned over frequently.

23 **Category** Closed

Request B.1.9-K-08
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?

Response A 1996 ultrasonic thickness measurement of the fuel oil storage tank bottom surface revealed no significant degradation. The Diesel Fuel Monitoring Program includes an enhancement to perform UT measurements of the fuel oil storage tank bottom surface every 10 years during the period of extended operation. Reference LRA Section B.1.9. WO 94-08951, with the results of the 1996 UT measurement, is available for on-site review in the program basis document.

24 **Category** Closed

Request B.1.9-K-09
How often are the fuel oil in the tanks sampled? Is this data trended and what criteria is used to initiate corrective actions?

Response The Diesel Fuel Monitoring Program is consistent with NUREG-1801, Section XI.M30 for the monitoring and trending attribute. As described in NUREG-1801, monitoring (sampling) and trending occurs at least quarterly, and in accordance with VYNPS Technical Specifications (monthly). Reference LRA Section B.1.9 and Technical Specification 4.10.C.2. Filterable solids acceptance criterion is = 10 mg/l. Water and sediment acceptance criterion is = 0.05%, UT acceptance criterion will be = 60% nominal thickness. Reference LRA Section B.1.9 and LRPD-02 (AMPER) Section 4.9.

25 **Category** Closed

Request B.1.9-K-10
Have there been any component failures related to the quality of the fuel oil which led to the loss of intended function?

Response The review of plant operating experience did not reveal any component failures related to the quality of the fuel oil that led to the loss of intended function. Reference LRA Section B.1.9 and LRPD-05 (OE Report).

26 **Category** Accepted

Request B.1.10-N-01
The results of the EQ of electrical equipment in LRA Section 4.4. indicate 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)

Response LRA Appendix B.1.10 will be revised to add the following:
VYNPS may perform re-analysis of an aging evaluation in order to extend the qualification of electrical components under 10 CFR 50.49 on a routine basis as part of the plant's EQ program. Important attributes for the re-analysis of an aging evaluation include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions.

VYNPS may apply this re-analysis program to EQ components now qualified for the current operating term. A re-analysis program that meets the conditions defined in the GALL report for important attributes, is an acceptable AMP for license renewal under option 10 CFR 54.21(c)(1)(iii).

EQ Component Re-analysis Attributes
The re-analysis 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 re-analysis of an aging evaluation is documented according to the station's quality assurance program requirements, that requires the verification of assumptions and conclusions. As already noted, important attributes of a re-analysis 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 below.

Analytical Methods:
The analytical models used in the re-analysis 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.

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 re-analysis. 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 re-analysis 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.

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 that may include changes to the qualification bases and conclusions.

Acceptance Criteria and Corrective Actions:
The re-analysis of an aging evaluation could extend the qualification of the component. If the qualification cannot be extended by re-analysis, the component is to be refurbished, replaced, or re-qualified prior to exceeding the period for which the current qualification remains valid. A re-analysis is to be performed in a timely manner (that is, sufficient time is available to refurbish, replace, or re-qualify the component if the re-analysis is unsuccessful).

27 **Category** Closed

Request 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.

Response The EQ program (10 CFR 50.49) does not require environmental monitoring, because the EQ components are qualified based on conservative bounding plant environments. The VYNPS EQ program, consistent with GALL X.E1, ensures that the components covered by the program are replaced at the end of the qualified life or the qualified life is modified by analysis in accordance with the applicable regulations governing the program.

28 **Category** Closed

Request 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 identifying aging degradation in a timely manner.

Response The EQ program is a qualification program that assures SSCs are replaced prior to exceeding qualified life beyond that date when unacceptable aging degradation may occur. The review of OE identified no conditions in which the program failed to identify unacceptable aging degradation. License Event Report (LER) 97-20 notified the NRC staff of program deficiencies including non-conservative analytical methods. Supplementary and confirmatory analyses were completed because conditions in the EQ analyses were determined to be non-conservative. This OE demonstrates that the corrective action process is used to document program deficiencies and track corrective actions when necessary.

QA audits in 2000 and 2002 identified deficiencies related to maintenance and content of program documentation. A 2004 QA audit and engineering program health report determined the program is effective and being administered and maintained in a manner that meets regulatory requirements and commitments.

29 **Category** Accepted

Request B.1.11-P-1
Please clarify the basis for excluding the impact of environmental factors for critical locations during the period of extended operation.

Response The impact of environmental factors on fatigue at critical locations during the period of extended operation will be addressed as stated in the following commitment.

Prior to entering the period of extended operation, for each of the seven locations that may exceed a CUF of 1.0 when considering environmental effects, VYNPS will implement one or more of the following: (1) further refinement of the fatigue analyses to lower the predicted CUFs to less than 1.0; (2) management of fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC); (3) repair or replacement of the affected locations. Should VYNPS select the option to manage environmental-assisted fatigue during the period of extended operation, details of the aging management program such as scope, qualification, method, and frequency will be provided to the NRC prior to the period of extended operation. Reference LRA Section 4.3.
This is License Renewal Commitment No. 27.

30 **Category** Accepted

Request 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 (CO2) fire suppression system." The LRA does not address the halon/carbon dioxide (CO2) fire suppression system. On what basis does the LRA not address the halon/carbon dioxide (CO2) fire suppression system?

Response The Halon 1301 suppression system provides fire suppression only for the computer room. There are no Appendix A, SER commitments or Appendix R commitments requiring the Halon 1301 suppression system. Therefore, it is not subject to aging management review. Aging effects for components in the CO2 system are managed by the System Walkdown Program. Reference LRA Section B.1.12.1, exception note 1; LRA Table 3.3.2-9; and AMRM-17 (Aging Management Review of the Fire Protection - Water System).

VY will perform CO2 system walkdowns every 6 months starting no later than the beginning of the period of extended operation.
This is License Renewal Commitment #30.

31 **Category** Closed

Request 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/CO2 fire suppression system." The LRA states, "This program is not necessary to manage aging effects for halon fire protection system components." What program will manage aging effects on halon system components?

Response The computer room fire suppression is provided by a Halon 1301 suppression system. There are no Appendix A, SER commitments or Appendix R commitments requiring the Halon 1301 suppression system. Therefore, it is not subject to aging management review. Reference AMRM-17 (Aging Management Review of the Fire Protection - Water System).

32 **Category** Closed

Request B.1.12.1-L-03
The LRA states "the Halon 1301 suppression system is not subject to aging management review. Aging effects for components in the CO2 system are managed by the System Walkdown Program." Explain rational for why the Halon 1301 suppression system is not subject to review.

Response The computer room fire suppression is provided by a Halon 1301 suppression system. There are no Appendix A, SER commitments or Appendix R commitments requiring the Halon 1301 suppression system. Therefore, it is not subject to aging management review. Reference AMRM-17 (Aging Management Review of the Fire Protection - Water System).

33 **Category** Accepted

Request 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 number associated with this enhancement?

Response Yes - License Renewal Commitment #9 addresses this enhancement

34 **Category** Closed

Request 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." How are inaccessible seals addressed?

Response The environment to which inaccessible seals are exposed is very similar, if not the same, as the environment for accessible seals such that the condition of accessible seals is representative of the condition of inaccessible seals.

35 **Category** Closed

Request 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 number associated with this enhancement?

Response Licensing Commitment #8 addresses the need to revise these acceptance criteria.

Any recordable indication is entered into the Corrective Action Program for evaluation.

36 **Category** Closed

Request B.1.12.2-L-01
Program Description Item - 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 fire water storage tanks?

Response No, VYNPS does not have fire water storage tanks. Reference UFSAR Section 10.11.

37 **Category** Accepted

Request B.1.12.2-L-02
Program Description Item - 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 bio-fouling is managed such that the system function is maintained." The LRA does not address this item. How does VYNPS intend to address these NFPA and GALL recommendations?

Response This paragraph comes from NUREG-1801, Section XI.M27 program description. The recommendation for flow testing is included in the NUREG-1801 technical basis for the parameters monitored/inspected attribute. As stated in LRA Section B.1.12.2, the VYNPS Fire Water System Program is consistent with this attribute. Every fire main segment is full flow tested using the guidelines of NFPA 25 at least once every 3 years. Reference LRPD-02 (AMPER) Section 4.12.2.

The recommendation for wall thinning monitoring is included in the NUREG-1801 technical basis for the detection of aging effects attribute. As indicated in LRA Section B.1.12.2, the Fire Water System program includes an enhancement to this attribute to perform wall thickness evaluations of fire protection piping 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. Results of the initial evaluations will be used to determine the appropriate inspection interval.

This is License Renewal Commitment # 11.

38 **Category** Accepted

Request B.1.12.2-L-03
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." Provide justification for relaxing the test frequency.

Response Per NUREG-1800, Table 2.1-3, fire hoses are consumables not subject to aging management review. Therefore, the exception to the Fire Water System program related to fire hydrant hose hydrostatic tests is not necessary. (An aging management program is not required to address components that are not subject to aging management review.) .

39 **Category** Closed

Request B.1.12.2-L-04
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." Provide justification for relaxing the test frequency.

Response Since aging effects are typically manifested over several years, differences in inspection and testing frequencies are insignificant. The review of operating experience did not reveal age-related failures of fire water system components that led to loss of intended function. Reference LRA Section B.1.12.2, exception note 1 and LRPD-05 (OE Report). License Renewal Commitment 31 agrees to examine these components annually.

40 **Category** Closed

Request B.1.12.2-L-05
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." Provide justification for relaxing the test frequency.

Response As stated in LRA Section B.1.12.2, exception note 1, since aging effects are typically manifested over several years, differences in inspection and testing frequencies are insignificant. The review of operating experience did not reveal age-related failures of fire water system components that led to loss of intended function. Reference LRPD-05 (OE Report).

License Renewal Commitment 31 agrees to examine these components annually.

41 **Category** Accepted

Request B.1.12.2-L-06
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 VYNPS LRA identified the following enhancement, "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." What is the VYNPS commitment number associated with this enhancement?

Response License Renewal Commitment #11 is the commitment associated with this enhancement.

42 **Category** Closed

Request 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.

Response Portions of drawings G-191150, G-191277, & G-191481 have been provided to the NRC for the Sand pocket region of the Drywell; Refueling Bellows assemblies, and the General Arrangement of the Reactor Building including the Primary Containment.

The Refueling Bellows (to RPV) and the Drywell to Reactor Cavity Seal assemblies are permanently installed by full penetrant welds. The bellows allow the Refueling Cavity to be flooded during refueling operations to allow for spent fuel transfer to the Spent Fuel Pool for storage. No procedures are required for the operation of the bellow assemblies since they are static. Operation of the drain line isolation valves are controlled by plant operating procedures used for flood-up and drain-down of the cavity.

There is no fill material in the gap located between the Drywell Shell and the Secondary Concrete Shield.

VYNPS response to GL 87-05 has been provided to the NRC.

43 **Category** Closed

Request 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.

Response VYNPS has a Service Level I Coatings Program, however it is not relied on for managing the aging effects for licensing renewal.

The VYNPS UFSAR states: "No material within primary containment will fail by decomposition or corrosion and affect vital systems." The examination of the coated surfaces is performed as a part of the Containment Inservice Inspection Program (IWE) to assure that the paint and base metal has not degraded (TS Section 4.7.A). VY has an active and effective Service Level I Coatings Program to prevent degradation to the primary containment structure.

VYNPS response to GL 98-04 includes our commitment to EPRI TR-109937 "Guideline on Nuclear Safety-Related Coatings (renumbered 1003102). The GL also discusses the impact of debris loading on the ECCS strainers. These strainers were designed to accept 100% of the coatings within the LOCA zone of influence. The approach velocity of materials entrained in the torus water is extremely low due to the sizing of the ECCS strainers. Conservative design assumptions ensures VYNPS compliance with 10CFR50.46(b)(5).

A copy of VYNPS response to GL 98-04 has been provided.

44 **Category** Closed

Request B.1.15.1-W-03
Explain why the Containment Inservice Inspection Program is a plant-specific program instead of an ASME Section XI, subsection IWE program with exceptions. 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.

Response Entergy chose to describe the Inservice Inspection and Containment Inservice Inspection Programs as plant-specific programs rather than comparing to the corresponding NUREG-1801 programs because the NUREG-1801 programs contain many ASME Section XI table and section numbers that change with different versions of the code. Because of this, comparison with the NUREG-1801 programs generates many exceptions and explanations that detract from the objective of the comparison. VYNPS follows the version of ASME Section XI that is approved for use at VYNPS and accepted by 10CFR50.55(a). As this is the case, the Inservice Inspection and Containment Inservice Inspection Programs are presented as plant-specific programs so they can be judged on their own merit without the distraction of numerous explanations of code revision.

The Containment Inservice Inspection Program does not include containment seals or gaskets because they have been removed from the scope of Subsection IWE in the 1998 Edition of ASME Section XI with 2000 Addenda. These components are inspected under the Structures Monitoring Program as indicated in Table 3.5.2.1 of the LRA. Pressure retaining bolts are considered and included as integral part of the structural components.

The Containment Inspection Program does not include containment seals or gaskets because they have been removed from the scope of Subsection IWE in the 1998 Edition of ASME Section XI with 2000 Addenda. These components are seal tested under the Containment Leak Rate Program. Pressure retaining bolts are considered and included as Containment Inservice Inspection Program,

VY has been in compliance with10CFR50.55a (b)(2)(vi) and (b)(2)(ix) since at least September 9, 2001. No notification of commitment to the IWE examinations was required by 10CFR50.55a. In 2003, VY submitted a notification of the intent to use ASME Section XI -1998 Edition with 2000 Addenda as the Code of Record for all ISI programs. A copy of the submittal has been provided.

45 **Category** Closed

Request B.1.15.1-W-04
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.

Response Examinations are performed in accordance with the Code of Record that requires the examination of all accessible interior and exterior surfaces. In 1998, the interior surface, slightly above and fully below the water line, was stripped and coated. During RFO-24 (2004), the Suppression Pool exterior surface was General Visual examined. Though normally inaccessible, the Suppression Pool interior was made accessible and the surface above the water-line was General Visual examined. During the General Visual examination of the interior surface, the water clarity permitted observation of nearly 100% of the submerged surface area. Three small areas (at the water line) in BAY 3 were identified to have a loss of coating and primer. These areas were UT (ultrasonic tested) from the exterior, in 2" gridded areas. No result approached the minimum wall thickness of 0.533" with the lowest reading being 0.597." Based on the results, these areas were excluded from augmented examination. In RFO-27 (2008), the VT-3 of the wetted areas is presently planned to be executed by divers without dewatering the Suppression Pool. The current examination schedule is contained in Program Bases Document (4.14.2) in the PP 7024 tables. The projected schedule through the possible license extension period will be developed in accordance with the Code in effect but should be 6 inspection periods in 20 years.

46 **Category** Closed

Request B.1.15.1-W-05
VYNPS lists several Containment Inservice Inspection findings under operating experience for AMP B.1.15.1 in the LRA. 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 in-service inspection program.

Response Drywell moisture barrier is examined under the Containment Inservice Inspection Program. Table IWE-2500-1 Item E1.30 of ASME Section XI-1998 Edition with 2000 Addenda is contained in the Program Bases Document (4.14.2) in the PP 7024 tables. The Program Based Document (4.14.2) in Section B.1.15.1.10, describes the area examined and replaced during RFO-21 (2001). LRA Table 3.5.2.6 shows the drywell moisture barrier to be inspected under the structural monitoring program; this will be changed to the Containment Inservice Inspection Program. IWE examinations during RFO-25 (2005) produced no findings.

In 1991, an Auxiliary Operator (AO) observed water running from a crack in the Drywell pedestal concrete onto the Torus Room floor. The investigation revealed leakage from a steam valve was condensing on and traveling along the Primary Containment Air Conditioning piping to the Drywell shell. From the Drywell shell, the water found a crack or cold-joint that directed it to the Torus Room floor. To ensure the Drywell shell integrity, the sand-cushion drains were examined and found to be functional; the exterior drywell shell was inspected and determined to be non-corroded; and the sand-cushion was observed to be dry, compacted, with adequate ventilation to assure the sand would remain dry.

47 **Category** Accepted

Request B.1.16-P-1
Please identify the standard(s) to which instrument air is maintained, and document this commitment in Appendix A if appropriate.

Response License Renewal Commitment # 28 ensures that instrument air is maintained in accordance with ISA S7.3.

48 **Category** Accepted

Request B.1.17-N-01
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 occurs 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.

Response LRA Appendix B.1.17 will be revised to include the following:
VYNPS inspection for water accumulation in manholes is conducted by a plant procedure. An engineering evaluation will be used per EN-LI-102 to document and determine the plant experience that is considered in manhole inspection frequency.
This requires an amendment to the LRA.

49 **Category** Closed

Request B.1.17-N-02
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.

Response Operating Experience at VYNPS is controlled by procedure EN-OP-100, Operating Experience Program. The program includes the following components:
Operating Experience – Information received from various industry sources that describe events, issues, equipment failures that may represent opportunities to apply lessons learned to avoid negative consequences or to recreate positive experiences as applicable.
Internal Operating Experience – Operating Experience that originates as a condition report or request from plant personnel that warrants consideration for possible Entergy-wide distribution. Internal OE can originate from any Entergy plant or headquarters.
Impact Evaluation – Analysis of an OE event or problem that requires additional information and research to determine impact or potential impact, as it relates to plant condition and/or configuration. Impact evaluations are typically documented with a Condition Report.
Condition Report action items and corrective actions are used to confirm program effectiveness and to modify the program as needed

50 **Category** Open

Request B.1.17-N-03
As stated in FSAR Section 8.3.3 (Page 8.3-5 of 8), the underground power lines - that run from the adjacent Vernon Hydroelectric Station to station switchgear - have been designated as the Station Blackout 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.

Response Yes, the underground power lines that run from Vernon Dam Switchyard to VYNPS safety buses, are included in program B.1.17.

51 **Category** Accepted

Request 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.

Response LRA Appendix B.1.18 will be revised as follows:
The first test of neutron monitoring system cables that are disconnected during instrument calibrations shall be completed before the period of extended operation and subsequent tests will occur at least every 10 years. In accordance with the Corrective Action Program, an engineering evaluation will be performed when test acceptance criteria are not met and corrective actions, including modified inspection frequency will be implemented to ensure that the intended functions of the cables can be maintained consistent with the current licensing basis for the period of extended operation. This requires an amendment to the LRA.

52 **Category** Closed

Request B.1.18-N-02
Confirm that the test includes both cables and connections.

Response Yes, the B.1.18 program includes both cables and connections for the instrument circuits that are in scope for license renewal.

53 **Category** Accepted

Request 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.

Response The LRA Appendix B.1.19 program description will be changed to read as follows:
This program addresses cables and connections at plants whose configuration is such that most cables and connections installed in adverse localized environments are accessible. This program can be thought of as a sampling program. Selected cables and connections from accessible areas will be inspected and represent, with reasonable assurance, all cables and connections in the adverse localized environments. If an unacceptable condition or situation is identified for a cable or connection in the inspection sample, a determination will be made as to whether the same condition or situation is applicable to other accessible cables or connections. The sample size will be increased based on an evaluation per EN-LI-102 – Corrective Action Process.
This requires an amendment to the LRA.

54 **Category** Closed

Request B1.19-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.

Response Operating Experience at VYNPS is controlled by procedure EN-OE-100, Operating Experience Program. The program includes the following components:
•Operating Experience – Information received from various industry sources that describe events, issues, equipment failures, that may represent opportunities to apply lessons learned to avoid negative consequences or to recreate positive experiences as applicable.
•Internal Operating Experience – Operating Experience that originates as a Condition Report or request from plant personnel that warrants consideration for Entergy-wide distribution. Internal OE can originate from any Entergy plant or headquarters.
•Impact Evaluation – Analysis of an OE event or problem that requires additional information and research to determine impact or potential impact, as it relates to plant condition and/or configuration. Impact evaluations are typically documented within a Condition Report.

Condition Report action items and corrective actions are used to confirm program effectiveness and to modify the program as needed.

55 **Category** Closed

Request B.1.20-K-01
For those components that do not have regular oil changes, please provide the basis for Note 1 (not determining the flash point for the sampled oil).

Response As stated in LRA Section B.1.20, exception note 1, flash point is not determined for sampled oil because analyses of filter residue or particle count, viscosity, total acid/base (neutralization number), water content, and metals content provide sufficient information to verify the oil does not contain water or contaminants that would permit the onset of aging effects.

Added Response: Fuel dilution is measured on EDG lube oil, rather than determining the flash point.

In lieu of performing Flash point testing on the Emergency Diesel Generators, Diesel Driven Fire Pump and the John Deere Diesel Generator, a test for fuel and water by % of volume is performed. This test accomplishes the same goal as the flash point test but is more prescriptive then the flash point test. There could be two factors that affect the flash point of the oil; the addition of fuel that would lower the flash point or the addition of water that would raise the flash point. The worst case would be a combination of the two. By determining the % by volume of both fuel and water, the analysis can determine the cause of the change in flash point without having to conduct additional tests and corrective actions, if required, could be implemented on a timelier basis.

Additional tests to determine the "Health" of the diesels are; total base number (TBN), viscosity, SAE Grade, Total Soot, and Spectrometals analysis (for wear metals and additives). The results of these analyses are trended to determine the total health of the diesel and the quality of its lubricating oil. Diesel Lube Oil Analyses are performed on a quarterly basis.

56 **Category** Closed

Request B.1.20-K-02
How are the alert levels or action limits established? How is the data trended and what criteria are used to determine if the trends are unusual?

Response As indicated in LRA Section B.1.20, the Oil Analysis Program is consistent with NUREG-1801, Section XI.M39 for the acceptance criteria attribute. As recommended in NUREG-1801, action limits were established in accordance with industry standard ISO 4406 and manufacturer's recommendations. See DP 0213 (available for on-site review in the program basis document) for trending and criteria.

57 **Category** Closed

Request B.1.21-K-01
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.

Response Attachment 2 of LRPD-02 (AMPER), which is available for on-site review in the program basis document, is a table similar to the table provided in the GALL report. Attachment 2 identifies the inspection method and parameters monitored for applicable aging effects. As indicated in LRA Section B.1.21, Attachment 2 of LRPD-02 (AMPER) is consistent with the table provided in NUREG-1801, Section XI.M32.

58 **Category** Closed

Request B.1.21-K-02
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?

Please address the main steam flow restrictors in the response.

Response Combinations of non-destructive examinations including visual, ultrasonic, and surface techniques will monitor cracking of CASS valve bodies in piping <4" NPS to confirm that reduction of fracture toughness is not occurring or is so insignificant that an aging management program is not warranted. Reference Attachment 2 of LRPD-02 (AMPER).

Main steam flow restrictors:
Thermal aging embrittlement results in increased rates of crack growth that are evidenced by cracking in the material. The One-Time Inspection Program will be used to verify that reduction of fracture toughness has not progressed to the point that unacceptable cracking of the component has occurred.

59 **Category** Closed

Request B.1.21-K-03
What is Vermont Yankee's operating experience with Class 1 piping less than 4 inches NPS in terms of cracking?

Response The review of plant operating experience (1998 to 2005) did not reveal instances of cracking of Class I piping less than 4"NPS. Site to confirm and address experience prior to 1998.
In the early years of plant operation VYNPS experienced occurrences of intergranular stress corrosion cracking (IGSCC) in some stainless steel piping systems. In the period of approximately 1980 through 1986 VYNPS embarked on a major IGSCC mitigation program, replacing the susceptible stainless steel piping with IGSCC resistant materials. Since then, there have been no instances of IGSCC or other pipe cracking events at VYNPS. See report "YAEC-1247, Rev. 1" and Letter FVY 88-62.

60 **Category** Closed

Request 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.

Response This information is included in Attachment 3 of LRPD-02 (AMPER) that is available for on-site review in the program basis document.

61 **Category** Closed

Request 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?

Response Yes. Reference LRA Table B-2 and Section B.1.22 Program Description.

62 **Category** Closed

Request 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 throughout the volume of material. 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

Response VYNPS meets the 1998 edition through 2000 addenda of the ASME Section XI Code, Sub Section IWB 2500-1 Examination Category B -G-1."Pressure Retaining Boiler Greater than 2" in Diameter" Items BG.20 and .30 that specifies a surface or volumetric examination method.

63 **Category** Closed

Request B.1.23-M-02
Some replacement stud bolts use 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.M3, [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?

Response As stated in LRA Section B.1.23, the Reactor Head Closure Studs Program is consistent with NUREG-1801, XI.M3 for the preventive actions attribute. As described in NUREG-1801, threaded surfaces of studs, nuts and washers have a phosphate coating to act as a rust inhibitor and lubricant. Also, a stable lubricant compatible with the bolting and vessel materials is applied to the stud threads, the mating surfaces of the washers and the nut threads during assembly. Reference LRPD-02 (AMPER) Section 4.18.

64 **Category** Accepted

Request 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.

Response The 2002 examinations included visual and ultrasonic inspections. The 2004 examinations were visual only as per the stated exception. Future examination will be visual only in accordance with ASME Code Case N-652. Code Case N-652 has been endorsed by the NRC per Table 1 of Regulatory Guide 1.147, Revision 14. As this Code Case is now endorsed, this inspection is no longer an exception to GALL. The LRA Supplement Letter will revoke this GALL exception. This requires an amendment to the LRA.

65 **Category** Closed

Request B.1.26-W-01
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.

Response Procedures OP 5265, Service Water Component Inspection and Acceptance Criteria; PP 7021, Service Water Program; and PP 7601, Service Water Chemical Treatment and Monitoring Program are available for on-site review in the program basis document.

As stated in LRA Section B.1.26, the Service Water Integrity Program is consistent with NUREG-1801, XI.M20 for the scope of program attribute. Therefore, there are no differences between the GL 89-13 program scope and the Service Water Integrity Program scope for license renewal.

66 **Category** Closed

Request 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.

Response Provided a copy of the original site piping specification QC-10 that shows the piping for the Service Water and alternate cooling water systems piping is carbon steel material and are not coated.

67 **Category** Closed

Request 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.

Response Linings and coatings are not credited. Piping that is lined or coated will be inspected with the same techniques used for unlined piping. An itemized listing of which piping is lined or coated was not necessary for the aging management review.

In accordance with the piping specification QC-10 there is no coated piping in the Service Water system. The only coated components are a few valve body internals and heat exchanger heads that are currently and will continue to be inspected as part of the Service Water program.

68 **Category** Closed

Request 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.

Response The only sections of the Service Water (SW) system that are flushed on a regular basis are the instrumentation tubing lines (3/8" stainless steel tubing). A list of the specific lines has been provided. These lines are flushed on a 12 or 18 month basis as identified in the Preventive Maintenance program. The SW strainers are self cleaning and are not opened and cleaned on a regular basis. The suction line from the deep basin to the RHRSW pumps is opened and inspected every other outage (3 years). The results of the inspection have shown the line to be free of tuberication and silt. The line is treated with a biocide before being closed after inspection. No issues with flow blockage have been identified in the past six years. The line was found to be fouled in the early 1990's and was subsequently cleaned and the addition of biocide was started. This appears to be very successful based on the recent inspections.

69 **Category** Closed

Request 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.

Response PP7021 provides information related to VYNPS's compliance with GL89-13 requirements. A copy of this procedure was provided. GL 89-13 provides for the options of performing either thermal performance testing or periodic cleaning. VYNPS has chosen to perform cleaning for most of the SW supplied heat exchanger and coolers. The exceptions are the Stand-by Fuel Pool Cooling (SBFPC) Heat Exchangers, the Emergency Diesel Generator Coolers (3 each) and the Corner Room RRU's #7 & 8. The SBFPC heat exchangers are thermal performance tested every 18 months. Based on the satisfactory results of the tests VYNPS is preparing a change to perform cleaning instead of testing. The coolers have been internally examined and found to be very clean and free for silt, sludge and tuberculation. The frequency of cleaning has yet to be determined but is anticipated to be in the every 3 to 6 year range. The Emergency Diesel Generator Coolers are tested every month and the results are trended by System Engineering. No adverse trends have been identified. A copy of the trends for the "B" Diesel has been provided. Copies of the test data sheets for the entire year 2004 have been provided.. The RRU's are tested quarterly by measuring the DP across the units. This will detect any fouling which would decrease thermal performance. No performance issues have been identified. All performance data and inspection results are monitored and trended by the System Engineering Department and the Service Water System Engineer.

70 **Category** Closed

Request 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.

Response A copy of NRC Report, NVY 02-61 and CR-VTY-2003-02344 was provided. This CR documents the investigation into the adverse trend created by approximately 20 through wall leaks in the SW system. The result of this investigation identified several causes. One of these being the use of carbon steel components which are susceptible to Microbiological Influenced Corrosion (MIC). Another cause was determined to be ineffective chemical treatment of the system. The ineffectiveness of the chemical treatment was reinforced by a follow up assessment (DR Lutey Report). This assessment was also provided. Changes were made to the sampling program and chemical treatment process. New chemical addition pumps were installed and sampling was implemented for SW components during inspections. It should be noted that the plant is limited by the NPDES permit to no more than 2 hours a day of treatment to the SW system. This reduces the effectiveness of the treatments. VYNPS also began treatment of lines which are not normally inservice, i.e. supply line to the Diesel Generator Cooler. These lines are treated when the diesels are run to ensure that the lines are full of treated water when they are secured. Copies of the inspection database detailing the results of internal inspections have been provided.

71 **Category** Closed

Request 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.

Response Duplicate entry. Close to # 70.

72 **Category** Closed

Request B.1.27.1-W-01
Provide a masonry wall inspection report for an un-reinforced masonry wall.

Response Inspection Report for Masonry wall G-191513-51 provided in Drawing B-191600 Sheet 96 for an un-reinforced masonry wall was provided.

73 **Category** Closed

Request B.1.27.1-W-02
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.

Response Site procedure PP-7026 will be in the program basis document
Additional Response:
Inspection of masonry walls, in scope of license renewal, are performed each refueling outage. Upon completion of six successive surveillance intervals during a ten year period, the sequence of the inspection is reverted back to the initial sequence interval. The inspections are performed by inspection team comprised of degreed engineers having understanding of structures, materials of masonry construction and masonry wall analysis techniques. The observed instances of cracking are detailed on as-built and considered in record analysis.

74 **Category** Closed

Request B.1.27.1-W-03
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?

Response PP 7026 Rev 1 requires that if during the course of inspection, a "significant finding" is encountered a Condition Report shall be generated and the Civil Structural Supervisor is notified (Section 4.4, PP 7026). PP 7026 is provided for reference. The Engineering Request process is used to control the plants configuration. Walls affected via planned modifications are identified during the design process and the analysis of record and design drawings reflecting I. E. B. 80-11 are updated accordingly. Administrative controls require that proposed new attachments are reviewed by the Civil Structural Department (Section 4.4.5, PP 7026). A log book is maintained by the Civil Structural Department with a summary findings memo and surveillance walkdown sheets (Form VYPPF 7026.01 and Section 4.4.7, PP 7026).

Attachments include the Vermont Yankee Masonry Wall Routine Surveillance for RFO 25 in which three corrective updates were performed for observed discrepancies. The CR generated for correcting the drawings is also attached along with a corrected drawing for example.

75 **Category** Closed

Request B.1.27.2-W-01

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.

Response The water-control structure at VYNPS is the intake structure. There are no earthen water control structures at VYNPS. The attributes of the Water Control Structures, GALL XI.S7 aging management program applicable to the intake structure are incorporated in the VYNPS Structures Monitoring Program as described below. Attributes of the GALL XI.S7 aging management program that are not incorporated in the Structures Monitoring Program primarily apply to earthen structures.

1) Scope – The scope of the GALL XI.S7 program applicable to VYNPS is the intake structure. The intake structure is included in the scope of the Structures Monitoring Program as delineated in Table 3.5.2-3.

2) Preventive actions – The GALL XI.S7 program includes no preventive actions.

3) Parameters Monitored – The aging effect requiring management for concrete structural components of the intake structure is loss of material which is consistent with GALL Volume 2 item II.A6-7. The parameters monitored from the GALL XI.S7 program applicable to loss of material are consistent with those monitored by the Structures Monitoring Program. The guidance for inspections of concrete in Section C.2 of RG 1.127 is consistent with the guidance in ACI 349.3 used in the Structures Monitoring Program.

4) Detection of Aging – GALL XI.S7 identifies visual inspection methods as the primary method used to detect aging. The Structures Monitoring similarly uses visual inspection methods as the primary method used to detect aging in concrete structural components. GALL XI.S7 identifies inspection intervals of five years. The Structures Monitoring Program identifies similar inspection intervals of three years for accessible areas, ten years for inaccessible areas and opportunistic inspections for buried components.

5) Monitoring and Trending – Monitoring is by periodic inspection for both the GALL XI.S7 and Structures Monitoring Programs.

6) Acceptance Criteria – Acceptance criteria is not identified in RG 1.127, however appropriate guidance is provided in the Structures Monitoring Program to ensure corrective measures are identified prior to loss of intended function.

7-9) The corrective actions, confirmation process and administrative control attributes of the Structures Monitoring Program and the GALL XI.S7 program are consistent.

10) Operating Experience – The operating experience relevant to the effectiveness of the Structures Monitoring Program is presented in Appendix B of the application and is consistent with the operating experience described in GALL XI.S7.

Therefore, the attributes of the NUREG-1801 XI.S7, Water Control Structures, aging management program pertaining to the intake structure are incorporated within the VYNPS Structures Monitoring Program.

76 **Category** Accepted

Request B.1.27.2-W-02
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.

Response The drywell floor liner seal (moisture barrier) is examined under the Containment Inservice Inspection-IWE Program and will remain under the CII-IWE Program during the period of extended operation not the Structures Monitoring Program as shown in LRA Table 3.5.2-1. This approach will require the following.
1) Update LRPD-02, Section 4.14.2 Item B.4 by adding "The CII Program manages cracking and change in material properties for drywell shell to floor seal (moisture barrier) elastomers"
2) Update LRPD 02, Section 4.21.1 Items B.1.a and b "Enhancement" and Item 10.D. "Summary" to delete "drywell floor liner seal" from the discussion.
3) Update LRA Table Line Item "Drywell floor liner seal" for Table Item "AMP" change "Structures Monitoring" to "CII-IWE". For clarification, change "drywell floor liner seal" to "drywell shell to floor seal (moisture barrier)" The clarification of the terminology also applies to Table 2.4-1 and Section B.1.27.2. (This change requires an amendment letter to the LRA)

The Periodic Surveillance and Preventive Maintenance and Structures Monitoring Programs adequately manage aging effects for cranes and girders. Therefore, a separate program (i.e., inspection of overhead heavy load and light load handling system) is not necessary. Not all the miscellaneous structures and components added by the enhancement to the SMP are currently inspected under another program.

77 **Category** Accepted

Request B.1.27.2-W-03
Explain if VYNPS has any porous concrete sub foundations and a site dewatering system. Explain if the Structures Monitoring Program requires periodic sampling and testing of groundwater to determine and confirm that 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.

Response VNPS does not have porous concrete sub foundations or a site dewatering system. The inspection team was provided with the results of the two most recent reported groundwater samples as submitted to the State of Vermont. These samples are currently obtained twice yearly, primarily around the plant septic systems (some of the sampling wells are near plant structures). The results of these samples are provided to the State of Vermont in accordance with our Indirect Discharge Permit. The Structures Monitoring Program will be enhanced, (License Renewal Commitment #33) to ensure an engineering evaluation is made on a periodic basis of groundwater samples to assess for evidence of groundwater being aggressive to concrete. Historically, VYNPS groundwater samples have shown some level of seasonality in that the wells adjacent to roadways have slightly higher levels of chlorides due to salt treatment.

78 **Category** Closed

Request B.1.27.2-W-04
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?

Response Yes. VYNPS will and currently does take advantage of inspection opportunities for underground structures that become accessible by excavation. This inspection is already part of the program.

79 **Category** Closed

Request B.1.27.2-W-05
Explain how the frequency of inspection for the structures, buildings and components within the scope of this program are affected when aging effects are

Response Vermont Yankee's current structures monitoring program is performed by Design Structural Engineers in accordance with PP 7030, Structures Monitoring Program Procedure. Our surveillance tracking program ensures that this inspection is performed on a three year interval.

Any adverse condition discovered during inspections of buildings, structures and components would be entered into Entergy's Corrective Action Process through the initiation of a Condition Report in the PCRS tracking system. The Corrective Action Program defines further responses to the discovered condition. Attributes considered through the corrective action will include, as applicable, apparent cause evaluation, root cause evaluation, extent of condition, consideration of Operating Experience, required corrective action and follow-up verification. Frequency of future inspections will also be considered through the Corrective Action Process.

80 **Category** Open

Request B.1.27.2-W-06
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.

Response The VYNPS Structures Monitoring Program is controlled by PP 7030, Structures Monitoring Program Procedure. The standards used to develop and conduct the program are listed in Sect. 5.2 of the procedure. The specific standard used to develop inspection requirements for this procedure is NEI 96-03, "Nuclear Energy Institute, Industry Guideline for Monitoring the Condition of Structures at Nuclear Power Plants", Section 3.3 "Examination Guidance." Inspection requirements of commodities taken from NEI-96-03 are delineated in Section 4.3.3 of PP7030. A comparison of the relevant guidelines for concrete structural components in PP7030, with the guidelines of ACI 349.3 Chapter 5 "Evaluation Criteria" indicates general consistency.

1) Both documents specify visual inspection methods for the examination of structures.
2) Both documents provide guidance for the inspections for the following parameters and conditions:
Concrete components: spalling, cracking, delamination, honey combs, water in-leakage, chemical leaching, peeling paint, or discoloration
Structure Settlement: excessive total or differential settlement
Structural/seismic gap: insufficient space for structural movement during a seismic event (i.e., exclusion of foreign objects or debris); deteriorated elastomer type filler.
3) ACI 349.3R96 Chapter 5 provides acceptable limits beyond which further evaluation is required. PP7030 Section 4.8 conservatively requires evaluation of identified degradation.

Based upon this comparison, the guidance for inspections provided in PP7030 is consistent with the guidelines in ACI 349.3R96.

The acceptance criteria for crane rail/girder inspections are contained in the preventive maintenance tasks for the crane inspection. Procedure OP 2200 provides the inspection and acceptance criteria for crane rail/girders. The procedure criteria is based on the following codes and standards ANSI B30.2-83 "Overhead and Gantry Cranes" and NUREG-0612, Control of Heavy Loads at Nuclear Power Plants".

The acceptance criteria for the drywell shell to floor liner seal (moisture barrier) is covered under 4.14.2, Containment Inspection Program. See the response to Item 76 for additional discussion on this seal. For additional discussion, see Item #243 response.

81 **Category** Closed

Request B.1.27.2-W-07
VYNPS lists the following structure issues under operating experience for this AMP.

- Concrete pad above JD diesel generator day tank sinking and cracking
- Degradation of Cooling Tower structural column

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 follow-up inspections.

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.

Response Documentation of the operating experience with structural repairs was provided to the Inspection Team in the following format:

Concrete pad above the JD diesel generator day tank
WO 99-1090-000
WO 99-9746-001

Degradation of cooling tower structural columns
WO 05-5158-000
WO 97-5357-004
WO 97-5327-00
WO 03-1243-009

Intake structure floor concrete repair
WO 04-1745-000

The concrete pad above the JD diesel generator day tank is in a high traffic area. Degradation was identified by personnel transiting the area. The cracked concrete slab was replaced. This was essentially a design issue, in that the original pad was not designed to bear the weight of the fuel oil delivery truck. The reference WO replaced the pad and added bollard columns to prevent vehicles from driving over the pad. No further follow-up inspections are required.

Degradation of cooling tower structural columns was discovered during routine fall and spring structural inspection PMs. These columns were replaced in kind. Follow-up inspections are performed during the routine fall and spring structural inspection PMs.

The most recent inspection and repair results for the Turbine Building overhead crane were provided to the Inspection Team. Included were reports of two different inspections, repair information and monitoring plans. Both the Reactor and Turbine Building overhead cranes are in scope of the Maintenance Rule and are subject to the same inspection and corrective action programs. Recent Reactor Building overhead crane inspections have identified only mechanical and electrical deficiencies (i.e. trolley motors, brakes, etc.). The results for the Turbine Building overhead crane were provided in lieu of the Reactor Building overhead crane because the recent inspection results involve structural elements and show the effectiveness of the Maintenance Rule crane inspection program. The Structures Monitoring Program will be enhanced (Project document revision) to describe how the program takes credit for the structural inspection program being performed through the Maintenance Rule crane inspection program.

Examples of inspections for cooling tower aging are included in the referenced WOs above.

As stated in other responses, LRDP-02 will be revised to indicate that the drywell floor liner seal will be covered under the containment inspection program, not the structures monitoring program. The seal was replaced two refueling outages ago, and the seal inspection report for last outage has already been provided to the inspection team.

Degradation of intake structure floor concrete was discovered during routine diver PM inspections performed every refueling outage. The small washed out area was repaired with an underwater concrete repair product. Follow-up routine diver PM inspections will be performed every refueling outage.

82 **Category** Open

Request B.1.27.3-W-01
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 the 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.

Response There has not been any need for site to coordinate or interface with Vernon Dam's Federal Energy Regulatory Commission (FERC) inspection. VYNPS does not have an individual responsible for coordinating, interfacing, collecting and reviewing FERC inspection report. There is no site procedure for dealing with FERC and obtaining a current copy. Reports are normally received on site after each inspection. VYNPS does not have any influence on what and when repairs should be made from management or economics standpoint.

83 **Category** Open

Request B.1.27.3-W-02
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.

Response As stated in LRA section 2.4.5, Vernon Dam is not part of the site structures owned by VYNPS. Dam inspections are regulated by the Federal Energy Regulatory Commission (FERC), which licenses the dam and associated power block. Daily inspections are performed by the dam owner's (e.g. Trans Canada, maintenance personnel. And, underwater inspections are performed by divers once every 5 years as required by FERC. No evidence of flooding to require additional FERC inspections beyond the normal 5 year. As stated in the inspection reports, maximum rise in stage cause by a breach will not exceed 1.7 feet under either 50 or 100 year flood condition. The areas of degradation, found on Vernon Dam during the 2002 FERC inspection, are monitored by FERC on a five year cycle. However, daily inspection by the dam owner also supplements these inspections. Number and type of staff at Vernon Dam on daily basis is not known. Although not proceduralized, any significant problem with dam is expected to be communicated to the site.

In accordance with NEI 95-10, Rev. 6, Appendix C, Reference 4 (pages C-20 through C-25), "License Renewal Issue No. 98-0100, Crediting FERC-Required Inspection and Maintenance Programs for Dam Aging Management," FERC inspections may be credited for aging management activities. The Vernon Dam is under FERC jurisdiction and that its inspection and maintenance program is in conformance with FERC requirements. The NRC guidance in the referenced section of NEI 95-10 states "It is the staff's opinion that dam inspection and maintenance programs under the jurisdiction of FERC or the Army Corps of Engineers, continued through the period of the license renewal, will be adequate for the purpose of aging management (page C-25)."

During the period of the onsite inspection Vermont Yankee Staff provided a copy of the most recent FERC inspection for the Vernon Dam to the NRC Staff.

84 **Category** Accepted

Request B.1.30.1-M-01
Since the applicant is currently and periodically sampling and analyzing the cooling water of the other systems "controlled" by VYNPS's existing program—the stator cooling water and plant heating boiler systems—is it also the intent of the applicant to periodically sample and analyze the John Deere Diesel cooling water

Response No, as stated in LRA Section B.1.30.1, rather than sampling, procedures will be (License Renewal Commitment 26) enhanced to flush the John Deere diesel cooling water system and replace the coolant and coolant conditioner every three years.

85 **Category** Accepted

Request B.1.30.2-M-01
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"?

Response Yes, the one-time inspection program described in LRA Section B.1.21 includes inspections to verify the effectiveness of the water chemistry control aging management programs by confirming that unacceptable cracking, loss of material, and fouling is not occurring.

To provide further clarification, the effectiveness of the Water Chemistry Control – Auxiliary Systems, BWR, and Closed Cooling Water programs is confirmed by the One-Time Inspection program. This requires an amendment to the license renewal application to change the Appendix A, SAR supplement descriptions for the Water Chemistry Control –Auxiliary Systems, BWR and Closed Cooling Water programs to explicitly state One-Time Inspection Program activities will confirm the effectiveness of these programs.

86 **Category** Accepted

Request B.1.30.2-M-02
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..."?

Response Yes, the one-time inspection program described in LRA Section B.1.21 includes inspections to verify the effectiveness of the water chemistry control aging management programs by confirming that unacceptable cracking, loss of material, and fouling is not occurring.

To provide further clarification, the effectiveness of the Water Chemistry Control – Auxiliary Systems, BWR, and Closed Cooling Water programs is confirmed by the One-Time Inspection program. This requires an amendment to the license renewal application to change the Appendix A, SAR supplement descriptions for the Water Chemistry Control –Auxiliary Systems, BWR and Closed Cooling Water programs to explicitly state One-Time Inspection Program activities will confirm the effectiveness of these programs.

87 **Category** Accepted

Request B.1.30.3-M-01
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?

Response This AMP does not ensure that a stagnant flow condition or crevice will not be periodically present in system piping during the period of extended operation. Preventing stagnant flow conditions is not a recommended preventive action in NUREG-1801, Section XI.M21. As stated in LRA Section B.1.20.3, passive intended functions of pumps, heat exchangers and other components will be adequately managed by the Water Chemistry Control - Closed Cooling Water Program through monitoring and control of water chemistry parameters. Also the one-time inspection program described in LRA Section B.1.21 includes inspections to verify the effectiveness of the water chemistry control aging management programs by confirming that unacceptable cracking, loss of material, and fouling is not occurring.

To provide further clarification, the effectiveness of the Water Chemistry Control – Auxiliary Systems, BWR, and Closed Cooling Water programs is confirmed by the One-Time Inspection program. This requires an amendment to the license renewal application to change the Appendix A, SAR supplement descriptions for the Water Chemistry Control –Auxiliary Systems, BWR and Closed Cooling Water programs to explicitly state One-Time Inspection Program activities will confirm

88 **Category** Closed

Request 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"?

Response No, functional and performance testing are not aging management actions. They are maintenance rule activities and not part of the Water Chemistry Control - Closed Cooling Water Program. As stated in LRA Section B.1.30.3, the Water Chemistry Control - Closed Cooling Water Program takes exception to this recommendation of NUREG 1801, Section XI.M21.

89 **Category** Closed

Request 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)

Response Section 13 includes all the systems that have intended functions that meet 10 CFR 54.4(a)(2) for physical interaction. The aging management review of these systems that have functions that met 10 CFR 54.4(a)(2) for physical interaction was done separately from the review of systems with intended functions that met 10 CFR 54.4 (a)(1) or (a)(3). The results of this review therefore needed to be presented separately so that they could be distinguished from the 10 CFR 54(a)(1) and (a)(3) review. Table 3.3.1-13 would be the next sequential table number after the remainder of the auxiliary system tables. To indicate individual systems included in the aging management review for (a)(2), Table 3.3.1-13 is subdivided by system. For example, Table 3.3.1-13-1 is for the augmented off gas system, a system which only has components included for (a)(2). For the core spray system, Table 3.3.1-13-6 shows the components included for (a)(2) but since the system is also in scope for other reasons, Table 3.2.2-2 shows the components included for 54.4(a)(1) and (a)(3). This numbering system was chosen so that these systems and the components that had intended functions unique for 54.4(a)(2) could be uniquely identified and reviewed separately. This allows a reviewer to clearly distinguish which component types in a system were included for 10 CFR 54.4(a)(2) for physical interaction. Since most of these systems are auxiliary systems they were added as part of the auxiliary systems section.

90 **Category** Closed

Request 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.

Response This response assumes that the question is referring to the tables in Section 3.3.2-13 for components included for 10 CFR 54.4(a)(2). This function is described in Section 2.3.3.13 under "System Description (pg. 2.3-65) and in the definition in Table 2.0-1 for "Pressure boundary." As shown in the component type tables in Section 2.3.3-13, a footnote states "For component types included under 10 CFR54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for non-safety-related SSCs directly connected to safety-related SSCs" when this function is appropriate. Pressure boundary was only used because there is no difference in the aging management review regardless of whether the component intended function is pressure boundary or structural support, and if the pressure boundary intended function of the component is maintained the structural support function will be maintained. This definition of providing structural/seismic support would be equivalent to the intended function of SSR as defined in Table 2.0-1.

91 **Category** Open

Request 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.

Response VYNPS electrical AMR AMRE-01 in section 4.1.4.4 states for cable connections (metallic parts)
"An evaluation of thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation stressors for the metallic parts of electrical cable connections identified no aging effects requiring management:
•Metallic parts of electrical cable connections potentially exposed to thermal cycling and ohmic heating are those carrying significant current in power supply circuits. Typically, power cables are in a continuous run from the supply to the load. Therefore, the connections are part of an active component that is controlled by Maintenance Rule and is not subject to aging management review.
•The fast action of circuit protective devices at high currents mitigates stresses associated with electrical faults and transients. In addition, mechanical stress associated with electrical faults is not a credible aging mechanism because of the low frequency of occurrence for such faults. Therefore, electrical transients are not applicable stressors.
•Metallic parts of electrical cable connections exposed to vibration are those associated with active components that cause vibration. Since active components are controlled by Maintenance Rule, they are not subject to aging management review.
•Corrosive chemicals are not stored in most areas of the plant. Routine releases of corrosive chemicals to areas inside plant buildings do not occur during plant operation. Such a release, and its effects, would be an event, not an effect of aging. The location of electrical connections inside active components protects the metallic parts from contamination. Therefore, this stressor is not applicable.
•Oxidation and corrosion usually occur in the presence of moisture or contamination such as industrial pollutants and salt deposits. Enclosures or splice materials protect metal connections from moisture or contamination. Therefore, oxidation and corrosion are not applicable stressors.

Based on the evaluations of the stressors above, there are no aging effects requiring management for metallic components of connections and no AMP is required.

92 **Category** Closed

Request 3.6.2.2-N-02
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., heat-up) when the connection cools, the joint will be loose. EPRI document TR-104213, "Bolted Joint Maintenance & Application Guide," recommends inspection of bolted joints for evidence of overheating, signs of burning or discoloration, and indication of loose bolds. Provide a discussion why torque relaxation for bolted connections of switchyard bus is not a concern for VYNPS.

Response VYNPS electrical AMR Section 4.3.4 of AMRE-01.
Connection surface oxidation for aluminum switchyard bus is not applicable since all switchyard bus connections requiring AMR are welded connections. No aging effects have been identified for welded connections on switchyard bus for SBO.

93 **Category** Accepted

Request 3.6.2.2-N-03
Provide AMR line item for transmission conductor connections in Table 3.6.2-1. Address any aging effects requiring management.

Response LRA Table 3.6.1 and section 3.6.2.2.3 will be revised as shown below:
Table 3.6.1 Item # 12 – Transmission conductors and connections.
Aging Effects – Section 3.6.2.2.3
Transmission conductors are un-insulated, stranded electrical cables used outside buildings in high voltage applications. The transmission conductor commodity group includes the associated fastening hardware, but excludes the high-voltage insulators. Major active equipment assemblies include their associated transmission conductor terminations.
Transmission conductors are subject to aging management review if they are necessary for recovery of offsite power following an SBO. At VYNPS, transmission conductors located between switchyard breakers K-1/K-186 and startup transformers T-3-1A/T-3-1B support recovery from an SBO event. Other transmission conductors are not subject to aging management review since they do not perform a license renewal intended function.
AMRE-01
The aging effect for transmission conductors found in industry reviews are loss of conductor strength and loss of material (wear).

The prevalent mechanism contributing to loss of conductor strength of an ACSR transmission conductor is corrosion, which includes corrosion of the steel core and aluminum strand pitting. Corrosion in ACSR conductors is a very slow acting mechanism, and the corrosion rates depend on air quality, which includes suspended particles chemistry, SO2 concentration in air, precipitation, fog chemistry and meteorological conditions. Air quality in rural areas generally contains low concentrations of suspended particles and SO2, which keeps the corrosion rate to a minimum. Tests performed by Ontario Hydroelectric showed a 30% loss of composite conductor strength of an 80 year old ACSR conductor due to corrosion.

ACAR conductors are more resistant to loss of conductor strength since the core of the conductor is an alloy of steel and corrosion resistant metals. AMR conclusions regarding ACSR conductors conservatively bound ACAR conductors.

The National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. The NESC also sets the maximum tension a conductor must be designed to withstand under heavy load requirements, which includes consideration of ice, wind and temperature. These requirements are reviewed concerning the specific conductors included in scope at VYNPS.

The 4/0 ACSR conductors have the lowest initial design margin of any transmission conductors included in the AMR. The Ontario Hydro test and the NESC requirements illustrate with reasonable assurance that transmission conductors will have ample strength through the period of extended operation.

Therefore, loss of conductor strength due to corrosion of the transmission conductors in not an aging effect requiring management for the period of extended operation.

Loss of material due to mechanical wear can be an aging effect for strain and suspension insulators that are subject to movement caused by transmission conductor vibration or sway from wind loading. Design and installation standards for transmission conductors consider sway caused by wind loading. Experience has shown that transmission conductors do not normally swing and that when they do swing because of substantial wind, they do not continue to swing for very long once the wind has subsided. Wear has not been identified during routine inspection; therefore, loss of material due to wear in not an aging effect requiring management.

This report documents a review of industry OE and NRC generic communications related to the aging of transmission conductors in order to ensure that no additional aging effects exist beyond those previously identified. This report also documents a review of plant-specific OE, which did not identify any unique aging effects for transmission conductors.

This requires an amendment to the LRA.

94 **Category** Accepted

Request 3.6.2.2-N-04
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.

Response VYNPS electrical AMR Section 4.2 in AMRE-01.
The prevalent mechanism contributing to loss of conductor strength of an ACSR transmission conductor is corrosion, which includes corrosion of the steel core and aluminum strand pitting. Corrosion in ACSR conductors is a very slow acting mechanism, and the corrosion rates depend on air quality, which includes suspended particles chemistry, SO2 concentration in air, precipitation, fog chemistry and meteorological conditions. Air quality in rural areas generally contains low concentrations of suspended particles and SO2, which keeps the corrosion rate to a minimum.
Tests performed by Ontario Hydro showed a 30% loss of composite conductor strength of an 80-year old ACSR conductor due to corrosion.
The National Electric Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. The acceptance criteria for VYNPS is less than 40% loss of composite conductor strength per NESC.
Aluminum conductor alloy reinforced (ACAR) conductors are used at VYNPS as well as ACSR conductors.
ACAR conductors are more resistant to loss of conductor strength since the core of the conductor is an alloy of steel and corrosion resistant metals.
Conclusions for ACSR conductors conservatively bound ACAR conductors. The National Electric Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. The acceptance criteria for VYNPS is less than 40% loss of composite conductor strength per NESC. Aluminum conductor alloy reinforced (ACAR) conductors are used at VYNPS as well as ACSR conductors.
ACAR conductors are more resistant to loss of conductor strength since the core of the conductor is an alloy of steel and corrosion resistant metals.
Conclusions for ACSR conductors conservatively bound ACAR conductors.

Therefore, corrosion of transmission conductors is not aging effect requiring management and an AMP is not required.

95 **Category** Closed

Request 3.6.2.2-N-05
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 airborne particles such a near facilities that discharge soot. Explain why surface contamination is not a concern at VYNPS.

Response Per VYNPS electrical AMR Section 4.4 in AMRE-01:

Various airborne materials such as dust, salt and industrial effluents 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.
VYNPS is not located near the seacoast where salt spray is prevalent, or near facilities that discharge soot.
At VYNPS, as in most areas of the New England transmission system, contamination build up on insulators is not a problem. Therefore, surface contamination is not an applicable aging mechanism for the insulators at VYNPS.

96 **Category** Closed

Request 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).

Response Section 3.4.2 in AMRE-01and FSAR Section 5.2.3.4.3

At VYNPS, electrical penetration assemblies are included in the EQ program and are not subject to aging management review.

97 **Category** Accepted

Request 3.6.2.2-N-07
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:

3.6.2.2-7(a). 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?

3.6.2.2-7(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?

3.6.2.2-7(c). 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?

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.

Response Resolution__ The VY UFSAR Section 8.3.3 describes three offsite power sources. The immediate access circuit from the 345kV yard through the 345/115kV autotransformer to the startup transformers, the alternate immediate access circuit from the 115kV yard (Keene Line) through the startup transformers. The delayed access circuit is available by opening the generator no-load disconnect switch and establishing a feed from the 345kV switchyard through the main and aux transformers.

3.6.2.2-N-07(a)
No, there is no non-segregated phase buses in the path from the startup transformers to the 4.16 safety buses.

3.6.2.2-N-07(b)
The delayed access circuit from the 345KV switchyard through the main generator step-up transformer and unit aux transformer uses the Iso-phase bus for connection and is in scope for license renewal. The VYNPS Metal-Enclosed Bus program will be consistent with GALL XI.E4. The VYNPS Metal-Enclosed Bus program will perform visual inspection of the internal portions of the bus for cracks, corrosion, foreign debris, excessive dust buildup, and evidence of water intrusion. Internal bus supports will be inspected for structural integrity and signs of cracks. Enclosure assemblies will be inspected for evidence of loss of material and elastomers will be inspected to manage cracking and change in material properties.
The first inspection will be completed before the period of extended operation and every five years thereafter.

The Metal-Encased Bus Program will be added to the following LRA sections:
Section 2.5 – Electrical and I&C Systems
Section 3.6 – Electrical and Instrumentation and Controls
Table 3.6.1
Table 3.6.2-1
Appendix A
Appendix B

The Metal-Enclosed Bus Program will be added to the following AMR and AMPER.
LRPD-02- Aging Management Program Evaluation Results
AMRE-01 – Electrical Screening and AMR

This is LR commitment #32.

3.6.2.2-N-07(c)
No, there are no non-segregated phase buses in the path from the Unit Aux Transformer to the 4.16 safety buses.

Summary
The in-scope components required for recovery from a SBO do not include any non-segregated phase bus that requires aging management review.