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July 14, 2006

Docket No. 50-271
BVY 06-064
TAC No. MC 8634

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Reference: 1. Letter, Entergy to USNRC, "Vermont Yankee Nuclear Power Station, License No. DPR-28, License Renewal Application," BVY 06-009, dated January 25, 2006.

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
License Renewal Application, Amendment 5

On January 25, 2006, Entergy Nuclear Operations, Inc. and Entergy Nuclear Vermont Yankee, LLC (Entergy) submitted the License Renewal Application for the Vermont Yankee Nuclear Power Station (VYNPS) as indicated by Reference 1. Attachment 1 transmits changes to the VYNPS License Renewal Application in response to NRC staff questions received during on-site license renewal audits. Attachment 2 transmits changes to the VYNPS License Renewal Application tables in Sections 3.1 through 3.4 to address time-limited aging analyses in response to Audit Question 309.

Should you have any questions concerning this letter, please contact Mr. James DeVincentis at (802) 258-4236.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 14, 2006.

Sincerely,

Ted A. Sullivan
Site Vice President
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Attachments 1 and 2
cc: See next page

A117

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Attachment 1

Vermont Yankee Nuclear Power Station

License Renewal Application Supplement

Amendment 5

ATTACHMENT 1

LICENSE RENEWAL APPLICATION SUPPLEMENT

AMENDMENT LIST

Audit item 11: LRA Section B.1.7 is revised as follows.

1. Delete the exception to the BWR vessel internals program related to the core shroud (page B-27).
2. Delete exception Note #1 on page B- 29.

Audit item 26: Add the following text to LRA Section B.1.10 to include the "EQ Component Reanalysis Attributes" specified in NUREG-1801 Vol. 2 Section X.E1.

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 require 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).

Audit items 30, 141, and 146: LRA Section B.1.28 is revised to include an enhancement to perform CO2 system inspections every 6 months under the System Walkdown Program. The required inspections will be initiated prior to the period of extended operation. Commitment 30.

Audit item 39: LRA Section B.1.12.2 is revised to delete the exception to the annual fire hydrant gasket inspections. Commitment 31.

Audit item 40: LRA Section B.1.12.2 is revised to delete the exception to the annual fire hydrant flow tests. Commitment 31.

Audit item 48: LRA Section B.1.17 is revised as follows. "VYNPS inspection for water accumulation in manholes is conducted in accordance with a plant procedure. An evaluation per the Corrective Action Process will be used to determine the need to revise manhole inspection frequency based on inspection results."

Audit item 51: LRA Section B.1.18 is 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 once 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."

Audit item 53: To clarify the technical basis for sampling, the sampling discussion in LRA Section B.1.19 for the Non-EQ Insulated Cables and Connections Program is revised to read as follows. "Most cables and connections installed in adverse localized environments are accessible. This program is 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 the Corrective Action Process."

Audit item 64: The exception taken to NUREG-1801 Section XI.M3 in LRA Section B.1.23 is deleted. In accordance with ASME Code Case N-652, future examination will be visual only. 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 NUREG-1801.

Audit items 76, 80, 81, 243, 266, and 270: Aging effects on the drywell moisture barrier will be managed under the Containment Inservice Inspection Program instead of the Structures Monitoring Program. In support of this, the LRA is revised as follows.

1. In the LRA Table 3.5.2-1 line item for "Drywell floor liner seal" change the aging management program from "Structures Monitoring" to "CII-IWE". For clarification, change "drywell floor liner seal" to "drywell shell to floor seal (moisture barrier)." The clarification of this terminology also applies to Table 2.4-1 and Section B.1.27.2.
2. In LRA Table 3.5.1 line Item 3.5.1-16 the Discussion column is revised to read: "The aging effects cited in the NUREG-1801 item are loss of sealing and leakage. Loss of sealing is a consequence of the aging effects "cracking" and "change in material properties." For VYNPS, the Containment Leak Rate Program manages cracking and changes in material properties for the primary containment seal and gaskets. The Inservice Inspection -IWE Program manages cracking and changes in material properties for the drywell shell to floor seal (moisture barrier)."
3. In LRA Table 3.5.1, Line Item 3.5.1-5, the Discussion column last paragraph is revised to read "The drywell steel shell and the moisture barrier where the drywell shell becomes embedded in the drywell concrete floor are inspected in accordance with the Containment Inservice Inspection (IWE) Program."
4. LRA Section 3.5.2.2.1.4 is revised to delete from the end of the first paragraph, the phrase "and Structures Monitoring Program". The drywell to floor moisture barrier will be inspected under the Containment Inservice Inspection (IWE) Program only. The Structures Monitoring Program is not used.

Audit item 77: LRA Section B.1.27.2 for the Structures Monitoring Program is revised to include an enhancement to perform at least once every five years an engineering evaluation of groundwater samples to assess for groundwater being aggressive to concrete. Commitment 33.

Audit items 85, 86, 87, 166, 200, 232, 233, 239, 240, 295, 297, 310, 312, 313, and 359: The effectiveness of the Water Chemistry Control – Auxiliary Systems, BWR, and Closed Cooling Water programs is confirmed by the One-Time Inspection program. To provide further clarification, LRA Appendix A is revised for these three water chemistry control programs to

include the sentence "The One-Time Inspection Program will confirm the effectiveness of the program".

Audit item 93: In order to address transmission connections, in LRA Table 3.6.2-1, change line item Transmission conductors to Transmission conductors and connections. Revise Section 3.6.2.2.3 to include the following text after the second paragraph.

> The aging effects for transmission conductors evident in industry operating experience are loss of conductor strength and loss of material (wear).
>
> The prevalent mechanism contributing to loss of conductor strength of an aluminum conductor steel reinforced (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.
>
> VYNPS transmission conductors include ACSR and aluminum conductor alloy reinforced (ACAR) conductors. ACAR conductors are aluminum conductors reinforced with alloy steel. ACAR conductors are more resistant to loss of conductor strength since the core of the conductor is a more corrosion resistant alloy steel. 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.

Audit item 97: The VYNPS Metal-Enclosed Bus program ten element comparison to NUREG-1801 (excerpt from the Aging Management Program Evaluation Report LRPD-02) will be provided in later correspondence along with associated revisions to the LRA.

Audit item 118: LRA Section B.1.17 is revised to replace the last sentence in the Program Description with; "The specific type of test to be performed will be determined prior to the initial test and is to be a proven test for detecting deterioration of the insulation system due to wetting as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed."

Audit item 120: LRA Section B.1.17 Program Description is revised to state that medium-voltage cables include cables with operating voltage level from 2kV to 35kV.

Audit item 124: LRA Section B.1.19 Program Description is revised to include the following. "The program applies to accessible electrical cables and connections within the scope of license renewal that are installed in adverse localized environments caused by heat or radiation in the presence of oxygen."

Audit Item 159: LRA Section B.1.12.1 is revised to add fire dampers to the list of components in the Program Description that require a periodic visual inspection.

Audit item 165: Line Items 3.3.1-50 and 3.3.1-51 in LRA Table 3.3.1 are revised to replace the Water Chemistry Control – Auxiliary Systems program in the Discussion column with the Water Chemistry Control – BWR Program

Audit item 187: LRA section B.1.28 is revised to add the following enhancements. The System Walkdown Program implementing procedure will be enhanced to specify that systems in scope and subject to aging management review for license renewal in accordance with 10 CFR 50.54 (a)(1) and (a)(3) shall be inspected. In addition, the implementing procedure will be enhanced to provide guidance to inspect nearby systems with the potential for spatial interaction. These enhancements will be implemented as shown in Commitment 24.

Audit item 198, 216, 218, 237, 331 and 333: The VYNPS Bolting Integrity Program ten element comparison to NUREG-1801 (excerpt from the Aging Management Program Evaluation Report LRPD-02) will be provided in later correspondence along with associated changes to the LRA. The Bolting Integrity Program will be implemented prior to the period of extended operation in accordance with Commitment 34.

Audit item 203: LRA Table 3.1.2-3 is revised to indicate that with the exception of the head seal leak detection line, the Inservice Inspection Program applies to all component types of Piping and fittings < 4" NPS with an aging effect of cracking in addition to the Water Chemistry Control – BWR and One-Time Inspection Programs.

Audit Item 209 and 291: LRA Table 3.1.2-1 on page 3.1-52 is revised to remove all the line items for the component type of Thermal Sleeves Feedwater Inlets (N4). The thermal sleeves are not subject to aging management review since they perform no intended function for license renewal. The sleeves are installed with an interference fit rather than welded so they have no impact on the reactor coolant pressure boundary.

ATTACHMENT 1
LICENSE RENEWAL APPLICATION SUPPLEMENT
AMENDMENT LIST

Audit items 224, 225, 226, 229, 293, 294, 315, and 369: LRA Section B.1.21 is revised to state that the One-Time Inspection program will verify effectiveness of the Oil Analysis and Diesel Fuel Monitoring programs by confirming the absence of loss of material, cracking and fouling, where applicable.

Audit item 235: In LRA Table 3.3.2-10 for the NUREG-1801 Vol. 2 Item for component types "humidifier housing" and "piping", change item VIII.F1-8 to item VII.F1-8. The incorrect number was entered due to a typographical error.

Audit item 242: LRA Table 3.5.2-1 is revised to delete line items for "Bellows (reactor vessel and drywell)". Also the corresponding line item in Table 2.4-1 is deleted.

Audit item 244: LRA Table 3.5.2-6 is revised to indicate that Note "A" applies to component seals and gaskets (doors, man-ways and hatches) with the aging management program of Structures Monitoring Program.

Audit item 248: LRA Table 3.5.2-6 is revised to change Note "A" to Note "C" for electrical and instrument panels and enclosures with a material of galvanized steel in a protected from weather environment. Aging effect and associated aging management program are unchanged.

Audit item 249: LRA Table 3.5.2-6 is revised to change Note "A" to Note "C" for flood curb with a material of galvanized steel in a protected from weather environment. Aging effect and associated aging management program are unchanged.

Audit item 250: LRA Table 3.5.2-1 is revised to change Note "E" to Note "A" for torus shell with an aging effect of cracking-fatigue. Aging effect and associated aging management program are unchanged.

Audit items 255, 257, 258, 259, 263, and 278: The LRA is revised to indicate loss of material as an aging effect requiring management with the Structures Monitoring Program as the aging management program and the NUREG-1801 Vol. 2 Item as III.B4-7 with a Note C in the following cases.

1. Table 3.5.2-5 for transmission towers with a material of galvanized steel in an exposed to weather environment
2. Table 3.5.2-6 for conduit with a material of galvanized steel in an exposed to weather environment
3. Table 3.5.2-6 for conduit support with a material of galvanized steel in an exposed to weather environment
4. Table 3.5.2-6 for electrical and instrument panels and enclosures with a material of galvanized steel in an exposed to weather environment
5. Table 3.5.2-6 for structural bolting with a material of galvanized steel in an exposed to weather environment

LRA Table 3.5.1, item 3.5.1-50 is revised to include the following in the Discussion column: "Consistent with NUREG-1801 for galvanized steel components in outdoor air. The Structures Monitoring Program will manage loss of material."

Audit item 267:

LRA Table 3.5.2-1 is revised to add the following line.

Torus mechanical penetrations	PB, SSR	Carbon steel	Protected from weather	Cracking (fatigue)	TLAA-metal fatigue	II.B4-4 (C-13)	3.5.1-8	A

LRA Table 3.5.2-1 is revised to delete the following line.

Drywell to torus vent system	PB, SSR	Carbon steel	Protected from weather	Cracking (fatigue)	TLAA-metal fatigue	II.B1.1-4 (C-21)	3.5.1-8	A

The Discussion column for LRA Table 3.5.1 item 3.5.1-8 is revised to read as follows. "Fatigue analysis is a TLAA for the torus shell. Fatigue of the torus to drywell vent system is event driven and the analysis is not a TLAA. See Section 3.5.2.2.1.6.

The Discussion column of LRA Table 3.5.1 item 3.5.1-9 is revised to read as follows. "Fatigue analysis is a TLAA for the torus penetrations. See Section 3.5.2.2.1.6.

The Discussion column of LRA Section 3.5.2.2.1.6 is revised to read as follows. "TLAA are evaluated in accordance with 10 CFR 54.21(c) as documented in Section 4. Fatigue TLAAs for the torus and associated penetrations are evaluated and documented in Section 4.6.

LRA Section 3.5.2.3, Time-Limited Aging Analyses, is revised to read as follows. "TLAA identified for structural components and commodities include fatigue analyses for the torus and torus penetrations. These topics are discussed in Section 4.6."

Audit items 268 and 269: The LRA is revised as follows.

1. For clarification, the Discussion column of Table 3.5.1, line items 3.5.1-12 and 3.5.1-13 is revised to add the following statement at the end of the existing information. "See Section 3.5.2.2.1.8".
2. LRA Section 3.5.2.2.1.8 is revised to read as follows. "Cyclic loading can lead to cracking of steel and stainless steel penetration bellows, and dissimilar metal welds of BWR containments and BWR suppression pool shell and downcomers. Cracking due to cyclic loading is not expected to occur in the drywell, torus and associated penetration bellows, penetration sleeves, un-braced downcomers, and dissimilar metal welds. A review of plant operating experience did not identify cracking of the components, and primary containment leakage has not been identified as a concern. Nonetheless the existing Containment Leak Rate Program with augmented ultrasonic exams and Containment Inservice Inspection – IWE, will continue to be used to detect cracking. Observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process. The Containment Inservice Inspection – IWE and Containment Leak Rate programs are described in Appendix B."

Audit item 279: For clarification, LRA Table 3.5.1, Item 3.5.1-52 discussion is revised to read as follows. "Loss of mechanical function due to the listed mechanisms is not considered an aging

effect. Such failures typically result from inadequate design or operating events rather than from the effects of aging. Failures due to cyclic thermal loads are rare for structural supports due to their relatively low temperatures."

Audit item 280: For clarification, LRA Table 3.5.1, Item 3.5.1-54 discussion is revised as follows. "Loss of mechanical function due to distortion, dirt, overload, fatigue due to vibratory, and cyclic thermal loads is not considered an aging effect requiring management. Such failures typically result from inadequate design or events rather than the effects of aging. Loss of material due to corrosion, which could cause loss of mechanical function, is addressed under Item 3.5.1-53 for Groups B1.1, B1.2, and B1.3 support members."

Audit item 282: For clarification, LRA Table 3.5.1, Line Item 3.5.1-34 discussion is revised to add "See Section 3.5.2.2.2.4(1)".

Audit item 283: LRA Table 3.5.1, Item 3.5.1-35 discussion is revised to replace ACI 301 with ACI 318 and add "See Section 3.5.2.2.2.4(2)" at the end of the existing discussion.

Audit item 284: LRA Table 3.5.1, Line item Number 3.5.1-36 discussion column is revised as follows. "Reaction with aggregates is not an applicable aging mechanism for VYNPS concrete components. See Section 3.5.2.2.2.1(5) (although for Groups 1-5, 7, 9 this discussion is also *applicable for Group 6). See Section* 3.5.2.2.2.4(3) *additional discussion.* Nonetheless, the Structures Monitoring Program will confirm the absence of aging effects requiring management for VYNPS Group 6 concrete components."

To correct an administrative error, the heading of LRA Section 3.5.2.2.2.4 (3) is revised to begin with "Cracking Due to Expansion, Reaction with Aggregates...". The term stress corrosion cracking is deleted from the heading as it does not apply to this section.

Audit item 285: The Discussion column of LRA Table 3.5.1, Item Number 3.5.1-37, is revised to state the following. "Not applicable. Nonetheless the Structures Monitoring Program will confirm the absence of aging effects requiring management for VYNPS Group 6 concrete components. See Section 3.5.2.2.2.4(3)".

Audit item 286: For clarification, LRA Table 3.5.1, Item Number 3.5.1-40 discussion column is revised to add "See Section 3.5.2.2.2.6(1)".

Audit Item 304: LRA Table 3.3.2.13-32 is revised to replace the aging management program of One-Time Inspection with Periodic Surveillance and Preventive Maintenance for all line items containing carbon steel and copper alloy with an environment of untreated water.

Audit item 309: LRA Section 3.1, 3.2, 3.3 and 3.4 tables will be revised to remove "TLAA-metal fatigue" from all line items for which Section 4 does not discuss evaluation of a TLAA. Line by line changes to the tables are provided in Attachment 2 to this letter.

Audit item 318: LRA Table 4.3-1 is revised to remove the NUREG/CR-6260 values for core spray safe end, feedwater piping, RHR return piping, and RR piping tee and replace them with N/A. Commitment 27 requires an analysis that addresses the effects of reactor coolant environment on fatigue performed to an NRC-approved version (year) of the ASME code.

Audit item 319: The last paragraph of LRA Section 4.3.1.1 is replaced with the following. "The VYNPS Fatigue Monitoring Program will assure that the allowed number of transient cycles is not exceeded. The program requires corrective action if transient cycle limits are approached. Consequently, the TLAA (fatigue analyses) based on those transients will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). However, when the effects of reactor coolant environment on fatigue are considered in the existing fatigue analyses, several locations have a projected cumulative usage factor in excess of 1.0. See Section 4.3.3 for further discussion of the effects of reactor water environment on fatigue."

Audit item 320: LRA Reference 4.3.1 on page 4.3-9 is revised as follows; "4.3-1 Sojka, R. E. (VYNPS), to USNRC Document Control Desk, "Response to Request for Additional Information Regarding Vermont Yankee Core Shroud Modification," BVY 96-96, letter dated August 7, 1996."

Audit item 322: LRA Section 4.3.1.3 is replaced with the following.

"VYNPS replaced reactor recirculation (RR) system piping in 1986. Also replaced were connecting portions of the residual heat removal (RHR) system piping. The new piping was designed and analyzed to ANSI B31.1 but was inspected and tested to ASME Section III requirements. Stress analyses for the reactor recirculation system were performed to B31.1 requirements. B31.1 does not require a detailed fatigue analysis that calculates a CUF, but allows up to 7000 cycles with a stress reduction factor of 1.0 in the stress analyses. The 7000 thermal cycle assumption is valid and bounding for 60 years of operation. Therefore, the pipe stress calculations are valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

There are no TLAA for Class 1 non-piping components other than the reactor vessel as none of them are designed to codes that require fatigue analyses.

UFSAR Section 4.6.3 states that the main steam isolation valves are designed for 40 years based on 100 cycles of operation the first year and 50 cycles of operation per year thereafter. This statement may be interpreted to imply a TLAA. This TLAA will remain valid through the period of extended operation per 10 CFR 54.21(c)(1)(i). The MSIVs will not exceed 2050 cycles in 60 years (34 cycles per year)."

In addition LRA section 4.3.2 is replaced with the following.

"The design of safety class 2 and 3 piping systems incorporates the Code stress reduction factor for determining acceptability of piping design with respect to thermal stresses. The design of ASME B31.1 Code piping also incorporates stress reduction factors based upon an assumed number of thermal cycles. In general, 7000 thermal cycles are assumed, leading to a stress reduction factor of 1.0 in the stress analyses. VYNPS evaluated the validity of this assumption for 60 years of plant operation. The results of this evaluation indicate that the 7000 thermal cycle assumption is valid and bounding for 60 years of operation. Therefore, the pipe stress calculations are valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

There are no TLAA for any non-Class 1, non-piping components as they are not built to codes that require fatigue analyses.

Some applicants for license renewal have estimated that piping in the primary sampling system will have more than 7000 thermal cycles before the end of the period of extended operation. The sampling system is used to take reactor coolant samples every 96 hours during normal operation. However, the normal samples are taken from the RWCU filter influent, where the water has already been cooled. Thus normal sampling does not cause a thermal cycle. Alternate samples may be taken directly from the B discharge header of the reactor recirculation system via containment penetration X-41; however, this is an infrequently performed procedure and this piping, designed to ASME B31.1, will not exceed 7000 cycles prior to 60 years of operation."

Audit item 335: LRA Table 3.5.2-6 lists the aging effects for component Penetration sealant, material elastomer in a protected from weather environment as "cracking" and "change in material properties." For clarification, the LRA is revised to separate this component line item into two line items as follows:

1. Delete line item:

Penetration sealant (fire, flood, radiation)	EN, FB, FLB, PB, SNS	Elastomer	Protected from weather	Cracking, Change in material properties	Fire protection, Structures Monitoring	III.A6-12 (TP-7)	3.5.1-44	C

2. Add line item:

Penetration sealant (fire)	EN, FB, PB, SNS	Elastomer	Protected from weather	Cracking, Change in material properties	Fire protection	VII.G-1 (A-19)	3.3.1-61	B

3. Add line item:

Penetration sealant (flood, radiation)	EN, FLB, PB, SNS	Elastomer	Protected from weather	Cracking, Change in material properties	Structures Monitoring	III.A6-12 (TP-7)	3.5.1-44	C

Audit item 336: LRA Table 3.5.2-6 lists the aging effects for the Seismic isolation joint, with a material of elastomer in a protected from weather environment as "cracking" and "change in material properties." For clarification, the LRA is revised to make the following changes.

1. Note C is changed to Note E for this line item.
2. The discussion in Table 3.3.1 line Item 3.3.1-61, Page 3.3-49 is revised to read as follows. "This line item was not used in the auxiliary systems tables. Fire barrier

seals are evaluated as structural components in Section 3.5. Cracking and change in material properties of elastomer seals, including seismic isolation joints located in fire barriers, are managed by the Fire Protection Program."

3. An additional line item is added to read as follows.

Seismic isolation joint	SSR	Elastomer	Protected from weather	Cracking, Change in material properties	Structures Monitoring	III.A6-12 (TP-7)	3.5.1-44	C

Audit item 337: LRA Table 3.5.2-6 lists the aging effect for Fire doors, with a material of carbon steel in a protected from weather environment as "loss of material." For clarification, the LRA is revised to change 'Note C' to 'Note B' for this line item.

Audit item 345: LRA Table 3.3.2-13 lists the aging effect for component type of bolting, with a material of stainless steel in an air - outdoor (ext) environment as "none." The LRA is revised to identify loss of material as an aging effect for this line item as shown below.

Bolting	Pressure boundary	Stainless steel	Air - outdoor	Loss of material	System walkdown			G

Audit item 350: LRA Section A.2.1.31 Structures Monitoring-Vernon Dam FERC Program is replaced with the following. "The Vernon dam is subject to the Federal Energy Regulatory Commission (FERC) inspection program. This program consists of visual inspections in accordance with FERC guidelines and complies with Title 18 of the Code of Federal Regulations, Conservation of Power and Water Resources, Part 12 (Safety of Water Power Projects and Project Works) and Division of Dam Safety and Inspections Operating Manual. The operation inspection frequency for licensed and exempt low hazard potential dams is biennially. As indicated in NUREG-1801 for water control structures, NRC has found that FERC / US Army Corp of Engineers dam inspections and maintenance programs are acceptable for aging management. "

Audit item 354: The LRA is revised to delete Sections 4.7.2.5, 4.7.2.6, A.2.2.7 and A.2.2.8. Also the component type of vessel ID attachment welds and instrument penetrations in LRA Table 4.1-1 is deleted. The items discussed in these sections do not meet the definition of time-limited aging analyses.

In LRA table 3.1.2-1 (page 3.1-54) for the component type of internals attachments the line with the aging effect of cracking-fatigue and TLAA-metal fatigue as the aging management program is deleted. Cracking managed by the BWR Vessel ID Attachment Welds Program remains in the table.

In LRA table 3.1.2-1 (page 3.1-44) for the component type of nozzles, instrumentation, N11 the line item with the aging effect of cracking-fatigue and TLAA-metal fatigue as the aging management program is deleted. Cracking managed by the BWR Penetrations Program remains in the table.

Audit item 371: LRA Section B.1.11 is revised as follows. "The VYNPS Fatigue Monitoring Program includes counting of the cycles incurred by the plant. Five transients are monitored by plant operations and recorded as they occur. It is projected that less 60% of the design cycles for these five transients will be used through the first 60 years of operation, including the period of extended operation. The remaining transients are monitored by plant engineering based on review of operating data at the end of each fuel cycle. These remaining transients are summarized in the Fatigue Monitoring Program as the sixth transient (reactor startups and shutdowns). Engineering evaluates these transients and advises operations if the number of design cycles is being approached."

Audit item 373: LRA Section 3.3.2.2.13 Loss of Material due to Wear is revised to state, "Wear is the removal of surface layers due to relative motion between two surfaces. At VYNPS, in the auxiliary systems, this specific aging effect is not applicable because the heating, ventilation, and air conditioning elastomer coated fiberglass duct flexible connections are fixed at both ends, precluding wear. This item is not applicable to VYNPS auxiliary systems."

Audit item 376: LRA Table 3.3.1 line item 3.3.1-69 is revised to remove the reference to the One-Time Inspection Program.

Audit item 379: LRA Table 3.5.1 line item 3.5.1-16 discussion is revised to add the following paragraph. "For reactor building seals and gaskets, the Periodic Surveillance and Preventive Maintenance Program manages cracking and change in material properties for the railroad inner and outer lock doors elastomer seals."

Audit item 382: The operating experience discussion in LRA Appendices B.1.17, B.1.18, and B.1.19 is replaced with the following.

"This program is a new aging management program. Industry operating experience that forms the basis for the program is described in the operating experience element of the NUREG-1801 program description. VYNPS plant-specific operating experience has been reviewed against the industry operating experience identified in NUREG-1801. Although VYNPS has not experienced all of the aging effects listed in NUREG-1801, the VYNPS program will manage all of the aging effects identified in the Operating Experience section of NUREG-1801.

The program is based on the program description in NUREG-1801, which in turn is based on relevant industry operating experience. As such, this program will provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. As additional operating experience is obtained, lessons learned can be used to adjust the program, as needed."

Attachment 2

Vermont Yankee Nuclear Power Station

License Renewal Application Supplement

Amendment 5

ATTACHMENT 2
LICENSE RENEWAL APPLICATION SUPPLEMENT
TLAA TABLE CHANGES

Audit item 309 – Tables and text of LRA Sections 3.1, 3.2, 3.3 and 3.4 are modified as follows:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Table 3.1.2-1 Reactor Vessel									
Closure flange studs, nuts, washers and bushings	Pressure boundary	Low alloy steel	Air-indoor (ext)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	~~C, 101~~	Aging effect entry for component line deleted – Cracking managed by Reactor Head Closure Studs Program in following entry of line.
Incore housing bolting • Flange bolts • Flange • Nut and washer	Pressure boundary	Stainless steel	Air-indoor (ext)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~			~~G~~	Aging effect entry for component line deleted – Cracking managed by Inservice Inspection Program in following entry of line.
Other pressure boundary bolting • Flange bolts and nuts (N6A, N6B, N7) • CRD flange caps-crews and washers	Pressure boundary	Low alloy steel	Air-indoor (ext)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	~~C, 101~~	Aging effect entry for component line deleted – Cracking managed by Inservice Inspection Program in following entry of line.
CAP • CRD return line (N9)	Pressure boundary	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	A	Aging effect entry for component line deleted – Cracking managed by BWR CRD Return Line Nozzle Program in following entry of line.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Thermal sleeves • Recirc inlet (N2) • Core spray (N5)	Pressure boundary	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
~~Thermal sleeves~~ ~~• Feedwater inlets (N4)~~	~~Pressure boundary~~	~~Stainless steel and Nickel-based alloy~~	~~Treated water >270ºF (int)~~	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	~~A~~	Deleted entire line – Feedwater inlet thermal sleeves are not welded to nozzles and are not subject to aging management review (See audit items 209 and 291).
Weld • SLC nozzle to safe end weld (N10)	Pressure boundary	Nickel-based alloy	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.A1-7 (R-04)~~	~~3.1.1-2~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Penetrations Program in following entry of line.
Table 3.1.2-2 Reactor Vessel Internals									
Control rod guide tubes • Tubes	Support for Criterion (a)(1) equipment	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Control rod guide tubes • Bases	Support for Criterion (a)(1) equipment	CASS	Treated water >482ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Core plate • Plate, beams • Blocks, plugs, • Alignment assemblies	Support for Criterion (a)(1) equipment	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.

ATTACHMENT 2
LICENSE RENEWAL APPLICATION SUPPLEMENT
TLAA TABLE CHANGES

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Core spray lines	Flow distribution	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Fuel support pieces • Orificed supports • Peripheral supports	Support for Criterion (a)(1) equipment	CASS	Treated water >482ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Incore dry tubes	Pressure boundary	Stainless steel	Treated water >270ºF (ext)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Incore guide tubes	Pressure boundary	Stainless steel	Treated water >270ºF (ext)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Jet pump assemblies • Risers, riser braces • Riser hold down bolts • Mixer barrels and adapters • Restraint brackets, wedges, bolts • Diffusers and tailpipes • Adapter upper rings	Floodable volume	Stainless steel	Treated water >270ºF (int)	~~Cracking–fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Jet pump assemblies • Hold-down beams • Adapter lower ring	Floodable volume	Nickel-based alloy	Treated water >270ºF (int)	~~Cracking–fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Jet pump castings • Transition piece • Inlet elbow/ nozzle • Mixer flange and flare • Diffuser collar	Floodable volume	CASS	Treated water >482ºF (int)	~~Cracking–fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Shroud	Floodable volume	Stainless steel	Treated water >270ºF (int)	~~Cracking–fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Shroud support • Ring, cylinder, and legs • Access hole cover	Support for Criterion (a)(1) equipment	Nickel-based alloy	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Top guide assembly	Support for Criterion (a)(1) equipment	Stainless steel	Treated water >270ºF (int)	~~Cracking – fatigue~~	~~TLAA-metal fatigue~~	~~IV.B1-14 (R-53)~~	~~3.1.1-5~~	A	Aging effect entry for component line deleted – Cracking managed by BWR Vessel Internals Program in following entry of line.
Table 3.1.2-3: Reactor Coolant System Pressure Boundary									
Detector (CRD)	Pressure boundary	Stainless steel	Treated water >270°F (int)	~~Cracking-fatigue~~	~~TLAA – metal fatigue~~	~~IV.C1-15 (R-220)~~	~~3.1.1-3~~	A	Aging effect entry for component line deleted – Cracking managed by One-Time Inspection Program in previous entry of line.
Drive (CRD)	Pressure boundary	Stainless steel	Treated water ~~>270°F (int)~~	~~Cracking-fatigue~~	~~TLAA – metal fatigue~~	~~IV.C1-15 (R-220)~~	~~3.1.1-3~~	A	Environment for this component line changed. CRD drive temperatures maintained below threshold for fatigue. Aging effect entry for component line deleted.

ATTACHMENT 2
LICENSE RENEWAL APPLICATION SUPPLEMENT
TLAA TABLE CHANGES

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Pump casing and cover (RR)	Pressure boundary	CASS	Treated water >482°F (int)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.C1-15 (R-220)~~	~~3.1.1-3~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by BWR Stress Corrosion Cracking and Inservice Inspection Programs in preceding entry of line.
Restrictors (MS)	Flow control	CASS	Treated water >482°F (int)	~~Cracking – fatigue~~	~~TLAA – metal fatigue~~	~~IV.C1-15 (R-220)~~	~~3.1.1-3~~	~~A~~	Aging effect entry for component line deleted – Cracking managed by One-Time Inspection Program in preceding entry of line.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
Table 3.2.2-1: Residual Heat Removal System									
~~Heat exchanger (shell)~~	~~Pressure boundary~~	~~Carbon steel~~	~~Treated water >270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~V.D2-32 (E-10)~~	~~3.2.1-1~~	~~C~~	Line deleted. See next line.
Heat exchanger (shell)	***Pressure boundary***	***Carbon steel***	***Treated water >270°F (int)***	***Cracking***	***One-Time Inspection***	***V.D2-32 (E-10)***	***3.2.1-1***	***E***	New line item.
~~Heat exchanger (tubes)~~	~~Pressure boundary~~	~~Stainless steel~~	~~Treated water >270°F (ext)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VII.E3-14 (A-62)~~	~~3.3.1-2~~	~~C~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table

ATTACHMENT 2
LICENSE RENEWAL APPLICATION SUPPLEMENT
TLAA TABLE CHANGES

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
~~Heat exchanger (tubes)~~	~~Pressure boundary~~	~~Stainless steel~~	~~Treated water >270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VII.E3-14 (A-62)~~	~~3.3.1-2~~	~~C~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table
~~Pump casing~~	~~Pressure boundary~~	~~Carbon steel~~	~~Treated water >270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~V.D2-32 (E-10)~~	~~3.2.1-1~~	~~A~~	Line deleted. See next line.
Pump casing	***Pressure boundary***	***Carbon steel***	***Treated water >270°F (int)***	***Cracking***	***One-Time Inspection***	***V.D2-32 (E-10)***	***3.2.1-1***	***E***	New line item.
Table 3.2.2-4: High Pressure Coolant Injection System									
~~Turbine casing~~	~~Pressure boundary~~	~~Carbon steel~~	~~Steam > 270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VIII.B2-5 (S-08)~~	~~3.4.1-1~~	~~C~~	Line deleted. See next line.
Turbine casing	***Pressure boundary***	***Carbon steel***	***Steam > 270°F (int)***	***Cracking***	***One-Time Inspection***	***VIII.B2-5 (S-08)***	***3.4.1-1***	***E***	New line item.
Table 3.2.2-5: Reactor Core Isolation Cooling									
~~Turbine casing~~	~~Pressure boundary~~	~~Carbon steel~~	~~Steam > 220°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VIII.B2-5 (S-08)~~	~~3.4.1-1~~	~~C~~	Line deleted. See next line.
Turbine casing	***Pressure boundary***	***Carbon steel***	***Steam > 220°F (int)***	***Cracking***	***One-Time Inspection***	***VIII.B2-5 (S-08)***	***3.4.1-1***	***E***	New line item.
3.3.2-13-36: Reactor Water Clean-Up System									
~~Heat exchanger (shell)~~	~~Pressure boundary~~	~~Stainless steel~~	~~Treated water > 270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VII.E3-14 (A-62)~~	~~3.3.1-2~~	~~C~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes	Change Description
~~Pump casing~~	~~Pressure boundary~~	~~Stainless steel~~	~~Treated water > 270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VII.E3-14 (A-62)~~	~~3.3.1-2~~	~~A~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table
~~Tank~~	~~Pressure boundary~~	~~Stainless steel~~	~~Treated water > 270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~	~~VII.E3-14 (A-62)~~	~~3.3.1-2~~	~~A~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table
3.4.2-1: Main Condenser and MSIV Leakage Pathway									
~~Heat exchanger (tubes)~~	~~Pressure boundary~~	~~Stainless steel~~	~~Steam > 270°F (int)~~	~~Cracking-fatigue~~	~~Metal fatigue TLAA~~			~~H~~	Line deleted – Cracking managed by Water Chemistry Control – BWR augmented by One-Time Inspection in preceding line of table

Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1						
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**	**Change Description**
3.2.1-1	Steel and stainless steel piping, piping components, and piping elements in emergency core cooling system	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue is a TLAA ***for most components. The One-Time Inspection Program manages cracking for components susceptible to fatigue with no TLAA.*** See Section 3.2.2.2.1.	Discussion modified as shown

Section 3.2.2.2.1 is revised as follows:

3.2.2.2.1 Cumulative Fatigue Damage

Where identified as an aging effect requiring management ***for components designed to ASME Code requirements,*** the analysis of fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). Evaluation of this TLAA is addressed in Section 4.3.

Where fatigue damage is identified as an aging effect requiring management for components with no fatigue design requirements, the aging effect is managed by inspection. The One-Time Inspection program will manage cracking due to fatigue for these components.

Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1						
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**	**Change Description**
3.4.1-1	Steel piping, piping components, and piping elements exposed to steam or treated water	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue is a TLAA ***for most components. The One-Time Inspection Program manages cracking for components susceptible to fatigue with no TLAA.*** See Section 3.4.2.2.1.	Discussion modified as shown

Section 3.4.2.2.1 is revised as follows:

3.4.2.2.1 Cumulative Fatigue Damage

Where identified as an aging effect requiring management ***for components designed to ASME Code requirements,*** the analysis of fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). Evaluation of this TLAA is addressed in Section 4.3.

Where fatigue damage is identified as an aging effect requiring management for components with no fatigue design requirements, the aging effect is managed by inspection. The One-Time Inspection program will manage cracking due to fatigue for these components.