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1CAN040503

April 26, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: License Amendment Request
Response to NRC Request for Additional Information on ANO-1 Proposed Technical Specification Change to Steam Generator Tube Inservice Inspection Program
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

REFERENCES:

1 Entergy letter dated September 30, 2004, *Proposed Technical Specification Change for Revision to ANO-1 Steam Generator Tube Inservice Inspection Program* (1CAN090401)

Dear Sir or Madam:

On September 30, 2004 (Reference 1), Entergy requested NRC review and approval of a proposed Operating License amendment for Arkansas Nuclear One, Unit 1 (ANO-1) to replace the existing steam generator tube surveillance program with that of the Technical Specification Task Force in TSTF 449, Draft Revision 2. Since the ANO-1 submittal, TSTF 449, Revision 3 was issued and the NRC Staff noticed it in the Federal Register as a Consolidated Line Item Improvement Program (CLIIP) for comment.

On March 23, 2005, the NRC Staff provided a Request for Additional Information (RAI) on the Entergy application based on Revision 3 of TSTF-449. The proposed responses to the RAI were discussed with the NRC Staff on April 12, 2005. A recent Revision 4 has also been issued to address comments received by the NRC and the industry. The appropriate changes from Revision 4 have been included in this response. Entergy's response to the RAIs is contained in Attachment 1. Revised markups of affected Technical Specification (TS) and Bases pages are contained in Attachments 2 and 3, respectively. These modified TS and Bases pages supersede those provided in Reference 1.

The inclusion of a modified TS page 1.1-3, *Definitions*, impacts the No Significant Hazards Consideration provided by Entergy in Reference 1 since this section of the TSs was not

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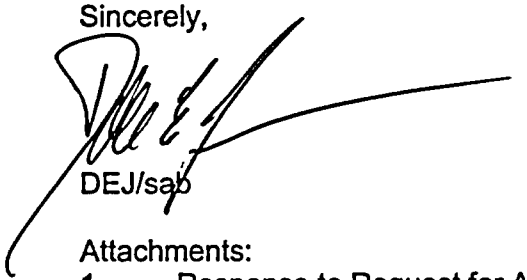
included in the original amendment request. Therefore, re-noticing in the Federal Register of the proposed license amendment may be necessary as discussed in the response to RAI A.7 of Attachment 1.

In Reference 1, Entergy included a modified Table of Contents page for completeness and requested that it be issued with the NRC Operating License Amendment. Since this page only resides in the ANO-1 TSs as a roadmap, we are withdrawing this page from the license amendment request.

The proposed changes do not include any new commitments from that provided in Reference 1. If you have any questions or require additional information, please contact Steve Bennett at 479-858-4626.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 26, 2005.

Sincerely,



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Attachments:
1. Response to Request for Additional Information for ANO-1 License Amendment Request on Steam Generator Tube Inservice Inspection Program
2. Proposed Technical Specification Changes (mark-up)
3. Proposed Technical Specification Bases Changes (mark-up)

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Attachment 1

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Response to Request for Additional Information on
License Amendment Request for
ANO-1 Steam Generator Tube Inservice Inspection Program

Response to Request for Additional Information on
License Amendment Request for
ANO-1 Steam Generator Tube Inservice Inspection Program

A. *In its submittal, Entergy stated that they are applying the draft Revision 2 of Technical Specification Task Force (TSTF) 449 format and content which was being finalized for industry application. TSTF 449 has since been revised, and NRC recently issued Revision 3 for public comment. The staff compared Entergy's submittal against TSTF 449, Revision 3.*

1. *TSTF 449, Revision 3, contains a "NOTE" in the technical specification (TS) limiting condition for operation (LCO) applicable to steam generator tube integrity (Section 3.4.17). The note states that "Separate Condition entry is allowed for each SG tube." The proposed ANO-1 TS Section 3.4.16, "Steam Generator (SG) Tube Integrity" does not contain this note. This note is required in order for the LCO to be used as intended and described in the TSTF. Please modify the TS accordingly, or provide justification for eliminating the statement.*

   ANO Response: The note "Separate Condition entry is allowed for each SG tube" is being added to the proposed TS 3.4.16 LCO to be consistent with TSTF 449, Revision 3.

   In addition, Revision 4 to TSTF 449 clarified in Action A.1 to the Steam Generator Tube Integrity Specification, to add . . . *next refueling outage* . This makes Action A.1 consistent with Action A.2 and its Completion Time for performing tube repairs. ANO-1 TS 3.4.16, Action A.1 will now read: *Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection.* A similar change was made to the 3.4.16 Bases. A revised mark-up of TS page 3.4.16-1 and Bases page 3.4.16.4 are provided in Attachments 2 and 3, respectively.

2. *On the top of proposed TS page B 3.4.13-2, ANO-1 Bases Section B 3.4.13 RCS [Reactor Coolant System] Operational LEAKAGE, APPLICABLE SAFETY ANALYSES, states; "The SAR (Ref. 4) analysis for SGTR assumes the contaminated secondary fluid is released via turbine bypass valves to the condenser and briefly through the MSSVs to the atmosphere." This wording is not consistent with the TSTF. Discuss the purpose of the plant-specific wording and/or confirm that it is consistent the SGTR licensing basis assumptions.*

   ANO Response: The added statement at the top of proposed TS page B 3.4.13-2 which reads "and briefly through the MSSVs to the atmosphere" was added to provide clarification of the atmospheric release path at ANO-1 for a SGTR. This addition was for clarification only. The statement "compared to the tube rupture leakage" was added to indicate that for the ANO-1 licensing basis dose consequence, the primary to secondary leakage contribution to offsite doses is relatively inconsequential when compared to that of a SGTR. This clarifies the ANO-1 licensing basis. Therefore, Entergy proposes to leave the 3.4.13 TS Bases discussion as proposed.

3. *The TSTF, Revision 3, Section B 3.4.13 RCS Operational LEAKAGE, SURVEILLANCE REQUIREMENTS [SR], SR 3.4.13.2 states; "During normal operation the primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling* ***in accordance with the EPRI Guidelines, Reference 8.*** *The ANO-1 proposed BASES did not include the last part of the sentence (i.e., the bolded portion). Please modify the TS accordingly, or provide justification for eliminating the statement.*

   ANO Response: This change was incorporated in Revision 3 of TSTF 449. Therefore, the ANO-1 TS Bases for SR 3.4.13.2 are being modified to reference the *EPRI Pressurized Water Reactor Primary-to-Secondary Leak Guidelines.*

   In addition, in the previously proposed wording on the last page of B 3.4.13-6 that begins "During normal operation..." and the following sentences are being removed since they are no longer contained in TSTF 449, Rev 3:

   > *In MODES 3 and 4, the primary system radioactivity level may be very low, making it difficult to measure primary to secondary LEAKAGE. If SG water samples are less than the minimum detectable activity of [5.0 E-7] microcuries/ml for each principal gamma emitter, primary to secondary LEAKAGE may be assumed to be less than 150 gallons per day through any one SG (Ref.8).*

   A revised mark-up of TS Bases page 3.4.13-6 is provided in Attachment 3.

4. *The ANO-1 proposed Section B 3.4.16 Steam Generator (SG) Tube Integrity, APPLICABLE SAFETY ANALYSES, states; "The analysis of a SGTR event assumes a bounding* ***unidentified operational RCS*** *LEAKAGE rate equal to the operational ....." The TSTF replaced part of the licensee's sentence (i.e., the bolded phrase) with the words "primary to secondary." Explain the basis for inserting "unidentified operational RCS" in this part of the basis, or modify the TS to be consistent with the TSTF.*

   ANO Response: The ANO-1 proposed wording for "unidentified operational RCS" was considered to be more consistent with the original TS and analysis definitions. However, in further review, Entergy agrees that the TSTF wording of "primary to secondary" is appropriate and is changing the Bases for 3.4.16 to be consistent with the TSTF. A revised mark-up of TS Bases page 3.4.16-2 is provided in Attachment 3.

5. *The ANO-1 proposed TS Bases page B 3.4.16-3, second paragraph on that page, has a sentence that reads: "The structural integrity performance criterion provides guidance on assessing loads that* ***significant*** *affect burst or collapse. In that context, the term "significantly" is defined as ....."*

   The bolded word above should be "significantly." Please modify the TS Bases accordingly.

ANO Response: This use of the word as contained in TSTF 449, Rev 2 and 3 was incorrect. However, "significant" was changed to "significantly" in Revision 4 to TSTF-449. The sentence will be revised to read "significantly affect burst..." A revised mark-up of TS Bases page 3.4.16-3 is provided in Attachment 3.

6. *The ANO-1 proposed TS Bases page B 3.4.16-3 is not consistent with the TSTF, Revision 3, in that it is missing a paragraph which should reside between the second and third paragraphs on that page. Please add the appropriate paragraph or discuss the basis for eliminating the paragraph.*

ANO Response: The TSTF 449 statement is consistent with the ANO design basis and the TS Bases for Section 3.4 will be revised to incorporate as follows:

> *Structural integrity requires that the primary membrane stress intensity in a tube not exceed the yield strength for all ASME Code, Section III, Service Level A (normal operating conditions) and Service Level B (upset or abnormal conditions) transients included in the design specification. This includes safety factors and applicable design basis loads based on ASME Code, Section III, Subsection NB (Ref. 4) and Draft Regulatory Guide 1.121 (Ref. 5).*

A revised mark-up of TS Bases page 3.4.16-3 is provided in Attachment 3.

7. *The current ANO-1 TS Page 1.1-3 (Definitions) contains (in part) definitions for "Identified LEAKAGE" and "Pressure Boundary LEAKAGE." The ANO-1 definitions refer to SG LEAKAGE but that term is not used in the TS or Bases. The term used in the TS and Bases is "primary to secondary LEAKAGE." Therefore, the two definitions, identified above, should be modified to reflect primary-to-secondary leakage. (Note: TSTF 449, Revision 3, identified this as a necessary editorial change.)*

ANO Response: Consistent with TSTF 449, Revision 3, the definition of LEAKAGE will be modified from "SG LEAKAGE" to "primary to secondary LEAKAGE". A revised TS page 1.1-3 is provided in Attachment 2.

Even though TSTF 449, Rev 3 noted this as editorial, the No Significant Hazards Consideration (NSHC) contained in Section 5.2 of the original license amendment request (Reference 1) is impacted by the addition of a new TS section not previously referenced. In addition, the reference to a specific TSTF-449 revision should be removed. A revised NSHC lead-in summary is proposed below:

> *5.2 No Significant Hazards Consideration [Modified from Reference 1]*
>
> *The proposed change revises the improved Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specifications (TS) Section 1.1, Definitions, Section 3.4.13, RCS Operational LEAKAGE, Section 5.5.9, Steam Generator Program, and Section 5.6.7, Steam Generator Tube Inspection Report. The proposed change also adds a new TS 3.4.16 for Steam Generator Tube Integrity. The proposed changes apply ~~draft Revision 2 of~~ the Technical Specification Task Force (TSTF)-449 format. Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed generic change by focusing on the three standards set forth in 10 CFR 50.92, Issuance of amendment,* as discussed below:

B. The staff identified several statements/phrases in the ANO-1 technical specifications and associated bases that were more conservative than that required by the TSTF. These items are acceptable because they are more conservative, however, the staff wants to ensure this was the licensee's intent. Confirm that the TS should remain as written, or propose changes to be consistent with the TSTF.

*1. The last sentence of proposed TS Section 5.5.9.b.2 of the ANO-1 TS states, "Leakage is not to exceed 1 gpm [gallon per minute]." The TSTF states, "Leakage is not to exceed 1 gpm **per SG.**" Identify which version you intend to implement and modify the proposed TS, if appropriate.*

Similarly, the 7th paragraph of the proposed Bases, Section B 3.4.16 "Steam Generator (SG) Tube Integrity", LCO, states, "The accident analysis assumes that accident induced leakage does not exceed 1 gpm." The TSTF adds "per SG" to the end of this sentence. Identify which version you intend to implement and modify the proposed TS Bases, if appropriate.

ANO Response: The fourth paragraph under Applicable Safety Analysis for TS Bases 3.4.13 states that "The safety analysis for the SLB [steam line break] accident assumes 1 gpm primary to secondary leakage in one steam generator as an initial condition". TS Bases 3.7.4.1 (secondary iodine activity limit) mentions SGTR, MSLB, and Loss of Load with 1 gpm primary to secondary tube leak as the source. The ANO-1 SAR also reflects this assumption for the Loss of Load event in Section 14.1.1.8.3. The total of 1 gpm primary to secondary leakage is consistent with ANO-1 licensing basis assumptions.

Therefore, Entergy believes that the proposed change in the original license amendment application is appropriate.

*2. Section 5.5.9.d of the TSTF contains the following sentence; "The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, **and that may satisfy the applicable tube repair criteria.**" Section 5.5.9.d of ANO-1 TS proposal does not contain the last part of that sentence (i.e., bolded words). Eliminating these words (as currently proposed) could imply that Entergy's tube inspections should be capable of detecting flaws of any size, not just those that may satisfy the applicable tube repair criteria. Identify which version you intend to implement and modify the proposed TS, if appropriate.*

ANO Response: Entergy agrees that the absence of the TSTF 449 wording could infer detection capability beyond the current SG tube examination technology. Entergy is proposing to add this phrase into TS 5.5.9.d consistent with TSTF 449, Revision 3. A revised mark-up of TS page 5.0-11 is provided in Attachment 2.

3. *Two ANO-1 proposed Bases pages contain EPRI Guideline references. Specific EPRI Report numbers are identified. Similar to TSTF-449, Revision 3, the staff suggests you consider eliminating the specific EPRI technical report numbers since these numbers change each time the report is revised. (The title of the report remains constant from revision to revision.) Modify the proposed TS Bases, as appropriate.*

ANO Response: The report number (TR-104788) will be removed from Reference 8 of TS Bases 3.4.13 to read "*EPRI Pressurized Water Reactor Primary-to-Secondary Leak Guidelines*" and the report number (TR-107569) will be removed from Reference 6 of TS Bases 3.4.16 to now read, "*EPRI Pressurized Water Reactor Steam Generator Examination Guidelines*". Revised mark-ups of TS Bases pages 3.4.13-6 and 3.4.16-6 are provided in Attachment 3.

Attachment 2

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Proposed Technical Specification Changes (mark-up)

1.1 Definition (continued)

$\bar{E}$-AVERAGE DISINTEGRATION ENERGY	$\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives > 15 minutes, making up at least 95% of the total noniodine activity in the coolant.
LEAKAGE	LEAKAGE shall be: a. Identified LEAKAGE 1. LEAKAGE, such as that from pump seals or valve packing (except RCP seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank; 2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE; or 3. Reactor Coolant System (RCS) LEAKAGE through a steam generator ~~(SG)~~ to the Secondary System (primary to secondary LEAKAGE); b. Unidentified LEAKAGE All LEAKAGE (except RCP seal water injection and leakoff) that is not identified LEAKAGE; c. Pressure Boundary LEAKAGE LEAKAGE (except primary to secondary~~SG~~ LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 Steam Generator (SG) Tube Integrity

LCO 3.4.16 SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube repair criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

---NOTE---
Separate Condition entry is allowed for each SG tube.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG tubes satisfying the tube repair criteria and not plugged in accordance with the Steam Generator Program.	A.1 Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection. AND A.2 Plug the affected tube(s) in accordance with the Steam Generator Program.	7 days Prior to entering MODE 4 following the next refueling outage or SG tube inspection
B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

b. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

1. Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 1 gpm.

3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG tube repair criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube repair criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. An assessment of degradation shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

Attachment 3

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Proposed Technical Specification Bases Changes (mark-up)

The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with EPRI Guidelines (Ref. 8). ~~This SR provides the means necessary to determine SG OPERABILITY in an operational MODE. The requirement to demonstrate SG tube integrity in accordance with the Steam Generator Tube Surveillance Program emphasizes the importance of SG tube integrity, even though this Surveillance cannot be performed at normal operating conditions.~~

REFERENCES

1. SAR, Section 1.4, GDC 30.

2. Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, May 1973.

3. Information Submittal - Comparison of ANO-1 RCS Leak Detection Systems to Regulatory Guide 1.45 (1CAN108607), dated October 14, 1986.

4. SAR, Chapter 14.

5. SAR, Section 4.2.3.8.

6. 10 CFR 50.36.

~~7. 10 CFR 100.~~

7. NEI 97-06, "Steam Generator Program Guidelines."

8. EPRI "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

APPLICABLE SAFETY ANALYSES

The steam generator tube rupture (SGTR) accident is the limiting design basis event for SG tubes and avoiding an SGTR is the basis for this Specification. The analysis of a SGTR event assumes a bounding primary to secondary LEAKAGE rate equal to the operational LEAKAGE rate limits in LCO 3.4.13, "RCS Operational LEAKAGE," plus the leakage rate associated with a double-ended rupture of a single tube. The accident analysis for a SGTR assumes the contaminated secondary fluid is only briefly released to the atmosphere via safety valves and the majority is discharged to the main condenser.

The analysis for design basis accidents and transients other than a SGTR assume the SG tubes retain their structural integrity (i.e., they are assumed not to rupture.) In these analyses, the steam discharge to the atmosphere is based on the total primary to secondary LEAKAGE from all SGs of 1 gallon per minute or is assumed to increase to 1 gallon per minute as a result of accident induced conditions. For accidents that do not involve fuel damage, the primary coolant activity level of DOSE EQUIVALENT I-131 is assumed to be equal to the LCO 3.4.16, "RCS Specific Activity," limits. For accidents that assume fuel damage, the primary coolant activity is a function of the amount of activity released from the damaged fuel. The dose consequences of these events are within the limits of GDC 19 (Ref. 2), 10 CFR 100 (Ref. 3) or the NRC approved licensing basis (e.g., a small fraction of these limits).

Steam generator tube integrity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires that SG tube integrity be maintained. The LCO also requires that all SG tubes that satisfy the repair criteria be plugged in accordance with the Steam Generator Program.

During an SG inspection, any inspected tube that satisfies the Steam Generator Program repair criteria is removed from service by plugging. If a tube was determined to satisfy the repair criteria but was not plugged the tube may still have tube integrity.

In the context of this Specification, a SG tube is defined as the entire length of the tube, including the tube wall, between the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet. The tube-to-tubesheet weld is not considered part of the tube.

A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 5.5.9, "Steam Generator Program," and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria.

LCO (continued)

There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. Failure to meet any one of these criteria is considered failure to meet the LCO.

The structural integrity performance criterion provides a margin of safety against tube burst or collapse under normal and accident conditions, and ensures structural integrity of the SG tubes under all anticipated transients included in the design specification. Tube burst is defined as, "The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation." Tube collapse is defined as, "For the load displacement curve for a given structure, collapse occurs at the top of the load versus displacement curve where the slope of the curve becomes zero." The structural integrity performance criterion provides guidance on assessing loads that significantly affect burst or collapse. In that context, the term "significantly" is defined as "An accident loading condition other than differential pressure is considered significant when the addition of such loads in the assessment of the structural integrity performance criterion could cause a lower structural limit or limiting burst/collapse condition to be established." For circumferential degradation, the classification of axial thermal loads as primary or secondary loads will be evaluated on a case-by-case basis. The division between primary and secondary classifications will be based on detailed analysis and/or testing.

Structural integrity requires that the primary membrane stress intensity in a tube not exceed the yield strength for all ASME Code, Section III, Service Level A (normal operating conditions) and Service Level B (upset or abnormal conditions) transients included in the design specification. This includes safety factors and applicable design basis loads based on ASME Code, Section III, Subsection NB (Ref. 4) and Draft Regulatory Guide 1.121 (Ref. 5).

The accident induced leakage performance criterion ensures that the primary to secondary LEAKAGE caused by a design basis accident, other than a SGTR, is within the accident analysis assumptions. The accident analysis assumes that accident induced leakage does not exceed 1 gpm. The accident induced leakage rate includes any primary to secondary LEAKAGE existing prior to the accident in addition to primary to secondary LEAKAGE induced during the accident.

The operational LEAKAGE performance criterion provides an observable indication of SG tube conditions during plant operation. The limit on operational LEAKAGE is contained in LCO 3.4.13, "RCS Operational LEAKAGE," and limits primary to secondary LEAKAGE through any one SG to 150 gallons per day. This limit is based on the assumption that a single crack leaking this amount would not propagate to a SGTR under the stress conditions of a LOCA or a main steam line break. If this amount of LEAKAGE is due to more than one crack, the cracks are very small, and the above assumption is conservative.

APPLICABILITY

Steam generator tube integrity is challenged when the pressure differential across the tubes is large. Large differential pressures across SG tubes can only be experienced in MODE 1, 2, 3, or 4.

RCS conditions are far less challenging in MODES 5 and 6 than during MODES 1, 2, 3, and 4. In MODES 5 and 6, primary to secondary differential pressure is low, resulting in lower stresses and reduced potential for LEAKAGE.

ACTIONS

The ACTIONS are modified by a Note clarifying that the Conditions may be entered independently for each SG tube. This is acceptable because the Required Actions provide appropriate compensatory actions for each affected SG tube. Complying with the Required Actions may allow for continued operation, and subsequent affected SG tubes are governed by subsequent Condition entry and application of associated Required Actions.

A.1 and A.2

Condition A applies if it is discovered that one or more SG tubes examined in an inservice inspection satisfy the tube repair criteria but were not plugged in accordance with the Steam Generator Program as required by SR 3.4.16.2. An evaluation of SG tube integrity of the affected tube(s) must be made. Steam generator tube integrity is based on meeting the SG performance criteria described in the Steam Generator Program. The SG repair criteria define limits on SG tube degradation that allow for flaw growth between inspections while still providing assurance that the SG performance criteria will continue to be met. In order to determine if a SG tube that should have been plugged has tube integrity, an evaluation must be completed that demonstrates that the SG performance criteria will continue to be met until the next refueling outage or SG tube inspection. The tube integrity determination is based on the estimated condition of the tube at the time the situation is discovered and the estimated growth of the degradation prior to the next refueling outage or SG tube inspection. If it is determined that tube integrity is not being maintained, Condition B applies.

A Completion Time of 7 days is sufficient to complete the evaluation while minimizing the risk of plant operation with a SG tube that may not have tube integrity.

If the evaluation determines that the affected tube(s) have tube integrity, Required Action A.2 allows plant operation to continue until the next refueling outage or SG inspection provided the inspection interval continues to be supported by an operational assessment that reflects the affected tubes. However, the affected tube(s) must be plugged prior to entering MODE 4 following the next refueling outage or SG inspection. This Completion Time is acceptable since operation until the next inspection is supported by the operational assessment.

flaw size measurement and for future flaw growth. In addition, the tube repair criteria, in conjunction with other elements of the Steam Generator Program, ensure that the SG performance criteria will continue to be met until the next inspection of the subject tube(s). Reference 1 provides guidance for performing operational assessments to verify that the tubes remaining in service will continue to meet the SG performance criteria.

The Frequency of prior to entering MODE 4 following a SG inspection ensures that the Surveillance has been completed and all tubes meeting the repair criteria are plugged prior to subjecting the SG tubes to significant primary to secondary pressure differential.

REFERENCES

1. NEI 97-06, "Steam Generator Program Guidelines."

2. 10 CFR 50 Appendix A, GDC 19.

3. 10 CFR 100.

4. ASME Boiler and Pressure Vessel Code, Section III, Subsection NB.

5. Draft Regulatory Guide 1.121, "Basis for Plugging Degraded Steam Generator Tubes," August 1976.

6. EPRI "Pressurized Water Reactor Steam Generator Examination Guidelines."