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NL-13-145

April 1, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Rockville, MD 20852

SUBJECT: Proposed License Amendment to Adopt TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection"
Indian Point Unit Nuclear Generating Unit Nos. 2 and 3
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Nuclear Operations, Inc., (Entergy) hereby requests a License Amendment to Operating License DPR-26, Docket No. 50-247, Indian Point Nuclear Generating Unit No. 2 (IP2) and to Operating License DPR-64, Docket No. 50-286, Indian Point Nuclear Generating Unit No. 3 (IP3). The proposed Technical Specification (TS) change proposes to implement revisions consistent with NRC approved Technical Specification Task Force (TSTF) Technical Change Traveler 510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection." This traveler revised the Improved Standard Technical Specifications for editorial corrections, changes, and clarifications intended to improve internal consistency, consistency with implementing industry documents, and usability without changing the intent of the requirements.

Entergy has evaluated the proposed changes in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and has determined that the changes involve no significant hazards considerations, as described in Attachment 1. The marked up pages showing the proposed Technical Specification changes are provided in Attachment 2. The proposed changes for the associated Bases changes are provided in Attachment 3. A copy of this application and the associated attachments are being submitted to the designated New York State official in accordance with 10 CFR 50.91.

Entergy requests approval of the proposed amendment by April 1, 2015 and an allowance of 30 days for implementation. There are no new commitments being made in this submittal. If you

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have any questions or require additional information, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 1, 2014.

Sincerely,

A handwritten signature in black ink that reads "D. Maye, Jr." with a stylized flourish at the end.

JAV/ai

- Attachments:
1. Analysis of proposed Technical Specifications changes for TSTF-510, Revision 2
 2. Marked Up Technical Specifications Pages for Proposed Changes for TSTF-510, Revision 2
 3. Marked Up Technical Specifications Bases Pages for Proposed Changes for TSTF-510, Revision 2

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL
Mr. William Dean, Regional Administrator, NRC Region 1
NRC Resident Inspector's Office
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA
Ms. Bridget Frymire, New York State Dept. of Public Service

ATTACHMENT 1 TO NL-13-145

**ANALYSIS OF PROPOSED TECHNICAL SPECIFICATIONS CHANGES
FOR TSTF-510, REVISION 2**

**ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT Nos. 2 AND 3
DOCKET Nos. 50-247 & 50-286**

1.0 DESCRIPTION

Entergy Nuclear Operations, Inc (Entergy) is requesting an amendment to Operating License DPR-26, Docket No. 50-247, Indian Point Nuclear Generating Unit No. 2 (IP2) and to Operating License DPR-64, Docket No. 50-286, Indian Point Nuclear Generating Unit No. 3 (IP3). The proposed changes are needed to address implementation issues with respect to TSTF-449 Revision 4 (Reference 1). TSTF-449 was implemented as Amendment 251 at IP2 and Amendment 233 at IP3. The TSTF-510 changes are associated with the inspection periods, and address other administrative changes and clarifications, without changing the intent of the existing requirements. The SGs at IP2 are equipped with alloy 600 thermally treated tubing and the SGs at IP3 are equipped with alloy 690 thermally treated tubing; therefore, the TSTF-510 material specific requirements for both material types are reflected in the proposed changes.

The changes are consistent with NRC approved Technical Specification Task Force (TSTF) 510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection" (Reference 2). The availability of this TS improvement was announced in the Federal Register on October 27, 2011 (76 FR 66763) as part of the Consolidated Line Item Improvement Process (CLIP).

The specific proposed TS changes are listed in the following section.

2.0 PROPOSED CHANGES

This amendment request proposes to revise:

IP2 Technical Specifications (TS):

- TS 3.4.17 "Steam Generator (SG) Tube Integrity",
- TS 5.5.7 "Steam Generator (SG) Program", and
- TS 5.6.7 "Steam Generator Tube Inspection Report"

IP3 Technical Specifications (TS):

- TS 3.4.17 "Steam Generator (SG) Tube Integrity",
- TS 5.5.8 "Steam Generator (SG) Program", and
- TS 5.6.8 "Steam Generator Tube Inspection Report"

The current references to "tube repair criteria" in IP2/IP3 LCO 3.4.17, Condition A and SR 3.4.17.2 are being revised to "tube plugging criteria" consistent with the TSTF-510 Revision 2 change. Change from:

LCO 3.4.17 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.

CONDITION A

- A. One or more SG tubes satisfying the tube repair criteria and not plugged in accordance with the Steam Generator Program.

SURVEILLANCE

- SR 3.4.17.2 Verify that each inspected SG tube that satisfies the tube repair criteria is plugged in accordance with the Steam Generator Program.

To:

- LCO 3.4.17 SG tube integrity shall be maintained.

AND

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

CONDITION A

- A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program.

SURVEILLANCE

- SR 3.4.17.2 Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program.

The introductory paragraph in IP2 TS 5.5.7 and IP3 TS 5.5.8 "Steam Generator (SG) Program" has a duplicative word "provisions" at the end of the first paragraph as noted in TSTF-510 Revision 2:

Change from:

"A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions:"

To:

"A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:"

IP2 TS 5.5.7.b.1 and IP3 TS 5.5.8.b.1 has misplaced closing parenthesis as noted in TSTF-510 Revision 2:

Change from:

“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.”

To:

“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), all anticipated transients included in the design specification and design basis accidents.”

IP2 TS 5.5.7.c and IP3 TS 5.5.8.c are to be revised, consistent with TSTF-510 Revision 2, to change “tube repair criteria” to “tube plugging criteria.”

Change IP2 TS 5.5.7.c/ IP3 TS 5.5.8.c from:

- 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.

To:

- c. Provisions for SG tube plugging 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.

IP2 TS 5.5.7.d and IP3 TS 5.5.8.d are being revised, consistent with TSTF-510 Revision 2, to replace “repair criteria” with “plugging criteria” and “An assessment of degradation” with “A degradation assessment.”

Change IP2 TS 5.5.7.d/ IP3 TS 5.5.8.d from:

- 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.

To:

- 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 plugging 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. A degradation assessment 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.

IP2 TS 5.5.7.d.1 and IP3 TS 5.5.8.d.1 are to be revised, consistent with TSTF-510 Revision 2, to replace "replacement" with "installation."

Change IP2 TS 5.5.7.d.1/ IP3 TS 5.5.8.d.1 from:

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG replacement.

To:

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

Consistent with TSTF-510 Revision 2, IP2 TS 5.5.7.d.2 is replaced with content applicable to SGs with Alloy 600 thermally treated tubing and IP3 TS 5.5.8.d.2 is replaced with content applicable to SGs with Alloy 690 thermally treated tubing. The TSTF-510 content is modified slightly consistent with the administrative error noted in Technical Specifications Task Force letter dated March 28, 2012 (Reference 3). The correction in this letter notes that the phrase "tube repair criteria" should have read "tube plugging criteria" consistent with other changes to specification 5.5.7.d of TSTF-510. The corrected phrase is modified to "tube plugging criteria" to reflect that IP2/IP3 do not have an approved SG tube repair method.

Replace IP2 TS 5.5.7.d.2 with:

2. After the first refueling outage following SG installation, inspect each SG at least every 48 effective full power months or at least every other refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, and c below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the

SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

- a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 120 effective full power months. This constitutes the first inspection period;
- b) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period; and
- c) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the third and subsequent inspection periods.

Replace IP3 TS 5.5.8.d.2 with:

After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every third refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

- a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;

- b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;
- c) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and
- d) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.

Consistent with TSTF-510 Revision 2, IP2 TS 5.5.7.d.3 and IP3 TS 5.5.8.d.3 are revised to clarify the term "each SG" and to make an editorial change to the parenthetical statement.

Change IP2 TS 5.5.7.d.3 and IP3 TS 5.5.8.d.3 from:

- 3. If crack indications are found in any SG tube, then the next inspection for each SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever is less). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

To:

- 3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

Correct a typo in IP2 TS 5.5.7.e to change "operations" to "operational"

Change IP2 TS 5.5.7.e from:

- e. Provisions for monitoring operations primary to secondary LEAKAGE.

To:

- e. Provisions for monitoring operational primary to secondary LEAKAGE.

Consistent with TSTF-510 Revision 2, the word "active" is removed from IP2 TS 5.6.7.b and e and IP3 TS 5.6.8.b and e. Further IP2 TS 5.6.7.f and IP3 TS 5.6.8.f are being combined with 5.6.7.h/5.6.8.h to require reporting the effective plugging percentage.

Change IP2 TS 5.6.7 from:

5.6.7 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.7, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Active degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,
- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
- f. Total number and percentage of tubes plugged to date,
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing, and
- h. The effective plugging percentage for all plugging in each SG.

To:

5.6.7 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.7, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,
- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each degradation mechanism,

- f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG, and
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

Change IP3 TS 5.6.8 from:

5.6.8 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.8, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Active degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,
- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
- f. Total number and percentage of tubes plugged to date,
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing, and
- h. The effective plugging percentage for all plugging in each SG.

To:

5.6.8 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.8, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,

- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each degradation mechanism,
- f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG, and
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

3.0 ASSESSMENT

3.1 Applicability of TSTF-510 Revision 2 and Published Safety Evaluation

Entergy has reviewed TSTF-510, and the model safety evaluation (Reference 4) as part of the Federal Register Notice of Availability dated October 27, 2011 (76 FR 66763). The purpose of this model is to provide a common template for licensees to use in order to permit the NRC to efficiently process amendments that propose to revise TS for SG tube integrity. Entergy has concluded that the justifications presented in TSTF-510 and the model safety evaluation prepared by the NRC staff are applicable to IP2 and IP3 for those changes consistent with TSTF-510.

3.2 Optional Changes and Variations

Entergy is not proposing any variations or deviations from the TS changes described in TSTF-510 Revision 2, or the NRC staff's model safety evaluation (Reference 4) as part of the CLIP Notice of Availability. The following Standard Technical Specification numbers of TSTF-510 are different from the IP2/IP3 TS numbers, and the correspondence is provided below.

- TSTF-510 TS 5.5.9 corresponds to IP2 TS 5.5.7 and IP3 TS 5.5.8
- TSTF-510 TS 5.6.7 corresponds to IP3 TS 5.6.8

In addition, while not part of TSTF-510, a typo is being corrected in IP2 TS 5.5.7.e to change "operations" to "operational".

4.0 REGULATORY ANALYSIS

4.1 No Significant Hazards Consideration

This request proposes to revise IP2/IP3 TS Sections 3.4.17 "Steam Generator (SG) Tube Integrity", IP2 TS 5.5.7/IP3 TS 5.5.8 "Steam Generator (SG) Program", and IP2 TS 5.6.7/IP3 TS 5.6.8 "Steam Generator Tube Inspection Report" to address issues associated with the inspection periods, and address other administrative changes and clarifications consistent with TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection" (Reference 2).

Entergy Nuclear Operations, Inc. (Entergy) has evaluated the safety significance of the proposed changes to the Indian Point 2 and Indian Point 3 Technical Specifications according to the criteria

of 10 CFR 50.92, "Issuance of Amendment". Entergy has determined that the subject changes do not involve a Significant Hazards Consideration, as discussed below

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change revises the Steam Generator (SG) Program to modify the frequency of verification of SG tube integrity and SG tube sample selection. A steam generator tube rupture (SGTR) event is one of the design basis accidents that are analyzed as part of a plant's licensing basis. The proposed SG tube inspection frequency and sample selection criteria will continue to ensure that the SG tubes are inspected such that the probability of a SGTR is not increased. The consequences of a SGTR are bounded by the conservative assumptions in the design basis accident analysis. The proposed change will not cause the consequences of a SGTR to exceed those assumptions. The proposed change to reporting requirements and clarifications of the existing requirements have no effect on the probability or consequences of a SGTR. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes to the SG Program will not introduce any adverse changes to the plant design basis or postulated accidents resulting from potential tube degradation. The proposed changes do not affect the design of the SGs or their method of operation. In addition, the proposed changes do not impact any other plant system or component. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The SG tubes in pressurized water reactors are an integral part of the reactor coolant pressure boundary and, as such, are relied upon to maintain the primary system's pressure and inventory. As part of the reactor coolant pressure boundary, the SG tubes are unique in that they are also relied upon as a heat transfer surface between the primary and secondary systems such that residual heat can be removed from the primary system. In addition, the SG tubes also isolate the radioactive fission products in the primary coolant from the secondary system. In summary, the safety function of a SG is maintained by ensuring the integrity of its tubes.

Steam generator tube integrity is a function of the design, environment, and the physical condition of the tube. The proposed change does not affect tube design or operating environment. The proposed change will continue to require monitoring of the physical condition of the SG tubes such that there will not be a reduction in the margin of safety compared to the current requirements.

Changes associated with inspection frequency and tube selection criteria are consistent with TSTF-510 Revision 2 and are based on recent industry experience and are more effective in managing the frequency of verification of tube integrity and sample selection than those required by current TSs. Therefore, the proposed change does not involve a significant reduction in any margin of safety.

4.2 Applicable Regulatory Requirements/Criteria

The Traveler and model Safety Evaluation for TSTF-510 discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). The General Design Criteria which formed the bases for Indian Point 2 and 3 designs were published by the Atomic Energy Commission (AEC) in the Federal Register of July 11, 1967 and subsequently made part of 10 CFR 50. The application of the AEC proposed GDC to IP2 and IP3 is contained in the UFSARs. Appendix A of 10 CFR Part 50 GDC differ both in numbering and content from the AEC for IP2/IP3. However, the following information demonstrates how the intent of GDC 14, 15, 30, 31 and 32 of 10 CFR 50, Appendix A are met for IP2/IP3.

1967 GDC-9 Reactor Coolant Pressure Boundary - The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime.

1967 GDC-16 Monitoring Reactor Coolant Leakage - Means shall be provided to detect significant uncontrolled leakage from the reactor coolant pressure boundary.

1967 GDC-33 Reactor Coolant Pressure Boundary Capability -The RCPB shall be capable of accommodating without rupture the static and dynamic load imposed on any boundary component as a result of an inadvertent and sudden release of energy to the coolant. As a design reference, this sudden release shall be taken as that which would result from a sudden reactivity insertion such as rod ejection (unless prevented by positive mechanical means), rod dropout, or cold water addition.

1967 GDC-34 Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention -The reactor coolant pressure boundary shall be designed and operated to reduce to an acceptable level the probability of rapidly propagating type failure. Consideration is given (a) to the provisions for control over service temperature and irradiation effects, which may require operational restrictions, (b) to the design and construction of the reactor pressure vessel in accordance with applicable codes, including those, which establish requirements for absorption of energy within the elastic strain energy range and for absorption of energy by plastic deformation and (c) to the design and construction of reactor coolant pressure boundary piping and equipment in accordance with applicable codes.

1967 GDC-36 RCPB Surveillance - RCPB components shall have provisions for inspection, testing, and surveillance of criteria areas by appropriate means to assess the structural and leaktight integrity of the boundary components during their service lifetime.

The TS plugging limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions. The reactor coolant pressure boundary is designed, fabricated and constructed so as to have an exceedingly low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime. Reactor coolant pressure boundary components have provisions for the

inspection, testing, and surveillance of critical areas by appropriate means to assess the structural and leaktight integrity of the boundary components during their service lifetime. Structural integrity refers to maintaining adequate margins against burst and collapse of the SG tubing. Leakage integrity refers to limiting primary-to-secondary leakage to within acceptable limits during all plant conditions.

10 CFR 50, Appendix B, establishes quality assurance requirements for the design, construction, and operation of safety related components. The pertinent requirements of this appendix apply to all activities affecting the safety related functions of these components. These requirements are described in Criteria IX, XI, and XVI of Appendix B and include control of special processes, inspection, testing, and corrective action.

Under 10 CFR 50.65, the Maintenance Rule, licensees classify SGs as risk significant components because they are relied upon to remain functional during and after design basis events. SGs are to be monitored under 10 CFR 50.65(a)(2) against industry established performance criteria. Meeting the performance criteria of NEI 97-06, Revision 3 (Reference 5), provides reasonable assurance that the SG tubing remains capable of fulfilling its specific safety function of maintaining the reactor coolant pressure boundary.

5.0 ENVIRONMENTAL CONSIDERATIONS

Entergy has evaluated the proposed amendment for environmental considerations. The review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, and would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c) (9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

6.0 PRECEDENCE

The proposed changes consistent with TSTF-510 Revision 2, are similar to the following license amendment requests approved by the NRC staff as noted:

- Wolf Creek Generating Station - Issuance of Amendment Re: Adoption of TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection," using the Consolidated Line Item Improvement Process (TAC No. ME8569), dated November 19, 2012
- Donald C. Cook Nuclear Plant, Units 1 and 2 -Issuance of Amendments Re: Adoption of TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection," using the Consolidated Line Item Improvement Process (TAC Nos. ME9560 and ME9561), March 22, 2013
- Surry Power Station, Unit No.1 and 2 Issuance of Amendments to Adopt Technical

Specification Task Force (TSTF) 510, Revision 2, Revision To Steam Generator Program Inspection Frequencies and Tube Sample Selection (TAC No. ME9199 and ME9200) January 28, 2013

7.0 REFERENCES

1. Technical Specification Task Force (TSTF) Letter to NRC, TSTF-05-05, TSTF-449, Revision 4, "Steam Generator Tube Integrity", April 14, 2005 (ADAMS Accession No. ML051090200)
2. Technical Specification Task Force (TSTF) Letter to NRC, TSTF-11-02, Correction to TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection" March 1, 2011 (ADAMS Accession No. ML 110610350)
3. Technical Specification Task Force (TSTF) Letter to NRC, TSTF-12-09, Correction to TSTF-510-A, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection" March 28, 2012 (ADAMS Accession No. ML12088A82)
4. Model Safety Evaluation for Plant-Specific Adoption of Technical Specifications Task Force Traveler TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection", using the Consolidated Line Item Improvement Process, October 27, 2011 (ADAMS Accession No. ML112101513)
5. NEI 97-06 "Steam Generator - Program Guidelines" Revision 3, January 2011 (ADAMS Accession No. ML 111310708)

ATTACHMENT 2 TO NL-13-145

MARKED UP TECHNICAL SPECIFICATIONS PAGES FOR PROPOSED
CHANGES FOR TSTF-510, REVISION 2

Changes indicated by ***Bold/Italics*** for additions and ~~strikeout~~ for deletions

AFFECTED PAGES (IP2)

3.4.17-1 & 2
5.5-6, 7, & 8
5.6-4 & 5

AFFECTED PAGES (IP3)

3.4.17-1 & 2
5.0-13, 14, 15 & 16
5.0-36

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained.

AND

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

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

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG tubes satisfying the tube repair plugging 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.	7 days
	<u>AND</u> A.2 Plug the affected tube(s) in accordance with the Steam Generator Program.	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. <u>OR</u> SG tube integrity not maintained.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program
SR 3.4.17.2	Verify that each inspected SG tube that satisfies the tube repair plugging criteria is plugged in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection

5.5 Programs and Manuals

5.5.6 Inservice Testing Program (continued)

- b. The provisions of SR 3.0.2 are applicable to the above required Frequencies for performing inservice testing activities,
- c. The provisions of SR 3.0.3 are applicable to inservice testing activities, and
- d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirements of any TS.

5.5.7 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions:

- a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.
- 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

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Program (continued)

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 150 gpd per SG.
 3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."
- c. Provisions for SG tube repair **plugging** 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 **plugging** 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 **assessment** 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.
1. Inspect 100% of the tubes in each SG during the first refueling outage following SG replacement **installation**.
 2. ~~Inspect 100% of the tubes at sequential periods of 120, 90, and, thereafter, 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. In addition, inspect 50% of the tubes by the refueling outage~~

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Program (continued)

~~nearest the midpoint of the period and the remaining 50% by the refueling outage nearest the end of the period. No SG shall operate for more than 48 effective full power months or two refueling outages (whichever is less) without being inspected.~~

After the first refueling outage following SG installation, inspect each SG at least every 48 effective full power months or at least every other refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, and c below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

- a) ***After the first refueling outage following SG installation, inspect 100% of the tubes during the next 120 effective full power months. This constitutes the first inspection period;***
- b) ***During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period; and***
- c) ***During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the third and subsequent inspection periods.***

5.6 Programs and Manuals

5.5.7 Steam Generator (SG) Program (continued)

3. If crack indications are found in any SG tube, then the next inspection for each ***affected and potentially affected*** SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever is ~~less~~ ***results in more frequent inspections***). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.
- e. Provisions for monitoring ~~operations~~ ***operational*** primary to secondary LEAKAGE

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

8. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report", April 1995;
 9. WCAP-10079-P-A, "NOTRUMP, A Nodal Transient Small Break and General Network Code", August 1985;
 10. WCAP-10054-P-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code", August 1985; and
 11. WCAP-10054-P-A, Addendum 2, Revision 1, "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection Into the Broken Loop and Cosi Condensation Model", July 1997.
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided to the NRC upon issuance for each reload cycle.

5.6.6 Post Accident Monitoring Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following

14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.7 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.7, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Active ~~d~~Degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,

5.6 Reporting Requirements

5.6.7 Steam Generator Tube Inspection Report (continued)

- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
 - e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
 - f. ~~Total~~ **The** number and percentage of tubes plugged to date, and **the effective plugging percentage in each SG and**
 - g. The results of condition monitoring, including the results of tube pulls and in-situ testing, ~~and~~
 - h. ~~The effective plugging percentage for all plugging in each SG.~~
-

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained.

AND

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

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

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG tubes satisfying the tube repair plugging 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.	7 days
	<u>AND</u> A.2 Plug the affected tube(s) in accordance with the Steam Generator Program.	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. <u>OR</u> SG tube integrity not maintained.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.1 Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program
SR 3.4.17.2 Verify that each inspected SG tube that satisfies the tube repair plugging criteria is plugged in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection

5.5 Programs and Manuals

5.5.8 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions:

- a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.
- 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 inservice 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

(continued)

5.5 Programs and Manuals

5.5.8 Steam Generator (SG) Program (continued)

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 0.3 gpm per SG and 1 gpm through all SGs.

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

c. Provisions for SG tube ~~repair~~**plugging** 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~~**plugging** 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~~ **assessment** 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.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG ~~replacement~~ **installation**.

~~2. Inspect 100% of the tubes at sequential periods of 144, 108, 72, and, thereafter, 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. In addition, inspect 50% of the tubes by the refueling outage nearest the midpoint of the period and the remaining 50% by the refueling outage nearest the end of the period. No~~

5.5 Programs and Manuals

~~SG shall operate for more than 72 effective full power months or three refueling outages (whichever is less) without being inspected.~~

After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every third refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

- a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;*
- b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;*

5.5 Programs and Manuals

- c) *During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and*
- d) *During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.*

(continued)

The additional wording on the previous page will result in spillover to page 5.0-16

5.5 Programs and Manuals

5.5.8 Steam Generator (SG) Program (continued)

3. If crack indications are found in any SG tube, then the next inspection for each **affected and potentially affected** SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever ~~is less~~ **results in more frequent inspections**). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.
- e. Provisions for monitoring operational primary to secondary LEAKAGE.

-----NOTE-----
Pages 5.0-167 through 5.0-19 are deleted.
Next page is 5.0-20.

(continued)

5.6 Reporting Requirements

5.6.7 Post Accident Monitoring Instrumentation (PAM) Report

When a report is required by LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the next 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.8 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.8, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
 - b. ~~Active~~ Degradation mechanisms found,
 - c. Nondestructive examination techniques utilized for each degradation mechanism,
 - d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
 - e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
 - f. ~~Total~~ **The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG, and**
 - g. The results of condition monitoring, including the results of tube pulls and in-situ testing. ~~and~~
 - ~~h. The effective plugging percentage for all plugging in each SG.~~
-

ATTACHMENT 3 TO NL-13-145

MARKED UP TECHNICAL SPECIFICATIONS BASES PAGES
FOR PROPOSED CHANGES FOR TSTF-510, REVISION 2

Changes indicated by ***Bold/Italics*** for additions and ~~strikeout~~ for deletions

AFFECTED PAGES (IP2)

B3.4.17-2
B3.4.17-4, 5, 6, & 7

AFFECTED PAGES (IP3)

B3.4.17-2
B3.4.17-5
B3.4.17-7 & 8

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT Nos. 2 AND 3
DOCKET Nos. 50-247 & 50-286

BASES

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 released to the atmosphere via SG safety valves or atmospheric relief valves.

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 600 gallons per day or is assumed to increase to 600 gallons per day 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 applicable limits of 10 CFR 50.67 (Ref. 2) and Regulatory Guide 1.183 (Ref. 3).

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~~**plugging** criteria be plugged in accordance with the Steam Generator Program.

During an SG inspection, any inspected tube that satisfies the Steam Generator Program ~~repair~~**plugging** criteria is removed from service by plugging. If a tube was determined to satisfy the ~~repair~~**plugging** 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 as 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.

BASES

LCO (continued)

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 150 gallons per day per SG. 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~~**plugging** criteria but were not plugged in accordance with the Steam Generator Program as required by SR 3.4.17.2.

BASES

ACTIONS (continued)

A.1 and A.2 (continued)

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~~**plugging** 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 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.

B.1 and B.2

If the Required Actions and associated Completion Times of Condition A are not met or if SG tube integrity is not being maintained, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the desired plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.17.1

During shutdown periods the SGs are inspected as required by this SR and the Steam Generator Program. NEI 97-06, Steam Generator Program Guidelines (Ref. 1), and its referenced EPRI Guidelines, establish the content of the Steam Generator Program. Use of the Steam Generator Program ensures that the inspection is appropriate and consistent with accepted industry practices.

During SG inspections a condition monitoring assessment of the SG tubes is performed. The condition monitoring assessment determines the "as found" condition of the SG tubes. The purpose of the condition monitoring assessment is to ensure that the SG performance criteria have been met for the previous operating period.

The Steam Generator Program determines the scope of the inspection and the methods used to determine whether the tubes contain flaws satisfying the tube ~~repair~~**plugging** criteria. Inspection scope (i.e., which tubes or areas of tubing within the SG are to be inspected) is a function of existing and potential degradation locations. The Steam Generator Program also specifies the inspection methods to be used to find potential degradation. Inspection methods are a function of degradation morphology, non-destructive examination (NDE) technique capabilities, and inspection locations.

The Steam Generator Program defines the Frequency of SR 3.4.17.1. The Frequency is determined by the operational assessment and other limits in the SG examination guidelines (Ref. 6). The Steam Generator Program uses information on existing degradations and growth rates to determine an inspection Frequency that provides reasonable assurance that the tubing will meet the SG performance criteria at the next scheduled inspection. In addition, Specification 5.5.7 contains prescriptive requirements concerning inspection intervals to provide added assurance that the SG performance criteria will be met between scheduled inspections. ***If crack indications are found in any SG tube, the maximum inspection interval for all affected and potentially affected SGs is restricted by Specification 5.5.7 until subsequent inspections support extending the inspection interval.***

SR 3.4.17.2

During an SG inspection, any inspected tube that satisfies the Steam Generator Program ~~repair~~**plugging** criteria is removed from service by plugging. The tube ~~repair~~**plugging** criteria delineated in Specification 5.5.7 are intended to ensure that tubes accepted for continued service satisfy the SG performance criteria with allowance for error in the flaw size measurement and for future flaw growth. In addition, the tube ~~repair~~**plugging** criteria, in conjunction with other

BASES
SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.17.2 (continued)

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~~**plugging** 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 50.67. |
| | 3. | Regulatory Guide 1.183, "Alternate Radiological Source Terms for Evaluating Design Basis Accidents in Nuclear Power Reactors", July 2000. |
| | 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." |
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BASES

BACKGROUND (continued)

Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions.

The processes used to meet the SG performance criteria are defined by the Steam Generator Program Guidelines (Ref. 1).

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 released to the atmosphere via SG safety valves or atmospheric relief valves.

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 applicable limits of 10 CFR 50.67 (Ref. 2) and Regulatory Guide 1.183 (Ref. 3).

BASES

BACKGROUND (continued)

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~~ **plugging** criteria be plugged in accordance with the Steam Generator Program.

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

BASES

APPLICABILITY (continued)

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~~ **plugging** criteria but were not plugged in accordance with the Steam Generator Program as required by SR 3.4.17.2. 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~~ **plugging** 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 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.17.1 (continued)

The Steam Generator Program determines the scope of the inspection and the methods used to determine whether the tubes contain flaws satisfying the tube ~~repair~~ **plugging** criteria. Inspection scope (i.e., which tubes or areas of tubing within the SG are to be inspected) is a function of existing and potential degradation locations. The Steam Generator Program also specifies the inspection methods to be used to find potential degradation. Inspection methods are a function of degradation morphology, non-destructive examination (NDE) technique capabilities, and inspection locations.

The Steam Generator Program defines the Frequency of SR 3.4.17.1. The Frequency is determined by the operational assessment and other limits in the SG examination guidelines (Ref. 6). The Steam Generator Program uses information on existing degradations and growth rates to determine an inspection Frequency that provides reasonable assurance that the tubing will meet the SG performance criteria at the next scheduled inspection. In addition, Specification 5.5.8 contains prescriptive requirements concerning inspection intervals to provide added assurance that the SG performance criteria will be met between scheduled inspections. *If crack indications are found in any SG tube, the maximum inspection interval for all affected and potentially affected SGs is restricted by Specification 5.5.8 until subsequent inspections support extending the inspection interval.*

SR 3.4.17.2

During an SG inspection, any inspected tube that satisfies the Steam Generator Program ~~repair~~ **plugging** criteria is removed from service by plugging. The tube ~~repair~~ **plugging** criteria delineated in Specification 5.5.8 are intended to ensure that tubes accepted for continued service satisfy the SG performance criteria with allowance for error in the flaw size measurement and for future flaw growth. In addition, the tube ~~repair~~ **plugging** 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.17.2 (continued)

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~~**plugging** 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. 67.
 3. Regulatory Guide 1.183, "Alternate Radiological Source Terms for Evaluating Design Basis Accidents in Nuclear Power Reactors", July 2000.
 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."
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