



Entergy Nuclear South
Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-3093
Tel 504-739-6485
jridgel@entergy.com

Jerry A. Ridgel
Acting Nuclear Safety Assurance
Director
Waterford 3

W3F1-2006-0035

July 12, 2006

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

SUBJECT: Supplement 3 to Amendment Request NPF-38-260
Tubesheet Inspection Depth for Steam Generator Tube Inspections
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

- REFERENCES:
1. Entergy letter dated March 15, 2005, *License Amendment Request NPF-38-260 Proposed Technical Specification Change Regarding Tubesheet Inspection Depth for Steam Generator Tube Inspections* (W3F1-2005-0009)
 2. Entergy letter dated March 22, 2006, *Supplement to Amendment Request NPF-38-260 Tubesheet Inspection Depth for Steam Generator Tube Inspections* (W3F1-2006-0008)
 3. Entergy letter dated June 2, 2006, *Supplement 2 to Amendment Request NPF-38-260 Tubesheet Inspection Depth for Steam Generator Tube Inspections* (W3F1-2006-0030)

Dear Sir or Madam:

By letter dated March 15, 2005 (Reference 1), Entergy Operations, Inc. (Entergy) proposed a change to Waterford Steam Electric Station, Unit 3 (Waterford-3) Technical Specifications (TSs) Section 4.4.4.4 to modify the steam generator tube inspection Acceptance Criteria for the "Plugging or Repair Limit" and the "Tube Inspection," as contained in the Waterford-3 Surveillance Requirements 4.4.4.4.a.7 and 4.4.4.4.a.9, respectively. The purpose of these changes is to define the depth of the required tube inspections and to clarify the plugging criteria within the tubesheet region.

On November 17, 2005, Entergy received an NRC Staff Request for Additional Information (RAI) on the proposed amendment request. The RAI response was provided on March 22, 2006 in Reference 2.

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On May 9, 2006, Entergy received a second NRC Staff RAI dated May 3, 2006 to support the review of the proposed C* TS change. The RAI response was provided on June 2, 2006 in Reference 3.

On June 27, 2006, NRC Staff personnel communicated with Entergy representatives regarding corrections to the Waterford-3 TSs identified in the June 2, 2006 submittal (Reference 3). As a result of the communications, Entergy agreed to provide a follow-up letter with the appropriate corrections.

Attachment 1 contains Entergy's response to the NRC Staff's RAI. Attachment 2 contains the replacement pages for the proposed TS changes provided in Attachment 2 of Reference 3. TS pages 6-7b and 6-7c have been revised to reflect Entergy's response to the RAI questions. The TS changes are identified by the revision bar in the right hand margin.

The conclusions of the original no significant hazards consideration included in Reference 1 are not affected by any information contained in this supplemental letter. There are no new commitments contained in this letter.

If you have any questions or require additional information, please contact Ron Williams at (504) 739-6255.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 12, 2006.

Sincerely,



JAR/RLW/cbh

Attachments:

1. Response to Request for Additional Information
2. Replacement Pages for Revised TS Changes

cc: (w/Attachments)

Dr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Waterford Steam Electric Station Unit 3
P.O. Box 822
Killona, LA 70066-0751

U.S. Nuclear Regulatory Commission
Attn: Mr. Mel B. Fields MS O-7E1
Washington, DC 20555-0001

(w/o Attachment 2)

Wise, Carter, Child & Caraway
ATTN: J. Smith
P.O. Box 651
Jackson, MS 39205

Winston & Strawn
ATTN: N.S. Reynolds
1700 K Street, NW
Washington, DC 20006-3817

Morgan, Lewis & Bockius LLP
ATTN: T.C. Poindexter
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Louisiana Department of Environmental Quality
Office of Environmental Compliance
Surveillance Division
P. O. Box 4312
Baton Rouge, LA 70821-4312

American Nuclear Insurers
95 Glastonbury Blvd – Suite 300
Glastonbury, CT 06033-4443

**Attachment 1
To
W3F1-2006-0035**

Response to Request for Additional Information

Response to Request for Additional Information

Question 1:

The second sentence of your proposed TS 6.5.9.c addresses the tube repair criteria for the C* region. This sentence begins with the phrase, "Plugging is not applicable in the portion of the tube that is greater than 10.6 inches below...." This statement is awkward. In addition, TS 6.5.9.c does not specify that the C* criteria apply only to the hot leg. The phrase "hot leg" should precede each instance of the phrases "tube end," "expansion transition," and "tubesheet."

Please discuss your plan to modify the proposed TS to address these comments. Consider, for example, the following wording:

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.

The following alternate tube repair criteria may be applied as an alternative to the 40% depth based criteria:

1. Flaws located greater than 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, may remain in service. Degradation detected between 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, and the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is higher, shall be plugged on detection.

Response 1:

Entergy proposes the following TS formatted wording to address the comments in the above question. The changes are in **bold text**.

- 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.*

The following alternate tube repair criteria may be applied as an alternative to the 40% depth based criteria:

- 1. ***Flaws located greater than 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, may remain in service. Degradation detected between 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, and the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is higher, shall be plugged on detection.***

This change is reflected in the proposed revision to TS page 6-7b contained in Attachment 2 of this letter.

Question 2:

The staff has the following comments on proposed TS 6.5.9.d:

- a. In the second sentence, at the end of the fourth line, the word "from" appears to be missing. (i.e., The number and portions of the tubes inspected along the length of the tube, from 10.6 inches below)
- b. At the end of the paragraph, the word "employs" should be replaced with "employed."

Response 2:

- a. Entergy agrees that TS 6.5.9.d, third sentence, at the end of the fourth line on page 6-7c, should contain the word "from" before the words "10.6 inches below." Waterford-3 proposes to revise TS 6.5.9.d, third sentence, to read as follows. The change is in **bold** text.

*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** 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, completely around the U-bend to the tube-to-tubesheet weld at the tube outlet and that may satisfy the applicable tube repair criteria.*

- b. Entergy agrees that the word "employs" should be replaced with "employed." Waterford-3 proposes to revise TS 6.5.9.d, last sentence in the first paragraph, to read as follows. The change is in **bold** text.

*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.*

These changes are reflected in the proposed revision to TS page 6-7c contained in Attachment 2 of this letter.

**Attachment 2
To
W3F1-2006-0035**

Replacement Pages for Revised TS Changes

ADMINISTRATIVE CONTROLS

STEAM GENERATOR (SG) PROGRAM (Continued)

- 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. Primary to secondary leakage is not to exceed 540 gpd through any one SG.
 - 3. The operational leakage performance criterion is specified in LCO 3.4.5.2, "Reactor Coolant System 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.

The following alternate tube repair criteria may be applied as an alternative to the 40% depth based criteria:

- 1. Flaws located greater than 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, may remain in service. Degradation detected between 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, and the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is higher, shall be plugged on detection.

ADMINISTRATIVE CONTROLS

STEAM GENERATOR (SG) PROGRAM (Continued)

- 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 10.6 inches below the bottom of the hot leg expansion transition or top of the hot leg tubesheet, whichever is lower, completely around the U-bend 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.
1. Inspect 100% of the tubes in each SG during the first refueling outage following SG replacement.
 2. Inspection 100% of the tubes at sequential periods of 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. No SG shall operate for more than 24 effective full power months or one refueling outage (whichever is less) without being inspected.
 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-like 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.

ADMINISTRATIVE CONTROLS

ANNUAL REPORTS (Continued)

- (1) Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded;
- (2) Results of the last isotopic analysis for radioiodine performed prior to exceeding the limit, results of analysis while limit was exceeded and results of one analysis after the radioiodine activity was reduced to less than limit. Each result should include date and time of sampling and the radioiodine concentrations;
- (3) Clean-up system flow history starting 48 hours prior to the first sample in which the limit was exceeded;
- (4) Graph of the I-131 concentration and one other radioiodine isotope concentration in microcuries per gram as a function of time for the duration of the specific activity above steady-state level; and
- (5) The time duration when the specific activity of the primary coolant exceeded the radioiodine limit.

6.9.1.5 STEAM GENERATOR TUBE INSPECTION REPORT

A report shall be submitted within 180 days after the initial entry into HOT SHUTDOWN following completion of an inspection performed in accordance with the Specification 6.5.9, 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, in-situ testing, and assessment of accident-induced leakage from all tubesheet indications, and
- h. The effective plugging percentage for all plugging in each SG.