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Kevin T. Walsh
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1CAN080902

August 31, 2009

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

SUBJECT: Response to Request for Information Regarding Steam Generator
Tube Integrity During Break in Upper Hot Leg Piping
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

REFERENCES: 1. NRC letter dated July 31, 2009, "Arkansas Nuclear One, Unit No. 1 – Individual Plant Actions Re: Pressurized-Water Reactor Owners Group Topical Report BAW-2374, Revision 2, "Risk-Informed Steam Generator Tube Thermal Loads due to Breaks in Reactor Coolant System Upper Hot Leg Large-Bore Piping" (1CNA070901) (TAC No. MD7178)

2. Entergy letter dated August 14, 2008, "Response to Request for Additional Information Regarding Technical Specification Changes and Analyses Relating to Use of Alternate Source Term" (1CAN080801) (TAC No. MD7178)

Dear Sir or Madam:

By letter dated July 31, 2009 (Reference 1), the NRC requested Babcock & Wilcox (B&W) licensees provide information relating to once-through Steam Generator (SG) tube loads under conditions resulting from postulated breaks in reactor coolant system (RCS) upper hot leg large-bore piping. The letter contained six questions and also requested further dialogue with Arkansas Nuclear One, Unit 1 (ANO-1) to determine impact, if any, on the ANO-1 request to adopt an Alternate Source Term (AST), currently under NRC review. Applicable NRC and ANO-1 personnel participated in a conference call on August 6, 2009 to discuss appropriate responses and the AST submittal. As a result of the call, Entergy Operations, Inc. (Entergy) is providing a response to the questions presented in the NRC July 31, 2009 letter (Reference 1) in Attachment to this letter and is also providing a revised response under separate cover to Question 3 of the Response to Additional Information (RAI) as previously provided in Entergy letter dated August 14, 2008 (Reference 2).

There is one new commitment included in Attachment 2 of this letter.

If you have any questions or require additional information, please contact David Bice at 479-858-5338.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 31, 2009.

Sincerely,

Original signed by K. T. Walsh

KTW/dbb

Attachments:

1. Response to Request for Information Regarding Steam Generator Tube Integrity During Break in Upper Hot Leg Piping
2. List of Regulatory Commitments

cc: Mr. Elmo Collins
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. Kaly Kalyanam
MS O-8 B1
Washington, DC 20555-0001

Mr. Bernard R. Bevill
Arkansas Department of Health
Radiation Control Section
4815 West Markham Street
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Little Rock, AR 72205

Attachment to

1CAN080902

**Response to Request for Information Regarding Steam Generator Tube Integrity
During Break in Upper Hot Leg Piping**

Response to Request for Information Regarding Steam Generator Tube Integrity During Break in Upper Hot Leg Piping

By letter dated July 31, 2009, the NRC requested that within 30 days from the date of the letter, each Babcock and Wilcox (B&W) licensee submit a letter providing plans to address the following items resulting from the June 25, 2009, public meeting (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091820001), regarding once-through steam generator (SG) tube loads under conditions resulting from postulated breaks in reactor coolant system (RCS) upper hot leg large-bore piping. The Entergy Operations, Inc., (Entergy) responses for Arkansas Nuclear One, Unit 1 (ANO-1) are included below. ANO-1 is a B&W designed commercial nuclear power facility.

1. Confirmation that its justification for continued operation for addressing tube integrity following a large break loss-of-coolant accident (LBLOCA) remains valid. (All B&W licensees)

Response:

A condition report (CR-ANO-1-2000-00149) that identified the issue with steam generator tube integrity following a large break Loss of Coolant Accident (LBLOCA), including an operability evaluation of the condition, was generated in March 2000. ANO-1 subsequently replaced its steam generators with Areva-designed enhanced once-through steam generators (EOTSGs) during its fall 2005 refueling outage. The EOTSGs include numerous design enhancements that make them more resilient to failure following a LBLOCA, including Inconel 690 tubing, which is not known to be susceptible to circumferential cracking. The EOTSG tubes have been 100% inspected during each of the two refueling outages since their installation and the only degradation observed has been some minor mechanical wear at tube support plates. The operability evaluation associated with the above referenced Condition Report has been reviewed in light of the current ANO-1 EOTSG condition and the elements of that evaluation remain valid, with the exception of the evaluations of tube re-rolls and the mechanical rolled sleeves, neither of which are applicable to the current EOTSG condition. EOTSG operability continues to be assured with ongoing condition monitoring assessments considering LBLOCA conditions.

2. Confirmation that compensatory measures, such as changes to emergency operating procedures, have been incorporated into plant procedures and operator training has been performed. (All B&W licensees)

Response:

The single compensatory measure with respect to operator action following a Loss of Coolant Accident (LOCA) that results in a steam generator tube rupture (SGTR) is isolation of the "broken" EOTSG(s) to limit loss of containment sump inventory. The ANO-1 Emergency Operating Procedure (EOP) for SGTR includes criteria for isolation of a "bad" EOTSG(s), if conditions warrant, and identification of the valves requiring closure in order to establish that isolation. The criteria are set to ensure isolation occurs before entry of liquid into the main steam lines. The EOP steps are included in the Operator continuing training program.

3. Confirmation that Title 10 of the *Code of Federal Regulations* (10 CFR) 50.46(a)(3) reporting requirements have been satisfied. (All B&W licensees)

Response:

The hot leg U-bend LOCA is not considered reportable under 10 CFR 50.46. The break is not limiting for peak fuel centerline temperature (PCT), not limiting for local oxidation, not limiting for hydrogen generation, and not limiting for coolable core geometry. In addition, the break is not reportable for long-term core cooling, because adequate pump net positive suction head (NPSH) is preserved and long-term core cooling is maintained with automatic and EOP-directed follow-up actions to isolate the secondary side of the EOTSGs upon indication of SGTR.

4. Confirmation that all LBLOCAs (including those in the candy-cane region) are considered as design basis accidents in the assessments of SG tube integrity following each SG tube inspection. (All B&W licensees)

Response:

All LBLOCAs (including those in the candy-cane region) are currently considered as design basis accidents in the assessments of SG tube integrity following each SG tube inspection.

5. Provide a commitment that an analysis will be performed to confirm that the design of the replacement SGs is sufficient to withstand the loads associated with a LBLOCA including the thermal loads associated with a LBLOCA in the candy-cane region of the RCS and to provide the results of that analysis to the NRC by January 31, 2010. (Three Mile Island Nuclear Station, Unit 1, and Arkansas Nuclear One, Unit 1 (ANO-1))

Response:

Entergy is adopting a License Condition to perform an analysis to confirm that the design of the ANO-1 EOTSGs is sufficient to withstand the loads associated with a LBLOCA, including the thermal loads associated with a LBLOCA in the candy-cane region of the RCS. The License Condition is being adopted in association with the ANO-1 Alternate Source Term (AST) request (see Entergy letter dated August 31, 2009, 1CAN080903).

6. Commitment to provide the structural limit associated with the most limiting LBLOCA for the replacement SGs as part of the next SG tube inspection report (required by the technical specifications) following completion of the next inspection of the tubes in the replacement SGs, unless previously submitted. (All B&W licensees)

Response:

Entergy will provide the structural limit associated with the most limiting LBLOCA for the ANO-1 EOTSGs as part of the next EOTSG tube inspection report (required by Technical Specification 5.6.7) following completion of the next inspection of the tubes in the ANO-1 EOTSGs (see Attachment 2).

Attachment 2 to

1CAN080902

List of Regulatory Commitments

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Entergy Operations, Inc. (Entergy) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

| COMMITMENT | TYPE (Check one) | | SCHEDULED COMPLETION DATE |
|---|---------------------|--------------------------|--|
| | ONE-TIME ACTION | CONTINUING COMPLIANCE | |
| Entergy will provide the structural limit associated with the most limiting large break Loss of Coolant Accident (LBLOCA) for the Arkansas Nuclear One, Unit 1 (ANO-1) enhanced once-through steam generators (EOTSGs) as part of the next EOTSG tube inspection report (required by Technical Specification 5.6.7) following completion of the next inspection of the tubes in the ANO-1 EOTSGs. | ✓ | | Within 180 days after the initial entry into Mode 4 following completion of the next inspection performed in accordance with the Specification 5.5.9, Steam Generator (SG) Program |